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October 2006

**REPORT OF THE MEETING OF THE
OIE AQUATIC ANIMAL HEALTH STANDARDS COMMISSION
Paris, 2-6 October 2006**

The OIE Aquatic Animal Health Standards Commission (hereafter referred to as the Aquatic Animals Commission) met at the OIE Headquarters from 2 to 6 October 2006. The meeting was chaired by Dr Eva-Maria Bernoth, President of the Commission, and Dr Ricardo Enriquez, Secretary General, acted as Rapporteur. Participants are listed at [Appendix I](#). The adopted Agenda is given at [Appendix II](#).

The Aquatic Animals Commission recognised the contribution of the following Member Countries in providing comments: Australia, Canada, Cuba, the European Community (EC), Japan, New Zealand, Norway, Switzerland, Thailand and the United States of America (USA). The Commission stressed the importance for feedback for the development of sound international standards that take into account Member Countries' needs.

The Aquatic Animals Commission examined various *Aquatic Animal Health Code* (hereafter referred to as the *Aquatic Code*) texts from its March 2006 report in the light of Member Countries' comments. The outcome of the Aquatic Animals Commission's work is presented as appendices to this report. Additions are shown as double underlined text, with deleted text in ~~strikeout~~.

Member Countries are invited to submit their comments to the OIE on Appendices III to XXVII of this report prior to 11th February 2007. The comments should be sent preferably by electronic mail to the following address: trade.dept@oie.int.

The table below summarises the texts presented for Member Countries' comment and those for Member Countries' information.

Appendix for Member Countries' comment	Appendix number
Definitions (Ch. 1.1.1.)	Appendix III
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Recommendations for transport (Ch. 1.5.1.)	Appendix XII
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Spherical baculovirus (Ch. 4.1.5.)	Appendix XIX
Infectious hypodermal and haematopoietic necrosis (Ch. 4.1.6.)	Appendix XX
Crayfish plague (Ch. 4.1.7.)	Appendix XXI
Infectious myonecrosis (Ch. 4.1.9.)	Appendix XXII
Necrotising hepatopancreatitis (Ch. 4.1.10.)	Appendix XXIII
White tail disease (Ch. 4.1.11.)	Appendix XXIV
Hepatopancreatic parvovirus disease (Ch. 4.1.12.)	Appendix XXV
Mourilyan virus disease (Ch. 4.1.13.)	Appendix XXVI
Koi herpesvirus disease (<i>Aquatic Manual</i> Chapter)	Appendix XXVII
Appendix for Member Countries' information	Appendix number
Abalone viral mortality – disease information card	Appendix XXVIII
Mourilyan virus – disease information card	Appendix XXIX
Infectious myonecrosis – disease information card	Appendix XXX
White tail disease – disease information card	Appendix XXXI
Report of the <i>ad hoc</i> Group on the OIE List of Aquatic Animal Diseases	Appendix XXXII
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Report of the <i>ad hoc</i> Group on Chapters for Crustacean Diseases	Appendix XXXIV
Report of the <i>ad hoc</i> Group on Amphibian Diseases	Appendix XXXV
Questionnaire on amphibian trade and diseases	Appendix XXXVI
Position paper on pathogen strain differentiation	Appendix XXXVII
Work plan	Appendix XXXVIII

1. Activities and progress of *ad hoc* Groups

The Aquatic Animals Commission reviewed the progress made by those *ad hoc* Groups that have met since the previous meeting of the Commission:

- I. OIE *ad hoc* Group on Aquatic Animal Health Surveillance, 24-26 July 2006
- II. OIE *ad hoc* Group on Chapters for Mollusc Diseases for the OIE *Aquatic Animal Health Code*, 8-10 August 2006
- III. OIE *ad hoc* Group on the OIE List of Aquatic Animal Diseases - Mollusc Team - for the OIE *Aquatic Animal Health Code*, 8-10 August 2006

- IV. OIE *ad hoc* Group on Amphibian Diseases, 11-13 September 2006
- V. The OIE *ad hoc* Group on the OIE List of Aquatic Animal Diseases – Crustacean Team - and the OIE *ad hoc* Group on Chapters for Crustacean Diseases for the OIE *Aquatic Animal Health Code* met in conjunction with this meeting of the Commission.

The Commission noted the overall progress made by the *ad hoc* Groups against their terms of reference and expressed its appreciation for the excellent work of the experts involved. The Commission recognised the efficiency of face-to-face meetings and agreed that this way of working should be continued.

Specific items related to the above *ad hoc* Groups will be dealt with in specific agenda items below.

2. *Aquatic Animal Health Code*

2.1. General comments on the March 2006 report

The EC had questioned the need for certificates for non-viable molluscs or mollusc products as well as for fish products arguing that given the nature and intended use of the commodities, a request for health certificates would not be justifiable. The Aquatic Animals Commission is of the view that a health certificate, even for dead molluscs and their products or eviscerated fish products, is necessary to attest the health status of the exporting country, especially if the country claims to be free from the disease in question. Additionally, if these commodities were considered to be safe by the OIE *ad hoc* Groups, they would be suggested for listing under the relevant article of each disease chapter.

Furthermore, the EC asked that disinfected eggs be included in the list of safe commodities for certain diseases. The Aquatic Animals Commission had considered listing disinfected eggs as a safe commodity, but thought that scientific evidence showing that they pose no risk was necessary before their inclusion could be proposed. The Commission is looking forward to receiving the reports from the “EU funded study Fish Egg Trade”, as referred to by the EC in its comments, and will forward it to the OIE *ad hoc* Group on Chapters for Fish Diseases for the OIE *Aquatic Animal Health Code*.

2.2. Definitions (Chapter 1.1.1.)

The Aquatic Animals Commission addressed the comment raised by Canada during the past General Session and agreed on the need to introduce a definition for veterinary para-professionals; the definition proposed is based on the one given in the OIE *Terrestrial Animal Health Code* (hereafter referred to as the *Terrestrial Code*).

The Commission updated the Chapter on zoning (see below). This update required new definitions for *aquatic animal health status*, *biosecurity plan*, *compartmentalisation*, *subpopulation* and an update of the definition for *zoning*.

The Commission modified the definition of *infection* to distinguish it from infestation by parasites. Accordingly the definition of *disease* was updated and a definition for *infestation* was drafted.

The Commission submits the amended and new definitions for Member Countries’ comment at [Appendix III](#) with the view for proposing their adoption at the May 2007 General Session.

2.3. Revision of the list of diseases (Chapter 1.2.3.)

The Aquatic Animals Commission addressed the proposal from Thailand to delist tetrahedral baculovirus and spherical baculovirus. The Commission reviewed the suggestions of the *ad hoc* Group on the OIE List of Aquatic Animal Diseases for the OIE *Aquatic Animal Health Code* – Crustacean Team on the comments received from Thailand and recommended these two diseases be retained on the OIE list of diseases at this time.

The Commission noted that there had been no Member Country comments regarding the suggested addition of white tail disease, hepatopancreatic parvovirus disease and Mourilyan virus disease as proposed in the March 2006 report. The Commission therefore confirms its proposal to add these emerging diseases to the list. It also recommends the removal of the classification as [under study] for necrotising hepatopancreatitis and infectious myonecrosis. The Commission also presents, for Member Countries' information, the disease information cards for white tail disease, hepatopancreatic parvovirus disease and Mourilyan virus disease, prepared by the *ad hoc* Group at Appendices XXIX to XXXI.

The updated version of Chapter 1.2.3. is given at Appendix IV for Member Countries' comment with the view to proposing it for adoption at the May 2007 General Session.

The Commission noted the report of the *ad hoc* Group on the OIE List of Aquatic Animal Diseases - Mollusc Team. The abalone viral mortality disease information card drafted by the *ad hoc* Group was reviewed and modified as shown at Appendix XXVIII.

The Commission recommends the use of disease cards for Member Countries' reporting purposes until a chapter on the relevant disease is adopted and included in the OIE *Manual of Diagnostic Tests for Aquatic Animals* (hereafter referred to as the *Aquatic Manual*).

The Commission reviewed the preliminary assessment made by the *ad hoc* Group on the Sabellid Worm (*Terebrasabella heterouncinata*) and noted that a full assessment would be developed at the next meeting of the *ad hoc* Group.

Addressing the comment from Norway recommending reconsidering the delisting of bacterial kidney disease (BKD), the Commission pointed out that the deletion of BKD from Chapter 1.2.3. of the *Aquatic Code* was adopted at the 2006 General Session and that a chapter on BKD is, however, retained in Part 2 of the *Aquatic Code*.

The report of the *ad hoc* Group on the OIE List of Aquatic Animal Diseases is attached at Appendix XXXII.

2.4. Zoning and compartmentalisation (Chapter 1.4.4.)

The Aquatic Animals Commission considered the ongoing work by the OIE Terrestrial Animal Health Standards Commission (hereafter referred to as the Terrestrial Code Commission) on zoning and compartmentalisation.

On the basis of the most recent update of the *Terrestrial Code* chapter on zoning and compartmentalisation, the Aquatic Animals Commission produced a new draft for the *Aquatic Code*, which is given at Appendix V for Member Countries' comment with the view to proposing it for adoption at the May 2007 General Session. This is presented as a clean text because the chapter was completely revised.

2.5. Disease chapters

The OIE *ad hoc* Group on Chapters for Mollusc Diseases for the OIE *Aquatic Animal Health Code*, in its August 2006 meeting, addressed Member Countries' comments on the Commission's March 2006 meeting report. The *ad hoc* Group also took into account comments provided by the OIE Reference Laboratory for Infection with *Mikrocytos mackini*. As a result, the *ad hoc* Group revised some chapters as shown in its report appended at Appendix XXXIII.

The Commission noted the report of the *ad hoc* Group and proposes updated versions of the mollusc disease chapters. The updated versions are given at Appendices VI to XI for Member Countries' comment, with the view to proposing them for adoption at the May 2007 General Session.

One Member Country had queried the inclusion in point 1c) of Article 3 of a particular species that is not part of the scope in Article 1, in several mollusc disease chapters. The Commission considered that it is useful to list those species as they are known to be non-susceptible to the disease in question. This makes the conduct of a full risk analysis, as indicated in point 3 of the same Article, unnecessary when the scientific evidence is present (refer to the *ad hoc* Group's report at [Appendix XXXIII](#)).

The Commission addressed the recommendations of the *ad hoc* Group on the issue of risks associated with accompanying transport water for eggs and gametes. It supported the *ad hoc* Group's views and recommended that Chapter 1.5.1. of the *Aquatic Code* be updated to better address the treatment of the transport water, especially for gametes, eggs and larvae. Chapter 1.5.1. is submitted for Member Countries' comment at [Appendix XII](#) with the view to proposing its adoption at the May 2007 General Session.

The Commission addressed the draft revised chapter on gyrodactylosis, prepared by Prof. Barry Hill, the chair of the OIE *ad hoc* Group on Chapters for Fish Diseases for the OIE *Aquatic Animal Health Code*. The revision takes into account Member Countries' comments received on the August 2005 report. The Aquatic Animals Commission accepted this revision and submits the Chapter for Member Countries' comment at [Appendix XIII](#) with the view to proposing its adoption at the May 2007 General Session.

The Commission addressed the new draft chapter on koi herpesvirus disease (KHVD), submitted by Prof. Barry Hill. This work was initiated following the inclusion of KHVD in Chapter 1.2.3. at the May 2006 General Session. The Commission accepted this draft chapter and submits it for Member Countries' comment at [Appendix XIV](#) with the view to proposing its adoption at the May 2007 General Session.

The Commission addressed the comments received from the EC and Canada on the reference to the ICES Guidelines (in Article 8 of the proposed crustacean disease chapters). The Commission noted that methods for disease prevention and control are within the mandate of the OIE; hence it considers it appropriate to reference such an international code as the ICES Code of Practice on the Introductions and Transfers of Marine Organisms. The Commission noted the request from Canada to include a reference to the ICES Code in the fish and mollusc disease, and will refer this to its *ad hoc* Groups for consideration.

The Aquatic Animals Commission reviewed the updated and new chapters on crustacean diseases prepared by the OIE *ad hoc* Group on Chapters for Crustacean Diseases for the OIE *Aquatic Animal Health Code* (the report is attached at [Appendix XXXIV](#)). The Aquatic Animals Commission accepted these updated and new chapters and submits them for Member Countries' comment at [Appendices XV to XXVI](#), with the view to proposing their adoption at the May 2007 General Session.

The Commission agreed with the recommendation of the *ad hoc* Group on the possibility to use means other than boiling for cooking to produce products that may be traded without any disease-specific conditions (Article 3); Australia (who submitted the comment) is invited to provide further details on additional methods for cooking (other than boiling).

To better identify those diseases for which specific disease chapters are retained in the *Aquatic Code* despite their removal from the list of diseases in Chapter 1.2.3. (i.e. channel catfish virus disease, viral encephalopathy and retinopathy, infectious pancreatic necrosis, infectious salmon anaemia, bacterial kidney disease [*Renibacterium salmoninarum*], enteric septicaemia in catfish [*Edwardsiella ictaluri*], piscirickettsiosis [*Piscirickettsia salmonis*] and white sturgeon iridoviral disease), the Aquatic Animals Commission proposes to include the following explanatory note "Nota bene: This disease does not meet the listing criteria in Chapter 1.2.2. Therefore, Member Country obligations related to its notification to the OIE do not apply. Member Countries are free to decide for a voluntary notification.

2.6. New draft appendices on aquatic animal welfare

The Aquatic Animals Commission welcomed the considerable interest shown by Member Countries on this topic evidenced by the many constructive comments received. Besides the numerous technical comments, there were also concerns of a more fundamental nature that will need further consideration:

- a) Although the draft aquatic animal welfare guidelines took into consideration the already adopted guidelines on terrestrial animal welfare, and this approach was welcomed, further work should be conducted to provide scientific evidence in support of the draft aquatic animal welfare guidelines.
- b) The applicability to aquatic animals of the “five freedoms” should be reconsidered assessing scientific evidence for or against this issue.
- c) Comments from Member Countries with regard to the relationship between the guidelines on animal health and those on animal welfare are referred to the Animal Welfare Working Group for detailed consideration.
- d) The proposed need for certification of an “aquatic animal technician” was strongly criticised by several Member Countries.
- e) Several Member Countries expressed the view that the draft aquatic animal welfare guidelines should be less prescriptive and more outcome based.
- f) Implications the current draft aquatic animal welfare guidelines have for the wild capture fishing industry must be clarified.
- g) The fish species considered by the draft aquatic animal welfare guidelines should include all the commonly farmed species.

The Aquatic Animals Commission agrees with these comments and requests the OIE Animal Welfare Working Group to address these issues and the numerous technical comments and provide scientific justification for the recommendations reached.

2.7. Antimicrobial resistance in the field of aquatic animals

Dr Elisabeth Erlacher-Vindel, Deputy Head of the Scientific and Technical Department, joined the meeting. She informed the Aquatic Animals Commission of the outcomes of the FAO/WHO/OIE expert consultation on Antimicrobial Usage in Aquaculture and Resistance, which took place in Seoul (Republic of Korea) from 13 to 17 June 2006. The official report would be available shortly.

The Commission acknowledged the need for further discussion on this topic and agreed to identify relevant experts in the field of antimicrobial resistance in aquatic animal health to support the work of the Biological Standards Commission which has primary responsibility for the matter.

2.8. Aquatic animal feeds

The Aquatic Animals Commission noted that the OIE *ad hoc* Group on aquatic animal feeds, chaired by Prof. Eli Katunguka-Rwakishaya, is scheduled to meet in December 2006.

2.9. Diseases of amphibians

The Aquatic Animals Commission acknowledged the meeting report of the *ad hoc* Group on amphibian diseases and has included it as [Appendix XXXV](#) for Member Countries' information. The Commission noted that the *ad hoc* Group would need to meet again in early 2007 to assess the outcomes of the questionnaire on amphibian trade and diseases and submit a final report to the Commission with recommendations.

The Commission finalised the questionnaire and appended it to this report ([Appendix XXXVI](#)) for Member Countries' information. The Commission recommended this questionnaire be sent out as soon as possible by the OIE Central Bureau to all OIE Delegates with a copy of the *ad hoc* Group's report attached.

3. **Joint meeting with the Terrestrial Animal Health Standards Commission**

The Terrestrial Code Commission explained that, due to the physical size of the *Terrestrial Code*, it was planned to publish the next edition as two volumes.

Future editions of both Codes could be merged into one Code that would eventually be printed in several volumes. The Aquatic Animals Commission agreed that there may be benefit in producing a volume that includes general provisions pertinent to both aquatic and terrestrial standards.

Both Commissions acknowledged the harmonisation work that already had been accomplished and agreed that these efforts should be pursued, appreciating that consistent rather than identical texts would need to be prepared.

With the intent to assist Member Countries in the evaluation of their national Veterinary Services, the OIE is developing the Performance, Vision and Strategy (PVS) instrument. The Commissions discussed the future development of this instrument and next steps in the development of a Handbook and Indicators for conducting evaluations. The PVS Instrument, the Handbook and the Indicators will not form part of any of the Codes. Rather, they will be published by the OIE as an official tool for use in the evaluation of Veterinary Services.

Both Commissions agreed on the way forward for an harmonised approach to the concepts of zoning and compartmentalisation (see point 2.4 of this report).

4. **Joint meeting with the Animal Health Information Department**

Dr Karim Ben Jebara, Head of Information Department, joined the meeting for this agenda item.

4.1. Update on the new aquatic and terrestrial notification systems and WAHIS

Dr Ben Jebara informed the Commission that all four components (immediate notification, follow-up reports, six-monthly reports and annual reports) of the World Animal Health Information System (WAHIS) are now active. The Delegates had been provided with password protected access and were requested to nominate through the application national focal points for disease notification to the OIE (aquatic and/or terrestrial). The new system that promotes an environment of transparency for compiling data, World Animal Health Information Database (WAHID), would be launched shortly.

4.2. Emerging aquatic animal diseases

The Aquatic Animals Commission had become aware of some confusion caused by the difference between the list of diseases as displayed in Chapter 1.2.3. and the diseases listed in Part 2 of the *Aquatic Code*: Chapter 1.2.3. does not distinguish those diseases meeting the full listing criteria (Article 1.2.2.1.) from those meeting the emerging diseases listing criteria (Article 1.2.2.2.). For those emerging diseases, an *Aquatic Code* chapter has not yet been prepared, therefore these diseases do not appear in Part 2 of the *Aquatic Code*.

The Commission therefore proposes to identify those emerging disease by a footnote in Chapter 1.2.3. as shown in [Appendix IV](#) and by inserting a corresponding blank chapter labelled as [under study] in part 2 of the *Aquatic Code*.

4.3. Definition of "Case" for the purposes of WAHIS

One Member Country commented that because the new OIE system of immediate notification (WAHIS) calls for an indication of the number of cases, a suitable definition for case should be provided in the *Aquatic Code*. The Aquatic Animals Commission was advised by Dr Ben Jebara that the term "case" was explained in the OIE guidelines for completing the new form as well as defined in Chapter 1.1.1 (Definitions) of the *Terrestrial Code*.

However, the Commission was of the view that the current explanation of “case” in those guidelines may pose difficulties for reporting on aquatic animal disease events. This is because “case” is explained as “moribund animals and animals that died from the disease” in the guidelines, and defined as “an individual animal infected by a pathogenic agent, with or without clinical signs” in the *Terrestrial Code*, but disease events in aquatic animals typically affect very large numbers of individuals. The Commission encourages Member Countries to convey their experience in using those forms to the OIE Information Department.

5. Joint meeting with the Publications Department

Dr Paul-Pierre Pastoret and Ms Annie Souyri, respectively Head and Deputy Head of the Publications Department, joined the meeting for this agenda item.

They reported progress on the preparation of the OIE *Scientific and Technical Review: Issue on aquatic animal health*, which is due to be published in April 2008. All but two of the invited authors agreed to contribute to this publication. The Aquatic Animals Commission suggested possible replacements for the two remaining contributions.

6. The role and activities of the OIE in the field of aquatic animal health

6.1. International meetings

6.1.1. Regional Commission Conferences

Prof. Hill reported on his presentation to the Regional Commission for Europe in September 2006. The OIE Delegates had reacted positively to the information provided on the continuing global growth of aquaculture and the need for greater involvement of Veterinary Services in aquatic animal health. The presentation provided further information on amphibian trade and diseases. Prof. Hill stressed how much the OIE Director General had supported this issue in commenting to the Delegates after the presentation.

The Aquatic Animals Commission emphasised the usefulness of such regular updates on aquatic animal health to national Delegates through the Regional Commission Conferences and recommends continuation of this practice.

The Commission noted the schedule for the upcoming Regional Commission Conferences and agreed the following representation for follow-up presentations on developments in aquatic animal health:

- Regional Commission for the Americas (November 2006): Dr Ricardo Enriquez, Secretary General of the Aquatic Animals Commission;
- Regional Commission for Africa (February 2007): Prof. Eli Katunguka-Rwakishaya, Member of the Aquatic Animals Commission.

6.1.2. International Forum on Infectious Myonecrosis in farmed shrimp, 8-9 August 2006, Managua, Nicaragua

Prof. Lightner reported on the International Forum on Infectious Myonecrosis Virus (IMN) in Shrimp Farming held in the City of Managua. This Forum was organised by the Ministry of Agriculture and Forestry and the OIE Regional Representation for the Americas through its expert group on crustaceans, and sponsored by the Nicaraguan Association of Aquaculture Farmers (ANDA). It was attended by representatives from public institutions, universities, ANDA members and non-member producers, cooperatives and members of the Inter-American Committee on Aquatic Animal Health. Prof. Lightner presented technical papers on the global status of IMN and on the occurrence of a new shrimp disease in Central America with signs that mimic those presented by shrimp with IMNV. He also reported on the current known distribution of strains of Taura syndrome virus in the Americas with a particular emphasis on central America. The report prepared by the organisers has been published and is available at the web site of the OIE Regional Representation for the Americas (www.rr-americas.oie.int).

- 6.1.3. Fifth Annual General Meeting of Network of Aquaculture Centres in Asia-Pacific (NACA) Asia Regional Advisory Group on Aquatic Animal Health, 22-24 November 2006, Bangkok, Thailand

Dr Bernoth, President of the Aquatic Animals Commission, will represent the Commission at the fifth General Meeting of NACA's Asia Regional Advisory Group on Aquatic Animal Health and will report on progress with further development of the *Aquatic Code* and *Manual* and other new initiatives of the Commission. She will also report on the outcomes of the OIE Global Conference on Aquatic Animal Health.

- 6.1.4. First International Conference of OIE Reference Laboratories and Collaborating Centres, 3-5 December 2006, Florianopolis, Brazil

The Commission noted the programme of the Conference on the OIE website and the provision of limited time for the special workshop on viral strain differentiation and listing and notification of diseases by strain/genotype. The Commission feels that this would give insufficient time to address the subject adequately and requested that additional time be provided by the organisers. As a result, the special workshop will be held from 10 a.m. to 4 p.m. on Sunday 2 December, before the opening ceremony. The conclusions and recommendations will be prepared on Monday 3 December in parallel with Session 2. The draft recommendations will be presented to the Conference at the end of Session 2 from 12 to 12.15 p.m. The final recommendations will be presented at the end of the Conference.

6.2. Cooperation with FAO

Dr Bernard Vallat, the OIE Director General, joined the Aquatic Animals Commission for this agenda item.

Dr Rohana P. Subasinghe, Senior Fishery Resources Officer of FAO, provided a brief overview of past and present FAO/OIE collaboration on aquatic animal health activities. He mentioned the significant achievements of this cooperation in capacity building to improve aquatic animal health status, notably in Asia and the Pacific, with particular involvement of NACA. He also mentioned that, so far, this collaboration is yet to be initiated in Latin America and Africa. Given the predicted reliance on aquaculture for global aquatic food production in the future, Dr Subasinghe suggested that enhanced cooperation between FAO and OIE in aquatic animal health could provide significant contribution to the global efforts on sustainable aquatic production and invited Dr Vallat to meet the FAO Assistant Director General in charge of aquatic animals.

Dr Vallat noted the points raised and agreed that cooperation between FAO and OIE could be strengthened on aquatic animal health. He mentioned that the recently renewed agreement between FAO and OIE clearly identifies the respective and collaborative roles and responsibilities of the two organisations, in particular, OIE's responsibility in setting aquatic animal health standards and the FAO's responsibility in assisting developing Member Countries in the implementation. Dr Vallat mentioned that the Global Framework on the Control of Transboundary Diseases (GF-TADs) has been jointly set up by OIE and FAO; however, aquatic animal health is, as yet, not included. He clarified that regional policies are currently discussed in five OIE/FAO regional steering committees whose secretariat is managed by the OIE Regional Representatives.

The Commission agreed that a priority area for cooperation between the two organisations on aquatic animal health would be the governance for aquatic animal health in Member Countries. In this regard, the Commission expressed the importance of the recommendations arising from the OIE Global Conference on Aquatic Animal Health. The Commission agreed that a formal meeting between FAO and OIE should be held in the near future to discuss ways to improve collaboration.

7. *Manual of Diagnostic Tests for Aquatic Animals*

7.1. Feedback on the fifth edition of the *Aquatic Manual*

Feedback to Members of the Commission from individual experts on the fifth edition of the *Aquatic Manual* had been positive. The *Aquatic Manual* is widely regarded to be the definitive guide to diagnostic methods for listed aquatic animal diseases and other diseases of importance to international trade. It was also appreciated that chapters for delisted diseases had been retained. The next edition is planned for publication in 2009; intermittent changes, if adopted by the International Committee, will be added to the web version of the *Aquatic Manual*.

The Commission felt that for delisted diseases for which chapters are retained in the *Aquatic Manual*, the corresponding Reference Laboratories should be requested to update the chapters.

7.2. Terms of Reference for a proposed Consultant Editor for the next edition of the *Aquatic Manual*

In follow-up to its last report in which the Commission had considered convening an *ad hoc* Group (of fish, mollusc and crustacean disease experts) with an editorial focus to resolve the increasing volume and complexity of issues relating to the *Aquatic Manual*, the Commission now felt that appointing a Consultant Editor may be a more suitable approach. The Biological Standards Commission have adopted a similar approach for the *Terrestrial Manual*. The Commission reviewed and modified the proposed Terms of Reference for such a Consultant Editor, and discussed possible candidates, who would be contacted by the OIE Central Bureau.

7.3. *Ad hoc* Group on Surveillance: Revision of chapters for the *Aquatic Code* and *Manual*

Prof. Hill reported on the progress made by the *ad hoc* Group on Surveillance at its meeting in July, and requested out of session comments from the Commission on the initial draft texts. The Group would meet again in January 2007 to finalise the draft texts in time for them to be appended to the report of the meeting of the Commission in March 2007.

7.4. Review of Chapter 1.1.5. on methods for disinfection of aquaculture establishments

The Commission reviewed the *Aquatic Manual* chapter on methods for disinfection of aquaculture establishments and decided that some restructuring is needed to improve clarity and avoid repetition. This would be a task for the Consultant Editor.

7.5. Information on newly listed diseases (KHVD, abalone viral mortality)

An expert from the OIE Collaborating Centre for Information on Aquatic Animal Diseases had prepared a draft chapter on koi herpesvirus disease (KHVD). The chapter was endorsed by the Commission and can be found at [Appendix XXVII](#) for Member Countries' comment with a view to proposing it for adoption in May 2007.

For both recently added diseases (namely KHVD and abalone viral mortality), the Commission is preparing disease cards. These cards, when finalised, will be made available on the Commission's web pages.

Disease cards for crustacean diseases proposed for listing are attached to this report (infectious myonecrosis, white tail disease, and Mourilyan virus disease) or are in preparation (necrotising hepatopancreatitis and hepatopancreatic parvovirus disease). Should the OIE International Committee decide to list these diseases, the related disease cards will be made available on the Commission's web pages.

8. **OIE Reference Laboratories**

8.1. Review of the list of Reference Laboratories: New possible candidates for KHVD and abalone mortality

In response to a letter in July 2006 from the OIE Director General to OIE Delegates requesting applications for Reference Laboratory status especially for diseases for which there is currently no designated laboratory, one application had been received for OIE Reference Laboratory status for koi herpesvirus disease.

A second application was received after the meeting and circulated electronically to the members. The Commission was satisfied with the information provided on the laboratories and the designated experts.

The Aquatic Animals Commission welcomed these applications and encourages Member Countries to submit further applications (especially for abalone viral mortality) by 10 February 2007 for review at its next meeting in March 2007.

8.2. Concept paper on viral strain differentiation for the Conference of OIE Reference Laboratories and Collaborating Centres

The Commission reviewed a draft concept paper, prepared by Dr Franck Berthe, Member of the Aquatic Animals Commission, and made some minor modifications. This concept paper will provide the basis for discussion at the special workshop to be held during the Conference in Brazil (see above). It is attached for information at [Appendix XXXVII](#).

9. **Any other business**

9.1. Update of the Commission's web pages

The Commission discussed the current design of the web pages and agreed to add a facility that draws more attention to new and emerging diseases.

9.2. Inclusion of aquatic reptilian diseases in the remit of the OIE

The Aquatic Animals Commission discussed a suggestion from the Central Bureau to consider including diseases of aquatic reptiles (turtles, crocodiles, etc.) diseases in the remit of the OIE. The Commission considered that this issue would be better addressed once a decision on including amphibian diseases has been taken.

9.3. Review of the Aquatic Animals Commission's work plan for 2007-2008

The Aquatic Animals Commission reviewed its work plan for 2007-2008. The work plan is appended at [Appendix XXXVIII](#) for Member Countries' information.

10. **Date of the next meeting**

The Aquatic Animals Commission proposed to meet on 5-9 March 2007.

.../Appendices

**MEETING OF THE OIE
AQUATIC ANIMAL HEALTH STANDARDS COMMISSION**

Paris, 2-6 October 2006

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**MEETING OF THE OIE
AQUATIC ANIMAL HEALTH STANDARDS COMMISSION
Paris, 2-6 October 2006**

Adopted agenda

1. **Activities and progress of *ad hoc* Groups**
2. ***Aquatic Animal Health Code***
 - 2.1. General comments on the March 2006 report
 - 2.2. Definitions (Chapter 1.1.1.)
 - 2.3. Revision of the list of diseases (Chapter 1.2.3.)
 - 2.4. Zoning and compartmentalisation (Chapter 1.4.4.)
 - 2.5. Disease chapters
 - 2.6. New draft appendices on aquatic animal welfare
 - 2.7. Antimicrobial resistance in the field of aquatic animals
 - 2.8. Aquatic animal feeds
 - 2.9. Diseases of amphibians
3. **Joint meeting with the Terrestrial Animal Health Standards Commission**
4. **Joint meeting with the Animal Health Information Department**
 - 4.1. Update on the new aquatic and terrestrial notification systems and WAHIS
 - 4.2. Emerging aquatic animal diseases
 - 4.3. Definition of “Case” for the purposes of WAHIS
5. **Joint meeting with the Publications Department**
6. **The role and activities of the OIE in the field of aquatic animal health**
 - 6.1. International meetings
 - 6.1.1. Regional Commission Conferences
 - 6.1.2. International Forum on Infectious Myonecrosis in farmed shrimp, 8-9 August 2006, Managua, Nicaragua
 - 6.1.3. Fifth Annual General Meeting of NACA’s Asia Regional Advisory Group on Aquatic Animal Health, 22-24 November 2006, Bangkok, Thailand
 - 6.1.4. First International Conference of OIE Reference Laboratories and Collaborating Centres, 3-5 December 2006, Florianopolis, Brazil
 - 6.2. Cooperation with FAO

Appendix II (contd)

7. **Manual of Diagnostic Tests for Aquatic Animals**

- 7.1. Feedback from the Commission on the 5th edition of the *Aquatic Manual*
- 7.2. Terms of Reference for a proposed Consultant Editor for the next edition of the *Aquatic Manual*
- 7.3. *Ad hoc* Group on Surveillance: Revision of chapters for the *Aquatic Code* and *Manual*
- 7.4. Review of Chapter 1.1.5. on methods for disinfection of aquaculture establishments
- 7.5. Information on newly listed diseases (KHVD, abalone viral mortality)

8. **OIE Reference Laboratories**

- 8.1. Review of the list of Reference Laboratories: New possible candidates for KHVD and abalone mortality
- 8.2. Concept paper on viral strain differentiation for the Conference of OIE Reference Laboratories and Collaborating Centres

9. **Any other business**

- 9.1. Update of the Commission's web pages
- 9.2. Inclusion of aquatic reptilian diseases in the remit of the OIE
- 9.3. Review of the Aquatic Animals Commission's work plan for 2007-2008

10. **Date of the next meeting**

CHAPTER 1.1.1.

DEFINITIONS

Article 1.1.1.1.

Aquatic animal health status

means the status of a country, *zone* or *compartment* with respect to an *aquatic animal disease*, according to the criteria listed in the relevant chapter of the *Aquatic Code* dealing with the *disease*.

Biosecurity plan

means a plan that identifies potential pathways for the introduction and spread of *disease* in a *zone* or *compartment*, and describe the measures which are being or will be applied to mitigate the *disease risks*, in accordance with the recommendations in the *Aquatic Code*. The plan also describes how these measures are audited to ensure that the risks are regularly re-assessed and the measures adjusted accordingly.

Compartmentalisation

means identifying *compartments* for disease control or *international trade purposes*.

Disease

means clinical or non clinical *infection* or *infestation* with one or more of the aetiological agents of the diseases referred to in the *Aquatic Code*.

Infection

means the presence of a multiplying or otherwise developing or latent disease agent in ~~or, for~~ ectoparasites, on a host.

Infestation

means the presence in large numbers of a multiplying parasitic, or commensal, agent on a host so as to cause damage or *disease*.

Subpopulation

means a distinct part of a *population* identifiable according to specific common *aquatic animal* health characteristics.

Veterinary para-professional

means a person who, for the purposes of the *Aquatic Code*, is authorised by the *veterinary statutory body* to carry out certain designated tasks (dependent upon the category of *veterinary para-professional*) in a country, and delegated to them under the responsibility and direction of a *veterinarian*. The tasks authorized for each category of *veterinary para-professional* should be defined by the *veterinary statutory body* depending on qualifications and training, and according to need.

Zoning

means identifying *zones* for disease control or *international trade purposes*.

— text deleted

CHAPTER 1.2.3.

DISEASES LISTED BY THE OIE

Preamble: The following diseases are listed by the OIE according to the criteria for listing an aquatic animal disease (see Article 1.2.2.1.) or criteria for listing an emerging aquatic animal disease (see Article 1.2.2.2.)

Article 1.2.3.1.

The following diseases of fish are listed by the OIE:

- Epizootic haematopoietic necrosis
- Infectious haematopoietic necrosis
- Spring viraemia of carp
- Viral haemorrhagic septicaemia
- Infectious salmon anaemia
- Epizootic ulcerative syndrome
- Gyrodactylosis (*Gyrodactylus salaris*)
- Red sea bream iridoviral disease
- Koi herpesvirus disease.

Article 1.2.3.2.

The following diseases of molluscs are listed by the OIE:

- Infection with *Bonamia ostreae*
- Infection with *Bonamia exitiosa*
- Infection with *Marteilia refringens*
- Infection with *Perkinsus marinus*
- Infection with *Perkinsus olseni*
- Infection with *Xenobalotus californiensis*.
- Abalone viral mortality (1).

Article 1.2.3.3.

The following diseases of crustaceans are listed by the OIE:

- Taura syndrome

Appendix IV (contd)

- White spot disease
- Yellowhead disease
- Tetrahedral baculovirus (*Baculovirus penaei*)
- Spherical baculovirus (*Penaeus monodon*-type baculovirus)
- Infectious hypodermal and haematopoietic necrosis
- Crayfish plague (*Aphanomyces astaci*)
- Necrotising hepatopancreatitis²
- Infectious myonecrosis²
- ≡ White tail disease ⁽¹⁾
- ≡ Hepatopancreatic parvovirus disease ⁽¹⁾
- ≡ Mourilyan virus disease ⁽¹⁾.

¹ Listed according to Article 1.2.2.2.

² ~~Listing of this disease is under study.~~

— text deleted

CHAPTER 1.4.4.

ZONING AND COMPARTMENTALISATION

Article 1.4.4.1.

Introduction

Given the difficulty of establishing and maintaining for an entire country the status of *free country* for a particular *disease*, especially for *diseases* the entry of which is difficult to control through measures at national boundaries, there may be benefits to one or more Member Countries in establishing and maintaining a *subpopulation* with a distinct *aquatic animal health status*. *Subpopulations* may be separated by natural or artificial geographical barriers or, in certain situations, by the application of appropriate management systems.

Zoning and *compartmentalisation* are procedures implemented by a country under the provisions of this chapter with a view to defining *subpopulations* of distinct *aquatic animal health status* for the purpose of disease control or *international trade*. *Compartmentalisation* applies to a *subpopulation* when management practices related to biosecurity are the defining factors, while *zoning* applies when a *subpopulation* is defined on a geographical basis. In practice, spatial considerations and good management play important roles in the application of both concepts.

This chapter is to assist OIE Member Countries wishing to establish and maintain different *subpopulations*, using the principles of *compartmentalisation* and *zoning*. These principles should be applied in accordance with the measures recommended in the relevant *disease* chapter(s). This chapter also outlines a process through which trading partners may recognise such *subpopulations*. This process is best implemented by trading partners through establishing parameters and gaining agreement on the necessary measures prior to *outbreaks of disease*.

Before trade in *aquatic animals* or *aquatic animal products* may occur, an *importing country* needs to be satisfied that its *aquatic animal health status* will be appropriately protected. In most cases, the import regulations developed will rely in part on judgements made about the effectiveness of sanitary procedures undertaken by the *exporting country*, both at its borders and within its *territory*.

As well as contributing to the safety of *international trade*, *zoning* and *compartmentalisation* may assist *disease* control or eradication within Member Countries. *Zoning* may encourage the more efficient use of resources, and *compartmentalisation* may allow the functional separation of a *subpopulation* from other domestic or wild *aquatic animals* through biosecurity measures, which a *zone* (through geographical separation) would not achieve. Following an *outbreak of disease*, *compartmentalisation* may be able to take advantage of epidemiological links among *subpopulations* or common practices relating to biosecurity, despite diverse geographical locations, to facilitate *disease* control and/or the resumption of trade.

Zoning and *compartmentalisation* may not be applicable to all *diseases*, but separate requirements will be developed for each *disease* for which the application of *zoning* or *compartmentalisation* is considered appropriate.

To regain the status of a *free zone* or *free compartment* following an *outbreak of disease*, Member Countries should follow the recommendations in the relevant *disease* chapter in the *Aquatic Code*.

Appendix V (contd)

Article 1.4.4.2.

General considerations

The *Competent Authority* of an *exporting country* that is establishing a *zone* or *compartment* for *international trade* purposes should clearly define the *subpopulation* in accordance with the recommendations in the relevant chapters in the *Aquatic Code*, including those on *surveillance*, and the identification and traceability of *aquatic animals*. The *Competent Authority* of an *exporting country* should be able to explain to the *Competent Authority* of an *importing country* the basis for its claim of a distinct *aquatic animal health status* for the *zone* or *compartment* in such terms.

The procedures used to establish and maintain the distinct *aquatic animal health status* of a *zone* or *compartment* should be appropriate to the particular circumstances and will depend on the epidemiology of the *disease*, environmental factors and applicable biosecurity measures. The *exporting country* should be able to demonstrate, through detailed documentation published through official channels, that it has implemented the recommendations in the *Aquatic Code* for establishing and maintaining such a *zone* or *compartment*.

An *importing country* should recognise the existence of this *zone* or *compartment* when the appropriate measures recommended in the *Aquatic Code* are applied, and the *Competent Authority* of the *exporting country* certifies that this is the case.

Where countries share a *zone* or *compartment*, the *Competent Authority* of each country should collaborate to define and fulfil their respective responsibilities.

Article 1.4.4.3.

Prerequisite considerations in defining a zone or compartment

The *exporting country* should conduct an assessment of the resources needed and available to establish and maintain a *zone* or *compartment* for *international trade* purposes. These include the human and financial resources and the technical capability of the *Competent Authority* (and of the relevant industry, in the case of a *compartment*) including on *disease surveillance* and diagnosis.

Article 1.4.4.4.

Principles for defining a zone or compartment

In conjunction with the above considerations and the definitions of *zone* and *compartment*, the following principles should apply when Member Countries define a *zone* or *compartment*:

1. The extent of a *zone* should be established by the *Competent Authority* on the basis of the definition of *zone* and made public through official channels.
2. The factors defining a *compartment* should be established by the *Competent Authority* on the basis of relevant criteria such as management and husbandry practices related to biosecurity, and made public through official channels.
3. *Aquatic animals* belonging to such *subpopulations* need to be recognizable as such through a clear epidemiological separation from other *aquatic animals* and all things presenting a *disease* risk.

Appendix V (contd)

4. For a *zone* or *compartment*, the *Competent Authority* should document in detail the measures taken to ensure the identification of the *subpopulation* and the establishment and maintenance of its *aquatic animal health status* through a *biosecurity plan*. The measures used to establish and maintain the distinct *aquatic animal health status* of a *zone* or *compartment* should be appropriate to the particular circumstances and will depend on the epidemiology of the *disease*, environmental factors, the *aquatic animal health status* in adjacent areas, applicable biosecurity measures (including movement controls, use of natural and artificial boundaries, the spatial separation of *aquatic animals*, and commercial management and husbandry practices), and *surveillance*.
5. For a *compartment*, the *biosecurity plan* should describe the partnership between the relevant enterprise/industry and the *Competent Authority*, and their respective responsibilities, including the procedures for oversight of the operation of the *compartment* by the *Competent Authority*.
6. For a *compartment*, the *biosecurity plan* should also describe the routine operating procedures to provide clear evidence that the *surveillance* conducted and the management practices are adequate to meet the definition of the *compartment*. In addition to information on *aquatic animal* movements, the *biosecurity plan* should include production and stock records, feed sources, *surveillance* results, visitor logbook, morbidity and mortality history, medications, vaccinations, documentation of training and any other criteria necessary for evaluation of risk mitigation. The information required may vary according to the *aquatic animal* species and *disease(s)* under consideration.
7. Thus defined, the *zones* and *compartments* constitute the relevant *subpopulations* for the application of the recommendations in Part 2 of the *Aquatic Code*.

Article 1.4.4.5.

Sequence of steps to be taken in defining a zone/compartment and having it recognised for international trade purposes

There is no single sequence of steps which should be followed in defining a *zone* or a *compartment*. The steps that the *Competent Authority* of the *importing country* and the *exporting country* choose and implement will generally depend on the circumstances existing within the countries and at their borders, and their trading history. The recommended steps are:

1. For zoning
 - a) The *exporting country* identifies a geographical area, which it considers to contain an *aquatic animal subpopulation* with a distinct *aquatic animal health status* with respect to a specific *disease/specific diseases*, based on *surveillance*.
 - b) The *exporting country* describes in the *biosecurity plan* for the *zone* the measures which are being, or will be, applied to distinguish such an area epidemiologically from other parts of its *territory*, in accordance with the recommendations in the *Aquatic Code*.
 - c) The *exporting country* provides the above information to the *importing country*, with an explanation of why the area can be treated as an epidemiologically separated *zone* for *international trade* purposes.
 - d) The *importing country* determines whether it accepts such an area as a *zone* for the importation of *aquatic animals* and *aquatic animal products*, taking into account:
 - i) an evaluation of the *exporting country's* *Competent Authority*;

Appendix V (contd)

- ii) the result of a *risk assessment* based on the information provided by the *exporting country* and its own research;
 - iii) its own *aquatic animal* health situation with respect to the *disease(s)* concerned; and
 - iv) other relevant OIE standards.
- e) The *importing country* notifies the *exporting country* of the result of its determination and the underlying reasons, within a reasonable period of time, being either:
- i) recognition of the *zone*;
 - ii) request for further information; or
 - iii) rejection of the area as a *zone* for *international trade* purposes.
- f) An attempt should be made to resolve any differences over the definition of the *zone*, either in the interim or finally, by using an agreed mechanism to reach consensus (such as the OIE dispute settlement mechanism).
- g) The *importing country* and the *exporting country* may enter into a formal agreement defining the *zone*.
2. For compartmentalisation
- a) Based on discussions with the relevant enterprise/industry, the *exporting country* identifies a *compartment* of one or more *aquaculture establishments* or other premises owned by an enterprise(s) which operates under common management practices related to biosecurity, and which contains an identifiable *aquatic animal subpopulation* with a distinct *aquatic animal health status* with respect to a specific *disease/specific diseases*; the *exporting country* describes how this status is maintained through a partnership between the relevant enterprise/industry and the *Competent Authority* of the *exporting country*.
 - b) The *exporting country* examines the *compartment's biosecurity plan* and confirms through an audit that:
 - i) the *compartment* is epidemiologically closed throughout its routine operating procedures as a result of effective implementation of its *biosecurity plan*; and
 - ii) the *surveillance* programme in place is appropriate to verify the status of such *aquaculture establishment(s)* with respect to such *disease(s)*.
 - c) The *exporting country* describes the *compartment*, in accordance with the recommendations in the *Aquatic Code*.
 - d) The *exporting country* provides the above information to the *importing country*, with an explanation of why such an enterprise can be treated as an epidemiologically separated *compartment* for *international trade* purposes.
 - e) The *importing country* determines whether it accepts such an enterprise as a *compartment* for the importation of *aquatic animals* and *aquatic animal products*, taking into account:
 - i) an evaluation of the *exporting country's Competent Authority*;

Appendix V (contd)

- ii) the result of a *risk assessment* based on the information provided by the *exporting country* and its own research;
 - iii) its own *aquatic animal* health situation with respect to the *disease(s)* concerned; and
 - iv) other relevant OIE standards.
- f) The *importing country* notifies the *exporting country* of the result of its examination and the underlying reasons, within a reasonable period of time, being either:
- i) recognition of the *compartment*;
 - ii) request for further information; or
 - iii) rejection of such an enterprise as a *compartment* for *international trade* purposes.
- g) An attempt should be made to resolve any differences over the definition of the *compartment*, either in the interim or finally, by using an agreed mechanism to reach consensus (such as the OIE dispute settlement mechanism).
- h) The *importing country* and the *exporting country* may enter into a formal agreement defining the *compartment*.
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CHAPTER 2.2.1.

INFECTION WITH BONAMIA OSTREAE

Article 2.2.1.1.

For the purposes of the *Aquatic Code*, infection with *Bonamia ostreae* means *infection* only with *Bonamia ostreae*.

Methods for surveillance, diagnosis and confirmatory identification are provided in the *Aquatic Manual*.

Article 2.2.1.2.

Scope

The recommendations in this Chapter apply to: European flat oyster (*Ostrea edulis*), Australian mud oyster (*O. angasi*), Argentinean flat oyster (*O. puelchana*), Chilean flat oyster (*O. chilensis*), Asiatic oyster (*O. denselammellosa*) and Suminoe oyster (*Crassostrea ariakensis*). These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 2.2.1.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* should not require any *Bonamia ostreae* related conditions, regardless of the *Bonamia ostreae* status of the *exporting country, zone or compartment*:
 - a) For the species referred to in Article 2.2.1.2. for any purpose:
 - i) commercially sterile canned or other heat treated products;
 - ii) ~~gametes, eggs and~~ larvae.
 - b) The following *commodities* destined for human consumption from the species referred to in Article 2.2.1.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. smoked, salted, pickled, marinated, ~~etc.~~);
 - ii) non commercially sterile products (e.g. ready prepared meals) that have been heat treated in a manner to ensure the inactivation of the parasite;
 - iii) off the shell (chilled or frozen) packaged for direct retail trade;
 - iv) half-shell (chilled).
 - c) All *commodities* from *Crassostrea gigas*, *C. virginica*, *Ruditapes decussatus*, *R. philippinarum*, *Mytilus galloprovincialis* and *M. edulis*, including the live *aquatic animal*.

For the *commodities* referred to in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

Appendix VI (contd)

2. When authorising the importation or transit of *commodities* of a species referred to in Article 2.2.1.2., other than *commodities* referred to in point 1 of Article 2.2.1.3., the *Competent Authorities* should require the conditions prescribed in Articles 2.2.1.7. to 2.2.1.11. relevant to the *Bonamia ostreae* status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any other *commodity* from bivalve species not referred to in Article 2.2.1.2. (especially those of the genus *Ostrea*) ~~nor~~ in point 1c) of Article 2.2.1.3., from an *exporting country, zone or compartment* not declared free of *Bonamia ostreae*, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of *Bonamia ostreae*, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 2.2.1.4.

***Bonamia ostreae* free country**

A country may make a *self-declaration of freedom* from *Bonamia ostreae* if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from *Bonamia ostreae* if all the areas covered by the shared water are declared *Bonamia ostreae* free *zones* (see Article 2.2.1.5.).

1. A country where none of the *susceptible species* referred to in Article 2.2.1.2. is present may make a *self-declaration of freedom* from *Bonamia ostreae* when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where any *susceptible species* referred to in Article 2.2.1.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions – in all areas where the species are present – that are conducive to its clinical expression, as described in Chapter 2.2.1. of the *Aquatic Manual*, may make a *self-declaration of freedom* from *Bonamia ostreae* when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years and infection with *Bonamia ostreae* is not known to be established in wild populations.

OR

3. A country where the last known clinical occurrence was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter 2.2.1. of the *Aquatic Manual*, may make a *self-declaration of freedom* from *Bonamia ostreae* when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.1. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Bonamia ostreae*.

OR

4. A country that has made a *self-declaration of freedom* from *Bonamia ostreae* but in which the *disease* is detected may not make a *self-declaration of freedom* from *Bonamia ostreae* again until the following conditions have been met:

Appendix VI (contd)

- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
- b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
- c) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.1. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Bonamia ostreae*.

In the meantime, part of the non-affected area may be declared a free *zone* provided that it meets the conditions in point 3 of Article 2.2.1.5.

Article 2.2.1.5.

***Bonamia ostreae* free zone or free compartment**

A *zone* or *compartment* free from *Bonamia ostreae* may be established within the *territory* of one or more countries of infected or unknown status for infection with *Bonamia ostreae* and declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a *Bonamia ostreae* free *zone* or *compartment* if the conditions outlined below apply to all areas of the *zone* or *compartment*.

1. In a country of unknown status for *Bonamia ostreae*, a *zone* or *compartment* where none of the *susceptible species* referred to in Article 2.2.1.2. is present may be declared free from *Bonamia ostreae* when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. In a country of unknown status for *Bonamia ostreae*, a *zone* or *compartment* where any *susceptible species* referred to in Article 2.2.1.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions – in all areas where the species are present – that are conducive to its clinical expression, as described in Chapter 2.2.1. of the *Aquatic Manual*, may be declared free from *Bonamia ostreae* when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years and infection with *Bonamia ostreae* is not known to be established in wild populations.

OR

3. A *zone* or *compartment* where the last known clinical occurrence was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter 2.2.1. of the *Aquatic Manual*, may be declared free from *Bonamia ostreae* when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.1. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Bonamia ostreae*.

Appendix VI (contd)

OR

4. A *zone* previously declared free from *Bonamia ostreae* but in which the *disease* is detected may not be declared free from *Bonamia ostreae* again until the following conditions have been met:
- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.1. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Bonamia ostreae*.

Article 2.2.1.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from *Bonamia ostreae* following the provisions of points 1 or 2 of Articles 2.2.1.4. or 2.2.1.5. (as relevant) may maintain its status as *Bonamia ostreae* free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from *Bonamia ostreae* following the provisions of point 3 of Articles 2.2.1.4. or 2.2.1.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as *Bonamia ostreae* free provided that conditions that are conducive to clinical expression of infection with *Bonamia ostreae*, as described in Chapter 2.2.1. of the *Aquatic Manual*, exist and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of infection with *Bonamia ostreae*, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 2.2.1.7.

Importation of live aquatic animals from a country, zone or compartment declared free from *Bonamia ostreae*

When importing live *aquatic animals* of species referred to in Article 2.2.1.2. from a country, *zone* or *compartment* declared free from *Bonamia ostreae*, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This *certificate* must certify, on the basis of the procedures described in Articles 2.2.1.4. or 2.2.1.5. (as applicable), whether the place of production of the commodity consignment is a country, *zone* or *compartment* declared free from *Bonamia ostreae*.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.2.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.1.3.

Article 2.2.1.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from *Bonamia ostreae*

When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 2.2.1.2. from a country, *zone* or *compartment* not declared free from *Bonamia ostreae*, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:

1. the direct delivery into and holding of the consignment in *quarantine* facilities;
2. the continuous isolation of the imported *aquatic animals* from the local environment;
3. the treatment of all effluent and waste material from the processing in a manner that ensures inactivation of *Bonamia ostreae*.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.1.3.

Article 2.2.1.9.

Importation of live aquatic animals for processing for human consumption from a country, zone or compartment not declared free from *Bonamia ostreae*

When importing, for processing for human consumption, live *aquatic animals* of species referred to in Article 2.2.1.2. from a country, *zone* or *compartment* not declared free from *Bonamia ostreae*, the *Competent Authority* of the *importing country* should require that:

1. the consignment be delivered directly to and held in *quarantine* facilities until processing and/or consumption; and
2. all effluent and waste material from the processing be treated in a manner that ensures inactivation of *Bonamia ostreae*.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.1.3.

Article 2.2.1.10.

Importation of aquatic animal products from a country, zone or compartment declared free from *Bonamia ostreae*

When importing *aquatic animal products* of species referred to in Article 2.2.1.2. from a country, *zone* or *compartment* declared free from *Bonamia ostreae*, the *Competent Authority* of the *importing country* should require that the consignment be accompanied by an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This *certificate* must certify, on the basis of the procedures described in Articles 2.2.1.4. or 2.2.1.5. (as applicable), whether or not the place of production of the consignment is a country, *zone* or *compartment* declared free from *Bonamia ostreae*.

The *certificate* should be in accordance with the Model Certificate in Appendix X.X.X. (under study).

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.1.3.

Appendix VI (contd)

Article 2.2.1.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from *Bonamia ostreae*

When importing *aquatic animal products* of species referred to in Article 2.2.1.2. from a country, *zone* or *compartment* not declared free from *Bonamia ostreae*, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.1.3.

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CHAPTER 2.2.2.

INFECTION WITH BONAMIA EXITIOSA

Article 2.2.2.1.

For the purposes of the *Aquatic Code*, infection with *Bonamia exitiosa* means *infection* only with *Bonamia exitiosa*.

Methods for surveillance, diagnosis and confirmatory identification are provided in the *Aquatic Manual*.

Article 2.2.2.2.

Scope

The recommendations in this Chapter apply to: Australian mud oyster (*Ostrea angasi*) and Chilean flat oyster (*O. chilensis*). These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 2.2.2.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* should not require any *Bonamia exitiosa* related conditions, regardless of the *Bonamia exitiosa* status of the *exporting country, zone or compartment*:
 - a) For the species referred to in Article 2.2.2.2. for any purpose:
 - i) commercially sterile canned or other heat treated products;
 - ii) ~~gametes, eggs and~~ larvae.
 - b) The following *commodities* destined for human consumption from the species referred to in Article 2.2.2.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. smoked, salted, pickled, marinated, ~~etc.~~);
 - ii) non commercially sterile products (e.g. ready prepared meals) that have been heat treated in a manner to ensure the inactivation of the parasite;
 - iii) off the shell (chilled or frozen) packaged for direct retail trade;
 - iv) half-shell (chilled).
 - c) All *commodities* from *Crassostrea gigas*, ~~*C. virginica*~~ and *Saccostrea glomerata*, including the live *aquatic animal*.

For the *commodities* referred to in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

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2. When authorising the importation or transit of *commodities* of a species referred to in Article 2.2.2.2., other than *commodities* referred to in point 1 of Article 2.2.2.3., the *Competent Authorities* should require the conditions prescribed in Articles 2.2.2.7. to 2.2.2.11. relevant to the *Bonamia exitiosa* status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any other *commodity* from bivalve species not referred to in Article 2.2.2.2. (especially those of the genus *Ostrea*) ~~nor~~ in point 1c) of Article 2.2.2.3., from an *exporting country, zone or compartment* not declared free of *Bonamia exitiosa*, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of *Bonamia exitiosa*, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 2.2.2.4.

***Bonamia exitiosa* free country**

A country may make a *self-declaration of freedom* from *Bonamia exitiosa* if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from *Bonamia exitiosa* if all the areas covered by the shared water are declared *Bonamia exitiosa* free *zones* (see Article 2.2.2.5.).

1. A country where none of the *susceptible species* referred to in Article 2.2.2.2. is present may make a *self-declaration of freedom* from *Bonamia exitiosa* when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where any *susceptible species* referred to in Article 2.2.2.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions – in all areas where the species are present – that are conducive to its clinical expression, as described in Chapter 2.2.2. of the *Aquatic Manual*, may make a *self-declaration of freedom* from *Bonamia exitiosa* when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years and infection with *Bonamia exitiosa* is not known to be established in wild populations.

OR

3. A country where the last known clinical occurrence was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter 2.2.2. of the *Aquatic Manual*, may make a *self-declaration of freedom* from *Bonamia exitiosa* when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.2. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Bonamia exitiosa*.

OR

4. A country that has made a *self-declaration of freedom* from *Bonamia exitiosa* but in which the *disease* is detected may not make a *self-declaration of freedom* from *Bonamia exitiosa* again until the following conditions have been met:

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- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
- b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
- c) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.2. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Bonamia exitiosa*.

In the meantime, part of the non-affected area may be declared a free *zone* provided that it meets the conditions in point 3 of Article 2.2.2.5.

Article 2.2.2.5.

***Bonamia exitiosa* free zone or free compartment**

A *zone* or *compartment* free from *Bonamia exitiosa* may be established within the *territory* of one or more countries of infected or unknown status for infection with *Bonamia exitiosa* and declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a *Bonamia exitiosa* free *zone* or *compartment* if the conditions outlined below apply to all areas of the *zone* or *compartment*.

1. In a country of unknown status for *Bonamia exitiosa*, a *zone* or *compartment* where none of the *susceptible species* referred to in Article 2.2.2.2. is present may be declared free from *Bonamia exitiosa* when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. In a country of unknown status for *Bonamia exitiosa*, a *zone* or *compartment* where any *susceptible species* referred to in Article 2.2.2.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions – in all areas where the species are present – that are conducive to its clinical expression, as described in Chapter 2.2.2. of the *Aquatic Manual*, may be declared free from *Bonamia exitiosa* when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years and infection with *Bonamia exitiosa* is not known to be established in wild populations.

OR

3. A *zone* or *compartment* where the last known clinical occurrence was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter 2.2.2. of the *Aquatic Manual*, may be declared free from *Bonamia exitiosa* when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.2. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Bonamia exitiosa*.

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OR

4. A *zone* previously declared free from *Bonamia exitiosa* but in which the *disease* is detected may not be declared free from *Bonamia exitiosa* again until the following conditions have been met:
- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.2. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Bonamia exitiosa*.

Article 2.2.2.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from *Bonamia exitiosa* following the provisions of points 1 or 2 of Articles 2.2.2.4. or 2.2.2.5. (as relevant) may maintain its status as *Bonamia exitiosa* free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from *Bonamia exitiosa* following the provisions of point 3 of Articles 2.2.2.4. or 2.2.2.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as *Bonamia exitiosa* free provided that conditions that are conducive to clinical expression of infection with *Bonamia exitiosa*, as described in Chapter 2.2.2. of the *Aquatic Manual*, exist and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of infection with *Bonamia exitiosa*, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 2.2.2.7.

Importation of live aquatic animals from a country, zone or compartment declared free from *Bonamia exitiosa*

When importing live *aquatic animals* of species referred to in Article 2.2.2.2. from a country, *zone* or *compartment* declared free from *Bonamia exitiosa*, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This *certificate* must certify, on the basis of the procedures described in Articles 2.2.2.4. or 2.2.2.5. (as applicable), whether the place of production of the commodity consignment is a country, *zone* or *compartment* declared free from *Bonamia exitiosa*.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.2.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.2.3.

Article 2.2.2.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from *Bonamia exitiosa*

When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 2.2.2.2. from a country, *zone* or *compartment* not declared free from *Bonamia exitiosa*, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:

1. the direct delivery into and holding of the consignment in *quarantine* facilities;
2. the continuous isolation of the imported *aquatic animals* from the local environment;
3. the treatment of all effluent and waste material from the processing in a manner that ensures inactivation of *Bonamia exitiosa*.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.2.3.

Article 2.2.2.9.

Importation of live aquatic animals for processing for human consumption from a country, zone or compartment not declared free from *Bonamia exitiosa*

When importing, for processing for human consumption, live *aquatic animals* of species referred to in Article 2.2.2.2. from a country, *zone* or *compartment* not declared free from *Bonamia exitiosa*, the *Competent Authority* of the *importing country* should require that:

1. the consignment be delivered directly to and held in *quarantine* facilities until processing and/or consumption; and
2. all effluent and waste material from the processing be treated in a manner that ensures inactivation of *Bonamia exitiosa*.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.2.3.

Article 2.2.2.10.

Importation of aquatic animal products from a country, zone or compartment declared free from *Bonamia exitiosa*

When importing *aquatic animal products* of species referred to in Article 2.2.2.2. from a country, *zone* or *compartment* declared free from *Bonamia exitiosa*, the *Competent Authority* of the *importing country* should require that the consignment be accompanied by an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This *certificate* must certify, on the basis of the procedures described in Articles 2.2.2.4. or 2.2.2.5. (as applicable), whether or not the place of production of the consignment is a country, *zone* or *compartment* declared free from *Bonamia exitiosa*.

The *certificate* should be in accordance with the Model Certificate in Appendix X.X.X. (under study).

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.2.3.

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Article 2.2.2.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from *Bonamia exitiosa*

When importing *aquatic animal products* of species referred to in Article 2.2.2.2. from a country, *zone* or *compartment* not declared free from *Bonamia exitiosa*, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.2.3.

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CHAPTER 2.2.3.

INFECTION WITH HAPLOSPORIDIUM NELSONI

Article 2.2.3.1.

For the purposes of the *Aquatic Code*, infection with *Haplosporidium nelsoni* means *infection* only with *Haplosporidium nelsoni*.

Methods for surveillance, diagnosis and confirmatory identification are provided in the *Aquatic Manual* (under study).

Article 2.2.3.2.

Scope

The recommendations in this Chapter apply to: Pacific oyster (*Crassostrea gigas*) and Eastern oyster (*C. virginica*). These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 2.2.3.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* should not require any *Haplosporidium nelsoni* related conditions, regardless of the *Haplosporidium nelsoni* status of the *exporting country, zone or compartment*:
 - a) For the species referred to in Article 2.2.3.2. for any purpose:
 - i) commercially sterile canned or cooked products;
 - ii) ~~gametes, eggs and~~ larvae.
 - b) The following *commodities* destined for human consumption from the species referred to in Article 2.2.3.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. smoked, salted, pickled, marinated, ~~etc.~~);
 - ii) products (e.g. ready prepared meals) that have been heat treated in a manner to ensure the inactivation of the parasite;
 - iii) off the shell (chilled or frozen) packaged for direct retail trade;
 - iv) half-shell (chilled).
 - c) All *commodities* from *Crassostrea ariakensis*, including the live *aquatic animal*.

For the *commodities* referred to in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

Appendix VIII (contd)

2. When authorising the importation or transit of the *commodities* of a species referred to in Article 2.2.3.2., other than *commodities* referred to in point 1 of Article 2.2.3.3., the *Competent Authorities* should require the conditions prescribed in Articles 2.2.3.7. to 2.2.3.11. relevant to the *Haplosporidium nelsoni* status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any other *commodity* from bivalve species not referred to in Article 2.2.3.2. nor in point 1c) of Article 2.2.3.3., from an *exporting country, zone or compartment* not declared free of *Haplosporidium nelsoni*, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of *Haplosporidium nelsoni*, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 2.2.3.4.

***Haplosporidium nelsoni* free country**

A country may make a *self-declaration of freedom* from *Haplosporidium nelsoni* if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from *Haplosporidium nelsoni* if all the areas covered by the shared water are declared *Haplosporidium nelsoni* free *zones* (see Article 2.2.3.5.).

1. A country where none of the *susceptible species* referred to in Article 2.2.3.2. is present may make a *self-declaration of freedom* from *Haplosporidium nelsoni* when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where any *susceptible species* referred to in Article 2.2.3.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions – in all areas where the species are present – that are conducive to its clinical expression, as described in Chapter 2.2.3. of the *Aquatic Manual*, may make a *self-declaration of freedom* from *Haplosporidium nelsoni* when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years and infection with *Haplosporidium nelsoni* is not known to be established in wild populations.

OR

3. A country where the last known clinical occurrence was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter 2.2.3. of the *Aquatic Manual*, may make a *self-declaration of freedom* from *Haplosporidium nelsoni* when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.3. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Haplosporidium nelsoni*.

OR

4. A country that has made a *self-declaration of freedom* from *Haplosporidium nelsoni* but in which the *disease* is detected may not make a *self-declaration of freedom* from *Haplosporidium nelsoni* again until the following conditions have been met:

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- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
- b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
- c) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.3. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Haplosporidium nelsoni*.

In the meantime, part of the non-affected area may be declared a free *zone* provided that it meets the conditions in point 3 of Article 2.2.3.5.

Article 2.2.3.5.

***Haplosporidium nelsoni* free zone or free compartment**

A *zone* or *compartment* free from *Haplosporidium nelsoni* may be established within the *territory* of one or more countries of infected or unknown status for infection with *Haplosporidium nelsoni* and declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a *Haplosporidium nelsoni* free *zone* or *compartment* if the conditions outlined below apply to all areas of the *zone* or *compartment*.

1. In a country of unknown status for *Haplosporidium nelsoni*, a *zone* or *compartment* where none of the *susceptible species* referred to in Article 2.2.3.2. is present may be declared free from *Haplosporidium nelsoni* when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. In a country of unknown status for *Haplosporidium nelsoni*, a *zone* or *compartment* where any species referred to in Article 2.2.3.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions – in all areas where the species are present – that are conducive to its clinical expression, as described in Chapter 2.2.3. of the *Aquatic Manual*, may be declared free from *Haplosporidium nelsoni* when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years and infection with *Haplosporidium nelsoni* is not known to be established in wild populations.

OR

3. A *zone* or *compartment* where the last known clinical occurrence was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter 2.2.3. of the *Aquatic Manual*, may be declared free from *Haplosporidium nelsoni* when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.3. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Haplosporidium nelsoni*.

Appendix VIII (contd)

OR

4. A *zone* previously declared free from *Haplosporidium nelsoni* but in which the *disease* is detected may not be declared free from *Haplosporidium nelsoni* again until the following conditions have been met:
- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.3. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Haplosporidium nelsoni*.

Article 2.2.3.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from *Haplosporidium nelsoni* following the provisions of points 1 or 2 of Articles 2.2.3.4. or 2.2.3.5. (as relevant) may maintain its status as *Haplosporidium nelsoni* free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from *Haplosporidium nelsoni* following the provisions of point 3 of Articles 2.2.3.4. or 2.2.3.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as *Haplosporidium nelsoni* free provided that conditions that are conducive to clinical expression of infection with *Haplosporidium nelsoni*, as described in Chapter 2.2.3. of the *Aquatic Manual*, exist and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of infection with *Haplosporidium nelsoni*, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 2.2.3.7.

Importation of live aquatic animals from a country, zone or compartment declared free from *Haplosporidium nelsoni*

When importing live *aquatic animals* of species referred to in Article 2.2.3.2. from a country, *zone* or *compartment* declared free from *Haplosporidium nelsoni*, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This *certificate* must certify, on the basis of the procedures described in Articles 2.2.3.4. or 2.2.3.5. (as applicable), whether the place of production of the commodity consignment is a country, *zone* or *compartment* declared free from *Haplosporidium nelsoni*.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.2.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.3.3.

Article 2.2.3.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from *Haplosporidium nelsoni*

When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 2.2.3.2. from a country, *zone* or *compartment* not declared free from *Haplosporidium nelsoni*, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:

1. the direct delivery into and holding of the consignment in *quarantine* facilities;
2. the continuous isolation of the imported *aquatic animals* from the local environment;
3. the treatment of all effluent and waste material from the processing in a manner that ensures inactivation of *Haplosporidium nelsoni*.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.3.3.

Article 2.2.3.9.

Importation of live aquatic animals for processing for human consumption from a country, zone or compartment not declared free from *Haplosporidium nelsoni*

When importing, for processing for human consumption, live *aquatic animals* of species referred to in Article 2.2.3.2. from a country, *zone* or *compartment* not declared free from *Haplosporidium nelsoni*, the *Competent Authority* of the *importing country* should require that:

1. the consignment be delivered directly to and held in *quarantine* facilities until processing and/or consumption; and
2. all effluent and waste material from the processing be treated in a manner that ensures inactivation of *Haplosporidium nelsoni*.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.3.3.

Article 2.2.3.10.

Importation of aquatic animal products from a country, zone or compartment declared free from *Haplosporidium nelsoni*

When importing *aquatic animal products* of species referred to in Article 2.2.3.2. from a country, *zone* or *compartment* declared free from *Haplosporidium nelsoni*, the *Competent Authority* of the *importing country* should require that the consignment be accompanied by an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This *certificate* must certify, on the basis of the procedures described in Articles 2.2.3.4. or 2.2.3.5. (as applicable), whether or not the place of production of the consignment is a country, *zone* or *compartment* declared free from *Haplosporidium nelsoni*.

The *certificate* should be in accordance with the Model Certificate in Appendix X.X.X. (under study).

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.3.3.

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Article 2.2.3.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from *Haplosporidium nelsoni*

When importing *aquatic animal products* of species referred to in Article 2.2.3.2. from a country, *zone* or *compartment* not declared free from *Haplosporidium nelsoni*, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.3.3.

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CHAPTER 2.2.4.

INFECTION WITH MARTEILIA REFRINGENS

Article 2.2.4.1.

For the purposes of the *Aquatic Code*, infection with *Marteilia refringens* means *infection* only with *Marteilia refringens*.

Methods for surveillance, diagnosis and confirmatory identification are provided in the *Aquatic Manual*.

Article 2.2.4.2.

Scope

The recommendations in this Chapter apply to: European flat oyster (*Ostrea edulis*), Australian mud oyster (*O. angasi*), Argentinean oyster (*O. puelchana*) and Chilean flat oyster (*O. chilensis*), ~~as well as~~ blue mussel (*Mytilus edulis*) and Mediterranean mussel (*M. galloprovincialis*). These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 2.2.4.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* should not require any *Marteilia refringens* related conditions, regardless of the *Marteilia refringens* status of the *exporting country, zone or compartment*:
 - a) For the species referred to in Article 2.2.4.2. for any purpose:
 - i) commercially sterile canned or other heat treated products;
 - ii) ~~gametes, eggs and~~ larvae.
 - b) The following *commodities* destined for human consumption from the species referred to in Article 2.2.4.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. smoked, salted, pickled, marinated, ~~etc.~~);
 - ii) non commercially sterile products (e.g. ready prepared meals) that have been heat treated in a manner to ensure the inactivation of the parasite;
 - iii) off the shell (chilled or frozen) packaged for direct retail trade;
 - iv) half-shell (chilled).
 - c) All *commodities* from *Crassostrea gigas*, including the live *aquatic animal*.

For the *commodities* referred to in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

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2. When authorising the importation or transit of *commodities* of a species referred to in Article 2.2.4.2., other than *commodities* referred to in point 1 of Article 2.2.4.3., the *Competent Authorities* should require the conditions prescribed in Articles 2.2.4.7. to 2.2.4.11. relevant to the *Marteilia refringens* status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any other *commodity* from bivalve species not referred to in Article 2.2.4.2. (especially ~~those~~ the other species of the genera *Ostrea* and *Mytilus*) ~~nor~~ in point 1c) of Article 2.2.4.3., from an *exporting country, zone or compartment* not declared free of *Marteilia refringens*, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of *Marteilia refringens*, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 2.2.4.4.

***Marteilia refringens* free country**

A country may make a *self-declaration of freedom* from *Marteilia refringens* if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from *Marteilia refringens* if all the areas covered by the shared water are declared *Marteilia refringens* free *zones* (see Article 2.2.4.5.).

1. A country where none of the *susceptible species* referred to in Article 2.2.4.2. is present may make a *self-declaration of freedom* from *Marteilia refringens* when *basic biosecurity conditions* have been met continuously in the country for at least the past 3 years.

OR

2. A country where any *susceptible species* referred to in Article 2.2.4.2. is present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions – in all areas where the species are present – that are conducive to its clinical expression, as described in Chapter 2.2.4. of the *Aquatic Manual*, may make a *self-declaration of freedom* from *Marteilia refringens* when *basic biosecurity conditions* have been met continuously in the country for at least the past 3 years and infection with *Marteilia refringens* is not known to be established in wild populations.

OR

3. A country where the last known clinical occurrence was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter 2.2.4. of the *Aquatic Manual*, may make a *self-declaration of freedom* from *Marteilia refringens* when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 3 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.4. of the *Aquatic Manual*, has been in place for at least the last 2 of the past 3 years without detection of *Marteilia refringens*.

OR

4. A country that has made a *self-declaration of freedom* from *Marteilia refringens* but in which the *disease* is detected may not make a *self-declaration of freedom* from *Marteilia refringens* again until the following conditions have been met:

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- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
- b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
- c) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.4. of the *Aquatic Manual*, has been in place for at least the last 2 of the past 3 years without detection of *Marteilia refringens*.

In the meantime, part of the non-affected area may be declared a free *zone* provided that it meets the conditions in point 3 of Article 2.2.4.5.

Article 2.2.4.5.

***Marteilia refringens* free zone or free compartment**

A *zone* or *compartment* free from *Marteilia refringens* may be established within the *territory* of one or more countries of infected or unknown status for infection with *Marteilia refringens* and declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a *Marteilia refringens* free *zone* or *compartment* if the conditions outlined below apply to all areas of the *zone* or *compartment*.

1. In a country of unknown status for *Marteilia refringens*, a *zone* or *compartment* where none of the *susceptible species* referred to in Article 2.2.4.2. is present may be declared free from *Marteilia refringens* when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 3 years.

OR

2. In a country of unknown status for *Marteilia refringens*, a *zone* or *compartment* where any *susceptible species* referred to in Article 2.2.4.2. is present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions – in all areas where the species are present – that are conducive to its clinical expression, as described in Chapter 2.2.4. of the *Aquatic Manual*, may be declared free from *Marteilia refringens* when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 3 years and infection with *Marteilia refringens* is not known to be established in wild populations.

OR

3. A *zone* or *compartment* where the last known clinical occurrence was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter 2.2.4. of the *Aquatic Manual*, may be declared free from *Marteilia refringens* when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 3 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.4. of the *Aquatic Manual*, has been in place for at least the last 2 of the past 3 years without detection of *Marteilia refringens*.

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OR

4. A *zone* previously declared free from *Marteilia refringens* but in which the *disease* is detected may not be declared free from *Marteilia refringens* again until the following conditions have been met:
- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.4. of the *Aquatic Manual*, has been in place for at least the last 2 of the past 3 years without detection of *Marteilia refringens*.

Article 2.2.4.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from *Marteilia refringens* following the provisions of points 1 or 2 of Articles 2.2.4.4. or 2.2.4.5. (as relevant) may maintain its status as *Marteilia refringens* free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from *Marteilia refringens* following the provisions of point 3 of Articles 2.2.4.4. or 2.2.4.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as *Marteilia refringens* free provided that conditions that are conducive to clinical expression of infection with *Marteilia refringens*, as described in Chapter 2.2.4. of the *Aquatic Manual*, exist and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of infection with *Marteilia refringens*, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 2.2.4.7.

Importation of live aquatic animals from a country, zone or compartment declared free from *Marteilia refringens*

When importing live *aquatic animals* of species referred to in Article 2.2.4.2. from a country, *zone* or *compartment* declared free from *Marteilia refringens*, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This *certificate* must certify, on the basis of the procedures described in Articles 2.2.4.4. or 2.2.4.5. (as applicable), whether the place of production of the commodity ~~consignment~~ is a country, *zone* or *compartment* declared free from *Marteilia refringens*.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.2.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.4.3.

Article 2.2.4.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from *Marteilia refringens*

When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 2.2.4.2. from a country, *zone* or *compartment* not declared free from *Marteilia refringens*, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:

1. the direct delivery into and holding of the consignment in *quarantine* facilities;
2. the continuous isolation of the imported *aquatic animals* from the local environment;
3. the treatment of all effluent and waste material from the processing in a manner that ensures inactivation of *Marteilia refringens*.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.4.3.

Article 2.2.4.9.

Importation of live aquatic animals for processing for human consumption from a country, zone or compartment not declared free from *Marteilia refringens*

When importing, for processing for human consumption, live *aquatic animals* of species referred to in Article 2.2.4.2. from a country, *zone* or *compartment* not declared free from *Marteilia refringens*, the *Competent Authority* of the *importing country* should require that:

1. the consignment be delivered directly to and held in *quarantine* facilities until processing and/or consumption; and
2. all effluent and waste material from the processing be treated in a manner that ensures inactivation of *Marteilia refringens*.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.4.3.

Article 2.2.4.10.

Importation of aquatic animal products from a country, zone or compartment declared free from *Marteilia refringens*

When importing *aquatic animal products* of species referred to in Article 2.2.4.2. from a country, *zone* or *compartment* declared free from *Marteilia refringens*, the *Competent Authority* of the *importing country* should require that the consignment be accompanied by an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This *certificate* must certify, on the basis of the procedures described in Articles 2.2.4.4. or 2.2.4.5. (as applicable), whether or not the place of production of the consignment is a country, *zone* or *compartment* declared free from *Marteilia refringens*.

The *certificate* should be in accordance with the Model Certificate in Appendix X.X.X. (under study).

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.4.3.

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Article 2.2.4.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from *Marteilia refringens*

When importing *aquatic animal products* of species referred to in Article 2.2.4.2. from a country, *zone* or *compartment* not declared free from *Marteilia refringens*, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.4.3.

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CHAPTER 2.2.5.

INFECTION WITH MIKROCYTOS MACKINI

Article 2.2.5.1.

For the purposes of the *Aquatic Code*, infection with *Mikrocytos mackini* means *infection* only with *Mikrocytos mackini*.

Methods for surveillance, diagnosis and confirmatory identification are provided in the *Aquatic Manual* (under study).

Article 2.2.5.2.

Scope

The recommendations in this Chapter apply to: European flat oyster (*Ostrea edulis*), Olympia oyster (*O. conchaphila*), Pacific oyster (*Crassostrea gigas*) and Eastern oyster (*C. virginica*). These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 2.2.5.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* should not require any *Mikrocytos mackini* related conditions, regardless of the *Mikrocytos mackini* status of the *exporting country, zone or compartment*:

- a) For the species referred to in Article 2.2.5.2. for any purpose:
 - i) commercially sterile canned or other heat treated products;
 - ii) ~~gametes, eggs and~~ larvae.
- b) The following *commodities* destined for human consumption from the species referred to in Article 2.2.5.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. smoked, salted, pickled, marinated, ~~etc.~~);
 - ii) non commercially sterile products (e.g. ready prepared meals) that have been heat treated in a manner to ensure the inactivation of the parasite;
 - iii) off the shell (chilled or frozen) packaged for direct retail trade.
- c) All commodities from *Panope abrupta*, including the live aquatic animal.

For the *commodities* referred to in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

2. When authorising the importation or transit of *commodities* of a species referred to in Article 2.2.5.2., other than *commodities* referred to in point 1 of Article 2.2.5.3., the *Competent Authorities* should require the conditions prescribed in Articles 2.2.5.7. to 2.2.5.11. relevant to the *Mikrocytos mackini* status of the *exporting country, zone or compartment*.

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3. When considering the importation or transit of any other *commodity* from bivalve species not referred to in Article 2.2.5.2. ~~nor in point 1c) of Article 2.2.5.3.~~ from an *exporting country*, *zone* or *compartment* not declared free of *Mikrocytos mackini*, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of *Mikrocytos mackini*, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 2.2.5.4.

***Mikrocytos mackini* free country**

A country may make a *self-declaration of freedom* from *Mikrocytos mackini* if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from *Mikrocytos mackini* if all the areas covered by the shared water are declared *Mikrocytos mackini* free *zones* (see Article 2.2.5.5.).

1. A country where none of the *susceptible species* referred to in Article 2.2.5.2. is present may make a *self-declaration of freedom* from *Mikrocytos mackini* when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where any *susceptible species* referred to in Article 2.2.5.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions – in all areas where the species are present – that are conducive to its clinical expression, as described in Chapter 2.2.5. of the *Aquatic Manual*, may make a *self-declaration of freedom* from *Mikrocytos mackini* when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years and infection with *Mikrocytos mackini* is not known to be established in wild populations.

OR

3. A country where the last known clinical occurrence was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter 2.2.5. of the *Aquatic Manual*, may make a *self-declaration of freedom* from *Mikrocytos mackini* when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.5. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Mikrocytos mackini*.

OR

4. A country that has made a *self-declaration of freedom* from *Mikrocytos mackini* but in which the *disease* is detected may not make a *self-declaration of freedom* from *Mikrocytos mackini* again until the following conditions have been met:
 - a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and

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- b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
- c) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.5. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Mikrocytos mackini*.

In the meantime, part of the non-affected area may be declared a free *zone* provided that it meets the conditions in point 3 of Article 2.2.5.5.

Article 2.2.5.5.

***Mikrocytos mackini* free zone or free compartment**

A *zone* or *compartment* free from *Mikrocytos mackini* may be established within the *territory* of one or more countries of infected or unknown status for infection with *Mikrocytos mackini* and declared free by the *Competent Authority(ies)* of the country(ies) concerned, if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a *Mikrocytos mackini* free *zone* or *compartment* if the conditions outlined below apply to all areas of the *zone* or *compartment*.

1. In a country of unknown status for *Mikrocytos mackini*, a *zone* or *compartment* where none of the *susceptible species* referred to in Article 2.2.5.2. is present may be declared free from *Mikrocytos mackini* when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. In a country of unknown status for *Mikrocytos mackini*, a *zone* or *compartment* where any *susceptible species* referred to in Article 2.2.5.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions – in all areas where the species are present – that are conducive to its clinical expression, as described in Chapter 2.2.5. of the *Aquatic Manual*, may be declared free from *Mikrocytos mackini* when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years and infection with *Mikrocytos mackini* is not known to be established in wild populations.

OR

3. A *zone* or *compartment* where the last known clinical occurrence was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter 2.2.5. of the *Aquatic Manual*, may be declared free from *Mikrocytos mackini* when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.5. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Mikrocytos mackini*.

OR

4. A *zone* previously declared free from *Mikrocytos mackini* but in which the *disease* is detected may not be declared free from *Mikrocytos mackini* again until the following conditions have been met:

Appendix X (contd)

- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
- b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
- c) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.5. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Mikrocytos mackini*.

Article 2.2.5.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from *Mikrocytos mackini* following the provisions of points 1 or 2 of Articles 2.2.5.4. or 2.2.5.5. (as relevant) may maintain its status as *Mikrocytos mackini* free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from *Mikrocytos mackini* following the provisions of point 3 of Articles 2.2.5.4. or 2.2.5.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as *Mikrocytos mackini* free provided that conditions that are conducive to clinical expression of infection with *Mikrocytos mackini*, as described in Chapter 2.2.5. of the *Aquatic Manual*, exist and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of infection with *Mikrocytos mackini*, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 2.2.5.7.

Importation of live aquatic animals from a country, zone or compartment declared free from *Mikrocytos mackini*

When importing live *aquatic animals* of species referred to in Article 2.2.5.2. from a country, *zone* or *compartment* declared free from *Mikrocytos mackini*, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This *certificate* must certify, on the basis of the procedures described in Articles 2.2.5.4. or 2.2.5.5. (as applicable), whether the place of production of the *commodity consignment* is a country, *zone* or *compartment* declared free from *Mikrocytos mackini*.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.2.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.5.3.

Article 2.2.5.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from *Mikrocytos mackini*

When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 2.2.5.2. from a country, *zone* or *compartment* not declared free from *Mikrocytos mackini*, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:

Appendix X (contd)

1. the direct delivery into and holding of the consignment in *quarantine* facilities;
2. the continuous isolation of the imported *aquatic animals* from the local environment;
3. the treatment of all effluent and waste material from the processing in a manner that ensures inactivation of *Mikrocytos mackini*.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.5.3.

Article 2.2.5.9.

Importation of live aquatic animals for processing for human consumption from a country, zone or compartment not declared free from *Mikrocytos mackini*

When importing, for processing for human consumption, live *aquatic animals* of species referred to in Article 2.2.5.2. from a country, *zone* or *compartment* not declared free from *Mikrocytos mackini*, the *Competent Authority* of the *importing country* should require that:

1. the consignment be delivered directly to and held in *quarantine* facilities until processing and/or consumption; and
2. all effluent and waste material from the processing be treated in a manner that ensures inactivation of *Mikrocytos mackini*.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.5.3.

Article 2.2.5.10.

Importation of aquatic animal products from a country, zone or compartment declared free from *Mikrocytos mackini*

When importing *aquatic animal products* of species referred to in Article 2.2.5.2. from a country, *zone* or *compartment* declared free from *Mikrocytos mackini*, the *Competent Authority* of the *importing country* should require that the consignment be accompanied by an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This *certificate* must certify, on the basis of the procedures described in Articles 2.2.5.4. or 2.2.5.5. (as applicable), whether or not the place of production of the consignment is a country, *zone* or *compartment* declared free from *Mikrocytos mackini*.

The *certificate* should be in accordance with the Model Certificate in Appendix X.X.X. (under study).

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.5.3.

Article 2.2.5.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from *Mikrocytos mackini*

When importing *aquatic animal products* of species referred to in Article 2.2.5.2. from a country, *zone* or *compartment* not declared free from *Mikrocytos mackini*, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

Appendix X (contd)

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.5.3.

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CHAPTER 2.2.8.

**INFECTION
WITH XENOHALIOTIS CALIFORNIENSIS**

Article 2.2.8.1.

For the purposes of the *Aquatic Code*, infection with *Xenobaliothis californiensis* means *infection* only with *Xenobaliothis californiensis*.

Methods for surveillance, diagnosis and confirmatory identification are provided in the *Aquatic Manual*.

Article 2.2.8.2.

Scope

The recommendations in this Chapter apply to: black abalone (*Haliotis cracherodii*), white abalone (*H. sorenseni*), red abalone (*H. rufescens*), pink abalone (*H. corrugata*), green abalone (*H. fulgens*), flat abalone (*H. wallalensis*) and Japanese abalone (*H. discus-hannai*). These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 2.2.8.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* should not require any *Xenobaliothis californiensis* related conditions, regardless of the *Xenobaliothis californiensis* status of the *exporting country, zone or compartment*:
 - a) For the species referred to in Article 2.2.8.2. for any purpose:
 - i) commercially sterile canned or other heat treated products;
 - ii) gametes, eggs and larvae;
 - iii) shells.
 - b) The following *commodities* destined for human consumption from the species referred to in Article 2.2.8.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. smoked, salted, pickled, marinated, ~~etc.~~);
 - ii) non commercially sterile products (e.g. ready prepared meals) that have been heat treated in a manner to ensure the inactivation of the bacterium parasite;
 - iii) off the shell, eviscerated abalone (chilled or frozen) packaged for direct retail trade.

For the *commodities* referred to in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

Appendix XI (contd)

2. When authorising the importation or transit of *commodities* of a species referred to in Article 2.2.8.2., other than *commodities* referred to in point 1 of Article 2.2.8.3., the *Competent Authorities* should require the conditions prescribed in Articles 2.2.8.7. to 2.2.8.11. relevant to the *Xenobalotus californiensis* status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any other *commodity* from mollusc species not referred to in Article 2.2.8.2. (especially those of the genus *Haliotis*) from an *exporting country, zone or compartment* not declared free of *Xenobalotus californiensis*, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of *Xenobalotus californiensis*, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 2.2.8.4.

***Xenobalotus californiensis* free country**

A country may make a *self-declaration of freedom* from *Xenobalotus californiensis* if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from *Xenobalotus californiensis* if all the areas covered by the shared water are declared *Xenobalotus californiensis* free *zones* (see Article 2.2.8.5.).

1. A country where none of the *susceptible species* referred to in Article 2.2.8.2. is present may make a *self-declaration of freedom* from *Xenobalotus californiensis* when *basic biosecurity conditions* have been met continuously in the country for at least the past 3 2 years.

OR

2. A country where any *susceptible species* referred to in Article 2.2.8.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions – in all areas where the species are present – that are conducive to its clinical expression, as described in Chapter 2.2.8. of the *Aquatic Manual*, may make a *self-declaration of freedom* from *Xenobalotus californiensis* when *basic biosecurity conditions* have been met continuously in the country for at least the past 3 2 years and infection with *Xenobalotus californiensis* is not known to be established in wild populations.

OR

3. A country where the last known clinical occurrence was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter 2.2.8. of the *Aquatic Manual*, may make a *self-declaration of freedom* from *Xenobalotus californiensis* when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 3 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.8. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Xenobalotus californiensis*.

OR

4. A country that has made a *self-declaration of freedom* from *Xenobalotus californiensis* but in which the *disease* is detected may not make a *self-declaration of freedom* from *Xenobalotus californiensis* again until the following conditions have been met:

Appendix XI (contd)

- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
- b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
- c) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.8. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Xenobalotus californiensis*.

In the meantime, part of the non-affected area may be declared a free *zone* provided that it meets the conditions in point 3 of Article 2.2.8.5.

Article 2.2.8.5.

***Xenobalotus californiensis* free zone or free compartment**

A *zone* or *compartment* free from *Xenobalotus californiensis* may be established within the *territory* of one or more countries of infected or unknown status for infection with *Xenobalotus californiensis* and declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a *Xenobalotus californiensis* free *zone* or *compartment* if the conditions outlined below apply to all areas of the *zone* or *compartment*.

1. In a country of unknown status for *Xenobalotus californiensis*, a *zone* or *compartment* where none of the *susceptible species* referred to in Article 2.2.8.2. is present may be declared free from *Xenobalotus californiensis* when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 3 ~~2~~ years.

OR

2. In a country of unknown status for *Xenobalotus californiensis*, a *zone* or *compartment* where any *susceptible species* referred to in Article 2.2.8.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions – in all areas where the species are present – that are conducive to its clinical expression, as described in Chapter 2.2.8. of the *Aquatic Manual*, may be declared free from *Xenobalotus californiensis* when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 3 ~~2~~ years and infection with *Xenobalotus californiensis* is not known to be established in wild populations.

OR

3. A *zone* or *compartment* where the last known clinical occurrence was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter 2.2.8. of the *Aquatic Manual*, may be declared free from *Xenobalotus californiensis* when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 3 ~~2~~ years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.8. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Xenobalotus californiensis*.

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OR

4. A *zone* previously declared free from *Xenobalotus californiensis* but in which the *disease* is detected may not be declared free from *Xenobalotus californiensis* again until the following conditions have been met:
- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.8. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Xenobalotus californiensis*.

Article 2.2.8.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from *Xenobalotus californiensis* following the provisions of points 1 or 2 of Articles 2.2.8.4. or 2.2.8.5. (as relevant) may maintain its status as *Xenobalotus californiensis* free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from *Xenobalotus californiensis* following the provisions of point 3 of Articles 2.2.8.4. or 2.2.8.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as *Xenobalotus californiensis* free provided that conditions that are conducive to clinical expression of infection with *Xenobalotus californiensis*, as described in Chapter 2.2.8. of the *Aquatic Manual*, exist and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of infection with *Xenobalotus californiensis*, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 2.2.8.7.

Importation of live aquatic animals from a country, zone or compartment declared free from *Xenobalotus californiensis*

When importing live *aquatic animals* of species referred to in Article 2.2.8.2. from a country, *zone* or *compartment* declared free from *Xenobalotus californiensis*, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This *certificate* must certify, on the basis of the procedures described in Articles 2.2.8.4. or 2.2.8.5. (as applicable), whether the place of production of the commodity consignment is a country, *zone* or *compartment* declared free from *Xenobalotus californiensis*.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.2.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.8.3.

Article 2.2.8.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from *Xenohaliotis californiensis*

When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 2.2.8.2. from a country, *zone* or *compartment* not declared free from *Xenohaliotis californiensis*, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:

1. the direct delivery into and holding of the consignment in *quarantine* facilities;
2. the continuous isolation of the imported *aquatic animals* from the local environment;
3. the treatment of all effluent and waste material from the processing in a manner that ensures inactivation of *Xenohaliotis californiensis*.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.8.3.

Article 2.2.8.9.

Importation of live aquatic animals for processing for human consumption from a country, zone or compartment not declared free from *Xenohaliotis californiensis*

When importing, for processing for human consumption, live *aquatic animals* of species referred to in Article 2.2.8.2. from a country, *zone* or *compartment* not declared free from *Xenohaliotis californiensis*, the *Competent Authority* of the *importing country* should require that:

1. the consignment be delivered directly to and held in *quarantine* facilities until processing and/or consumption; and
2. all effluent and waste material from the processing be treated in a manner that ensures inactivation of *Xenohaliotis californiensis*.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.8.3.

Article 2.2.8.10.

Importation of aquatic animal products from a country, zone or compartment declared free from *Xenohaliotis californiensis*

When importing *aquatic animal products* of species referred to in Article 2.2.8.2. from a country, *zone* or *compartment* declared free from *Xenohaliotis californiensis*, the *Competent Authority* of the *importing country* should require that the consignment be accompanied by an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This *certificate* must certify, on the basis of the procedures described in Articles 2.2.8.4. or 2.2.8.5. (as applicable), whether or not the place of production of the consignment is a country, *zone* or *compartment* declared free from *Xenohaliotis californiensis*.

The *certificate* should be in accordance with the Model Certificate in Appendix X.X.X. (under study).

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.8.3.

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Article 2.2.8.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from *Xenohaliotis californiensis*

When importing *aquatic animal products* of species referred to in Article 2.2.8.2. from a country, *zone* or *compartment* not declared free from *Xenohaliotis californiensis*, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.8.3.

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CHAPTER 1.5.1.

RECOMMENDATIONS FOR TRANSPORT

Article 1.5.1.1.

General arrangements

1. These arrangements should be compulsory in all countries either by legislative or regulatory texts and methods of application should be described in a manual available to all concerned.
2. *Vehicles (or containers)* used for the *transport* of *aquatic animals* shall be designed, constructed and fitted in such a way as to withstand the weight of the *aquatic animals* and water and to ensure their safety and welfare during *transportation*. *Vehicles* shall be thoroughly cleansed and disinfected before use according to the guidelines given in the *Aquatic Code*.
3. *Vehicles (or containers)* in which *aquatic animals* are confined during *transport* by sea or by air shall be secured to maintain optimal conditions for the *aquatic animals* during *transport*, and to allow easy access by the attendant.

Article 1.5.1.2.

Particular arrangements for containers

1. The construction of *containers* intended for *transportation* of *aquatic animals* shall be such that the release of water, etc., is prevented during *transport*.
2. In the case of the *transportation* of *aquatic animals*, provision shall be made to enable preliminary observation of the contents of *containers*.
3. *Containers* in transit in which there are *aquatic animal products* shall not be opened unless the *Competent Authorities* of the *transit country* consider it necessary. If this is the case, *containers* shall be subject to precautions taken to avoid any *risk* of contamination.
4. *Containers* shall be loaded only with one kind of product or, at least, with products not susceptible to contamination by one another.
5. It rests with each country to decide on the facilities it requires for the *transport* and importation of *aquatic animals* and *aquatic animal products* in *containers*.

Article 1.5.1.3.

Particular arrangements for the transport of aquatic animals by air

1. The stocking densities for the *transport* of *aquatic animals* in aircraft or *containers* should be determined by taking the following into consideration:
 - a) the total cubic metres of available space for each type of *aquatic animal*;
 - b) the oxygenation capacity of the equipment attached to the aircraft and *containers* while on the ground and during all stages of the flight.

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With regard to fish, molluscs and crustaceans, the space reserved for each *aquatic animal* species in the aircraft or *containers* that have been fitted for the separate *transportation* of several *aquatic animals* or for the *transportation* of groups of *aquatic animals* should comply with acceptable densities specified for the species in question.

2. The International Air Transport Association (IATA) Regulations for live animals (which are approved by the OIE) may be adopted if they do not conflict with national legislative arrangements. (Copies of these Regulations are obtainable from the International Air Transport Association, 800 Place Victoria, P.O. Box 113, Montreal, Quebec H4Z 1M1, Canada.)

Article 1.5.1.4.

Disinfection and other sanitary measures

1. *Disinfection* and all zoo-sanitary work should be carried out in order to:
 - a) avoid all unjustified inconvenience and to prevent damage or injury to the health of people and *aquatic animals*;
 - b) avoid damage to the structure of the *vehicle* or its appliances;
 - c) prevent, as far as possible, any damage to *aquatic animal products*, fish *eggs* as well as mollusc and crustacean larvae.
2. On request, the *Competent Authority* shall issue the transporters with a certificate indicating the measures that have been applied to all *vehicles*, the parts of the *vehicle* that have been treated, the methods used and the reasons that led to the application of the measures.

In the case of aircraft, the certificate may be replaced, on request, by an entry in the General Declaration of the aircraft.

3. Likewise, the *Competent Authority* shall issue on request:
 - a) a certificate showing the date of arrival and departure of the *aquatic animals*;
 - b) a certificate to the shipper or exporter, the consignee and transporter or their representatives, indicating the measures applied.

Article 1.5.1.5.**Transportation water**

Water to be used for transportation of aquatic animals should be appropriately treated in order to minimise the risk of transferring pathogens. The specific recommendations are provided in the Chapter on "Disinfection" of the Aquatic Code.

Article 1.5.1.56.

Treatment of transportation water

During *transportation of aquatic animals*, the transporter should not be permitted to evacuate and replace the water in the *transport* tanks except on specifically designated sites in the national *territory*. The waste and rinsing water should not be emptied into a drainage system that is directly connected to an aquatic environment where *aquatic animals* are present. The water from the tanks should therefore either be disinfected by a recognised process (for example, 50 mg iodine or chlorine/litre for one hour), or sprayed over land that does not drain into waters containing *aquatic animals*. Each country shall designate the sites in their national *territories* where these operations can be carried out.

Article 1.5.1.67.

Discharge of infected material

The *Competent Authority* shall take all practical measures to prevent the discharge of any infective material into internal or territorial waters.

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CHAPTER 2.1.14.

GYRODACTYLOSIS
(*Gyrodactylus salaris*)

Article 2.1.14.1.

For the purposes of the *Aquatic Code*, gyrodactylosis means *infestation* with the viviparous freshwater ectoparasite *Gyrodactylus salaris* (Platyhelminthes and Monogenea).

Methods for surveillance and diagnosis are provided in the *Aquatic Manual*.

Article 2.1.14.2.

Scope

The recommendations in this Chapter apply to: Atlantic salmon (*Salmo salar*), rainbow trout (*Oncorhynchus mykiss*), Arctic char (*Salvelinus alpinus*), North American brook trout (*Salvelinus fontinalis*), grayling (*Thymallus thymallus*), North American lake trout (*Salvelinus namaycush*) and brown trout (*Salmo trutta*). The recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 2.1.14.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* should not require any gyrodactylosis related conditions, regardless of the gyrodactylosis status of the *exporting country, zone or compartment*:
 - a) For the species referred to in Article 2.1.14.2. for any purpose:
 - i) commercially sterile canned fish;
 - ii) leather made from fish skin.
 - b) The following *commodities* destined for human consumption from the species referred to in Article 2.1.14.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. smoked, salted, pickled, marinated, etc.);
 - ii) heat treated products (e.g. ready prepared meals and fish oil);
 - iii) *eviscerated fish* (chilled or frozen) packaged for direct retail trade;
 - iv) fillets or cutlets (chilled or frozen);
 - v) dried *eviscerated fish* (including air dried, flame dried and sun dried).

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- c) For species other than those referred to in Article 2.1.14.2., all *aquatic animal products*.

For the *commodities* referred to in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

2. When authorising the importation or transit of *commodities* of a species referred to in Article 2.1.14.2., other than those referred to in point 1 of Article 2.1.14.3., the *Competent Authorities* should require the conditions prescribed in Articles 2.1.14.7. to 2.1.14.11. relevant to the gyrodactylosis status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any live *commodity* of a species not referred in Article 2.1.14.2. from an *exporting country, zone or compartment* not declared free of gyrodactylosis, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of *G. salaris*, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 2.1.14.4.

Gyrodactylosis free country

A country may make a *self-declaration of freedom* from gyrodactylosis if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from gyrodactylosis if all the areas covered by the shared water are declared gyrodactylosis free countries, *zones* or *compartments* (see Article 2.1.14.5.).

1. A country where none of the *susceptible species* referred to in Article 2.1.14.2. is present may make a *self-declaration of freedom* from gyrodactylosis when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where the *susceptible species* referred to in Article 2.1.14.2. are present but there has never been any observed occurrence of the *disease* for at least the past 15 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from gyrodactylosis when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

3. A country where the last observed occurrence of the *disease* was within the past 25 years or where the *infestation* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from gyrodactylosis when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the last 2 years without detection of *G. salaris*.

OR

4. A country that has made a *self-declaration of freedom* from gyrodactylosis but in which the *disease* is subsequently detected may not make a *self-declaration of freedom* from gyrodactylosis again until the following conditions have been met:

Appendix XIII (contd)

- a) on detection of the *disease*, the affected area was declared an infested zone and a *buffer zone* was established; and
- b) infested populations have been destroyed or removed from the infested zone by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfestation* procedures (see *Aquatic Manual*) have been completed; and
- c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the last 2 years without detection of *G. salaris*.

In the meantime, part of the non-affected area may be declared a free *zone* provided that it meets the conditions in point 3 of Article 2.1.14.5.

Article 2.1.14.5.

Gyrodactylosis free zone or free compartment

A *zone* or *compartment* within the *territory* of one or more countries not declared free from gyrodactylosis may be declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a gyrodactylosis free *zone* or *compartment* if all the *Competent Authorities* confirm that the conditions have been met.

1. A *zone* or *compartment* where none of the *susceptible species* referred to in Article 2.1.14.2. is present may be declared free from gyrodactylosis when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. A *zone* or *compartment* where the *susceptible species* referred to in Article 2.1.14.2. are present but there has never been any observed occurrence of the *disease* for at least the past 25 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from gyrodactylosis when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 10 years.

OR

3. A *zone* or *compartment* where the last observed occurrence of the *disease* was within the past 25 years or where the *infestation* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from gyrodactylosis when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the last 2 years without detection of *G. salaris*.

OR

4. A *zone* previously declared free from gyrodactylosis but in which the *disease* is detected may not be declared free from gyrodactylosis again until the following conditions have been met:

Appendix XIII (contd)

- a) on detection of the *disease*, the affected area was declared an *infested zone* and a *buffer zone* was established; and
- b) infested populations have been destroyed or removed from the *infested zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfestation* procedures (see *Aquatic Manual*) have been completed; and
- c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the last 2 years without detection of *G. salaris*.

Article 2.1.14.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from gyrodactylosis following the provisions of points 1 or 2 of Articles 2.1.14.4. or 2.1.14.5. (as relevant) may maintain its status as gyrodactylosis free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from gyrodactylosis following the provisions of point 3 of Articles 2.1.14.4. or 2.1.14.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as gyrodactylosis free provided that conditions that are conducive to clinical expression of gyrodactylosis, as described in Chapter X.X.X. of the *Aquatic Manual*, exist, and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infested countries and in all cases where conditions are not conducive to clinical expression of gyrodactylosis, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infestation*.

Article 2.1.14.7.

Importation of live aquatic animals from a country, zone or compartment declared free from gyrodactylosis

When importing live *aquatic animals* of species referred to in Article 2.1.14.2. from a country, *zone* or *compartment* declared free from gyrodactylosis, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 2.1.14.4. or 2.1.14.5. (as applicable), the place of production of the *commodity* is a country, *zone* or *compartment* declared free from gyrodactylosis.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.1.

This Article does not apply to *commodities* referred to in point 1 of Article 2.1.14.3.

Article 2.1.14.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from gyrodactylosis

When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 2.1.14.2. from a country, *zone* or *compartment* not declared free from gyrodactylosis, the *Competent Authority* of the *importing country* should:

Appendix XIII (contd)

1. require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* attesting that:
 - a) the *aquatic animals* have been held, immediately prior to export, in water with a salinity of at least 25 parts per thousand for a continuous period of at least 14 days; and
 - b) no other live *aquatic animals* of the species referred to in Article 2.1.14.2. have been introduced during that period;

OR

- c) in the case of eyed eggs, the eggs have been disinfected;

OR

2. assess the risk and apply risk mitigation measures such as:
 - a) the direct delivery into and holding of the consignment in *quarantine* facilities;
 - b) the continuous isolation of the imported *aquatic animals* and their first generation progeny from the local environment;
 - c) the treatment of all effluent and waste materials in a manner that ensures inactivation of *G. salaris*.

This Article does not apply to *commodities* referred to in point 1 of Article 2.1.14.3.

Article 2.1.14.9.

Importation of live aquatic animals for processing for human consumption from a country, zone or compartment not declared free from gyrodactylosis

When importing, for processing for human consumption, live *aquatic animals* of species referred to in Article 2.1.14.2. from a country, *zone* or *compartment* not declared free from gyrodactylosis, the *Competent Authority* of the *importing country* should:

1. require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* attesting that the *aquatic animals* have been held, immediately prior to export, in water with a salinity of at least 25 parts per thousand for a continuous period of at least 14 days, and no other live fish of the species listed in Article 2.1.14.2. have been introduced during that period;

OR

2. require that the consignment be delivered directly to and held in *quarantine* facilities for slaughter and processing to one of the products referred to in point 1 of Article 2.1.14.3. or other products authorised by the *Competent Authority*, and all effluent and waste materials be treated in a manner that ensures inactivation of *G. salaris*.

This Article does not apply to *commodities* referred to in point 1 of Article 2.1.14.3.

Article 2.1.14.10.

Importation of live aquatic animals intended for use in animal feed, or for agricultural, industrial or pharmaceutical use, from a country, zone or compartment not declared free from gyrodactylosis

When importing, for use in animal feed, or for agricultural, industrial or pharmaceutical use, live *aquatic animals* of species referred to in Article 2.1.14.2. from a country, *zone* or *compartment* not declared free from gyrodactylosis, the *Competent Authority* of the *importing country* should:

Appendix XIII (contd)

1. require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* attesting that the *aquatic animals* have been held, immediately prior to export, in water with a salinity of at least 25 parts per thousand for a continuous period of at least 14 days, and no other live *aquatic animals* of the species referred to in Article 2.1.14.2. have been introduced during that period;

OR

2. require that the consignment be delivered directly to and held in *quarantine* facilities for slaughter and processing to one of the products referred to in point 1 of Article 2.1.14.3. or other products authorised by the *Competent Authority*, and all effluent and waste materials be treated in a manner that ensures inactivation of *G. salaris*.

This Article does not apply to *commodities* referred to in point 1 of Article 2.1.14.3.

Article 2.1.14.11.

Importation of aquatic animal products from a country, zone or compartment declared free from gyrodactylosis

When importing *aquatic animal products* of species referred to in Article 2.1.14.2. from a country, *zone* or *compartment* declared free from gyrodactylosis, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 2.1.14.4. or 2.1.14.5. (as applicable), the place of production of the consignment is a country, *zone* or *compartment* declared free from gyrodactylosis.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.2.1.

This Article does not apply to *commodities* referred to in point 1 of Article 2.1.14.3.

Article 2.1.14.12.

Importation of aquatic animal products from a country, zone or compartment not declared free from gyrodactylosis

When importing *aquatic animal products* of species referred to in Article 2.1.14.2. from a country, *zone* or *compartment* not declared free from gyrodactylosis, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

1. In the case of dead *aquatic animals*, whether *eviscerated* or *uneviscerated*, such risk mitigation measures may include:
 - a) the direct delivery into and holding of the consignment in biosecure facilities for processing to one of the products referred to in point 1 of Article 2.1.14.3. or other products authorised by the *Competent Authority*;
 - b) the treatment of all effluent and waste materials in a manner that ensures inactivation of *G. salaris*.

Appendix XIII (contd)

OR

2. The *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued from the *Competent Authority* of the *exporting country* attesting that the product was derived from *aquatic animals* which had been held, immediately prior to processing, in water with a salinity of at least 25 parts per thousand for a continuous period of 14 days, and no other live *aquatic animals* of the species referred to in Article 2.1.14.2. have been introduced during that period.

This Article does not apply to *commodities* referred to in point 1 of Article 2.1.14.3.

CHAPTER 2.1.17.

KOI HERPESVIRUS DISEASE

Article 2.1.17.1.

For the purposes of the *Aquatic Code*, koi herpesvirus disease (KHVD) means *infection* with the viral species koi herpesvirus tentatively placed in the sub-family *Cyprinid herpesvirus* of the family Herpesviridae.

Methods for surveillance and diagnosis are provided in the *Aquatic Manual*.

Article 2.1.17.2.

Scope

The recommendations in this Chapter apply to: common carp (*Cyprinus carpio carpio*), ghost carp (*Cyprinus carpio goi*), koi carp (*Cyprinus carpio koi*) and common carp hybrids (e.g. *Cyprinus carpio* × *Carassius auratus*). These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 2.1.17.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* should not require any KHVD related conditions, regardless of the KHVD status of the *exporting country, zone or compartment*:
 - a) For the species referred to in Article 2.1.17.2. for any purpose:
 - i) commercially sterile canned fish;
 - ii) leather made from fish skin.
 - b) The following *commodities* destined for human consumption from the species referred to in Article 2.1.17.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. smoked, salted, pickled, marinated, etc.);
 - ii) products (e.g. ready prepared meals and fish oil) that have been heat treated in a manner to ensure the inactivation of the pathogen;
 - iii) *eviscerated fish* (chilled or frozen) packaged for direct retail trade;
 - iv) fillets or cutlets (chilled or frozen);
 - v) dried *eviscerated fish* (including air dried, flame dried and sun dried).

For the *commodities* referred to in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

Appendix XIV (contd)

2. When authorising the importation or transit of the *commodities* of a species referred to in Article 2.1.17.2., other than those referred to in point 1 of Article 2.1.17.3., the *Competent Authorities* should require the conditions prescribed in Articles 2.1.17.7. to 2.1.17.12. relevant to the KHVD status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any live *commodity* of a species not referred to in Article 2.1.17.2. from an *exporting country, zone or compartment* not declared free of KHVD, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of KHVD, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 2.1.17.4.

Koi herpesvirus disease free country

A country may make a *self-declaration of freedom* from KHVD if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from KHVD if all the areas covered by the shared water are declared KHVD free countries or *zones* (see Article 2.1.17.5.).

1. A country where none of the *susceptible species* referred to in Article 2.1.17.2. is present may make a *self-declaration of freedom* from KHVD when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where the *susceptible species* referred to in Article 2.1.17.2. are present but there has never been any observed occurrence of the *disease* for at least the past 25 years despite conditions that are conducive to its clinical expression, as described in Chapter 2.1.17. of the *Aquatic Manual*, may make a *self-declaration of freedom* from KHVD when *basic biosecurity conditions* have been met continuously in the country for at least the past 10 years.

OR

3. A country where the last observed occurrence of the *disease* was within the past 25 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to its clinical expression, as described in Chapter 2.1.17. of the *Aquatic Manual*, may make a *self-declaration of freedom* from KHVD when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and 2.1.17. of the *Aquatic Manual*, has been in place for at least the last 2 years without detection of KHV.

OR

4. A country that has made a *self-declaration of freedom* from KHVD but in which the *disease* is subsequently detected may not make a *self-declaration of freedom* from KHVD again until the following conditions have been met:

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- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
- b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
- c) *targeted surveillance*, as described in Chapters 1.1.4. and 2.1.17. of the *Aquatic Manual*, has been in place for at least the last 2 years without detection of KHV.

In the meantime, part of the non-affected area may be declared a free *zone* provided that it meets the conditions in point 3 of Article 2.1.17.5.

Article 2.1.17.5.

Koi herpesvirus disease free zone or free compartment

A *zone* or *compartment* within the *territory* of one or more countries not declared free from KHVD may be declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a KHVD free *zone* or *compartment* if all the *Competent Authorities* confirm that the conditions have been met.

1. A *zone* or *compartment* where none of the *susceptible species* referred to in Article 2.1.17.2. is present may be declared free from KHVD when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. A *zone* or *compartment* where the *susceptible species* referred to in Article 2.1.17.2. are present but there has never been any observed occurrence of the *disease* for at least the past 25 years despite conditions that are conducive to its clinical expression, as described in Chapter 2.1.17. of the *Aquatic Manual*, may be declared free from KHVD when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 10 years.

OR

3. A *zone* or *compartment* where the last observed occurrence of the *disease* was within the past 25 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to its clinical expression, as described in Chapter 2.1.17. of the *Aquatic Manual*, may be declared free from KHVD when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and 2.1.17. of the *Aquatic Manual*, has been in place for at least the last 2 years without koi herpesvirus detection.

OR

4. A *zone* previously declared free from KHVD but in which the *disease* is detected may not be declared free from KHVD again until the following conditions have been met:

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- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
- b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
- c) *targeted surveillance*, as described in Chapters 1.1.4. and 2.1.17. of the *Aquatic Manual*, has been in place for at least the last 2 years without koi herpesvirus detection.

Article 2.1.17.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from KHVD following the provisions of points 1 or 2 of Articles 2.1.17.4. or 2.1.17.5. (as relevant) may maintain its status as KHVD free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from KHVD following the provisions of point 3 of Articles 2.1.17.4. or 2.1.17.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as KHVD free provided that conditions that are conducive to clinical expression of KHVD, as described in Chapter 2.1.17. of the *Aquatic Manual*, exist, and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of KHVD, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 2.1.17.7.

Importation of live aquatic animals from a country, zone or compartment declared free from koi herpesvirus disease

When importing live *aquatic animals* of species referred to in Article 2.1.17.2. from a country, *zone* or *compartment* declared free from KHVD, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 2.1.17.4. or 2.1.17.5. (as applicable), the place of production of the *commodity* is a country, *zone* or *compartment* declared free from KHVD.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.1.

This Article does not apply to *commodities* referred to in point 1 of Article 2.1.17.3.

Article 2.1.17.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from koi herpesvirus disease

When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 2.1.17.2. from a country, *zone* or *compartment* not declared free from KHVD, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:

1. the direct delivery into and holding of the consignment in *quarantine* facilities;

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2. the continuous isolation of the imported *aquatic animals* and their first generation progeny from the local environment;
3. the treatment of all effluent and waste materials in a manner that ensures inactivation of koi herpesvirus.

This Article does not apply to *commodities* referred to in point 1 of Article 2.1.17.3.

Article 2.1.17.9.

Importation of live aquatic animals for processing for human consumption from a country, zone or compartment not declared free from koi herpesvirus disease

When importing, for processing for human consumption, live *aquatic animals* of species referred to in Article 2.1.17.2. from a country, *zone* or *compartment* not declared free from KHVD, the *Competent Authority* of the *importing country* should require that:

1. the consignment be delivered directly to and held in *quarantine* facilities for slaughter and processing to one of the products referred to in point 1 of Article 2.1.17.3. or other products authorised by the *Competent Authority*; and
2. all effluent and waste materials from the processing be treated in a manner that ensures inactivation of koi herpesvirus.

This Article does not apply to *commodities* referred to in point 1 of Article 2.1.17.3.

Article 2.1.17.10.

Importation of live aquatic animals intended for use in animal feed, or for agricultural, industrial or pharmaceutical use, from a country, zone or compartment not declared free from koi herpesvirus disease

When importing, for use in animal feed, or for agricultural, industrial or pharmaceutical use, live *aquatic animals* of species referred to in Article 2.1.17.2. from a country, *zone* or *compartment* not declared free from KHVD, the *Competent Authority* of the *importing country* should require that:

1. the consignment be delivered directly to and held in *quarantine* facilities for slaughter and processing to products authorised by the *Competent Authority*; and
2. all effluent and waste materials from the processing be treated in a manner that ensures inactivation of koi herpesvirus.

This Article does not apply to *commodities* referred to in point 1 of Article 2.1.17.3.

Article 2.1.17.11.

Importation of aquatic animal products from a country, zone or compartment declared free from koi herpesvirus disease

When importing *aquatic animal products* of species referred to in Article 2.1.17.2. from a country, *zone* or *compartment* declared free from KHVD, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 2.1.17.4. or 2.1.17.5. (as applicable), the place of production of the consignment is a country, *zone* or *compartment* declared free from KHVD.

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The *certificate* should be in accordance with the Model Certificate in Appendix 4.2.1.

This Article does not apply to *commodities* referred to in point 1 of Article 2.1.17.3.

Article 2.1.17.12.

Importation of aquatic animal products from a country, zone or compartment not declared free from koi herpesvirus disease

When importing *aquatic animal products* of species referred to in Article 2.1.17.2. from a country, *zone* or *compartment* not declared free from KHVD, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

In the case of dead *aquatic animals*, whether *eviscerated* or *uneviscerated*, such risk mitigation measures may include:

1. the direct delivery into and holding of the consignment in biosecure/*quarantine* facilities for processing to one of the products referred to in point 1 of Article 2.1.17.3. or other products authorised by the *Competent Authority*;
2. the treatment of all effluent and waste materials in a manner that ensures inactivation of koi herpesvirus.

This Article does not apply to *commodities* referred to in point 1 of Article 2.1.17.3.

CHAPTER 4.1.1.

TAURA SYNDROME

Article 4.1.1.1.

For the purposes of the *Aquatic Code*, Taura syndrome (TS) means *infection* with Taura syndrome virus (TSV). *Taura syndrome virus* is classified as a species in the family *Dicistroviridae*. Common synonyms are listed in Chapter 4.1.1. of the *Aquatic Manual*.

Methods for surveillance and diagnosis are provided in the *Aquatic Manual*.

Article 4.1.1.2.

Scope

The recommendations in this Chapter apply to: Pacific white shrimp or whiteleg shrimp (*Penaeus vannamei*), blue shrimp (*P. stylirostris*), northern white shrimp (*P. setiferus*), southern white shrimp (*P. schmitti*), greasyback prawn (*Metapenaeus ensis*) and giant tiger prawn (*P. monodon*). These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 4.1.1.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* of the *importing country* should not require any TS related conditions, regardless of the TS status of the *exporting country*, *zone* or *compartment*.
 - a) For the species referred to in Article 4.1.1.2. for any purpose:
 - i) commercially sterile canned products;
 - ii) boiled products (e.g. boiled whole shrimp or tails, lobsters, crabs);
 - iii) chemically extracted chitin;
 - iv) crustacean meals or by-products made non-infectious by heating or drying (e.g. flame dried or sun dried);
 - v) crustacean products made non-infectious through processing as dry feeds (e.g. pelleted or extruded feeds);
 - vi) biological samples preserved for diagnostic applications in such a manner as to inactivate the TSV (e.g. formalin or alcohol preserved samples).
 - b) The following products destined for human consumption from species referred to in Article 4.1.1.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:

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- i) chemically preserved products (e.g. salted, pickled, marinated, pastes, etc.);
- ii) products that have been heat treated or dried (e.g. ready prepared meals) in a manner to ensure the inactivation of the pathogen.

For the *commodities* listed in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

2. When authorising the importation or transit of the *commodities* of a species referred to in Article 4.1.1.2., other than those listed in point 1 of Article 4.1.1.3., the *Competent Authorities* of the *importing country* should require the conditions prescribed in Articles 4.1.1.7. to 4.1.1.11. relevant to the TS status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any ~~other~~ *commodity* of a species not referred to in Article 4.1.1.2. but which could reasonably be expected to be a potential TSV carrier from an *exporting country, zone or compartment* not declared free of TS, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of TSV, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 4.1.1.4.

Taura syndrome free country

A country may make a *self-declaration of freedom* from TS if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from TS if all the areas covered by the shared water are declared TS free countries or *zones* (see Article 4.1.1.5.).

1. A country where none of the *susceptible species* referred to in Article 4.1.1.2. is present may make a *self-declaration of freedom* from TS when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where the *susceptible species* referred to in Article 4.1.1.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from TS when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

3. A country where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from TS when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the last 2 years without detection of TSV.

OR

4. A country that has previously made a *self-declaration of freedom* from TS but in which the *disease* is subsequently detected may not make a *self-declaration of freedom* from TS again until the following conditions have been met:
 - a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of TSV.

In the meantime, part of the non-affected area may be declared a free *zone* provided that they meet the conditions in point 3 of Article 4.1.1.5.

Article 4.1.1.5.

Taura syndrome free zone or free compartment

A *zone* or *compartment* within the *territory* of one or more countries not declared free from TS may be declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a TS free *zone* or *compartment* if all the relevant *Competent Authorities* confirm that the conditions have been met.

1. A *zone* or *compartment* where none of the *susceptible species* referred to in Article 4.1.1.2. is present may be declared free from TS when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. A *zone* or *compartment* where the *susceptible species* referred to in Article 4.1.1.2. are present but in which there has not been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from TS when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

3. A *zone* or *compartment* where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from TS when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place, through the *zone* or *compartment*, for at least the past 2 years without detection of TSV.

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OR

4. A *zone* previously declared free from TS but in which the *disease* is detected may not be declared free from TS again until the following conditions have been met:
- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of TSV.

Article 4.1.1.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from TS following the provisions of points 1 or 2 of Articles 4.1.1.4. or 4.1.1.5. (as relevant) may maintain its status as TS free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from TS following the provisions of point 3 of Articles 4.1.1.4. or 4.1.1.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as TS free provided that conditions that are conducive to clinical expression of TS, as described in Chapter X.X.X. of the *Aquatic Manual*, exist, and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of TS, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 4.1.1.7.

Importation of live aquatic animals from a country, zone or compartment declared free from Taura syndrome

When importing live *aquatic animals* of species referred to in Article 4.1.1.2. from a country, *zone* or *compartment* declared free from TS, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.1.4. or 4.1.1.5. (as applicable), the place of production of the *commodity* ~~consignment~~ is a country, *zone* or *compartment* declared free from TS.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.3.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.1.3.

Article 4.1.1.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from Taura syndrome

1. When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 4.1.1.2. from a country, *zone* or *compartment* not declared free from TS, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:
 - a) the direct delivery into and holding of the consignment in *quarantine* facilities;
 - b) the continuous isolation of the imported live *aquatic animals* and their first generation progeny from the local environment;
 - c) the treatment of all effluent and waste materials from the processing in a manner that ensures inactivation of TSV.
2. If the intention of the introduction is the establishment of new genetic lines, international standards, such as the Guidelines of the International Council for the Exploration of the Seas (ICES), should be followed.
3. For the purposes of the *Aquatic Code*, the ICES Guidelines may be summarised to the following main points:
 - a) identify stock of interest (cultured or wild) in its current location;
 - b) evaluate stock's health/*disease* history;
 - c) take and test samples for TSV, pests and general health/*disease* status;
 - d) import and quarantine in a secure facility a founder (F-0) population;
 - e) produce F-1 generation from the F-0 stock in *quarantine*;
 - f) culture F-1 stock and at critical times in its development (life cycle) sample and test for TSV and perform general examinations for pests and general health/*disease* status;
 - g) if TSV is not detected, pests are not present, and the general health/*disease* status of the stock is considered to meet the *basic biosecurity conditions* of the *importing country*, *zone* or *compartment*, the F-1 stock may be defined as TS free or specific pathogen free (SPF) for TSV;
 - h) release SPF F-1 stock from *quarantine* for *aquaculture* or stocking purposes in the country, *zone* or *compartment*.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.1.3.

Article 4.1.1.9.

Importation of live aquatic animals for human consumption from a country, zone or compartment not declared free from Taura syndrome

When importing, for human consumption, live *aquatic animals* of species referred to in Article 4.1.1.2. from a country, *zone* or *compartment* not declared free from TS, the *Competent Authority* of the *importing country* should require that:

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1. the consignment be delivered directly to and held in isolation until consumption; and
2. all effluent, dead *aquatic animals* and waste materials from the processing be treated in a manner that ensures inactivation of TSV.

Member Countries should consider introducing internal measures to prevent such *commodities* being used for any purpose other than for human consumption.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.1.3.

Article 4.1.1.10.

Importation of aquatic animal products from a country, zone or compartment declared free from Taura syndrome

When importing *aquatic animal products* of species referred to in Article 4.1.1.2. from a country, *zone* or *compartment* declared free from TS, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.1.4. or 4.1.1.5. (as applicable), the place of production of the consignment is a country, *zone* or *compartment* declared free from TS.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.2.2.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.1.3.

Article 4.1.1.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from Taura syndrome

When importing *aquatic animal products* of species referred to in Article 4.1.1.2. from a country, *zone* or *compartment* not declared free from TS, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.1.3.

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CHAPTER 4.1.2.

WHITE SPOT DISEASE

Article 4.1.2.1.

For the purposes of the *Aquatic Code*, white spot disease (WSD) means *infection* with white spot syndrome virus (WSSV). *White spot syndrome virus 1* is classified as a species in the genus *Whispovirus* of the family *Nimaviridae*. Common synonyms are listed in Chapter 4.1.2. of the *Aquatic Manual*.

Methods for surveillance and diagnosis are provided in the *Aquatic Manual*.

Article 4.1.2.2.

Scope

The recommendations in this Chapter apply to all decapod (order *Decapoda*) crustaceans from marine, brackish and freshwater sources. These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 4.1.2.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* of the *importing country* should not require any WSD related conditions, regardless of the WSD status of the *exporting country*, *zone* or *compartment*.
 - a) For the species referred to in Article 4.1.2.2. for any purpose:
 - i) commercially sterile canned products;
 - ii) boiled products (e.g. boiled whole shrimp or tails, lobsters, crabs);
 - iii) chemically extracted chitin;
 - iv) crustacean meals or by-products made non-infectious by heating or drying (e.g. flame dried or sun dried);
 - v) crustacean products made non-infectious through processing as dry feeds (e.g. pelleted or extruded feeds);
 - vi) biological samples preserved for diagnostic applications in such a manner as to inactivate the WSSV (e.g. formalin or alcohol preserved samples).
 - b) The following products destined for human consumption from species referred to in Article 4.1.2.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. salted, pickled, marinated, pastes, etc.);
 - ii) ~~products that have been heat treated or dried (e.g. ready prepared meals) in a manner to ensure the inactivation of the pathogen.~~

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For the *commodities* listed in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

2. When authorising the importation or transit of the *commodities* of a species referred to in Article 4.1.2.2., other than those listed in point 1 of Article 4.1.2.3., the *Competent Authorities* of the *importing country* should require the conditions prescribed in Articles 4.1.2.7. to 4.1.2.11. relevant to the WSD status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any ~~other~~ *commodity* of a species not referred to in Article 4.1.2.2. but which could reasonably be expected to be a potential WSSV carrier from an *exporting country, zone or compartment* not declared free of WSD, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of WSSV, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 4.1.2.4.

White spot disease free country

A country may make a *self-declaration of freedom* from WSD if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from WSD if all the areas covered by the shared water are declared WSD free countries or *zones* (see Article 4.1.2.5.).

1. A country where none of the *susceptible species* referred to in Article 4.1.2.2. is present may make a *self-declaration of freedom* from WSD when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where the *susceptible species* referred to in Article 4.1.2.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from WSD when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

3. A country where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from WSD when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the last 2 years without detection of WSSV.

OR

4. A country that has previously made a *self-declaration of freedom* from WSD but in which the *disease* is subsequently detected may not make a *self-declaration of freedom* from WSD again until the following conditions have been met:
 - a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of WSSV.

In the meantime, part of the non-affected area may be declared a free *zone* provided that they meet the conditions in point 3 of Article 4.1.2.5.

Article 4.1.2.5.

White spot disease free zone or free compartment

A *zone* or *compartment* within the *territory* of one or more countries not declared free from WSD may be declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a WSD free *zone* or *compartment* if all the relevant *Competent Authorities* confirm that the conditions have been met.

1. A *zone* or *compartment* where none of the *susceptible species* referred to in Article 4.1.2.2. is present may be declared free from WSD when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. A *zone* or *compartment* where the *susceptible species* referred to in Article 4.1.2.2. are present but in which there has not been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from WSD when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

3. A *zone* or *compartment* where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from WSD when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place, through the *zone* or *compartment*, for at least the past 2 years without detection of WSSV.

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OR

4. A *zone* previously declared free from WSD but in which the *disease* is detected may not be declared free from WSD again until the following conditions have been met:
 - a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of WSSV.

Article 4.1.2.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from WSD following the provisions of points 1 or 2 of Articles 4.1.2.4. or 4.1.2.5. (as relevant) may maintain its status as WSD free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from WSD following the provisions of point 3 of Articles 4.1.2.4. or 4.1.2.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as WSD free provided that conditions that are conducive to clinical expression of WSD, as described in Chapter X.X.X. of the *Aquatic Manual*, exist, and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of WSD, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 4.1.2.7.

Importation of live aquatic animals from a country, zone or compartment declared free from white spot disease

When importing live *aquatic animals* of species referred to in Article 4.1.2.2. from a country, *zone* or *compartment* declared free from WSD, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.2.4. or 4.1.2.5. (as applicable), the place of production of the commodity ~~consignment~~ is a country, *zone* or *compartment* declared free from WSD.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.3.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.2.3.

Article 4.1.2.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from white spot disease

1. When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 4.1.2.2. from a country, *zone* or *compartment* not declared free from WSD, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:
 - a) the direct delivery into and holding of the consignment in *quarantine* facilities;
 - b) the continuous isolation of the imported live *aquatic animals* and their first generation progeny from the local environment;
 - c) the treatment of all effluent and waste materials from the processing in a manner that ensures inactivation of WSSV.
2. If the intention of the introduction is the establishment of new genetic lines, international standards, such as the Guidelines of the International Council for the Exploration of the Seas (ICES), should be followed.
3. For the purposes of the *Aquatic Code*, the ICES Guidelines may be summarised to the following main points:
 - a) identify stock of interest (cultured or wild) in its current location;
 - b) evaluate stock's health/*disease* history;
 - c) take and test samples for WSSV, pests and general health/*disease* status;
 - d) import and quarantine in a secure facility a founder (F-0) population;
 - e) produce F-1 generation from the F-0 stock in *quarantine*;
 - f) culture F-1 stock and at critical times in its development (life cycle) sample and test for WSSV and perform general examinations for pests and general health/*disease* status;
 - g) if WSSV is not detected, pests are not present, and the general health/*disease* status of the stock is considered to meet the *basic biosecurity conditions* of the *importing country, zone* or *compartment*, the F-1 stock may be defined as WSD free or specific pathogen free (SPF) for WSSV;
 - h) release SPF F-1 stock from *quarantine* for *aquaculture* or stocking purposes in the country, *zone* or *compartment*.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.2.3.

Article 4.1.2.9.

Importation of live aquatic animals for human consumption from a country, zone or compartment not declared free from white spot disease

When importing, for human consumption, live *aquatic animals* of species referred to in Article 4.1.2.2. from a country, *zone* or *compartment* not declared free from WSD, the *Competent Authority* of the *importing country* should require that:

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1. the consignment be delivered directly to and held in isolation until consumption; and
2. all effluent, dead *aquatic animals* and waste materials from the processing be treated in a manner that ensures inactivation of WSSV.

Member Countries should consider introducing internal measures to prevent such *commodities* being used for any purpose other than for human consumption.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.2.3.

Article 4.1.2.10.

Importation of aquatic animal products from a country, zone or compartment declared free from white spot disease

When importing *aquatic animal products* of species referred to in Article 4.1.2.2. from a country, *zone* or *compartment* declared free from WSD, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.2.4. or 4.1.2.5. (as applicable), the place of production of the consignment is a country, *zone* or *compartment* declared free from WSD.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.2.2.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.2.3.

Article 4.1.2.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from white spot disease

When importing *aquatic animal products* of species referred to in Article 4.1.2.2. from a country, *zone* or *compartment* not declared free from WSD, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.2.3.

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CHAPTER 4.1.3.

YELLOWHEAD DISEASE

Article 4.1.3.1.

For the purposes of the *Aquatic Code*, yellowhead disease (YHD) means *infection* with yellow head virus (YHV). YHV and the related *Gill-associated virus* are classified as a species in the genus *Okavirus*, family *Roniviridae*, order *Nidovirales*. Common synonyms are listed in Chapter 4.1.3. of the *Aquatic Manual*.

Methods for surveillance and diagnosis are provided in the *Aquatic Manual*.

Article 4.1.3.2.

Scope

The recommendations in this Chapter apply to: giant tiger prawn (*Penaeus monodon*), brown tiger prawn (*P. esculentus*) and Kuruma prawn (*P. japonicus*). These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 4.1.3.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* of the *importing country* should not require any YHD related conditions, regardless of the YHD status of the *exporting country, zone or compartment*.
 - a) For the species referred to in Article 4.1.3.2. for any purpose:
 - i) commercially sterile canned products;
 - ii) boiled products (e.g. boiled whole shrimp or tails, lobsters, crabs);
 - iii) chemically extracted chitin;
 - iv) crustacean meals or by-products made non-infectious by heating or drying (e.g. flame dried or sun dried);
 - v) crustacean products made non-infectious through processing as dry feeds (e.g. pelleted or extruded feeds);
 - vi) biological samples preserved for diagnostic applications in such a manner as to inactivate the YHV (e.g. formalin or alcohol preserved samples).
 - b) The following products destined for human consumption from species referred to in Article 4.1.3.2 which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. salted, pickled, marinated, pastes, etc.);

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- ii) products that have been heat treated or dried (e.g. ready prepared meals) in a manner to ensure the inactivation of the pathogen.

For the *commodities* listed in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

2. When authorising the importation or transit of the *commodities* of a species referred to in Article 4.1.3.2., other than those listed in point 1 of Article 4.1.3.3., the *Competent Authorities* of the *importing country* should require the conditions prescribed in Articles 4.1.3.7. to 4.1.3.11. relevant to the YHD status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any ~~other~~ *commodity* of a species not referred to in Article 4.1.3.2. but which could reasonably be expected to be a potential YHV carrier from an *exporting country, zone or compartment* not declared free of YHD, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of YHV, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 4.1.3.4.

Yellowhead disease free country

A country may make a *self-declaration of freedom* from YHD if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from YHD if all the areas covered by the shared water are declared YHD free countries or *zones* (see Article 4.1.3.5.).

1. A country where none of the *susceptible species* referred to in Article 4.1.3.2. is present may make a *self-declaration of freedom* from YHD when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where the *susceptible species* referred to in Article 4.1.3.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from YHD when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

3. A country where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from YHD when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the last 2 years without detection of YHV.

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OR

4. A country that has previously made a *self-declaration of freedom* from YHD but in which the *disease* is subsequently detected may not make a *self-declaration of freedom* from YHD again until the following conditions have been met:
- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of YHV.

In the meantime, part of the non-affected area may be declared a free *zone* provided that they meet the conditions in point 3 of Article 4.1.3.5.

Article 4.1.3.5.

Yellowhead disease free zone or free compartment

A *zone* or *compartment* within the *territory* of one or more countries not declared free from YHD may be declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a YHD free *zone* or *compartment* if all the relevant *Competent Authorities* confirm that the conditions have been met.

1. A *zone* or *compartment* where none of the *susceptible species* referred to in Article 4.1.3.2. is present may be declared free from YHD when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. A *zone* or *compartment* where the *susceptible species* referred to in Article 4.1.3.2. are present but in which there has not been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from YHD when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

3. A *zone* or *compartment* where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from YHD when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place, through the *zone* or *compartment*, for at least the past 2 years without detection of YHV.

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OR

4. A *zone* previously declared free from YHD but in which the *disease* is detected may not be declared free from YHD again until the following conditions have been met:
 - a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of YHV.

Article 4.1.3.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from YHD following the provisions of points 1 or 2 of Articles 4.1.3.4. or 4.1.3.5. (as relevant) may maintain its status as YHD free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from YHD following the provisions of point 3 of Articles 4.1.3.4. or 4.1.3.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as YHD free provided that conditions that are conducive to clinical expression of YHD, as described in Chapter X.X.X. of the *Aquatic Manual*, exist, and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of YHD, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 4.1.3.7.

Importation of live aquatic animals from a country, zone or compartment declared free from yellowhead disease

When importing live *aquatic animals* of species referred to in Article 4.1.3.2. from a country, *zone* or *compartment* declared free from YHD, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.3.4. or 4.1.3.5. (as applicable), the place of production of the commodity ~~consignment~~ is a country, *zone* or *compartment* declared free from YHD.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.3.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.3.3.

Article 4.1.3.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from yellowhead disease

1. When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 4.1.3.2. from a country, *zone* or *compartment* not declared free from YHD, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:
 - a) the direct delivery into and holding of the consignment in *quarantine* facilities;
 - b) the continuous isolation of the imported live *aquatic animals* and their first generation progeny from the local environment;
 - c) the treatment of all effluent and waste materials from the processing in a manner that ensures inactivation of YHV.
2. If the intention of the introduction is the establishment of new genetic lines, international standards, such as the Guidelines of the International Council for the Exploration of the Seas (ICES), should be followed.
3. For the purposes of the *Aquatic Code*, the ICES Guidelines may be summarised to the following main points:
 - a) identify stock of interest (cultured or wild) in its current location;
 - b) evaluate stock's health/*disease* history;
 - c) take and test samples for YHV, pests and general health/*disease* status;
 - d) import and quarantine in a secure facility a founder (F-0) population;
 - e) produce F-1 generation from the F-0 stock in *quarantine*;
 - f) culture F-1 stock and at critical times in its development (life cycle) sample and test for YHV and perform general examinations for pests and general health/*disease* status;
 - g) if YHV is not detected, pests are not present, and the general health/*disease* status of the stock is considered to meet the *basic biosecurity conditions* of the *importing country*, *zone* or *compartment*, the F-1 stock may be defined as YHD free or specific pathogen free (SPF) for YHV;
 - h) release SPF F-1 stock from *quarantine* for *aquaculture* or stocking purposes in the country, *zone* or *compartment*.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.3.3.

Article 4.1.3.9.

Importation of live aquatic animals for human consumption from a country, zone or compartment not declared free from yellowhead disease

When importing, for human consumption, live *aquatic animals* of species referred to in Article 4.1.3.2. from a country, *zone* or *compartment* not declared free from YHD, the *Competent Authority* of the *importing country* should require that:

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1. the consignment be delivered directly to and held in isolation until consumption; and
2. all effluent, dead *aquatic animals* and waste materials from the processing be treated in a manner that ensures inactivation of YHV.

Member Countries should consider introducing internal measures to prevent such *commodities* being used for any purpose other than for human consumption.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.3.3.

Article 4.1.3.10.

Importation of aquatic animal products from a country, zone or compartment declared free from yellowhead disease

When importing *aquatic animal products* of species referred to in Article 4.1.3.2. from a country, *zone* or *compartment* declared free from YHD, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.3.4. or 4.1.3.5. (as applicable), the place of production of the consignment is a country, *zone* or *compartment* declared free from YHD.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.2.2.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.3.3.

Article 4.1.3.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from yellowhead disease

When importing *aquatic animal products* of species referred to in Article 4.1.3.2. from a country, *zone* or *compartment* not declared free from YHD, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.3.3.

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CHAPTER 4.1.4.

TETRAHEDRAL BACULOVIROSIS

Article 4.1.4.1.

For the purposes of the *Aquatic Code*, tetrahedral baculovirus means *infection* with *Baculovirus penaei* (BPV). This virus is closely related to *Penaeus monodon baculovirus* (Chapter 4.1.5.) which has been classified as a tentative species in the genus *Nucleopolyhedrovirus*. Common synonyms are listed in Chapter 4.1.4. of the *Aquatic Manual*.

Methods for surveillance and diagnosis are provided in the *Aquatic Manual*.

Article 4.1.4.2.

Scope

The recommendations in this Chapter apply to the following genera: *Penaeus*, *Trachypenaeus* and *Protrachypene*. These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 4.1.4.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* of the *importing country* should not require any tetrahedral baculovirus related conditions, regardless of the tetrahedral baculovirus status of the *exporting country*, *zone* or *compartment*.
 - a) For the species referred to in Article 4.1.4.2. for any purpose:
 - i) commercially sterile canned products;
 - ii) boiled products (e.g. boiled whole shrimp or tails, lobsters, crabs);
 - iii) chemically extracted chitin;
 - iv) crustacean meals or by-products made non-infectious by heating or drying (e.g. flame dried or sun dried);
 - v) crustacean products made non-infectious through processing as dry feeds (e.g. pelleted or extruded feeds);
 - vi) biological samples preserved for diagnostic applications in such a manner as to inactivate the BPV (e.g. formalin or alcohol preserved samples).
 - b) The following products destined for human consumption from species referred to in Article 4.1.4.2 which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. salted, pickled, marinated, pastes, etc.);

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- ii) products that have been heat treated or dried (e.g. ready prepared meals) in a manner to ensure the inactivation of the pathogen;
- iii) ~~de-headed and de-veined~~ “de-veined” (intestine removed) shrimp tails.

For the *commodities* listed in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

2. When authorising the importation or transit of the *commodities* of a species referred to in Article 4.1.4.2., other than those listed in point 1 of Article 4.1.4.3., the *Competent Authorities* of the *importing country* should require the conditions prescribed in Articles 4.1.4.7. to 4.1.4.11., relevant to the tetrahedral baculovirus status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any ~~other~~ *commodity* of a species not referred to in Article 4.1.4.2. but which could reasonably be expected to be a potential BPV carrier from an *exporting country, zone or compartment* not declared free of tetrahedral baculovirus, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of BPV, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 4.1.4.4.

Tetrahedral baculovirus free country

A country may make a *self-declaration of freedom* from tetrahedral baculovirus if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from tetrahedral baculovirus if all the areas covered by the shared water are declared tetrahedral baculovirus free countries or *zones* (see Article 4.1.4.5.).

1. A country where none of the *susceptible species* referred to in Article 4.1.4.2. is present may make a *self-declaration of freedom* from tetrahedral baculovirus when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where the *susceptible species* referred to in Article 4.1.4.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from tetrahedral baculovirus when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

3. A country where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from tetrahedral baculovirus when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and

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- b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the last 2 years without detection of BPV.

OR

4. A country that has previously made a *self-declaration of freedom* from tetrahedral baculovirus but in which the *disease* is subsequently detected may not make a *self-declaration of freedom* from tetrahedral baculovirus again until the following conditions have been met:
- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of BPV.

In the meantime, part of the non-affected area may be declared a free *zone* provided that they meet the conditions in point 3 of Article 4.1.4.5.

Article 4.1.4.5.

Tetrahedral baculovirus free zone or free compartment

A *zone* or *compartment* within the *territory* of one or more countries not declared free from tetrahedral baculovirus may be declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a tetrahedral baculovirus free *zone* or *compartment* if all the relevant *Competent Authorities* confirm that the conditions have been met.

1. A *zone* or *compartment* where none of the *susceptible species* referred to in Article 4.1.4.2. is present may be declared free from tetrahedral baculovirus when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. A *zone* or *compartment* where the *susceptible species* referred to in Article 4.1.4.2. are present but in which there has not been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from tetrahedral baculovirus when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

3. A *zone* or *compartment* where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from tetrahedral baculovirus when:

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- a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
- b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place, through the *zone* or *compartment*, for at least the past 2 years without detection of BPV.

OR

4. A *zone* previously declared free from tetrahedral baculovirus but in which the *disease* is detected may not be declared free from tetrahedral baculovirus again until the following conditions have been met:
 - a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of BPV.

Article 4.1.4.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from tetrahedral baculovirus following the provisions of points 1 or 2 of Articles 4.1.4.4. or 4.1.4.5. (as relevant) may maintain its status as tetrahedral baculovirus free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from tetrahedral baculovirus following the provisions of point 3 of Articles 4.1.4.4. or 4.1.4.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as tetrahedral baculovirus free provided that conditions that are conducive to clinical expression of tetrahedral baculovirus, as described in Chapter X.X.X. of the *Aquatic Manual*, exist, and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of tetrahedral baculovirus, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 4.1.4.7.

Importation of live aquatic animals from a country, zone or compartment declared free from tetrahedral baculovirus

When importing live *aquatic animals* of species referred to in Article 4.1.4.2. from a country, *zone* or *compartment* declared free from tetrahedral baculovirus, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.4.4. or 4.1.4.5. (as applicable), the place of production of the commodity consignment is a country, *zone* or *compartment* declared free from tetrahedral baculovirus.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.3.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.4.3.

Article 4.1.4.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from tetrahedral baculovirus

1. When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 4.1.4.2. from a country, *zone* or *compartment* not declared free from tetrahedral baculovirus, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:
 - a) the direct delivery into and holding of the consignment in *quarantine* facilities;
 - b) the continuous isolation of the imported live *aquatic animals* and their first generation progeny from the local environment;
 - c) the treatment of all effluent and waste materials from the processing in a manner that ensures inactivation of BPV.
2. If the intention of the introduction is the establishment of new genetic lines, international standards, such as the Guidelines of the International Council for the Exploration of the Seas (ICES), should be followed.
3. For the purposes of the *Aquatic Code*, the ICES Guidelines may be summarised to the following main points:
 - a) identify stock of interest (cultured or wild) in its current location;
 - b) evaluate stock's health/*disease* history;
 - c) take and test samples for BPV, pests and general health/*disease* status;
 - d) import and quarantine in a secure facility a founder (F-0) population;
 - e) produce F-1 generation from the F-0 stock in *quarantine*;
 - f) culture F-1 stock and at critical times in its development (life cycle) sample and test for BPV and perform general examinations for pests and general health/*disease* status;
 - g) if BPV is not detected, pests are not present, and the general health/*disease* status of the stock is considered to meet the *basic biosecurity conditions* of the *importing country*, *zone* or *compartment*, the F-1 stock may be defined as tetrahedral baculovirus free or specific pathogen free (SPF) for BPV;
 - h) release SPF F-1 stock from *quarantine* for *aquaculture* or stocking purposes in the country, *zone* or *compartment*.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.4.3.

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Article 4.1.4.9.

Importation of live aquatic animals for human consumption from a country, zone or compartment not declared free from tetrahedral baculovirus

When importing, for human consumption, live *aquatic animals* of species referred to in Article 4.1.4.2. from a country, *zone* or *compartment* not declared free from tetrahedral baculovirus, the *Competent Authority* of the *importing country* should require that:

1. the consignment be delivered directly to and held in isolation until consumption; and
2. all effluent, dead *aquatic animals* and waste materials from the processing be treated in a manner that ensures inactivation of BPV.

Member Countries should consider introducing internal measures to prevent such *commodities* being used for any purpose other than for human consumption.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.4.3.

Article 4.1.4.10.

Importation of aquatic animal products from a country, zone or compartment declared free from tetrahedral baculovirus

When importing *aquatic animal products* of species referred to in Article 4.1.4.2. from a country, *zone* or *compartment* declared free from tetrahedral baculovirus, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.4.4. or 4.1.4.5. (as applicable), the place of production of the consignment is a country, *zone* or *compartment* declared free from tetrahedral baculovirus.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.2.2.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.4.3.

Article 4.1.4.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from tetrahedral baculovirus

When importing *aquatic animal products* of species referred to in Article 4.1.4.2. from a country, *zone* or *compartment* not declared free from tetrahedral baculovirus, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.4.3.

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CHAPTER 4.1.5.

SPHERICAL BACULOVIROSI

Article 4.1.5.1.

For the purposes of the *Aquatic Code*, spherical baculovirosis means *infection* with *Penaeus monodon* baculovirus (MBV). *Penaeus monodon baculovirus* is classified as a tentative species in the genus *Nucleopolyhedrovirus*. Common synonyms are listed in Chapter 4.1.5. of the *Aquatic Manual*.

Methods for surveillance and diagnosis are provided in the *Aquatic Manual*.

Article 4.1.5.2.

Scope

The recommendations in this Chapter apply to the following genera: *Penaeus* and *Metapenaeus*. These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 4.1.5.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* of the *importing country* should not require any spherical baculovirosis related conditions, regardless of the spherical baculovirosis status of the *exporting country, zone or compartment*.
 - a) For the species referred to in Article 4.1.5.2. for any purpose:
 - i) commercially sterile canned products;
 - ii) boiled products (e.g. boiled whole shrimp or tails, lobsters, crabs);
 - iii) chemically extracted chitin;
 - iv) crustacean meals or by-products made non-infectious by heating or drying (e.g. flame dried or sun dried);
 - v) crustacean products made non-infectious through processing as dry feeds (e.g. pelleted or extruded feeds);
 - vi) biological samples preserved for diagnostic applications in such a manner as to inactivate the MBV (e.g. formalin or alcohol preserved samples).
 - b) The following products destined for human consumption from species referred to in Article 4.1.5.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. salted, pickled, marinated, pastes, etc.);

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- ii) products that have been heat treated or dried (e.g. ready prepared meals) in a manner to ensure the inactivation of the pathogen;
- iii) ~~de-headed and de-veined~~ “de-veined” (intestine removed) shrimp tails.

For the *commodities* listed in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

2. When authorising the importation or transit of the *commodities* of a species referred to in Article 4.1.5.2., other than those listed in point 1 of Article 4.1.5.3., the *Competent Authorities* of the *importing country* should require the conditions prescribed in Articles 4.1.5.7. to 4.1.5.11. relevant to the spherical baculovirus status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any ~~other~~ *commodity* of a species not referred to in Article 4.1.5.2. but which could reasonably be expected to be a potential MBV carrier from an *exporting country, zone or compartment* not declared free of spherical baculovirus, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of MBV, and the potential consequences, associated with the importation of the *commodity*, prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 4.1.5.4.

Spherical baculovirus free country

A country may make a *self-declaration of freedom* from spherical baculovirus if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from spherical baculovirus if all the areas covered by the shared water are declared spherical baculovirus free countries or *zones* (see Article 4.1.5.5.).

1. A country where none of the *susceptible species* referred to in Article 4.1.5.2. is present may make a *self-declaration of freedom* from spherical baculovirus when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where the *susceptible species* referred to in Article 4.1.5.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from spherical baculovirus when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

3. A country where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from spherical baculovirus when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and

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- b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the last 2 years without detection of MBV.

OR

4. A country that has previously made a *self-declaration of freedom* from spherical baculovirus but in which the *disease* is subsequently detected may not make a *self-declaration of freedom* from spherical baculovirus again until the following conditions have been met:
- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of MBV.

In the meantime, part of the non-affected area may be declared a free *zone* provided that they meet the conditions in point 3 of Article 4.1.5.5.

Article 4.1.5.5.

Spherical baculovirus free zone or free compartment

A *zone* or *compartment* within the *territory* of one or more countries not declared free from spherical baculovirus may be declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a spherical baculovirus free *zone* or *compartment* if all the relevant *Competent Authorities* confirm that the conditions have been met.

1. A *zone* or *compartment* where none of the *susceptible species* referred to in Article 4.1.5.2. is present may be declared free from spherical baculovirus when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. A *zone* or *compartment* where the *susceptible species* referred to in Article 4.1.5.2. are present but in which there has not been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from spherical baculovirus when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

3. A *zone* or *compartment* where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from spherical baculovirus when:

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- a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
- b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place, through the *zone* or *compartment*, for at least the past 2 years without detection of MBV.

OR

- 4. A *zone* previously declared free from spherical baculovirus but in which the *disease* is detected may not be declared free from spherical baculovirus again until the following conditions have been met:
 - a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of MBV.

Article 4.1.5.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from spherical baculovirus following the provisions of points 1 or 2 of Articles 4.1.5.4. or 4.1.5.5. (as relevant) may maintain its status as spherical baculovirus free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from spherical baculovirus following the provisions of point 3 of Articles 4.1.5.4. or 4.1.5.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as spherical baculovirus free provided that conditions that are conducive to clinical expression of spherical baculovirus, as described in Chapter X.X.X. of the *Aquatic Manual*, exist, and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of spherical baculovirus, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 4.1.5.7.

Importation of live aquatic animals from a country, zone or compartment declared free from spherical baculovirus

When importing live *aquatic animals* of species referred to in Article 4.1.5.2. from a country, *zone* or *compartment* declared free from spherical baculovirus, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.5.4. or 4.1.5.5. (as applicable), the place of production of the commodity ~~consignment~~ is a country, *zone* or *compartment* declared free from spherical baculovirus.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.3.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.5.3.

Article 4.1.5.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from spherical baculovirus

1. When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 4.1.5.2. from a country, *zone* or *compartment* not declared free from spherical baculovirus, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:
 - a) the direct delivery into and holding of the consignment in *quarantine* facilities;
 - b) the continuous isolation of the imported live *aquatic animals* and their first generation progeny from the local environment;
 - c) the treatment of all effluent and waste materials from the processing in a manner that ensures inactivation of MBV.
2. If the intention of the introduction is the establishment of new genetic lines, international standards, such as the Guidelines of the International Council for the Exploration of the Seas (ICES), should be followed.
3. For the purposes of the *Aquatic Code*, the ICES Guidelines may be summarised to the following main points:
 - a) identify stock of interest (cultured or wild) in its current location;
 - b) evaluate stock's health/*disease* history;
 - c) take and test samples for MBV, pests and general health/*disease* status;
 - d) import and quarantine in a secure facility a founder (F-0) population;
 - e) produce F-1 generation from the F-0 stock in *quarantine*;
 - f) culture F-1 stock and at critical times in its development (life cycle) sample and test for MBV and perform general examinations for pests and general health/*disease* status;
 - g) if MBV is not detected, pests are not present, and the general health/*disease* status of the stock is considered to meet the *basic biosecurity conditions* of the *importing country*, *zone* or *compartment*, the F-1 stock may be defined as spherical baculovirus free or specific pathogen free (SPF) for MBV;
 - h) release SPF F-1 stock from *quarantine* for *aquaculture* or stocking purposes in the country, *zone* or *compartment*.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.5.3.

Article 4.1.5.9.

Importation of live aquatic animals for human consumption from a country, zone or compartment not declared free from spherical baculovirus

When importing, for human consumption, live *aquatic animals* of species referred to in Article 4.1.5.2. from a country, *zone* or *compartment* not declared free from spherical baculovirus, the *Competent Authority* of the *importing country* should require that:

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1. the consignment be delivered directly to and held in isolation until consumption; and
2. all effluent, dead *aquatic animals* and waste materials from the processing be treated in a manner that ensures inactivation of MBV.

Member Countries should consider introducing internal measures to prevent such *commodities* being used for any purpose other than for human consumption.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.5.3.

Article 4.1.5.10.

Importation of aquatic animal products from a country, zone or compartment declared free from spherical baculovirus

When importing *aquatic animal products* of species referred to in Article 4.1.5.2. from a country, *zone* or *compartment* declared free from spherical baculovirus, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.5.4. or 4.1.5.5. (as applicable), the place of production of the consignment is a country, *zone* or *compartment* declared free from spherical baculovirus.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.2.2.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.5.3.

Article 4.1.5.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from spherical baculovirus

When importing *aquatic animal products* of species referred to in Article 4.1.5.2. from a country, *zone* or *compartment* not declared free from spherical baculovirus, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.5.3.

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CHAPTER 4.1.6.

**INFECTIOUS HYPODERMAL AND
HAEMATOPOIETIC NECROSIS**

Article 4.1.6.1.

For the purposes of the *Aquatic Code*, infectious hypodermal and haematopoietic necrosis (IHHN) means *infection* with infectious hypodermal and haematopoietic necrosis virus (IHHNV). IHHNV is classified as the species *Penaeus stylirostris densovirus* in the genus *Breviadensovirus* in the family *Parvoviridae*.

Methods for surveillance and diagnosis are provided in the *Aquatic Manual*.

Article 4.1.6.2.

Scope

The recommendations in this Chapter apply to: giant tiger prawn (*Penaeus monodon*), Pacific white shrimp (*P. vannamei*) and blue shrimp (*P. stylirostris*). These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 4.1.6.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* of the *importing country* should not require any IHHN related conditions, regardless of the IHHN status of the *exporting country*, *zone* or *compartment*.
 - a) For the species referred to in Article 4.1.6.2. for any purpose:
 - i) commercially sterile canned products;
 - ii) boiled products (e.g. boiled whole shrimp or tails, lobsters, crabs);
 - iii) chemically extracted chitin;
 - iv) crustacean meals or by-products made non-infectious by heating or drying (e.g. flame dried or sun dried);
 - v) crustacean products made non-infectious through processing as dry feeds (e.g. pelleted or extruded feeds);
 - vi) biological samples preserved for diagnostic applications in such a manner as to inactivate the IHHNV (e.g. formalin or alcohol preserved samples).
 - b) The following products destined for human consumption from species referred to in Article 4.1.6.2 which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. salted, pickled, marinated, pastes, etc.);

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- ii) products that have been heat treated or dried (e.g. ready prepared meals) in a manner to ensure the inactivation of the pathogen.

For the *commodities* listed in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

2. When authorising the importation or transit of the *commodities* of a species referred to in Article 4.1.6.2., other than those listed in point 1 of Article 4.1.6.3., the *Competent Authorities* of the *importing country* should require the conditions prescribed in Articles 4.1.6.7. to 4.1.6.11. relevant to the IHHN status of the *exporting country*, *zone* or *compartment*.
3. When considering the importation or transit of any ~~other~~ *commodity* of a species not referred to in Article 4.1.6.2. but which could reasonably be expected to be a potential IHHNV carrier from an *exporting country*, *zone* or *compartment* not declared free of IHHN, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of IHHNV, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 4.1.6.4.

Infectious hypodermal and haematopoietic necrosis free country

A country may make a *self-declaration of freedom* from IHHN if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from IHHN if all the areas covered by the shared water are declared IHHN free countries or *zones* (see Article 4.1.6.5.).

1. A country where none of the *susceptible species* referred to in Article 4.1.6.2. is present may make a *self-declaration of freedom* from IHHN when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where the *susceptible species* referred to in Article 4.1.6.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from IHHN when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

3. A country where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from IHHN when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the last 2 years without detection of IHHNV.

OR

4. A country that has previously made a *self-declaration of freedom* from IHHN but in which the *disease* is subsequently detected may not make a *self-declaration of freedom* from IHHN again until the following conditions have been met:
 - a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of IHHNV.

In the meantime, part of the non-affected area may be declared a free *zone* provided that they meet the conditions in point 3 of Article 4.1.6.5.

Article 4.1.6.5.

Infectious hypodermal and haematopoietic necrosis free zone or free compartment

A *zone* or *compartment* within the *territory* of one or more countries not declared free from IHHN may be declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared an IHHN free *zone* or *compartment* if all the relevant *Competent Authorities* confirm that the conditions have been met.

1. A *zone* or *compartment* where none of the *susceptible species* referred to in Article 4.1.6.2. is present may be declared free from IHHN when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. A *zone* or *compartment* where the *susceptible species* referred to in Article 4.1.6.2. are present but in which there has not been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from IHHN when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

3. A *zone* or *compartment* where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from IHHN when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place, through the *zone* or *compartment*, for at least the past 2 years without detection of IHHNV.

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OR

4. A *zone* previously declared free from IHHN but in which the *disease* is detected may not be declared free from IHHN again until the following conditions have been met:
 - a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of IHHNV.

Article 4.1.6.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from IHHN following the provisions of points 1 or 2 of Articles 4.1.6.4. or 4.1.6.5. (as relevant) may maintain its status as IHHN free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from IHHN following the provisions of point 3 of Articles 4.1.6.4. or 4.1.6.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as IHHN free provided that conditions that are conducive to clinical expression of IHHN, as described in Chapter X.X.X. of the *Aquatic Manual*, exist, and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of IHHN, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 4.1.6.7.

Importation of live aquatic animals from a country, zone or compartment declared free from infectious hypodermal and haematopoietic necrosis

When importing live *aquatic animals* of species referred to in Article 4.1.6.2. from a country, *zone* or *compartment* declared free from IHHN, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.6.4. or 4.1.6.5. (as applicable), the place of production of the commodity ~~consignment~~ is a country, *zone* or *compartment* declared free from IHHN.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.3.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.6.3.

Article 4.1.6.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from infectious hypodermal and haematopoietic necrosis

1. When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 4.1.6.2. from a country, *zone* or *compartment* not declared free from IHHN, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:
 - a) the direct delivery into and holding of the consignment in *quarantine* facilities;
 - b) the continuous isolation of the imported live *aquatic animals* and their first generation progeny from the local environment;
 - c) the treatment of all effluent and waste materials from the processing in a manner that ensures inactivation of IHHNV.
2. If the intention of the introduction is the establishment of new genetic lines, international standards, such as the Guidelines of the International Council for the Exploration of the Seas (ICES), should be followed.
3. For the purposes of the *Aquatic Code*, the ICES Guidelines may be summarised to the following main points:
 - a) identify stock of interest (cultured or wild) in its current location;
 - b) evaluate stock's health/*disease* history;
 - c) take and test samples for IHHNV, pests and general health/*disease* status;
 - d) import and quarantine in a secure facility a founder (F-0) population;
 - e) produce F-1 generation from the F-0 stock in *quarantine*;
 - f) culture F-1 stock and at critical times in its development (life cycle) sample and test for IHHNV and perform general examinations for pests and general health/*disease* status;
 - g) if IHHNV is not detected, pests are not present, and the general health/*disease* status of the stock is considered to meet the *basic biosecurity conditions* of the *importing country, zone* or *compartment*, the F-1 stock may be defined as IHHN free or specific pathogen free (SPF) for IHHNV;
 - h) release SPF F-1 stock from *quarantine* for *aquaculture* or stocking purposes in the country, *zone* or *compartment*.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.6.3.

Article 4.1.6.9.

Importation of live aquatic animals for human consumption from a country, zone or compartment not declared free from infectious hypodermal and haematopoietic necrosis

When importing, for human consumption, live *aquatic animals* of species referred to in Article 4.1.6.2. from a country, *zone* or *compartment* not declared free from IHHN, the *Competent Authority* of the *importing country* should require that:

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1. the consignment be delivered directly to and held in isolation until consumption; and
2. all effluent, dead *aquatic animals* and waste materials from the processing be treated in a manner that ensures inactivation of IHHNV.

Member Countries should consider introducing internal measures to prevent such *commodities* being used for any purpose other than for human consumption.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.6.3.

Article 4.1.6.10.

Importation of aquatic animal products from a country, zone or compartment declared free from infectious hypodermal and haematopoietic necrosis

When importing *aquatic animal products* of species referred to in Article 4.1.6.2. from a country, *zone* or *compartment* declared free from IHHN, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.6.4. or 4.1.6.5. (as applicable), the place of production of the consignment is a country, *zone* or *compartment* declared free from IHHN.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.2.2.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.6.3.

Article 4.1.6.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from infectious hypodermal and haematopoietic necrosis

When importing *aquatic animal products* of species referred to in Article 4.1.6.2. from a country, *zone* or *compartment* not declared free from IHHN, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.6.3.

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CHAPTER 4.1.7.

CRAYFISH PLAGUE

Article 4.1.7.1.

For the purposes of the *Aquatic Code*, crayfish plague means *infection* with *Aphanomyces astaci* Schikora. This organism is a member of a group commonly known as the water moulds (the Oomycetida). Common synonyms are listed in Chapter 4.1.7. of the *Aquatic Manual*.

Methods for surveillance and diagnosis are provided in the *Aquatic Manual*.

Article 4.1.7.2.

Scope

The recommendations in this Chapter apply to all species of crayfish in all three crayfish families (*Cambaridae*, *Astacidae*, and *Parastacidae*). These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Crayfish plague is most severe in European crayfish species including the noble crayfish (*Astacus astacus*), the white claw crayfish (*Austropotamobius pallipes*), stone crayfish (*Austropotamobius torrentium*), and the Turkish crayfish (*Astacus leptodactylus*). In general, the Parastacidae and the Astacidae (except *Pacifastacus*) are highly susceptible, while the *Cambaridae* are resistant to *disease*, but are potential carriers.

Article 4.1.7.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* of the *importing country* should not require any crayfish plague related conditions, regardless of the crayfish plague status of the *exporting country*, *zone* or *compartment*.
 - a) For the species referred to in Article 4.1.7.2. for any purpose:
 - i) commercially sterile canned products;
 - ii) boiled products (e.g. cooked whole shrimp or tails, lobsters, crabs);
 - iii) chemically extracted chitin;
 - iv) crustacean meals or by-products made non-infectious by heating (>60°C for >5 minutes) or drying by-product (e.g. flame dried or sun dried);
 - v) crustacean products made non-infectious during processing as dry feeds (e.g. pelleted or extruded feeds);
 - vi) biological samples preserved for diagnostic applications in such a manner as to inactivate the *A. astaci* (e.g. formalin or alcohol preserved samples);
 - vii) frozen products that have been subjected to -10°C or lower temperatures for at least 24 hours.

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- b) The following products destined for human consumption from species referred to in Article 4.1.7.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
- i) chemically preserved products (e.g. salted, pickled, marinated, pastes, etc.);
 - ii) products that have been heat treated or dried (e.g. ready prepared meals) in a manner to ensure the inactivation of the pathogen.

For the *commodities* listed in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

2. When authorising the importation or transit of the *commodities* of a species referred to in Article 4.1.7.2., other than those listed in point 1 of Article 4.1.7.3., the *Competent Authorities* of the *importing country* should require the conditions prescribed in Articles 4.1.7.7. to 4.1.7.11. relevant to the crayfish plague status of the *exporting country*, *zone* or *compartment*.
3. When considering the importation or transit of any ~~other~~ *commodity* of a species not referred to in Article 4.1.7.2. but which could reasonably be expected to be a potential *A. astaci* carrier from an *exporting country*, *zone* or *compartment* not declared free of crayfish plague, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of *A. astaci*, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 4.1.7.4.

Crayfish plague free country

A country may make a *self-declaration of freedom* from crayfish plague if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *water catchment* or with one or more other countries, it can only make a *self-declaration of freedom* from crayfish plague if all the areas covered by the shared water are declared crayfish plague free countries or *zones* (see Article 4.1.7.5.).

1. A country where none of the *susceptible species* referred to in Article 4.1.7.2. is present may make a *self-declaration of freedom* from crayfish plague when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where the *susceptible species* referred to in Article 4.1.7.2. are present but there has never been any observed occurrence of the *disease* for at least the past 25 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from crayfish plague when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

3. A country where the last observed occurrence of the *disease* was within the past 25 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from crayfish plague when:

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- a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
- b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the last 5 years without detection of *A. astaci*.

OR

4. A country that has previously made a *self-declaration of freedom* from crayfish plague but in which the *disease* is subsequently detected may not make a *self-declaration of freedom* from crayfish plague again until the following conditions have been met:
 - a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 5 years without detection of *A. astaci*.

In the meantime, part of the non-affected area may be declared a free *zone* provided that they meet the conditions in point 3 of Article 4.1.7.5.

Article 4.1.7.5.

Crayfish plague free zone or free compartment

A *zone* or *compartment* within the *territory* of one or more countries not declared free from crayfish plague may be declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a crayfish plague free *zone* or *compartment* if all the relevant *Competent Authorities* confirm that the conditions have been met.

1. A *zone* or *compartment* where none of the *susceptible species* referred to in Article 4.1.7.2. is present may be declared free from crayfish plague when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. A *zone* or *compartment* where the *susceptible species* referred to in Article 4.1.7.2. are present but in which there has not been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from crayfish plague when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

3. A *zone* or *compartment* where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from crayfish plague when:

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- a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
- b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place, through the *zone* or *compartment*, for at least the past 2 years without detection of *A. astaci*.

OR

- 4. A *zone* previously declared free from crayfish plague but in which the *disease* is detected may not be declared free from crayfish plague again until the following conditions have been met:
 - a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *A. astaci*.

Article 4.1.7.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from crayfish plague following the provisions of points 1 or 2 of Articles 4.1.7.4. or 4.1.7.5. (as relevant) may maintain its status as crayfish plague free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from crayfish plague following the provisions of point 3 of Articles 4.1.7.4. or 4.1.7.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as crayfish plague free provided that conditions that are conducive to clinical expression of crayfish plague, as described in Chapter X.X.X. of the *Aquatic Manual*, exist, and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of crayfish plague, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 4.1.7.7.

Importation of live aquatic animals from a country, zone or compartment declared free from crayfish plague

When importing live *aquatic animals* of species referred to in Article 4.1.7.2. from a country, *zone* or *compartment* declared free from crayfish plague, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.7.4. or 4.1.7.5. (as applicable), the place of production of the commodity consignment is a country, *zone* or *compartment* declared free from crayfish plague.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.3.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.7.3.

Article 4.1.7.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from crayfish plague

1. When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 4.1.7.2. from a country, *zone* or *compartment* not declared free from crayfish plague, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:
 - a) the direct delivery into and holding of the consignment in *quarantine* facilities;
 - b) the continuous isolation of the imported live *aquatic animals* and their first generation progeny from the local environment;
 - c) the treatment of all effluent and waste materials from the processing in a manner that ensures inactivation of *A. astaci*.
2. If the intention of the introduction is the establishment of new genetic lines, international standards, such as the Guidelines of the International Council for the Exploration of the Seas (ICES), should be followed.
3. For the purposes of the *Aquatic Code*, the ICES Guidelines may be summarised to the following main points:
 - a) identify stock of interest (cultured or wild) in its current location;
 - b) evaluate stock's health/*disease* history;
 - c) take and test samples for *A. astaci*, pests and general health/*disease* status;
 - d) import and quarantine in a secure facility a founder (F-0) population;
 - e) produce F-1 generation from the F-0 stock in *quarantine*;
 - f) culture F-1 stock and at critical times in its development (life cycle) sample and test for *A. astaci* and perform general examinations for pests and general health/*disease* status;
 - g) if *A. astaci* is not detected, pests are not present, and the general health/*disease* status of the stock is considered to meet the *basic biosecurity conditions* of the *importing country*, *zone* or *compartment*, the F-1 stock may be defined as crayfish plague free or specific pathogen free (SPF) for *A. astaci*;
 - h) release SPF F-1 stock from *quarantine* for *aquaculture* or stocking purposes in the country, *zone* or *compartment*.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.7.3.

Article 4.1.7.9.

Importation of live aquatic animals for human consumption from a country, zone or compartment not declared free from crayfish plague

When importing, for human consumption, live *aquatic animals* of species referred to in Article 4.1.7.2. from a country, *zone* or *compartment* not declared free from crayfish plague, the *Competent Authority* of the *importing country* should require that:

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1. the consignment be delivered directly to and held in isolation until consumption; and
2. all effluent, dead *aquatic animals* and waste materials from the processing be treated in a manner that ensures inactivation of *A. astaci*.

Member Countries should consider introducing internal measures to prevent such *commodities* being used for any purpose other than for human consumption.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.7.3.

Article 4.1.7.10.

Importation of aquatic animal products from a country, zone or compartment declared free from crayfish plague

When importing *aquatic animal products* of species referred to in Article 4.1.7.2. from a country, *zone* or *compartment* declared free from crayfish plague, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.7.4. or 4.1.7.5. (as applicable), the place of production of the consignment is a country, *zone* or *compartment* declared free from crayfish plague.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.2.2.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.7.3.

Article 4.1.7.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from crayfish plague

When importing *aquatic animal products* of species referred to in Article 4.1.7.2. from a country, *zone* or *compartment* not declared free from crayfish plague, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.7.3.

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CHAPTER 4.1.9.

INFECTIOUS MYONECROSIS

Article 4.1.9.1.

For the purposes of the *Aquatic Code*, infectious myonecrosis (IMN) means *infection* with infectious myonecrosis virus (IMNV). This virus is similar to members of the family *Totiviridae*.

Methods for surveillance and diagnosis are provided in the *Aquatic Manual*.

Article 4.1.9.2.

Scope

The recommendations in this Chapter apply to: Pacific white shrimp (*Penaeus vannamei*). These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 4.1.9.3.

Commodities

1. When authorising importation or transit of the following *commodities*, the *Competent Authorities* of the *importing country* should not require any IMN related conditions, regardless of the IMN status of the *exporting country*, *zone* or *compartment*.
 - a) For the species referred to in Article 4.1.9.2. for any purpose:
 - i) commercially sterile canned products;
 - ii) boiled products (e.g. boiled whole shrimp or tails, lobsters, crabs);
 - iii) chemically extracted chitin;
 - iv) crustacean meals or by-products made non-infectious by heating or drying (e.g. flame dried or sun dried);
 - v) crustacean products made non-infectious through processing as dry feeds (e.g. pelleted or extruded feeds);
 - vi) biological samples preserved for diagnostic applications in such a manner as to inactivate the IMNV (e.g. formalin or alcohol preserved samples).
 - b) The following products destined for human consumption from species referred to in Article 4.1.9.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. salted, pickled, marinated, pastes, etc.);
 - ii) products that have been heat treated or dried (e.g. ready prepared meals) in a manner to ensure the inactivation of the pathogen.

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For the *commodities* listed in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

2. When authorising the importation or transit of the *commodities* of a species referred to in Article 4.1.9.2., other than those listed in point 1 of Article 4.1.9.3., the *Competent Authorities* of the *importing country* should require the conditions prescribed in Articles 4.1.9.7. to 4.1.9.11. relevant to the IMN status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any ~~other~~ *commodity* of a species not referred to in Article 4.1.9.2. but which could reasonably be expected to be a potential IMNV carrier from an *exporting country, zone or compartment* not declared free of IMN, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of IMNV, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 4.1.9.4.

Infectious myonecrosis free country

A country may make a *self-declaration of freedom* from IMN if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from IMN if all the areas covered by the shared water are declared IMN free countries or *zones* (see Article 4.1.9.5.).

1. A country where none of the *susceptible species* referred to in Article 4.1.9.2. is present may make a *self-declaration of freedom* from IMN when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where the *susceptible species* referred to in Article 4.1.9.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from IMN when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

3. A country where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from IMN when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the last 2 years without detection of IMNV.

OR

4. A country that has previously made a *self-declaration of freedom* from IMN but in which the *disease* is subsequently detected may not make a *self-declaration of freedom* from IMN again until the following conditions have been met:
 - a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of IMNV.

In the meantime, part of the non-affected area may be declared a free *zone* provided that they meet the conditions in point 3 of Article 4.1.9.5.

Article 4.1.9.5.

Infectious myonecrosis free zone or free compartment

A *zone* or *compartment* within the *territory* of one or more countries not declared free from IMN may be declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared an IMN free *zone* or *compartment* if all the relevant *Competent Authorities* confirm that the conditions have been met.

1. A *zone* or *compartment* where none of the *susceptible species* referred to in Article 4.1.9.2. is present may be declared free from IMN when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. A *zone* or *compartment* where the *susceptible species* referred to in Article 4.1.9.2. are present but in which there has not been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from IMN when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

3. A *zone* or *compartment* where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from IMN when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place, through the *zone* or *compartment*, for at least the past 2 years without detection of IMNV.

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OR

4. A *zone* previously declared free from IMN but in which the *disease* is detected may not be declared free from IMN again until the following conditions have been met:
 - a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of IMNV.

Article 4.1.9.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from IMN following the provisions of points 1 or 2 of Articles 4.1.9.4. or 4.1.9.5. (as relevant) may maintain its status as IMN free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from IMN following the provisions of point 3 of Articles 4.1.9.4. or 4.1.9.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as IMN free provided that conditions that are conducive to clinical expression of IMN, as described in Chapter X.X.X. of the *Aquatic Manual*, exist, and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of IMN, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 4.1.9.7.

Importation of live aquatic animals from a country, zone or compartment declared free from infectious myonecrosis

When importing live *aquatic animals* of species referred to in Article 4.1.9.2. from a country, *zone* or *compartment* declared free from IMN, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.9.4. or 4.1.9.5. (as applicable), the place of production of the commodity ~~consignment~~ is a country, *zone* or *compartment* declared free from IMN.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.3.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.9.3.

Article 4.1.9.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from infectious myonecrosis

1. When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 4.1.9.2. from a country, *zone* or *compartment* not declared free from IMN, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:
 - a) the direct delivery into and holding of the consignment in *quarantine* facilities;
 - b) the continuous isolation of the imported live *aquatic animals* and their first generation progeny from the local environment;
 - c) the treatment of all effluent and waste materials from the processing in a manner that ensures inactivation of IMNV.
2. If the intention of the introduction is the establishment of new genetic lines, international standards, such as the Guidelines of the International Council for the Exploration of the Seas (ICES), should be followed.
3. For the purposes of the *Aquatic Code*, the ICES Guidelines may be summarised to the following main points:
 - a) identify stock of interest (cultured or wild) in its current location;
 - b) evaluate stock's health/*disease* history;
 - c) take and test samples for IMNV, pests and general health/*disease* status;
 - d) import and quarantine in a secure facility a founder (F-0) population;
 - e) produce F-1 generation from the F-0 stock in *quarantine*;
 - f) culture F-1 stock and at critical times in its development (life cycle) sample and test for IMNV and perform general examinations for pests and general health/*disease* status;
 - g) if IMNV is not detected, pests are not present, and the general health/*disease* status of the stock is considered to meet the *basic biosecurity conditions* of the *importing country*, *zone* or *compartment*, the F-1 stock may be defined as IMN free or specific pathogen free (SPF) for IMNV;
 - h) release SPF F-1 stock from *quarantine* for *aquaculture* or stocking purposes in the country, *zone* or *compartment*.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.9.3.

Article 4.1.9.9.

Importation of live aquatic animals for human consumption from a country, zone or compartment not declared free from infectious myonecrosis

When importing, for human consumption, live *aquatic animals* of species referred to in Article 4.1.9.2. from a country, *zone* or *compartment* not declared free from IMN, the *Competent Authority* of the *importing country* should require that:

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1. the consignment be delivered directly to and held in isolation until consumption; and
2. all effluent, dead *aquatic animals* and waste materials from the processing be treated in a manner that ensures inactivation of IMNV.

Member Countries should consider introducing internal measures to prevent such *commodities* being used for any purpose other than for human consumption.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.9.3.

Article 4.1.9.10.

Importation of aquatic animal products from a country, zone or compartment declared free from infectious myonecrosis

When importing *aquatic animal products* of species referred to in Article 4.1.9.2. from a country, *zone* or *compartment* declared free from IMN, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.9.4. or 4.1.9.5. (as applicable), the place of production of the consignment is a country, *zone* or *compartment* declared free from IMN.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.2.2.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.9.3.

Article 4.1.9.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from infectious myonecrosis

When importing *aquatic animal products* of species referred to in Article 4.1.9.2. from a country, *zone* or *compartment* not declared free from IMN, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.9.3.

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CHAPTER 4.1.10.

NECROTISING HEPATOPANCREATITIS

Article 4.1.10.1.

For the purposes of the *Aquatic Code*, necrotising hepatopancreatitis (NHP) means *infection* with necrotising hepatopancreatitis bacteria (NHP-B). This obligate intracellular bacterium is a member of the order α -Proteobacteria.

Methods for surveillance and diagnosis are provided in the *Aquatic Manual*.

Article 4.1.10.2.

Scope

The recommendations in this Chapter apply to: Pacific white shrimp (*Penaeus vannamei*), blue shrimp (*P. stylirostris*), northern white shrimp (*P. setiferus*) and northern brown shrimp (*P. aztecus*). These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 4.1.10.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* of the *importing country* should not require any NHP related conditions, regardless of the NHP status of the *exporting country*, *zone* or *compartment*.
 - a) For the species referred to in Article 4.1.10.2. for any purpose:
 - i) commercially sterile canned products;
 - ii) boiled products (e.g. boiled whole shrimp or tails, lobsters, crabs);
 - iii) chemically extracted chitin;
 - iv) crustacean meals or by-products made non-infectious by heating or drying (e.g. flame dried or sun dried);
 - v) crustacean products made non-infectious through processing as dry feeds (e.g. pelleted or extruded feeds);
 - vi) biological samples preserved for diagnostic applications in such a manner as to inactivate the NHP-B (e.g. formalin or alcohol preserved samples);
 - vii) frozen products.
 - b) The following products destined for human consumption from species referred to in Article 4.1.10.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:

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- i) chemically preserved products (e.g. salted, pickled, marinated, pastes, etc.);
- ii) products that have been heat treated or dried (e.g. ready prepared meals) in a manner to ensure the inactivation of the pathogen;
- iii) ~~de-headed and de-veined~~ “de-veined” (intestine removed) shrimp tails.

For the *commodities* listed in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

2. When authorising the importation or transit of the *commodities* of a species referred to in Article 4.1.10.2., other than those listed in point 1 of Article 4.1.10.3., the *Competent Authorities* of the *importing country* should require the conditions prescribed in Articles 4.1.10.7. to 4.1.10.11. relevant to the NHP status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any ~~other~~ *commodity* of a species not referred to in Article 4.1.10.2. but which could reasonably be expected to be a potential NHP-B carrier from an *exporting country, zone or compartment* not declared free of NHP, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of NHP-B, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 4.1.10.4.

Necrotising hepatopancreatitis free country

A country may make a *self-declaration of freedom* from NHP if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from NHP if all the areas covered by the shared water are declared NHP free countries or zones (see Article 4.1.10.5.).

1. A country where none of the *susceptible species* referred to in Article 4.1.10.2. is present may make a *self-declaration of freedom* from NHP when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where the *susceptible species* referred to in Article 4.1.10.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from NHP when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

3. A country where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from NHP when:

- a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and

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- b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the last 2 years without detection of NHP-B.

OR

4. A country that has previously made a *self-declaration of freedom* from NHP but in which the *disease* is subsequently detected may not make a *self-declaration of freedom* from NHP again until the following conditions have been met:
- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of NHP-B.

In the meantime, part of the non-affected area may be declared a free *zone* provided that they meet the conditions in point 3 of Article 4.1.10.5.

Article 4.1.10.5.

Necrotising hepatopancreatitis free zone or free compartment

A *zone* or *compartment* within the *territory* of one or more countries not declared free from NHP may be declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a NHP free *zone* or *compartment* if all the relevant *Competent Authorities* confirm that the conditions have been met.

1. A *zone* or *compartment* where none of the *susceptible species* referred to in Article 4.1.10.2. is present may be declared free from NHP when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. A *zone* or *compartment* where the *susceptible species* referred to in Article 4.1.10.2. are present but in which there has not been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from NHP when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

3. A *zone* or *compartment* where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from NHP when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and

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- b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place, through the *zone* or *compartment*, for at least the past 2 years without detection of NHP-B.

OR

4. A *zone* previously declared free from NHP but in which the *disease* is detected may not be declared free from NHP again until the following conditions have been met:
- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of NHP-B.

Article 4.1.10.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from NHP following the provisions of points 1 or 2 of Articles 4.1.10.4. or 4.1.10.5. (as relevant) may maintain its status as NHP free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from NHP following the provisions of point 3 of Articles 4.1.10.4. or 4.1.10.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as NHP free provided that conditions that are conducive to clinical expression of NHP, as described in Chapter X.X.X. of the *Aquatic Manual*, exist, and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of NHP, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 4.1.10.7.

Importation of live aquatic animals from a country, zone or compartment declared free from necrotising hepatopancreatitis

When importing live *aquatic animals* of species referred to in Article 4.1.10.2. from a country, *zone* or *compartment* declared free from NHP, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.10.4. or 4.1.10.5. (as applicable), the place of production of the commodity consignment is a country, *zone* or *compartment* declared free from NHP.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.3.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.10.3.

Article 4.1.10.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from necrotising hepatopancreatitis

1. When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 4.1.10.2. from a country, *zone* or *compartment* not declared free from NHP, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:
 - a) the direct delivery into and holding of the consignment in *quarantine* facilities;
 - b) the continuous isolation of the imported live *aquatic animals* and their first generation progeny from the local environment;
 - c) the treatment of all effluent and waste materials from the processing in a manner that ensures inactivation of NHP-B.
2. If the intention of the introduction is the establishment of new genetic lines, international standards, such as the Guidelines of the International Council for the Exploration of the Seas (ICES), should be followed.
3. For the purposes of the *Aquatic Code*, the ICES Guidelines may be summarised to the following main points:
 - a) identify stock of interest (cultured or wild) in its current location;
 - b) evaluate stock's health/*disease* history;
 - c) take and test samples for NHP-B, pests and general health/*disease* status;
 - d) import and quarantine in a secure facility a founder (F-0) population;
 - e) produce F-1 generation from the F-0 stock in *quarantine*;
 - f) culture F-1 stock and at critical times in its development (life cycle) sample and test for NHP-B and perform general examinations for pests and general health/*disease* status;
 - g) if NHP-B is not detected, pests are not present, and the general health/*disease* status of the stock is considered to meet the *basic biosecurity conditions* of the *importing country*, *zone* or *compartment*, the F-1 stock may be defined as NHP free or specific pathogen free (SPF) for NHP-B;
 - h) release SPF F-1 stock from *quarantine* for *aquaculture* or stocking purposes in the country, *zone* or *compartment*.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.10.3.

Article 4.1.10.9.

Importation of live aquatic animals for human consumption from a country, zone or compartment not declared free from necrotising hepatopancreatitis

When importing, for human consumption, live *aquatic animals* of species referred to in Article 4.1.10.2. from a country, *zone* or *compartment* not declared free from NHP, the *Competent Authority* of the *importing country* should require that:

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1. the consignment be delivered directly to and held in isolation until consumption; and
2. all effluent, dead *aquatic animals* and waste materials from the processing be treated in a manner that ensures inactivation of NHP-B.

Member Countries should consider introducing internal measures to prevent such *commodities* being used for any purpose other than for human consumption.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.10.3.

Article 4.1.10.10.

Importation of aquatic animal products from a country, zone or compartment declared free from necrotising hepatopancreatitis

When importing *aquatic animal products* of species referred to in Article 4.1.10.2. from a country, *zone* or *compartment* declared free from NHP, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.10.4. or 4.1.10.5. (as applicable), the place of production of the consignment is a country, *zone* or *compartment* declared free from NHP.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.2.2.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.10.3.

Article 4.1.10.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from necrotising hepatopancreatitis

When importing *aquatic animal products* of species referred to in Article 4.1.10.2. from a country, *zone* or *compartment* not declared free from NHP, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.10.3.

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CHAPTER 4.1.11.

WHITE TAIL DISEASE

Article 4.1.11.1.

For the purposes of the *Aquatic Code*, white tail disease (WTD) means *infection* with macrobrachium nodavirus (MrNV). This virus has yet to be formally classified.

Methods for surveillance and diagnosis are provided in the *Aquatic Manual*.

Article 4.1.11.2.

Scope

The recommendations in this Chapter apply to: the giant fresh water prawn (*Macrobrachium rosenbergii*). Other common names are listed in the *Aquatic Manual*. These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 4.1.11.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* of the *importing country* should not require any WTD related conditions, regardless of the WTD status of the *exporting country*, *zone* or *compartment*.
 - a) For the species referred to in Article 4.1.11.2. for any purpose:
 - i) commercially sterile canned products;
 - ii) boiled products (e.g. boiled whole shrimp or tails, lobsters, crabs);
 - iii) chemically extracted chitin;
 - iv) crustacean meals or by-products made non-infectious by heating or drying (e.g. flame dried or sun dried);
 - v) crustacean products made non-infectious through processing as dry feeds (e.g. pelleted or extruded feeds);
 - vi) biological samples preserved for diagnostic applications in such a manner as to inactivate the MrNV (e.g. formalin or alcohol preserved samples).
 - b) The following products destined for human consumption from species referred to in Article 4.1.11.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. salted, pickled, marinated, pastes, etc.);
 - ii) products that have been heat treated or dried (e.g. ready prepared meals) in a manner to ensure the inactivation of the pathogen.

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For the *commodities* listed in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

2. When authorising the importation or transit of the *commodities* of a species referred to in Article 4.1.11.2., other than those listed in point 1 of Article 4.1.11.3., the *Competent Authorities* of the *importing country* should require the conditions prescribed in Articles 4.1.11.7. to 4.1.11.11. relevant to the WTD status of the *exporting country*, *zone* or *compartment*.
3. When considering the importation or transit of any ~~other~~ *commodity* of a species not referred to in Article 4.1.11.2. but which could reasonably be expected to be a potential MrNV carrier from an *exporting country*, *zone* or *compartment* not declared free of WTD, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of MrNV, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 4.1.11.4.

White tail disease free country

A country may make a *self-declaration of freedom* from WTD if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from WTD if all the areas covered by the shared water are declared WTD free countries or *zones* (see Article 4.1.11.5.).

1. A country where none of the *susceptible species* referred to in Article 4.1.11.2. is present may make a *self-declaration of freedom* from WTD when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where the *susceptible species* referred to in Article 4.1.11.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from WTD when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

3. A country where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from WTD when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the last 2 years without detection of MrNV.

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OR

4. A country that has previously made a *self-declaration of freedom* from WTD but in which the *disease* is subsequently detected may not make a *self-declaration of freedom* from WTD again until the following conditions have been met:
 - a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of MrNV.

In the meantime, part of the non-affected area may be declared a free *zone* provided that they meet the conditions in point 3 of Article 4.1.11.5.

Article 4.1.11.5.

White tail disease free zone or free compartment

A *zone* or *compartment* within the *territory* of one or more countries not declared free from WTD may be declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a WTD free *zone* or *compartment* if all the relevant *Competent Authorities* confirm that the conditions have been met.

1. A *zone* or *compartment* where none of the *susceptible species* referred to in Article 4.1.11.2. is present may be declared free from WTD when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. A *zone* or *compartment* where the *susceptible species* referred to in Article 4.1.11.2. are present but in which there has not been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from WTD when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

3. A *zone* or *compartment* where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from WTD when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place, through the *zone* or *compartment*, for at least the past 2 years without detection of MrNV.

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OR

4. A *zone* previously declared free from WTD but in which the *disease* is detected may not be declared free from WTD again until the following conditions have been met:
 - a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of MrNV.

Article 4.1.11.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from WTD following the provisions of points 1 or 2 of Articles 4.1.11.4. or 4.1.11.5. (as relevant) may maintain its status as WTD free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from WTD following the provisions of point 3 of Articles 4.1.11.4. or 4.1.11.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as WTD free provided that conditions that are conducive to clinical expression of WTD, as described in Chapter X.X.X. of the *Aquatic Manual*, exist, and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of WTD, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 4.1.11.7.

Importation of live aquatic animals from a country, zone or compartment declared free from white tail disease

When importing live *aquatic animals* of species referred to in Article 4.1.11.2. from a country, *zone* or *compartment* declared free from WTD, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.11.4. or 4.1.11.5. (as applicable), the place of production of the *commodity* is a country, *zone* or *compartment* declared free from WTD.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.3.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.11.3.

Article 4.1.11.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from white tail disease

1. When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 4.1.11.2. from a country, *zone* or *compartment* not declared free from WTD, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:
 - a) the direct delivery into and holding of the consignment in *quarantine* facilities;
 - b) the continuous isolation of the imported live *aquatic animals* and their first generation progeny from the local environment;
 - c) the treatment of all effluent and waste materials from the processing in a manner that ensures inactivation of MrNV.
2. If the intention of the introduction is the establishment of new genetic lines, international standards, such as the Guidelines of the International Council for the Exploration of the Seas (ICES), should be followed.
3. For the purposes of the *Aquatic Code*, the ICES Guidelines may be summarised to the following main points:
 - a) identify stock of interest (cultured or wild) in its current location;
 - b) evaluate stock's health/*disease* history;
 - c) take and test samples for MrNV, pests and general health/*disease* status;
 - d) import and quarantine in a secure facility a founder (F-0) population;
 - e) produce F-1 generation from the F-0 stock in *quarantine*;
 - f) culture F-1 stock and at critical times in its development (life cycle) sample and test for MrNV and perform general examinations for pests and general health/*disease* status;
 - g) if MrNV is not detected, pests are not present, and the general health/*disease* status of the stock is considered to meet the *basic biosecurity conditions* of the *importing country*, *zone* or *compartment*, the F-1 stock may be defined as WTD free or specific pathogen free (SPF) for MrNV;
 - h) release SPF F-1 stock from *quarantine* for *aquaculture* or stocking purposes in the country, *zone* or *compartment*.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.11.3.

Article 4.1.11.9.

Importation of live aquatic animals for human consumption from a country, zone or compartment not declared free from white tail disease

When importing, for human consumption, live *aquatic animals* of species referred to in Article 4.1.11.2. from a country, *zone* or *compartment* not declared free from WTD, the *Competent Authority* of the *importing country* should require that:

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1. the consignment be delivered directly to and held in isolation until consumption; and
2. all effluent, dead *aquatic animals* and waste materials from the processing be treated in a manner that ensures inactivation of MrNV.

Member Countries should consider introducing internal measures to prevent such *commodities* being used for any purpose other than for human consumption.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.11.3.

Article 4.1.11.10.

Importation of aquatic animal products from a country, zone or compartment declared free from white tail disease

When importing *aquatic animal products* of species referred to in Article 4.1.11.2. from a country, *zone* or *compartment* declared free from WTD, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.11.4. or 4.1.11.5. (as applicable), the place of production of the consignment is a country, *zone* or *compartment* declared free from WTD.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.2.2.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.11.3.

Article 4.1.11.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from white tail disease

When importing *aquatic animal products* of species referred to in Article 4.1.11.2. from a country, *zone* or *compartment* not declared free from WTD, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.11.3.

CHAPTER 4.1.12.

HEPATOPANCREATIC PARVOVIRUS DISEASE

Article 4.1.12.1.

For the purposes of the *Aquatic Code*, hepatopancreatic parvovirus disease (HPVD) means *infection* with hepatopancreatic parvovirus (HPV). It is considered to be a member of the subfamily of the *Densovirinae* in the family *Parvoviridae*.

Methods for surveillance and diagnosis are provided in the *Aquatic Manual*.

Article 4.1.12.2.

Scope

The recommendations in this Chapter apply to: Indian white shrimp (*Penaeus indicus*), black tiger shrimp (*Penaeus monodon*), Pacific white shrimp (*Penaeus vannamei*) and Pacific blue shrimp (*P. stylirostris*). These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 4.1.12.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* of the *importing country* should not require any HPVD related conditions, regardless of the HPVD status of the *exporting country*, *zone* or *compartment*.
 - a) For the species referred to in Article 4.1.12.2. for any purpose:
 - i) commercially sterile canned products;
 - ii) boiled products (e.g. boiled whole shrimp or tails, lobsters, crabs);
 - iii) chemically extracted chitin;
 - iv) crustacean meals or by-products made non-infectious by heating or drying (e.g. flame dried or sun dried);
 - v) crustacean products made non-infectious through processing as dry feeds (e.g. pelleted or extruded feeds);
 - vi) biological samples preserved for diagnostic applications in such a manner as to inactivate the HPV (e.g. formalin or alcohol preserved samples).
 - b) The following products destined for human consumption from species referred to in Article 4.1.12.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. salted, pickled, marinated, pastes, etc.);

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- ii) products that have been heat treated or dried (e.g. ready prepared meals) in a manner to ensure the inactivation of the pathogen;
- iii) de-headed and “de-veined” (intestine removed) shrimp tails.

For the *commodities* listed in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

2. When authorising the importation or transit of the *commodities* of a species referred to in Article 4.1.12.2., other than those listed in point 1 of Article 4.1.12.3., the *Competent Authorities* of the *importing country* should require the conditions prescribed in Articles 4.1.12.7. to 4.1.12.11. relevant to the HPVD status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any ~~other~~ *commodity* of a species not referred to in Article 4.1.12.2. but which could reasonably be expected to be a potential HPV carrier from an *exporting country, zone or compartment* not declared free of HPVD, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of HPV, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 4.1.12.4.

Hepatopancreatic parvovirus disease free country

A country may make a *self-declaration of freedom* from HPVD if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from HPVD if all the areas covered by the shared water are declared HPVD free countries or *zones* (see Article 4.1.12.5.).

1. A country where none of the *susceptible species* referred to in Article 4.1.12.2. is present may make a *self-declaration of freedom* from HPVD when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where the *susceptible species* referred to in Article 4.1.12.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from HPVD when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

3. A country where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from HPVD when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the last 2 years without detection of HPV.

OR

4. A country that has previously made a *self-declaration of freedom* from HPVD but in which the *disease* is subsequently detected may not make a *self-declaration of freedom* from HPVD again until the following conditions have been met:
 - a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of HPV.

In the meantime, part of the non-affected area may be declared a free *zone* provided that they meet the conditions in point 3 of Article 4.1.12.5.

Article 4.1.12.5.

Hepatopancreatic parvovirus disease free zone or free compartment

A *zone* or *compartment* within the *territory* of one or more countries not declared free from HPVD may be declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a HPVD free *zone* or *compartment* if all the relevant *Competent Authorities* confirm that the conditions have been met.

1. A *zone* or *compartment* where none of the *susceptible species* referred to in Article 4.1.12.2. is present may be declared free from HPVD when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. A *zone* or *compartment* where the *susceptible species* referred to in Article 4.1.12.2. are present but in which there has not been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from HPVD when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

3. A *zone* or *compartment* where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from HPVD when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place, through the *zone* or *compartment*, for at least the past 2 years without detection of HPV.

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OR

4. A *zone* previously declared free from HPVD but in which the *disease* is detected may not be declared free from HPVD again until the following conditions have been met:
 - a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of HPV.

Article 4.1.12.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from HPVD following the provisions of points 1 or 2 of Articles 4.1.12.4. or 4.1.12.5. (as relevant) may maintain its status as HPVD free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from HPVD following the provisions of point 3 of Articles 4.1.12.4. or 4.1.12.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as HPVD free provided that conditions that are conducive to clinical expression of HPVD, as described in Chapter X.X.X. of the *Aquatic Manual*, exist, and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of HPVD, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 4.1.12.7.

Importation of live aquatic animals from a country, zone or compartment declared free from hepatopancreatic parvovirus disease

When importing live *aquatic animals* of species referred to in Article 4.1.12.2. from a country, *zone* or *compartment* declared free from HPVD, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.12.4. or 4.1.12.5. (as applicable), the place of production of the *commodity* is a country, *zone* or *compartment* declared free from HPVD.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.3.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.12.3.

Article 4.1.12.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from hepatopancreatic parvovirus disease

1. When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 4.1.12.2. from a country, *zone* or *compartment* not declared free from HPVD, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:
 - a) the direct delivery into and holding of the consignment in *quarantine* facilities;
 - b) the continuous isolation of the imported live *aquatic animals* and their first generation progeny from the local environment;
 - c) the treatment of all effluent and waste materials from the processing in a manner that ensures inactivation of HPV.
2. If the intention of the introduction is the establishment of new genetic lines, international standards, such as the Guidelines of the International Council for the Exploration of the Seas (ICES), should be followed.
3. For the purposes of the *Aquatic Code*, the ICES Guidelines may be summarised to the following main points:
 - a) identify stock of interest (cultured or wild) in its current location;
 - b) evaluate stock's health/*disease* history;
 - c) take and test samples for HPV, pests and general health/*disease* status;
 - d) import and quarantine in a secure facility a founder (F-0) population;
 - e) produce F-1 generation from the F-0 stock in *quarantine*;
 - f) culture F-1 stock and at critical times in its development (life cycle) sample and test for HPV and perform general examinations for pests and general health/*disease* status;
 - g) if HPV is not detected, pests are not present, and the general health/*disease* status of the stock is considered to meet the *basic biosecurity conditions* of the *importing country*, *zone* or *compartment*, the F-1 stock may be defined as HPVD free or specific pathogen free (SPF) for HPV;
 - h) release SPF F-1 stock from *quarantine* for *aquaculture* or stocking purposes in the country, *zone* or *compartment*.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.12.3.

Article 4.1.12.9.

Importation of live aquatic animals for human consumption from a country, zone or compartment not declared free from hepatopancreatic parvovirus disease

When importing, for human consumption, live *aquatic animals* of species referred to in Article 4.1.12.2. from a country, *zone* or *compartment* not declared free from HPVD, the *Competent Authority* of the *importing country* should require that:

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1. the consignment be delivered directly to and held in isolation until consumption; and
2. all effluent, dead *aquatic animals* and waste materials from the processing be treated in a manner that ensures inactivation of HPV.

Member Countries should consider introducing internal measures to prevent such *commodities* being used for any purpose other than for human consumption.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.12.3.

Article 4.1.12.10.

Importation of aquatic animal products from a country, zone or compartment declared free from hepatopancreatic parvovirus disease

When importing *aquatic animal products* of species referred to in Article 4.1.12.2. from a country, *zone* or *compartment* declared free from HPVD, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.12.4. or 4.1.12.5. (as applicable), the place of production of the consignment is a country, *zone* or *compartment* declared free from HPVD.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.2.2.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.12.3.

Article 4.1.12.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from hepatopancreatic parvovirus disease

When importing *aquatic animal products* of species referred to in Article 4.1.12.2. from a country, *zone* or *compartment* not declared free from HPVD, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.12.3.

CHAPTER 4.1.13.

MOURILYAN VIRUS DISEASE

Article 4.1.13.1.

For the purposes of the *Aquatic Code*, Mourilyan virus disease (MoVD) means *infection* with infection with Mourilyan virus (MoV). This virus is similar to members of the *Bunyaviridae*, but has yet to be formally classified.

Methods for surveillance and diagnosis are provided in the *Aquatic Manual*.

Article 4.1.13.2.

Scope

The recommendations in this Chapter apply to: black tiger shrimp (*Penaeus monodon*) and kuruma shrimp (*Penaeus japonicus*). These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 4.1.13.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* of the *importing country* should not require any MoVD related conditions, regardless of the MoVD status of the *exporting country*, *zone* or *compartment*.
 - a) For the species referred to in Article 4.1.13.2. for any purpose:
 - i) commercially sterile canned products;
 - ii) boiled products (e.g. boiled whole shrimp or tails, lobsters, crabs);
 - iii) chemically extracted chitin;
 - iv) crustacean meals or by-products made non-infectious by heating or drying (e.g. flame dried or sun dried);
 - v) crustacean products made non-infectious through processing as dry feeds (e.g. pelleted or extruded feeds);
 - vi) biological samples preserved for diagnostic applications in such a manner as to inactivate the MoV (e.g. formalin or alcohol preserved samples).
 - b) The following products destined for human consumption from species referred to in Article 4.1.13.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. salted, pickled, marinated, pastes, etc.);

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- ii) products that have been heat treated or dried (e.g. ready prepared meals) in a manner to ensure the inactivation of the pathogen.

For the *commodities* listed in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

2. When authorising the importation or transit of the *commodities* of a species referred to in Article 4.1.13.2., other than those listed in point 1 of Article 4.1.13.3., the *Competent Authorities* of the *importing country* should require the conditions prescribed in Articles 4.1.13.7. to 4.1.13.11. relevant to the MoVD status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any ~~other~~ *commodity* of a species not referred to in Article 4.1.13.2. but which could reasonably be expected to be a potential MoV carrier from an *exporting country, zone or compartment* not declared free of MoVD, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of MoV, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 4.1.13.4.

Mourilyan virus disease free country

A country may make a *self-declaration of freedom* from MoVD if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from MoVD if all the areas covered by the shared water are declared MoVD free countries or *zones* (see Article 4.1.13.5.).

1. A country where none of the *susceptible species* referred to in Article 4.1.13.2. is present may make a *self-declaration of freedom* from MoVD when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where the *susceptible species* referred to in Article 4.1.13.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from MoVD when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

3. A country where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from MoVD when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the last 2 years without detection of MoV.

OR

4. A country that has previously made a *self-declaration of freedom* from MoVD but in which the *disease* is subsequently detected may not make a *self-declaration of freedom* from MoVD again until the following conditions have been met:
 - a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of MoV.

In the meantime, part of the non-affected area may be declared a free *zone* provided that they meet the conditions in point 3 of Article 4.1.13.5.

Article 4.1.13.5.

Mourilyan virus disease free zone or free compartment

A *zone* or *compartment* within the *territory* of one or more countries not declared free from MoVD may be declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a MoVD free *zone* or *compartment* if all the relevant *Competent Authorities* confirm that the conditions have been met.

1. A *zone* or *compartment* where none of the *susceptible species* referred to in Article 4.1.13.2. is present may be declared free from MoVD when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. A *zone* or *compartment* where the *susceptible species* referred to in Article 4.1.13.2. are present but in which there has not been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from MoVD when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

3. A *zone* or *compartment* where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from MoVD when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place, through the *zone* or *compartment*, for at least the past 2 years without detection of MoV.

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OR

4. A *zone* previously declared free from MoVD but in which the *disease* is detected may not be declared free from MoVD again until the following conditions have been met:
- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of MoV.

Article 4.1.13.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from MoVD following the provisions of points 1 or 2 of Articles 4.1.13.4. or 4.1.13.5. (as relevant) may maintain its status as MoVD free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from MoVD following the provisions of point 3 of Articles 4.1.13.4. or 4.1.13.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as MoVD free provided that conditions that are conducive to clinical expression of MoVD, as described in Chapter X.X.X. of the *Aquatic Manual*, exist, and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of MoVD, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 4.1.13.7.

Importation of live aquatic animals from a country, zone or compartment declared free from Mourilyan virus disease

When importing live *aquatic animals* of species referred to in Article 4.1.13.2. from a country, *zone* or *compartment* declared free from MoVD, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.13.4. or 4.1.13.5. (as applicable), the place of production of the *commodity* is a country, *zone* or *compartment* declared free from MoVD.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.3.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.13.3.

Article 4.1.13.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from Mourilyan virus disease

1. When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 4.1.13.2. from a country, *zone* or *compartment* not declared free from MoVD, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:
 - a) the direct delivery into and holding of the consignment in *quarantine* facilities;
 - b) the continuous isolation of the imported live *aquatic animals* and their first generation progeny from the local environment;
 - c) the treatment of all effluent and waste materials from the processing in a manner that ensures inactivation of MoV.
2. If the intention of the introduction is the establishment of new genetic lines, international standards, such as the Guidelines of the International Council for the Exploration of the Seas (ICES), should be followed.
3. For the purposes of the *Aquatic Code*, the ICES Guidelines may be summarised to the following main points:
 - a) identify stock of interest (cultured or wild) in its current location;
 - b) evaluate stock's health/*disease* history;
 - c) take and test samples for MoV, pests and general health/*disease* status;
 - d) import and quarantine in a secure facility a founder (F-0) population;
 - e) produce F-1 generation from the F-0 stock in *quarantine*;
 - f) culture F-1 stock and at critical times in its development (life cycle) sample and test for MoV and perform general examinations for pests and general health/*disease* status;
 - g) if MoV is not detected, pests are not present, and the general health/*disease* status of the stock is considered to meet the *basic biosecurity conditions* of the *importing country*, *zone* or *compartment*, the F-1 stock may be defined as MoVD free or specific pathogen free (SPF) for MoV;
 - h) release SPF F-1 stock from *quarantine* for *aquaculture* or stocking purposes in the country, *zone* or *compartment*.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.13.3.

Article 4.1.13.9.

Importation of live aquatic animals for human consumption from a country, zone or compartment not declared free from Mourilyan virus disease

When importing, for human consumption, live *aquatic animals* of species referred to in Article 4.1.13.2. from a country, *zone* or *compartment* not declared free from MoVD, the *Competent Authority* of the *importing country* should require that:

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1. the consignment be delivered directly to and held in isolation until consumption; and
2. all effluent, dead *aquatic animals* and waste materials from the processing be treated in a manner that ensures inactivation of MoV.

Member Countries should consider introducing internal measures to prevent such *commodities* being used for any purpose other than for human consumption.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.13.3.

Article 4.1.13.10.

Importation of aquatic animal products from a country, zone or compartment declared free from Mourilyan virus disease

When importing *aquatic animal products* of species referred to in Article 4.1.13.2. from a country, *zone* or *compartment* declared free from MoVD, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.13.4. or 4.1.13.5. (as applicable), the place of production of the consignment is a country, *zone* or *compartment* declared free from MoVD.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.2.2.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.13.3.

Article 4.1.13.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from Mourilyan virus disease

When importing *aquatic animal products* of species referred to in Article 4.1.13.2. from a country, *zone* or *compartment* not declared free from MoVD, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.13.3.

CHAPTER X.X.X.

KOI HERPESVIRUS DISEASE**1. Case definition**

Koi herpesvirus disease (KHVD) is a herpesvirus infection (16) capable of inducing a contagious and acute viraemia in common carp (*Cyprinus carpio*) and varieties such as koi carp and ghost carp (14).

2. Information for the design of surveillance programmes**a) Agent factors**

The aetiological agent is koi herpesvirus (KHV) in the family Herpesviridae (16,39) although it has also been given the name carp nephritis and gill necrosis virus (CNGV) (27,18). Waltzek and colleagues (38) provided evidence to support the classification of the virus as a herpesvirus, and named it cyprinid herpesvirus 3 (CyHV-3) following the nomenclature of other cyprinid herpesviruses: CyHV-1 (carp pox virus, fish papilloma) and CyHV-2 (goldfish haematopoietic necrosis virus). Estimates of the genome size of KHV vary from at least 150 kbp (11) to 277 kbp (18) to 295 kbp (38). Four genes, coding for a helicase, intercapsomeric triplex protein, DNA polymerase and major capsid protein have been identified and sequence analysis of these genes has shown that KHV is closely related to CyHV-1 and CyHV-2, and distantly related to channel catfish virus (CCV) herpesvirus (IcHV-1) (38). Estimates of virion size also vary. Nucleocapsids of negative stained virus have been measured at 103-112 nm diameter surrounded by an envelope (16,36,18). The nucleocapsids of thin sectioned virus have been measured at 80-110 and 110-120 nm diameter (4,16,25).

Serum from koi carp containing antibodies to KHV have been shown to cross-react with CyHV-1, a further indication that these viruses are closely related. Evidence of cross reacting antibodies was demonstrated in reciprocal ELISA and western blot analyses of serum from koi infected with CyHV-1 or KHV (1).

Comparisons of the genomes of KHV isolates from different geographic areas by restriction enzyme analysis (9,14) or nucleotide sequence analysis (28,13,19) have shown them to be practically identical. Likewise, the polypeptides of KHV isolates from different geographic areas were similar, although one isolate from Israel had two additional polypeptides (7,9).

The virus is inactivated by UV radiation and temperatures above 50°C for 1 minute. The following disinfectants are also effective for inactivation: iodophore at 200 mg l⁻¹ for 30 seconds, benzalkonium chloride at 60 mg l⁻¹ for 30 seconds, ethyl alcohol at 30% for 30 seconds and sodium hypochlorite at 200 mg l⁻¹ for 30 seconds, all at 15°C (20).

b) Host factors

Naturally occurring KHV infections have only been recorded from common carp (*Cyprinus carpio carpio*), koi carp (*Cyprinus carpio koi*) and ghost carp (*Cyprinus carpio goi*) and hybrids of these varieties. All age groups of fish appear to be susceptible to KHVD (4,28,35), but under experimental conditions, 2.5-6 g fish were more susceptible than 230 g fish (25). Differential resistance to KHVD has been shown among different common carp strains (31) and other studies have suggested an age-related resistance (25). Morbidity of affected populations can be 100%, and mortality 70-80% (37,4), but the latter can be as high as 90 or 100% (4,36).

Appendix XXVII (contd)

Carp are often raised in polyculture with other fish species, but no signs of disease or mortalities have been observed in those other fish, during KHVD outbreaks, under normal polyculture conditions. Refractory species include goldfish (*Carrassius auratus*), grass carp (*Ctenopharyngodon idellus*), silver carp (*Hypophthalmichthys molitrix*), tench (*Tinca tinca*), sturgeon (*Acipenser* sp.) Nile tilapia (*Oreochromis niloticus*), silver perch (*Bidyanus bidyanus*) and channel catfish (*Ictalurus punctatus*) (4,16,25,34).

The disease is temperature dependent, occurring between 16-25°C (16,6,25,28,35,36). Under experimental conditions the disease has caused high mortality at 28°C (10) but not at 29 or 30°C (18,24), nor at 13°C (10). However, viral DNA was detected in the fish by the PCR at 13°C, and it is possible that infected fish surviving at low temperatures may be reservoirs of the virus (10). The disease course can be rapid. The disease manifested itself in 3 days following the addition of naïve fish to a pond containing diseased fish (37), but usually under those circumstances it takes 8-21 days for the disease to be observed in the naïve fish (4,16). It is not known whether under natural conditions survivors of KHVD are persistently infected with virus, and if so, whether they shed the virus or for how long the fish retain the virus. Some of these aspects have been investigated in experimentally infected fish where it was shown that virus could persist in common carp infected at a permissive temperature and subsequently maintained at a lower than permissive temperature (32).

Common carp (*Cyprinus carpio*) strains are currently the only reported host of KHVD and therefore considered to be most susceptible to KHV infection. Goldfish x common carp hybrids, produced by hybridizing male goldfish with female carp, have been reported to show some susceptibility to KHV infection. Approximately 50% of these hybrids examined at 25 days after intraperitoneal injection with a high dose of KHV possessed viral genomic DNA, as detected by PCR (17). In contrast to findings elsewhere, recent experimental data from Germany suggests a susceptibility of goldfish and grass carp to KHV but further confirmation of these findings are needed (17). When sampling during surveillance programmes for KHV, common carp or strains such as koi or ghost (koi × common) carp should be preferentially selected followed by any common carp hybrids present on the site such as goldfish x common carp. Cyprinid species are commonly mixed together in polyculture systems and the risk of transmission of virus between species, during disease outbreaks, is high. If the findings from Germany were confirmed then, for disease surveillance purposes, all cyprinid species would need to be considered as potential covert carriers of KHV.

The reservoirs of KHVD are clinically infected fish and covert virus carriers among cultured, feral or wild fish. Virulent virus is shed via faeces, urine, gill and skin mucus. However, gill, kidney, and spleen are the organs in which KHV is most abundant during the course of overt infection (10).

The mode of transmission of KHV is horizontal but 'egg-associated' transmission (usually called 'vertical' transmission) cannot currently be ruled out. Horizontal transmission may be direct (fish to fish) or vectorial, water being the major abiotic vector. However, animate vectors (e.g. parasitic invertebrates and piscivorous birds) and fomites may also be involved in transmission.

c) Disease pattern

Disease patterns are influenced by water temperature, age and condition of the fish, population density and stress factors. The immune status of the fish will also be an important factor with both non-specific (interferon) and specific immunity (serum antibodies, cellular immunity) having important roles in herpesvirus infections. Clinical disease dominates at water temperatures above 18°C when the host immune response is at its optimum. Infected carp produce antibodies against the virus, which have been detected by ELISA methods at high serum dilution. Antibody has been detected in the serum at 3 weeks after experimental infection and in survivors after 1 year following a natural infection (27,1,32). Secondary and concomitant bacterial and/or parasitic infections are commonly seen in diseased carp and may affect the mortality rate and display of signs (14).

Following the first reports of KHVD in Israel and Germany (15,25,4) the geographical range of the disease has become extensive. The disease has been spread to many countries world-wide, predominantly through the trade in koi carp before the current knowledge of the disease and means to detect it were available. It is now known to occur in, or has been recorded in fish imported into at least 22 different countries. In Europe this includes Austria, Belgium, Denmark, France, Italy, Luxembourg, The Netherlands, Poland, Switzerland and the United Kingdom (14,6,3,29). In Asia, China (Hong Kong), (14), Indonesia (34) Japan (28), Malaysia (14,21,22), Singapore (in fish imported from Malaysia), Taiwan (36) and Thailand (in fish imported into Germany, 14). Elsewhere, South Africa (14) and the USA (15,11,35) have reported occurrence of KHVD. It is likely that the virus is present in many more countries, but has not yet been identified there or reported

d) Control and prevention

Methods to control KHVD should mainly rely on avoiding exposure to the virus coupled with good hygiene and biosecurity practices. This is feasible on small farms supplied by spring or borehole water and a secure system to prevent fish entering the farm via the discharge water. Biosecurity measures should also include ensuring that new introductions of fish are from disease free sources and a quarantine system where new fish are held with sentinel fish at permissive temperatures for KHVD. The fish are then quarantined for a minimum of 4 weeks to 2 months before transfer to the main site and mixing with naïve fish. Hygiene measures on site should be similar to those recommended for SVC and include disinfection of eggs by iodophore treatment (20), regular disinfection of ponds, chemical disinfection of farm equipment, careful handling of fish to avoid stress and safe disposal of dead fish.

In rearing facilities with a controlled environment, elevation of water temperature above 26–28°C can reduce mortalities during KHVD outbreaks (7,27). Lowering the stocking density, and treating secondary infections may also help reduce the severity of the disease (34) A safe and effective vaccine is not currently widely available. However, attenuated virus has been used to vaccinate carp and protect the fish from virus challenge (27,24). The vaccine preparation induced antibody against the virus, but the duration of the protection is unknown. The vaccine is currently licenced for use in Israel and has been widely used in carp farms across the country

3. Diagnostic methods

Diagnosis of KHVD in clinically affected fish can be achieved by virus isolation. However, the virus is isolated in only a limited number of cell lines and these cells can be difficult to handle. Also, cell culture isolation is not as sensitive as the published PCR-based methods to detect KHV DNA and is not considered to be a reliable diagnostic method for KHVD (14). Immunodiagnostic methods, similar to those used for diagnosis of SVC (e.g. , immunofluorescence (IF) tests or enzyme-linked immunosorbent assays (ELISAs)), may be suitable for rapid identification and diagnosis of KHVD but have not been extensively reported, compared or validated. Until such time as validated tests are available then diagnosis of KHVD should not rely on just one test but a combination of 2 or 3 tests (14).

KHV infection produces a detectable antibody response in carp and enzyme immunoassays that reliably detect these antibodies have been published (27,1). Detection of antibodies may prove to be a valuable method of establishing previous exposure to KHV in apparently healthy fish. Until PCR-based methods have been developed that are able to detect latent virus in exposed fish then antibody assays may be the only surveillance tools available. However, due to insufficient knowledge of the serological responses of fish to virus infections, the detection of fish antibodies to viruses has not thus far been accepted as a routine screening method for assessing the viral status of fish populations. However, the validation of some serological techniques for certain fish virus infections could arise in the near future, rendering the use of fish serology more widely acceptable for health screening purposes.

Appendix XXVII (contd)

Fish material suitable for virological examination is:

- **Asymptomatic fish** (apparently healthy fish): Gill, kidney, spleen, and encephalon (any size fish).
- **Clinically affected fish:** Gill, kidney, spleen, gut and encephalon (any size fish).

a) Field diagnostic methods

During a KHVD outbreak there will be a noticeable increase in mortality in the population. All age groups of fish appear to be susceptible to KHVD although, generally, younger fish up to 1 year are more susceptible to clinical disease. Fish become lethargic, separate from the shoal and gather at the water inlet or sides of a pond and gasp at the surface of the water. Some fish may experience loss of equilibrium and disorientation but they may also show signs of hyperactivity. On closer examination of individual fish, typical clinical signs include pale discolouration or reddening of the skin, which may also have a rough texture, focal or total loss of epidermis, over- or under-production of mucus on the skin and gills. Other gross signs include enophthalmia (sunken eyes) and haemorrhages on the skin and base of the fins and fin erosion.

b) Clinical methods

There are no pathognomic gross lesions. Final diagnosis must await direct detection of viral DNA or antigen in tissues or virus isolation and identification. However, the most consistent gross pathology is seen in the gills and this can vary in extent from pale necrotic patches to extensive discolouration, severe necrosis and inflammation. Further examination can reveal erosion of primary lamellae, fusion of secondary lamellae, and swelling at the tips of the primary and secondary lamella. Other internal lesions are variable in occurrence and often absent in cases of sudden mortality. Other gross pathologies that have been reported include adhesions in the abdominal cavity with or without abnormal colouration of internal organs (lighter or darker). The kidney or liver may be enlarged, and they may also exhibit petechial or focal haemorrhages.

Presence of gross pathologies may also be complicated because diseased fish, particularly common carp, are also infested with ectoparasites such as *Argulus* sp., *Chilodonella* sp., *Cryptobia* sp., *Dactylogyrus* sp., *Gyrodactylus* sp., *Ichthyobodo* sp., *Ichthyophthirius* sp., *Trichodina* sp. and gill monogeneans, as well as numerous species of bacteria.

The histopathology of the disease can be non-specific and variable, but inflammation and necrosis of gill tissues is a consistent feature. Gills also exhibit hyperplasia and hypertrophy of branchial epithelium, and fusion of secondary lamellae and adhesion of gill filaments can be seen. Necrosis, ranging from small areas of necrotic epithelial cells of secondary lamellae to complete loss of the lamellae is observed. Branchial epithelial cells and leucocytes may have prominent nuclear swelling, margination of chromatin to give a “signet ring” appearance and pale diffuse eosinophilic intranuclear inclusions have been observed. Inflammation, necrosis and nuclear inclusions have been observed (individually or together) in other organs, particularly the kidney, but also in the spleen, pancreas, liver, brain, gut and oral epithelium.

c) Agent detection and identification methods

Detailed methods are not presented here because there have not been extensive comparison and validation of detection and identification methods for KHV. However, a short description of available published methods is provided. Method recommendations will rely on further testing and validation and further data being obtained from laboratories that have developed the methods to decide if they are ‘fit-for-purpose’.

- **Direct detection methods**

- i) **Isolation of SVCV in cell culture**

The virus can be isolated in a limited number of cell cultures, but cell culture isolation is not as sensitive as the PCR and is not considered to be a reliable diagnostic method for KHVD(14).

The virus replicates in koi fin cells (KF-1) (16), carp fin (CaF-2) and carp brain (CCB) cells (23), and in primary cells from fins of common or koi carp (25,27,18). Other cell lines used routinely for isolation of fish pathogenic viruses such as EPC, FHM, BF-2, CHSE-214 and RTG-2 cells are refractory to the virus (4,23,36,18). The virus is most abundant in gill, kidney, and spleen tissues during the course of overt infection (10) and it is recommended to sample these tissues for virus isolation. The optimum incubation temperature for virus isolation in KF-1 or CCB cells is 20°C but 8 to 12 days incubation may be required before a cytopathic effect (cpe) is observed (7).

- ii) **Identification of virus isolated in cell culture**

Viruses isolated in cell culture must be definitively identified, as a number of different viruses have been isolated from carp exhibiting clinical signs resembling those of KHVD (14,5).

Rapid presumptive methods

Immunodiagnostic methods, similar to those used for presumptive identification of SVC (e.g. , immunofluorescence (IF) tests or enzyme-linked immunosorbent assays (ELISAs)), may well be suitable for rapid identification and diagnosis of KHVD(26,31).

Confirmatory identification methods

The most reliable method for confirmatory identification is by PCR, or one of its variants, which have also been used to identify KHV DNA directly in fish tissues (8,9,10,11,13,26,2,18,19,39).

A PCR based on the thymidine kinase (TK) gene of KHV was reported to be more sensitive than PCR methods described by Gilad et al. (9) and Gray et al. (11), and could detect 10 fg of KHV DNA (2); the PCR of Ishioka et al. (19), based on the DNA polymerase gene, detected 100 fg of KHV DNA. The loop-mediated isothermal amplification (LAMP) method (13) was also based on the KHV TK gene, and was as sensitive as a PCR method developed by the same authors, but was more rapid than the PCR. The PCR described by Gray et al. (11) was improved by Yuasa et al. (39), and has been incorporated in the official Japanese guidelines for the detection of KHV

- iii) **Diagnostic methods for clinically diseased fish**

Direct detection in fish tissues

KHV has been identified in touch imprints of liver, kidney and brain of infected fish by IF. Highest levels of positive immunofluorescence was seen in the kidney and the virus could be detected by IF on a kidney imprint 1 day post infection (26,31). Virus antigen has also been detected in infected tissues by an immunoperoxidase staining method. The virus antigen was detected by 2 days post infection in the kidney, and was also observed in the gills and liver (26). However, the detection of KHV by immunostaining must be interpreted with care, as positive staining cells could result from cross-reaction with serologically related virus (e.g. CyHV-1) or a non-viral protein (26).

Appendix XXVII (contd)

ELISA-based methods for direct detection of KHV antigen in infected tissues are under development in a number of laboratories worldwide but no methods have been published.

4. Rating of tests against purpose of use

The methods currently available for surveillance, detection and diagnosis of KHVD are listed in Table 1. The designations used in the table indicate: A = the method is currently the recommended method for reasons of availability, utility and diagnostic sensitivity and specificity; B = the method is a standard method with good diagnostic sensitivity and specificity; C = the method has application in some situations, but cost, accuracy or other factors severely limits its application; D = the method is currently not recommended for this purpose. Although not all of the tests listed as category A or B have undergone formal standardisation and validation (at least stages 1 and 2 of figure 1 of Chapter 1.1.2), their routine nature and the fact that they have been used widely without dubious results makes them acceptable.

Table 1. KHVD surveillance, detection and diagnostic methods

Method	Surveillance to declare freedom from infection	Presumptive diagnosis of infection or disease	Confirmatory diagnosis of infection or disease
Gross signs	D	B	D
Histopathology of tissues and organs	D	B	C
Isolation of in cell culture	D	C	D
Antibody-based assays to detect KHV antigen (IFAT, ELISA)	D	B	C
Transmission EM of tissues	D	B	C
PCR of tissue extracts	C	A	A
PCR – sequence analysis	NA	C	A
Detection of KHV antibodies in exposed fish (ELISA)	C	C	D

IFAT = Indirect fluorescent antibody test; ELISA = enzyme-linked immunosorbent assay;
EM = electron microscopy; PCR = polymerase chain reaction.

NOTE: Many diagnostic laboratories may encounter difficulties in obtaining antibodies against KHV that are suitable for use in immunodiagnostic tests. However, a limited number of monoclonal and polyclonal antibodies may be very soon available from commercial sources. It is quite likely that diagnostic kits will also soon be available from the same sources.

5. Corroborative diagnostic criteria

a) Definition of suspect case

A suspect case of KHVD is defined as the presence of typical clinical signs of the disease in a population of susceptible fish OR presentation of typical histopathology in tissue sections OR typical CPE in cell cultures without identification of the causative agent OR a single positive result from one of the diagnostic assays described above.

b) Definition of confirmed case

A confirmed case is defined as a suspect case with subsequent identification of the causative agent by one of the serological or molecular assays described above OR a second positive result from a separate and different diagnostic assay described above.

6. Diagnostic/detection methods to declare freedom

There are no currently recommended methods for surveillance of susceptible fish populations for declaration of freedom from KHV. However, many laboratories are investigating further development of molecular-based methods to increase sensitivity (e.g. Real-time and nested PCR) or to reliably detect latent virus DNA. These assays may well prove suitable for surveillance programs.

REFERENCES

1. ADKISON M.A., GILAD O. & HEDRICK R.P. (2005). An enzyme linked immunosorbent assay (ELISA) for detection of antibodies to the koi herpesvirus (KHV) in the serum of koi *Cyprinus carpio*. *Fish Pathology*, **40**, 53-62.
2. BERCOVIER H., FISHMAN Y., NAHARY R., SINAI S., ZLOTKIN A., EYNGOR M., GILAD O., ELDAR A. & HEDRICK R.P. (2005). Cloning of the koi herpesvirus (KHV) gene encoding thymidine kinase and its use for a highly sensitive PCR based diagnosis. *BMC Microbiology*, **5**, 1-9.
3. BERGMANN S.M., KEMPTER J., SADOWSKI J. & FICHTNER D. (2006). First detection, confirmation and isolation of koi herpesvirus (KHV) in cultured common carp (*Cyprinus carpio* L.) in Poland. *Bulletin of the European Association of Fish Pathologists*, **26**, 97-104.
4. BRETZINGER A., FISCHER-SCHERL T., OUMOUNA M., HOFFMANN R. & TRUYEN U. (1999). Mass mortalities in koi carp, *Cyprinus carpio*, associated with gill and skin disease. *Bulletin of the European Association of Fish Pathologists*, **19**, 182-185.
5. CHOI D.L., SOHN S.G., BANG J.D., DO J.W. & PARK M.S. (2004). Ultrastructural identification of a herpes-like virus infection in common carp *Cyprinus carpio* in Korea. *Diseases of Aquatic Organisms*, **61**, 165-168.
6. DENHAM K. (2003). Koi herpesvirus in wild fish. *Veterinary Record*, **153**, 507.
7. GILAD O., YUN S., ADKISON M.A., WAY K., WILLITS N.H., BERCOVIER H. & HEDRICK R.P. (2003). Molecular comparison of isolates of an emerging fish pathogen, koi herpesvirus, and the effect of water temperature on mortality of experimentally infected koi. *Journal of General Virology*, **84**, 2661-2667.
8. GILAD O., YUN S., ANDREE K., ADKINSON M., ZLOTKIN A., BERCOVIER H., ELDAR A. & HEDRICK R.P. (2001). Characteristics of the koi herpesvirus (KHV) and development of a polymerase chain reaction (PCR) assay to detect the virus in koi *Cyprinus carpio koi*. *Fish Health Newsletter*, **29**, 4.
9. GILAD O., YUN S., ANDREE K.B., ADKISON M.A., ZLOTKIN A., BERCOVIER H., ELDAR A. & HEDRICK R.P. (2002). Initial characteristics of koi herpesvirus and development of a polymerase chain reaction assay to detect the virus in koi, *Cyprinus carpio koi*. *Diseases of Aquatic Organisms*, **48**, 101-108.

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10. GILAD O., YUN S., ZAGMUTT-VERGARA F.J., LEUTENEGGER C.M., BERCOVIER H. & HEDRICK R.P. (2004). Concentrations of a Koi herpesvirus (KHV) in tissues of experimentally infected *Cyprinus carpio koi* as assessed by real-time TaqMan PCR. *Diseases of Aquatic Organisms*, **60**, 179-187.
11. GRAY W.L., MULLIS L., LAPATRA S.E., GROFF J.M. & GOODWIN A. (2002). Detection of koi herpesvirus DNA in tissues of infected fish. *Journal of Fish Diseases*, **25**, 171-178.
12. GROFF J.M., LAPATRA S.E., MUNN R.J. & ZINKL J.G. (1998). A viral epizootic in cultured populations of juvenile goldfish due to a putative herpesvirus etiology. *Journal of Veterinary Diagnostic Investigation*, **10**, 375-378.
13. GUNIMALADEVI I., KONO T., VENUGOPAL M.N. & SAKAI M. (2004). Detection of koi herpesvirus in common carp, *Cyprinus carpio* L., by loop-mediated isothermal amplification. *Journal of Fish Diseases*, **27**, 583-589.
14. HAENEN O.L.M., WAY K., BERGMANN S.M. & ARIEL E. (2004). The emergence of koi herpesvirus and its significance to European aquaculture. *Bulletin of the European Association of Fish Pathologists*, **24**, 293-307.
15. HEDRICK R.P., GILAD O., YUN S. & SPANGENBERG J.V. (1999). An herpesvirus associated with mass mortality of juvenile and adult koi *Cyprinus carpio*. *Fish Health News*, **27**, 7.
16. HEDRICK R.P., GILAD O., YUN S., SPANGENBERG J.V., MARTY G.D., NORDHAUSEN R.W., KEBUS M.J., BERCOVIER H. & ELGAR A. (2000). A herpesvirus associated with mass mortality of juvenile and adult koi, a strain of common carp. *Journal of Aquatic Animal Health*, **12**, 44-57.
17. HEDRICK R.P., WALTZEK T.B. & MCDOWELL T.S. (2006). Susceptibility of koi carp, common carp, goldfish and goldfish x common carp hybrids to cyprinid herpesvirus-2 and herpesvirus-3. *Journal of Aquatic Animal Health*, **18**, 26-34.
18. HUTORAN M., RONEN A., PERELBERG A., ILOUZE M., DISHON A., BEJERANO I., CHEN N. & KOTLER M. (2005). Description of an as yet unclassified DNA virus from diseased *Cyprinus carpio* species. *Journal of Virology*, **79**, 1983-1991.
19. ISHIOKA T., YOSHIZUMI M., IZUMI S., SUZUKI K., SUZUKI H., KOZAWA K., ARAI M., NOBUSAWA K., MORITA Y., KATO M., HOSHINO T., IIDA T., KOSUGE K. & KIMURA H. (2005). Detection and sequence analysis of DNA polymerase and major envelope protein genes in koi herpesviruses derived from *Cyprinus carpio* in Gunma prefecture, Japan. *Veterinary Microbiology*, **110**, 27-33.
20. KASAI H., MUTO Y. & YOSHIMIZU M. (2005). Virucidal effects of ultraviolet, heat treatment and disinfectants against koi herpesvirus (KHV). *Fish Pathology*, **40**, 137-138.
21. LATIFF F.A. (2004). Current status of transboundary fish diseases in Malaysia: occurrence, surveillance, research and training. In: *Transboundary Fish Diseases in Southeast Asia: Occurrence, Surveillance, Research and Training*, C.R. Lavilla-Pitogo and K. Nagasawa (eds.), SEAFDEC Aquaculture Department, Tigbauan, Iloilo, Philippines, pp. 131-157.
22. MUSA N., LEONG N.K. & SUNARTO A. (2005). Koi herpesvirus (KHV) – an emerging pathogen in koi. *Colloquium on Viruses of Veterinary and Public Health Importance, Bangi, Malaysia*, 146-147.

Appendix XXVII (contd)

23. NEUKIRCH M. & KUNZ U. (2001). Isolation and preliminary characterization of several viruses from koi (*Cyprinus carpio*) suffering gill necrosis and mortality. *Bulletin of the European Association of Fish Pathologists*, **21**, 125-135.
24. PERELBERG A., RONEN A., HUTORAN M., SMITH Y. & KOTLER M. (2005). Protection of cultured *Cyprinus carpio* against a lethal viral disease by an attenuated virus vaccine. *Vaccine*, **23**, 3396-3403.
25. PERELBERG A., SMIRNOV M., HUTORAN M., DIAMANT A., BEJERANO Y. & KOTLER M. (2003) Epidemiological description of a new viral disease afflicting cultured *Cyprinus carpio* in Israel. *Israeli Journal of Aquaculture*, **55**, 5-12.
26. PIKARSKY E., RONEN A., ABRAMOWITZ J., LEVAVI-SIVAN B., HUTORAN M., SHAPIRA J., STEINITZ M., PERELBERG A., SOFFER D. & KOTLER M. (2004). Pathogenesis of acute viral disease induced in fish by carp interstitial nephritis and gill necrosis virus. *Journal of Virology*, **78**, 9544-9551.
27. RONEN A., PERELBERG A., ABRAMOWITZ J., HUTORAN M., TINMAN S., BEJERANO I., STEINITZ M. & KOTLER M. (2003). Efficient vaccine against the virus causing a lethal disease in cultured *Cyprinus carpio*. *Vaccine*, **21**, 4677-4684.
28. SANO M., ITO T., KURITA J., YANAI T., WATANABE N., MIWA S. & IIDA T. (2004A). First detection of koi herpesvirus in cultured common carp *Cyprinus carpio* in Japan. *Fish Pathology*, **39**, 165-167.
29. SCHLOTTFELDT H.F. (2004). Severe losses of common carp in Germany due to Koi Herpesvirus (KHV). *Bulletin of the European Association of Fish Pathologists*, **24**, 216-217.
30. SHAPIRA Y., BENET-PERLBERG A., ZAK T., HULATA G. & LEVAVI-SIVAN B. (2002). Differences in resistance to Koi Herpes Virus and growth rate between strains of carp (*Cyprinus carpio*) and their hybrids. *Israeli Journal of Aquaculture*, **54**, 62-63.
31. SHAPIRA Y., MAGEN Y., ZAK T., KOTLER M., HULATA G. & EVAVI-SIVAN B. (2005). Differential resistance to koi herpes virus (KHV)/carp interstitial nephritis and gill necrosis virus (CNGV) among common carp (*Cyprinus carpio* L.) strains and crossbreds. *Aquaculture*, **245**, 1-11.
32. ST-HILAIRE S., BEEVERS N., WAY K., LE DEUFF R.M., MARTIN P. & JOINER C. (2005). Reactivation of koi herpesvirus infections in common carp *Cyprinus carpio*. *Diseases of Aquatic Organisms*, **67**, 15-23.
33. SUNARTO A., RUKYANI A. & ITAMI T. (2005). Indonesian experience on the outbreak of koi herpesvirus in koi and carp (*Cyprinus carpio*). *Bulletin of Fisheries Research Agency*, Supplement No. 2, 15-21.
34. TAKASHIMA Y., WATANABE N., YANAI T. & NAKAMURA T. (2005). The status of koi herpesvirus disease outbreaks in Lake Kasumigaura and Kitaura. *Bulletin of Fisheries Research Agency*, Supplement No. 2, 65-71.
35. TERHUNE J.S., GRIZZLE J.M., HAYDEN K. & MCCLENAHAN S.D. (2004). First report of koi herpesvirus in wild common carp in the Western Hemisphere. *Fish Health Newsletter. American Fisheries Society, Fish Health Section*, **32**, 8-9.
36. TU C., WENG M.C., SHIAU J.R. & LIN S.Y. (2004b). Detection of koi herpesvirus in koi *Cyprinus carpio* in Taiwan. *Fish Pathology*, **39**, 109-110.

Appendix XXVII (contd)

37. WALSTER C. (1999). Clinical observations of severe mortalities in koi carp, *Cyprinus carpio*, with gill disease. *Fish Veterinary Journal*, **3**, 54-58.
38. WALTZEK T.B., KELLEY G.O., STONE D.M., WAY K., HANSON L., FUKUDA H., HIRONO I., AOKI T., DAVISON A.J. & HEDRICK R.P. (2005). Koi herpesvirus represents a third cyprinid herpesvirus (CyHV-3) in the family *Herpesviridae*. *Journal of General Virology*, **86**, 1659-1667.
39. YUASA K., SANO M., KURITA J., ITO T. & IIDA T. (2005). Improvement of a PCR method with the Sph 1-5 primer set for the detection of koi herpesvirus (KHV). *Fish Pathology*, **40**, 37-

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ABALONE VIRAL MORTALITY - DISEASE INFORMATION CARD**Pathogen information**

1. Causative agent

1.1. Pathogen type

Virus

1.2. Disease name and synonyms

Crack-shell disease of *Haliotis hannai*, *Haliotis diversicolor* viral disease and ganglioneuritis of abalone.

1.3. Pathogen common name and synonyms

Abalone icosahedral virus

1.4. Taxonomic affiliation

1.4.1. Pathogen scientific name (Genus, species, sub-species or type)

No data

1.4.2. Phylum, class, family, etc.

Putative herpesvirus

1.5. Description of the pathogen

Icosahedral virus, 90-140 nm in diameter, two-layer envelope (8-10 nm) with a smooth surface; nucleocapsid measures 70-100 nm in diameter; replicates in the nucleus and maturation takes place in cytoplasm of infected cells.

1.6. Authority (first scientific description, reference)

WANG B., LI X. & GOU C. (1997). Infection of spherical viruses from *Haliotis discus hannai* Ino. *Virologica Sinica*, **12** (4), 360–363.

1.7. Pathogen environment (fresh, brackish, marine waters)

Marine water

2. Modes of transmission

2.1. Routes of transmission (horizontal, vertical, direct, indirect)

Horizontal, per os

Given the nature of this virus, vertical transmission cannot be excluded.

Appendix XXVIII (contd)

2.2. Life cycle

No data

2.3. Associated factors (temperature, salinity, etc.)

Temperature less than 24oC required for expression of the disease

2.4. Additional comments

This disease is not the same as the amyotrophia or the viral infections of glioma described in *Nordotis discus*, from Japan (Otsu and Sasaki 1997; Harada *et al.* 1993).

3. Host range

3.1. Host type

Abalone

3.2. Host scientific names

Haliotis hannai, *H. diversicolor*, *H. laevigata* and *H. rubra*

3.3. Other known or suspected hosts

No data

3.4. Affected life stage

Young to adult abalone

3.5. Additional comments

Different names are used for the host species, such as *Haliotis diversicolor*, *Haliotis diversicolor aquatilis*, *Haliotis diversicolor supertexta* and *Haliotis diversicolor diversicolor*. It is suggested that these different names should be unified under the name *Haliotis diversicolor*.

4. Geographic distribution

4.1. Region

Asia, Far East and Oceania

4.2. Country

Australia, China (People's Rep. of) and Taipei China

Disease information

5. Clinical signs and case description

5.1. Host tissues and infected organs

Reported in digestive tract, hepatopancreas, renal tissue, haemocytes and neural tissue.

5.2. Gross observations and macroscopic lesions

Low activity, loss of appetite, decreased photophobia, decreased growth rate, increased secretion of mucus, contracted foot and mantle, black and hardened foot, dead abalone present swollen hepatopancreas and digestive tract.

5.3. Microscopic lesions and tissue abnormality

In haematoxylin and eosin stained sections of mantle, foot, gill, hepatopancreas and digestive tract, the common pathological changes are: necrosis and disorder of connective tissues of all organs; necrosis of haemocytes and epithelial cells; detachment and vacuolization of epithelial cells of foot, mantle, hepatopancreas and gills.

5.4. OIE status

Currently listed by the OIE

6. Social and economic significance

No data but significant economic importance is suspected from the various reports currently available.

7. Zoonotic importance

No data

8. Diagnostic methods

Three levels of examination procedures are used: screening methods for surveillance, presumptive diagnostic methods when abnormal mortalities occur, and confirmatory methods if available when a pathogen is encountered during screening or mortality outbreaks.

8.1. Screening methods

8.1.1. Level I

Increased mortality rates, low activity, loss of appetite, decreased photophobia, decreased growth rate, increased secretion of mucus, contracted foot and mantle, black and hardened foot, dead abalone presents swollen hepatopancreas and digestive tract.

8.1.2. Level II

In haematoxylin and eosin stained sections: haemocytic infiltration and necrotic lesions of connective tissue of all organs and in the neurolemma of cerebral ganglia and peripheral neural tissue; hypertrophy and hyperplasia of the digestive tract epithelial cells.

8.1.3. Level III

Under electron microscopy, infected cells show damage to the nuclear membrane, swelling of mitochondria and proliferation of the endoplasmic reticulum.

The nucleocapsids can be seen in the nucleus and assembled virions in the cytoplasm.

Appendix XXVIII (contd)

8.2. Presumptive methods

8.2.1. level I: see section 8.1.1.

8.2.2. level II: see section 8.1.2.

8.2.3. level III: see section 8.1.3.

8.3. Confirmatory methods

8.3.1. level I: None

8.3.2. level II: None

8.3.3. level III: Transmission electron microscopy. See section 8.1.3.

9. Control methods

No known methods of prevention or control. Infected abalone should not be transported into areas known to be free of the disease.

Selected references

- CHANG P. *et al.* (2005). Herpes-like virus infection causing mortality of cultured abalone *Haliotis diversicolor supertexta*. *Disease of Aquatic Organisms*, **65**, 23–27.
- DAVISON A.J., TRUS B.L., CHENG N., STEVEN A.C., WATSON M.S., CUNNINGHAM C., DEUFF R.-M.L. & RENAULT T. (2005). A novel class of herpesvirus with bivalve hosts. *Journal of General Virology*, **86**, 41–53.
- FANG Y., HUANG Y., YANG J., YAN D., WU W. & NI Z. (2002). Isolation and observation of “virus disease” virus of abalone in Dongshan Fujian. *Journal of Oceanography in Taiwan Strait*, **21**(2), 199–202.
- FAO/NACA (2006A). QUARTERLY AQUATIC ANIMAL DISEASE REPORT (ASIA-PACIFIC REGION) – 2005/4. [HTTP://LIBRARY.ENACA.ORG/NACA-PUBLICATIONS/QAAD/QAAD-2005-4.PDF](http://library.enaca.org/naca-publications/QAAD/QAAD-2005-4.pdf)
- FAO/NACA (2006B). QUARTERLY AQUATIC ANIMAL DISEASE REPORT (ASIA-PACIFIC REGION) – 2006/1. [HTTP://LIBRARY.ENACA.ORG/NACA-PUBLICATIONS/QAAD/QAAD-2006-1.PDF](http://library.enaca.org/naca-publications/QAAD/QAAD-2006-1.pdf)
- FAO/NACA (2006C). QUARTERLY AQUATIC ANIMAL DISEASE REPORT (ASIA-PACIFIC REGION) – 2006/2. [HTTP://LIBRARY.ENACA.ORG/NACA-PUBLICATIONS/QAAD/QAAD-2006-2.PDF](http://library.enaca.org/naca-publications/QAAD/QAAD-2006-2.pdf)
- HARADA T. *et al.* (1993). Tumors in nervous tissues of abalones, *Nordotis discus*. *Journal of Invertebrate Pathology*, **62**, 257–261.
- HUANG Y., CHEN X., WU W., YAN J. & NI Z. (2000). A diagnostic and cure report on the viral disease of *Haliotis diversicolor aquatilis*. *Fujian Veterinary and Zootechnics*, **22** (4), 5–6.
- HUANG Y., WU W., YAN J. & ZHOU W. (1999). Investigation on an exterminate disease of *Haliotis diversicolor aquatilis*. *Fujian Veterinary and Zootechnics*, **21** (3), 4–5.
- LI X., WANG B., LIU S. & XU J. (2000). The infection to a few kinds of shellfish inshore by a kind of virus. *Journal of Dalian Fisheries University*, **15**(2), 86–91.

Appendix XXVIII (contd)

- LI X., WANG B., LIU S., LIU M. & WANG Q. (1998). Studies on pathogeny and histopathology of “crack shell disease” of *Haliotis discus hannii*. *Journal of Fisheries of China*, **22**(3), 61–66.
 - NIE Z. & WANG S. (2004). The status of abalone culture in China. *Journal of Shellfisheries Research*, **23**(4), 941–946.
 - OIE Quarterly Aquatic Animal Disease Report, October-December 2005 (Asian and Pacific Region)
 - OIE fourth quarterly report 2005 and the second and third report for 2006.
 - SONG Z., JI R., YAN S., CHEN C., ZHONG Y., JIANG Y. & NI Z. A sphereovirus resulted in mass mortality of *Haliotis diversicolor aquatilis*. *Journal of Fisheries of China*, **24**(5): 463–466.
 - WANG B., LI X. & GOU C. (1997). Infection of spherical viruses from *Haliotis discus hannai* Ino. *Virologica Sinica*, **12**(4), 360–363.
 - WANG J. *et al.* (2004). Virus infection in cultured abalone, *Haliotis diversicolor* Reeve in Guangdong Province, China. *Journal of Shellfisheries Research*, **23**(4), 1163–1168.
 - WANG J., SU Y., ZHANG J., HUANG Y., ZHANG Z., YAN Q. & WANG D. (1999). Spring explosive epidemic disease of abalone in Dongshan district. *Journal of Xiamen University (Natural Science)*, **38** (5), 641–644.
 - ZHANG Z., WANG J., SU Y., YAN Q., CHI X., ZHOU H. & ZHOU Y. (2001a). Pathogen and histopathology of the epidemic disease in *Haliotis diversicolor supertexta*. *Journal of Xiamen University (Natural Science)*, **40**(4), 949–956.
 - ZHANG Z., WANG J., ZHANG J., SU Y., HUAN Y. & YAN Q. (2001b). Bacterial diseases of *Haliotis diversicolor supertexta* in Dong Shan, Fujian. *Journal of Oceanography in Taiwan Strait*, **20** (2), 193–199.
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MOURILYAN VIRUS - DISEASE INFORMATION CARD**Pathogen information**

1. Causative agent

1.1. Pathogen type

Virus

1.2. Disease name and synonyms

No specific disease name but acute virus infection can be found in *Penaeus monodon* displaying characteristic gross signs of mid-crop mortality syndrome and in *Penaeus japonicus* suffering idiopathic mortalities

1.3. Pathogen common name and synonyms

Mourilyan virus

1.4. Taxonomic affiliation

1.4.1. Pathogen scientific name (Genus, species, sub-species or type)

Currently unclassified

1.4.2. Phylum, class, family, etc.

Possible member of the Bunyaviridae

1.5. Description of the pathogen

Spherical to ovoid-shaped, enveloped virus (85-100 nm in diameter) with a diffuse surface structure; replicates in the cytoplasm; virion maturation occurs at endoplasmic membranes.

1.6. Authority (first scientific description, reference)

COWLEY J.A. *et al.* (2005). *Diseases of Aquatic Organisms*, **66**, 91-104.

1.7. Pathogen environment (fresh, brackish or marine waters)

Marine and brackish water

2. Modes of transmission

2.1. Routes of transmission (horizontal, vertical, direct, indirect)

Horizontal transmission via injection and likely via ingestion of infected tissue; vertical transmission has not been reported but cannot be excluded.

2.2. Life cycle

No data

Appendix XXIX (contd)

2.3. Associated factors (temperature, salinity, etc.)

No data

2.4. Additional comments

None

3. Host range

3.1. Host type

Shrimp

3.2. Host scientific names

Penaeus monodon, *Penaeus japonicus*

3.3. Other known or suspected hosts

No data

3.4. Affected life stage

Juvenile to adult shrimp

3.5. Additional comments

Mourilyan virus has been detected at very low levels in *Penaeus merguensis* using RT-nested PCR but a productive infection state has not been demonstrated. Minor nucleotide sequence variations (< 5%) occur between Mourilyan virus isolates from Australia, Malaysia and Thailand, indicating that strain variants exist in divergent populations of *P. monodon*. No significant sequence variation has been detected between virus isolates infecting eastern Australian *P. monodon* and *P. japonicus*, or among *P. monodon* sampled from various locations in north and eastern Australia and in Fiji, suggesting a single genetic lineage might exist in the shrimp populations in these regions.

4. Geographic distribution

4.1. Region

Asia and Pacific

4.2. Country

Known presence in Australia, Fiji, Malaysia, Thailand and Vietnam.

Disease information

5. Clinical signs and case description

5.1. Host tissues and infected organs

Lymphoid organ spheroids and stromal matrix cells of tubules, cuticular epithelium and underlying connective tissues of the stomach and of the cephalothoracic exoskeleton, antennal gland tubules, primary and secondary gill filaments, epithelial pillar cells, hepatopancreas connective tissues, the pericardial septum, epicardium and fixed phagocytes within the myocardium, haemocytes within haematopoietic tissues, glial, neurosecretory and giant cells associated with the segmental nerve ganglia, nerve cell bodies.

5.2. Gross observations and macroscopic lesions

No data

5.3. Microscopic lesions and tissue abnormality

In haematoxylin and eosin stained sections of cephalothorax tissues, the presence of aggregates of cells with hypertrophied nuclei, known as spheroids, in the lymphoid organ is the most obvious pathology caused by Mourilyan virus. Spheroids numbers, the extent of cytoplasmic vacuolization within spheroid cells, and the amount of necrotic cell debris within spheroids, increase in relation to infection severity. In severe infections, ectopic spheroids may also be detected in gill and in connective tissue associated with various cephalothorax organs.

5.4. OIE status

Under consideration for listing

6. Social and economic significance

Considered to be of some economic importance due to its association with disease and mortalities in *P. monodon* and *P. japonicus*.

7. Zoonotic importance

No data

8. Diagnostic methods

Procedures leading to definitive diagnosis can include: (i) basic surveillance methods; (ii) preliminary presumptive methods when infection is suspected or abnormal mortalities occur; and (iii) confirmatory methods for suspected low-level of chronic infections and for suspected involvement in mortality outbreaks.

8.1. Surveillance methods

RT-nested PCR as described in Cowley *et al.* (2005) (*Diseases of Aquatic Organisms*, **66**, 91–104) or real-time PCR as described in Rajendran *et al.* (2006) (*Journal of Virological Methods*, **137**, 265–271) on RNA extracted from lymphoid organ, hemocytes, gill tissue of juvenile or adult shrimp, on whole post-larvae.

8.2. Presumptive methods

Enlarged lymphoid organ indicating the existence of viral-induced spheroids, idiopathic mortalities in *Penaeus japonicus* and gross disease signs consistent with mid-crop mortality syndrome in *Penaeus monodon* are potential indicators of acute infection. In haematoxylin and eosin stained histological sections: the presence of Type 1 spheroids (comprising small tubule occlusions of densely packed cells) and/or Type 2 spheroids (comprising larger aggregates of cells with enlarged nuclei and variably vacuolated cytoplasm, as well as debris due to cell necrosis) in the lymphoid organ as well as ectopic spheroids in other tissues.

8.3. Confirmatory methods

In severe infections, examination of lymphoid organ and gill tissue by electron microscopy for evidence of mature enveloped virions in the cytoplasm of infected cells can assist confirmatory diagnosis. However, as mature virions only appear to occur in circumstances where infection levels are extremely high, lower-level infection may not be detected. It is recommended that *in situ* hybridization on tissue sections be used for diagnosis of moderate to high-level infection and that either RT-nested PCR or real-time RT-PCR employing RNA isolated from lymphoid organ, gill or haemocytes be used for confirmatory diagnosis irrespective of predicted infection level. Methods for electron microscopy, *in situ* hybridization and RT-nested PCR are described in Cowley *et al.* (2005) (*Diseases of Aquatic Organisms*, **66**, 91–104). The method for real-time PCR is described in Rajendran *et al.* (2006) (*Journal of Virological Methods*, **137**, 265–271).

Appendix XXIX (contd)

9. Control methods

No known methods of prevention or control. Infected shrimp should not be transported into areas known to be free of the virus.

Selected references

- RAJENDRAN K.V., COWLEY J.A., MCCULLOCH R.J. & WALKER P.J. (2006). A TaqMan real-time RT-PCR for quantifying Mourilyan virus infection levels in shrimp tissues. *Journal of Virological Methods*, **137**, 265–271.
 - SELLARS M.J., KEYS S.J., COWLEY J.A., MCCULLOCH R.J. & PRESTON N.P. (2005). Association of Mourilyan virus with mortalities in farm-reared *Penaeus (Marsupenaeus) japonicus* transferred to maturation tank systems. *Aquaculture*, **252**, 242–247.
 - COWLEY J.A., MCCULLOCH R.J., RAJENDRAN K.V., CADOGAN L.C., SPANN K.M. & WALKER P.J. (2005). RT-nested PCR detection of Mourilyan virus in Australian *Penaeus monodon* and its tissue distribution in healthy and moribund prawns. *Diseases of Aquatic Organisms*, **66**, 91–104.
 - COWLEY J.A., MCCULLOCH R.J., SPANN K.M., CADOGAN L.C. & WALKER P.J. (2005). Preliminary molecular and biological characterisation of Mourilyan virus (MoV): A new bunya-related virus of penaeid prawns. *In* : Walker P.J., Lester R.G. and Bondad-Reantaso M.G. (eds.). *Diseases in Asian Aquaculture V*. Proceedings of the 5th *Symposium on Diseases in Asian Aquaculture*, Fish Health Section, Asian Fisheries Society, Manila, pp. 113–124.
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INFECTIOUS MYONECROSIS - DISEASE INFORMATION CARD

Pathogen information

1. Causative agent

1.1. Pathogen type

virus

1.2. Disease name and synonyms

Infectious myonecrosis (IMN)

1.3. Pathogen common name and synonyms

Infectious myonecrosis virus (IMNV)

1.4. Taxonomic affiliation

1.4.1. Pathogen scientific name (Genus, species, sub-species or type)

Infectious myonecrosis virus (IMNV) - proposed

1.4.2. Phylum, class, family, etc

IMNV is a putative totivirus. Phylogenetic analysis based on the RdRp clustered IMNV with *Giardia lamblia virus*, a member of the family Totiviridae.

1.5. Description of the pathogen

IMNV particles are icosahedral in shape and 40 nm in diameter, with a buoyant density of 1.366 g/ml in cesium chloride. The genome consists of a single, double-stranded (dsRNA) molecule of 7560 bp. Sequencing of the viral genome reveals two non-overlapping open reading frames (ORFs). The 59 ORF (ORF 1, nt 136–4953) encoded a putative RNA-binding protein and a capsid protein. The coding region of the RNA-binding protein is located in the first half of ORF 1 and contains a dsRNA-binding motif in the first 60 aa. The second half of ORF 1 encoded a capsid protein, as determined by amino acid sequencing, with a molecular mass of 106 kDa. The 39 ORF (ORF 2, nt 5241–7451) encodes a putative RNA-dependent RNA polymerase (RdRp).

1.6. Authority (first scientific description, reference)

POULOS B.T., TANG K.F.J., PANTOJA C.R., BONAMI J.R. & LIGHTNER D.V. (2006). Purification and characterization of infectious myonecrosis virus of penaeid shrimp. *Journal of General Virology*, **87**, 987-996.

1.7. Pathogen environment (fresh, brackish or marine waters)

IMN occurs in *Penaeus vannamei* farmed in brackish and marine water.

2. Modes of transmission

2.1. Routes of transmission (horizontal, vertical, direct, indirect)

Horizontal, via contaminated water, per os (cannibalism).

Vertical transmission is considered likely, but not experimentally documented.

Appendix XXX (contd)

2.2. Life cycle

Not applicable.

2.3. Associated factors (temperature, salinity, etc.)

Temperature and salinity effects considered as likely contributors to disease outbreaks, but no experimental data is available.

2.4. Additional comments

IMN disease is not the same disease as penaeid white tail disease. The later disease is a recently discovered disease with gross and histological signs that mimic IMN, but which is caused by a different type of virus (a nodavirus named *Penaeus vannamei* novavirus – PvNV).

3. Host range

3.1. Host type

Penaeid shrimp

3.2. Host scientific names

Natural infections: *Penaeus vannamei*

Experimental infections: *Penaeus stylirostris* and *P. monodon*

3.3. Other known or suspected hosts

Native wild penaeids in north-eastern Brazil are anecdotally reported as hosts.

3.4. Affected life stage

Late postlarvae (PL), juveniles and adults

3.5. Additional comments

None.

4. Geographic distribution

4.1. Region

North-eastern Brazil and south-east Asia.

4.2. Countries

North-eastern Brazil and Java, Indonesia.

Disease information

5. Clinical signs and case description

5.1. Host tissues and infected organs

Reported from: striated muscles (skeletal and less often cardiac), connective tissues, hemocytes, and the lymphoid organ parenchymal cells.

5.2. Gross observations and macroscopic lesions

Affected shrimp present focal to extensive white necrotic areas in striated (skeletal) muscles, especially in the distal abdominal segments and tail fan, which can become necrotic and reddened in some individual shrimp. These signs may have a sudden onset following stresses (e.g. capture by cast-net, feeding, sudden changes in temperature or salinity). Severely affected shrimp may have been feeding just before the onset of stress and will have a full gut. Such severely affected shrimp become moribund and mortalities can be instantaneously high and continue for several days.

Exposing the paired lymphoid organs by simple dissection will show that they are hypertrophied to 3-4 times their normal size.

5.3. Microscopic lesions and tissue abnormality

Stained or unstained tissue squashes of affected skeletal muscle or of the lymphoid organ (LO) may show abnormalities.

Tissue squashes of skeletal muscle when examined with phase or reduced light microscopy may show loss of the normal striations. Fragmentation of muscle fibers may also be apparent.

Squashes of the LO may show the presence of significant accumulations of spherical masses of cells (lymphoid organ spheroids or LOS) amongst normal LO tubules.

6. OIE status

Listed by the OIE as “under study”

7. Social and economic significance

An estimate published in a trade magazine from the Brazilian shrimp farming industry estimated the economic impact of IMN from 2002-2004 to be \$20 million (Nunes *et al.*, 2004). More recent estimates for IMN losses in Brazil are >\$100 million.

8. Zoonotic importance

None

9. Diagnostic methods

Three levels of examination procedures are used: screening methods for surveillance, presumptive diagnostic methods when abnormal mortalities occur, and confirmatory methods if available when a pathogen is encountered during screening or mortality outbreaks.

9.1. Screening methods

9.1.1. Level I

Onset of gross signs as described in section 5 (above) following handling or other episodes of stress.

Appendix XXX (contd)

9.1.2. Level II:

By histopathology using routine H&E stained paraffin sections (Bell and Lightner, 1988), shrimp with acute phase IMN present myonecrosis with characteristic coagulative necrosis of striated (skeletal) muscle fibers, often with marked edema among affected muscle fibers. Some shrimp may present with a mix of acute and older lesions. In these shrimp, the affected muscle fibers appear to progress from presenting coagulative necrosis to presenting liquefactive necrosis, which is accompanied by moderate infiltration and accumulation of hemocytes. In the most advanced lesions, hemocyte inflamed muscle fibers are replaced by a loose matrix of fibrocytes and connective tissue fibers that are interspersed with hemocytes and foci of (presumed) regenerating muscle fibers.

Significant hypertrophy of the lymphoid organ (LO) due to accumulations of lymphoid organ spheroids (LOS) is a highly consistent lesion in shrimp with acute or chronic phase IMN lesions. Often many ectopic LOS are found in other tissues not near the main body of the LO. Common locations for ectopic LOS include the hemocoelom in the gills, heart, near the antennal gland tubules, and ventral nerve cord.

9.1.3. Level III:

RT-PCR using the methods described in Poulos *et al.* (2006) and Poulos *et al.* (“in press”).

ISH using specific cDNA probes to IMNV according to the methods described in Tang *et al.* (2005).

9.2. Presumptive methods

9.2.1. Level I: see section 9.1.1.

9.2.2. Level II: see section 9.1.2.

9.2.3. Level III: see section 9.1.3.

9.3. Confirmatory methods

9.3.1. Level I: See section 9.1.1. for the available diagnostic options.

9.3.2. Level II: See section 9.1.2. for the available diagnostic options.

9.3.3. Level III: See section 9.1.3. for the available diagnostic options.

10. Control methods

No methods are known for prevention or control of IMN in farms, compartments, regions or countries using infected stocks of *Penaeus vannamei*. The use of specific pathogen-free (SPF) stocks (Wyban *et al.*, 1992) of *P. vannamei* under biosecure culture conditions (Lee & O’Byren, 2003; Lightner, 2005) is the recommended method for prevention of IMN disease.

IMNV infected broodstock (of any penaeid species), nauplii or PLs produced from infected broodstock should not be transported into areas known to be free of the disease.

Selected references

BELL T.A. & LIGHTNER D.V. (1988). A Handbook of Normal Penaeid Shrimp Histology. Baton Rouge, LA: World Aquaculture Society.

Appendix XXX (contd)

FAUQUET C.M., MAYO M.A., MANILOFF J., DESSELBERGER U. & BALL L.A. (editors) (2005). Totiviridae. *In* Virus Taxonomy: Classification and Nomenclature of Viruses. Eighth Report of the International Committee on the Taxonomy of Viruses, pp. 571–580. San Francisco: Elsevier.

HOLTHIUS L.B. (1980). Shrimps and prawns of the world: An annotated catalogue of species of interest to fisheries. *In* FAO Species Catalogue: FAO Fisheries Synopsis 125(1). Rome: Food and Agricultural Organization of the United Nations.

LEE C.S. & O'BRYEN P.J. (Eds.). (2003). Biosecurity in Aquaculture Production Systems: Exclusion of Pathogens and Other Undesirables. World Aquaculture Society, Baton Rouge, LA, 293 p.

LIGHTNER D.V. (2005). Biosecurity in shrimp farming: Pathogen exclusion through the use of SPF stock and routine surveillance. *Journal of the World Aquaculture Society*, **36**, 229–248.

LIGHTNER D.V., PANTOJA C.R., POULOS B.T., TANG K.F.J., REDMAN R.M., PASOS DE ANDRADE T. & BONAMI J.R. (2004). Infectious myonecrosis: New disease in Pacific white shrimp. *Global Aquaculture Advocate*, **7**, 85.

NUNES A.J.P., CUNHA-MARTINS P. & VASCONSELOS-GESTEIRA T.C. (2004). Carcinicultura ameacada. *Rev. Panoram Aquic.*, **83**, 37–51 (in Portuguese).

TANG K.F.J., PANTOJA C.R., POULOS B.T., REDMAN R.M. & LIGHTNER D.V. (2005). *In situ* hybridization demonstrates that *Litopenaeus vannamei*, *L. stylirostris* and *Penaeus monodon* are susceptible to experimental infection with infectious myonecrosis virus (IMNV). *Diseases of Aquatic Organisms*, **63**, 261–265.

WYBAN J.A., SWINGLE J.S., SWEENEY J.N. & PRUDER G.D. (1992). Development and commercial performance of high health shrimp using specific pathogen free (SPF) broodstock *Penaeus vannamei*. *In* Proceedings of the Special Session on Shrimp Farming, pp. 254–259. Edited by J. Wyban. Baton Rouge, LA: World Aquaculture Society.

WHITE TAIL DISEASE - DISEASE CARD¹

by
A.S.Sahul Hameed²

Pathogen information

1. Causative agent

1.1. Pathogen type: virus

1.2. Disease name and synonyms: White Tail disease (WTD)

White Muscle Disease (WMD)

1.3. Pathogen common name and synonyms:

Macrobrachium rosenbergii Nodavirus (*MrNV*) and extra small virus (XSV).

Both these viruses have been found to be associated with the disease. However, the role of *MrNV* and XSV is not yet clear.

1.4. Taxonomic affiliation

1.4.1. Pathogen scientific name: *Macrobrachium rosenbergii* Nodavirus (*MrNV*)

1.4.2. Phylum, class, family, etc.: Family: *Nodaviridae*

1.5. Description of the pathogen: *MrNV* is an icosahedral non-enveloped RNA virus with a size of 26-27 nm in diameter. Viral replication in the cytoplasm of connective tissue cells of most organs and tissues. It is composed of two linear single stranded RNAs (genome) and CP-43 (capsid) (Bonami *et al.*, 2005).

XSV is a satellite virus with a diameter of 14-16 nm, associated with *MrNV*. It consists of a linear single stranded RNA (genome) and CP-17 (capsid) (Bonami *et al.*, 2005).

1.6. Authority:

ARCIER J.M., HERMAN F., LIGHTNER D.V., REDMAN R., MARI J., BONAMI J.R. (1999). A viral disease associated with mortalities in hatchery-reared postlarvae of the giant freshwater prawn *Macrobrachium rosenbergii*. *Diseases of Aquatic Organisms*, **38**, 177–181.

QIAN D., SHI Z., ZHANG S., CAO Z., LIU W., LI L., XIE Y., CAMBOURNAC I. & BONAMI J.R. (2003). Extra small virus-like particles (XSV) and nodavirus associated with whitish muscle disease in the giant freshwater prawn, *Macrobrachium rosenbergii*. *Journal of Fish Diseases*, **26**, 521–527.

¹A.S.Sahul Hameed (2005). White Tail Disease - disease card. Developed to support the NACA/FAO/OIE regional quarterly aquatic animal disease (QAAD) reporting system in the Asia-Pacific. NACA, Bangkok, Thailand. 7 pp.

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Appendix XXXI (contd)

SAHUL HAMEED A.S., YOGANANDHAN K., WIDADA J. S. & BONAMI J.R. (2004). Studies on the occurrence and RT-PCR detection of *Macrobrachium rosenbergii* nodavirus and extra small virus-like particles associated with white tail disease of *Macrobrachium rosenbergii* in India. *Aquaculture*, **238**, 127-133.

WIDADA J.S., DURAND S., CAMBOURNAC I., QIAN D., SHI Z., DEJONGHE E., RICHARD V. & BONAMI J.R. (2003). Genome-based detection methods of *Macrobrachium rosenbergii* nodavirus, a pathogen of the giant freshwater prawn, *Macrobrachium rosenbergii*: dot-blot, *in situ* hybridization and RT-PCR. *Journal of Fish Diseases*, **26**, 583–590.

1.7. Pathogen environment: Brackish water and Freshwater

2. Modes of transmission

2.1. Routes of transmission: Vertical and horizontal transmission (Sahul Hameed *et al.*, 2004)

2.2. Life cycle: Replication in the cytoplasm of cell

2.3. Associated factors: Unknown

2.4. Additional comments: Nil

3. Host range

3.1. Host type: Giant Freshwater prawn or Malaysian prawn

3.2. Host scientific names: *Macrobrachium rosenbergii* (De Man)

3.3. Other known or suspected hosts: Unknown so far.

3.4. Affected life stage: Larvae, post-larvae and early juvenile

3.5. Additional comments: No evidence of adult life stages being affected. Adults might act as carriers.

4. Geographic distribution

4.1. Region: Northern South America (Caribbean region) and Asia.

4.2. Country: French West Indies, Dominican Republic (Caribbean region), China, Taipei China and India.

4.3. Additional comments: Clinical signs and mortality patterns appear similar in China, Taipei China and Indian outbreaks and it may be assumed that movement of some common prawn population source might be the reason for the wide distribution of the WTD. However, further studies are required to understand the geographic distribution.

Disease information

5. Clinical signs and case description

5.1. Host tissues and infected organs: Abdomen (Tail) is particularly milky and opaque. The discoloration appears to start at the tail extremity (telson region) and gradually progress towards the head (Figure 1). Eventually all muscles in the abdomen and cephalothorax are affected. Very few post-larvae presenting these signs survive and survivors seem to grow normally in grow-out ponds.

Appendix XXXI (contd)

- 5.2. Gross observations and macroscopic lesions: Affected post-larvae are more milky and opaque (Figure 1). Appearance of these clinical signs usually followed by death with variable mortality rate reaching up to 95%. The tissues most affected in moribund PLs/early juveniles are striated muscles of the abdomen and cephalothorax and intratubular connective tissue of the hepatopancreas.
- 5.3. Microscopic lesions and tissue abnormality: Multifocal areas of hyaline necrosis of muscle fibres are found in the striated muscle (Figure 2).
- 5.4. OIE status: not listed.
6. **Social and economic significance**: WTD causes significant damage to the critical life stage i.e. post-larvae of the host. Heavy mortalities of post larvae in hatcheries and pond nurseries cause significant economic loss and affect the livelihoods of primary producers.

7. **Zoonotic importance**: none

8. Diagnostic methods

8.1. Screening methods

8.1.1. Level I: none

8.1.2. Level II: none

8.1.3. Level III: RT-PCR and LAMP

Reverse Transcriptase-PCR (RT-PCR) is a method used to amplify cDNA copies of RNA. The primer sequence for *MrNV* is 5' GCG TTA TAG ATG GCA CAA GG 3' (forward) and 5' AGC TGT GAA ACT TCC ACT GG 3' (reverse) with amplified product size of 425 bp (Fig. 2). For *XSV*, 5' GGA GAA CCA TGA GAT CAC G 3' (forward) and 5' CTG CTC ATT ACT GTT CGG AGT 3' (reverse) with amplified product of 500 bp (Fig. 2) (Widada *et al.*, 2003; Sahul Hameed *et al.*, 2004a; Widada *et al.*, 2004).

LAMP (loop-mediated isothermal amplification) is intended to amplify cDNA copies of RNA. Four (*MrNV*) or six primers (*XSV*), able to recognize respectively six or eight sequences, were used. This methodology is under development (Pathogens and Immunity, CNRS/UM2, Universite Montpellier II, Montpellier, France).

8.2. Presumptive methods

8.2.1. Level I: Gross observations

Presence of post-larvae with whitish colour followed by mortality, 2 to 3 days after the conversion of first post-larva in larval rearing tanks. The abdomen (tail) becomes milky white and opaque. Mortalities reach to maximum around fifth day after the appearance of the first gross sign resulting in complete drain-out of the tank.

8.2.2. Level II: Histopathology

Histopathological changes are characterized by pale to darkly basophilic, reticulated cytoplasmic inclusions in the connective tissue cells of most organs and tissues (Tung *et al.*, 1999). Prionin methyl green staining can be used to distinguish the characteristically green-stained *MrNV* viral inclusions from hemocyte nuclei (Tung *et al.*, 1999).

Appendix XXXI (contd)

8.2.3. Level III: Virology

MrNV is an icosahedral non-enveloped RNA virus with a size of 26-27 nm in diameter. It is composed of two linear single stranded RNAs.

XSV has a diameter of 14-16 nm and is associated with *MrNV* with. It consists of a linear single stranded RNA.

Both the viruses have been found to be associated with the disease; however, the role of *MrNV* and XSV is not yet clear. In view of this, detection of either virus or simultaneous detection of both viruses should be reported as WTD or WTD suspicion.

8.3. Confirmatory methods

8.3.1. Level I: none

8.3.2. Level II: none

8.3.3. Level III: Reverse Transcriptase Polymerase Chain Reaction (RT-PCR) and Loop-Mediated Isothermal Amplification (LAMP)

9. **Control methods:** Because *Macrobrachium rosenbergii* is domesticated completely and an RT-PCR technique is available for commercial use, brood stock and seed screening should be strongly encouraged. The brood stock or seed tested positive for WTD must be discarded with proper zoosanitary methods. Usual sanitation and control protocols for viral infections are recommended.

10. Selected references

- ARCIER J.M., HERMAN F., LIGHTNER D.V., REDMAN R., MARI J., BONAMI J.R. (1999). A viral disease associated with mortalities in hatchery-reared postlarvae of the giant freshwater prawn *Macrobrachium rosenbergii*. *Diseases of Aquatic Organisms*, **38**, 177–181.
- BONAMI J.R., SHI Z., QIAN D. & WIDADA J.S. (2005). White tail disease of the giant freshwater prawn, *Macrobrachium rosenbergii*: Separation of the associated virions and characterization of *MrNV* as a new type of nodavirus. *Journal of Fish Diseases*, **28**(1), 23–32.
- QIAN D., SHI Z., ZHANG S., CAO Z., LIU W., LI L., XIE Y., CAMBOURNAC I. & BONAMI J.R. (2003). Extra small virus-like particles (XSV) and nodavirus associated with whitish muscle disease in the giant freshwater prawn, *Macrobrachium rosenbergii*. *Journal of Fish Diseases*, **26**, 521–527.
- ROMESTAND B. & BONAMI J.R. (2003). A sandwich enzyme linked immunosorbent assay (S-ELISA) for detection of *MrNV* in the giant freshwater prawn, *Macrobrachium rosenbergii* (de Man). *Journal of Fish Diseases*, **26**, 71–75.
- SAHUL HAMEED A.S., YOGANANDHAN K., WIDADA J.S. & BONAMI J.R. (2004). Studies on the occurrence and RT-PCR detection of *Macrobrachium rosenbergii* nodavirus and extra small virus-like particles associated with white tail disease of *Macrobrachium rosenbergii* in India. *Aquaculture*, **238**, 127-133.
- SAHUL HAMEED A.S., YOGANANDHAN K., WIDADA J.S. & BONAMI J.R. (2004). Experimental transmission and tissue tropism of *Macrobrachium rosenbergii* nodavirus (*MrNV*) and extra small virus like-particles in *Macrobrachium rosenbergii*. *Diseases of Aquatic Organisms*, **62**, 191-196.
- TUNG C.W., WANG C.S. & CHEN S.N. (1999). Histological and electron microscopic study on *Macrobrachium* muscle virus (MMV) infection in the giant freshwater prawn, *Macrobrachium rosenbergii* (de Man), cultured in Taiwan. *Journal of Fish Diseases*, **22**, 319-324.

Appendix XXXI (contd)

WIDADA J.S., DURAND S., CAMBOURNAC I., QIAN D., SHI Z., DEJONGHE E., RICHARD V. & BONAMI J.R. (2003). Genome-based detection methods of *Macrobrachium rosenbergii* nodavirus, a pathogen of the giant freshwater prawn, *Macrobrachium rosenbergii*: dot-blot, *in situ* hybridization and RT-PCR. *Journal of Fish Diseases*, **26**, 583–590.

WIDADA J.S., RICHARD V., CAMBOURNAC I., SHI Z., QIAN D. & BONAMI J.R. (2004). Dot-blot hybridization and RT-PCR detection of extra small virus (XSV) associated with white tail disease of prawn *Macrobrachium rosenbergii*. *Diseases of Aquatic Organisms*, **58**, 83–87.

WIDADA J.S. & BONAMI J.R. (2004). Characteristics of the monocistronic genome of extra small virus, a virus-like particle associated with *Macrobrachium rosenbergii* nodavirus: Possible candidate for a new species of satellite virus. *Journal of General Virology*, **85**, 643–646.

YOGANANDHAN K., WIDADA J.S., BONAMI J.R. & SAHUL HAMEED A.S. (2005). Simultaneous detection of *Macrobrachium rosenbergii* nodavirus and extra small virus by a single tube, one-step multiplex RT-PCR assay. *Journal of Fish Diseases*, **28**, 65–69.

Appendix XXXI (contd)

Figure 1. *Macrobrachium rosenbergii* post-larvae showing white tail disease

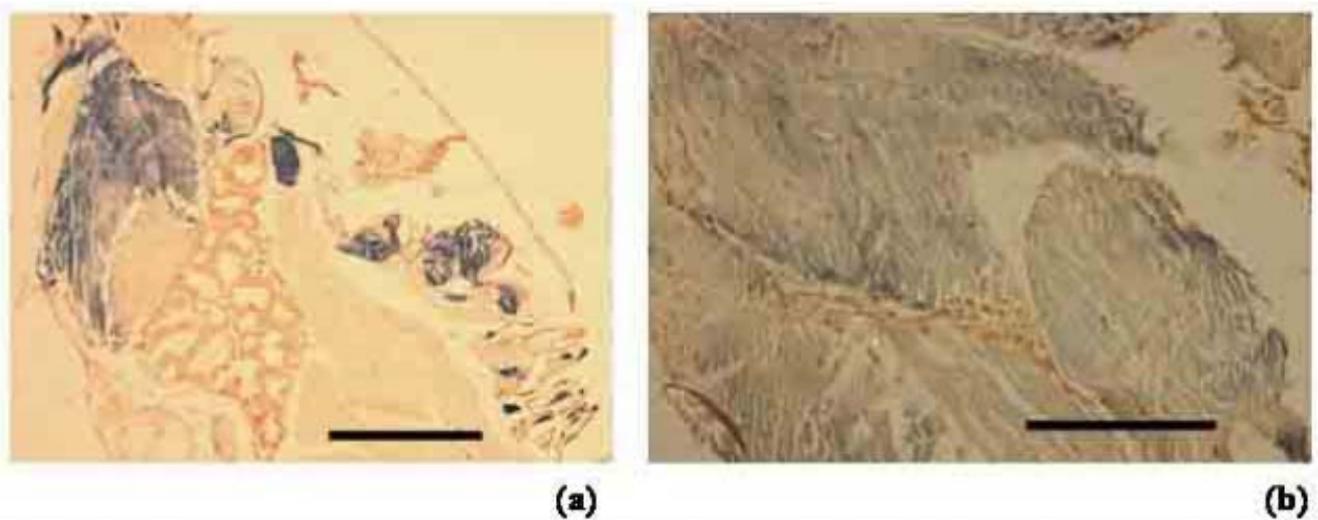


Figure 2. *In situ* hybridization, using *MrNV* probes. a) General view of the cephalothorax of an infected PL; hybridization was restricted to muscular areas while the hepatopancreas and the gills remained unaffected; bar: 500 μm . b) Positive hybridization in muscular fibrils; nuclei were virus-free and blood cells were uninfected; bar: 200 μm . (Widada *et al.*, 2003).

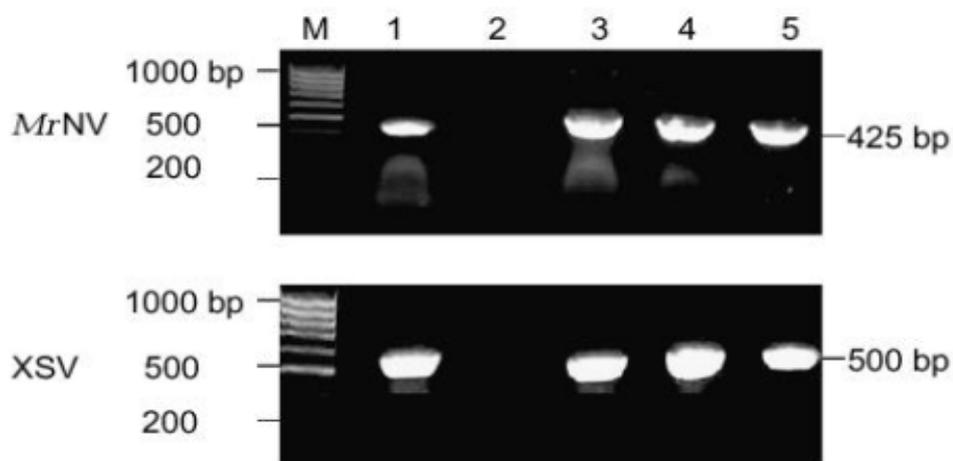


Figure 3. RT-PCR detection of *MrNV* and *XSV*

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**REPORT OF THE MEETING OF THE TEAMS COMPRISING
THE OIE *AD HOC* GROUP ON THE LIST OF AQUATIC ANIMAL DISEASES**

The OIE *ad hoc* Group on the List of Aquatic Animal Diseases comprises three teams – finfish diseases, mollusc diseases and crustacean diseases.

This report addresses the 2006 meetings of the mollusc and crustacean diseases teams.

The report of the mollusc diseases team is at [Appendix A](#).

The report of the crustacean diseases team is at [Appendix B](#).

.../Appendices



Original: English
August 2006

REPORT OF THE MEETING OF THE OIE *AD HOC* GROUP ON THE OIE LIST OF AQUATIC ANIMAL DISEASES - MOLLUSC TEAM - FOR THE OIE *AQUATIC ANIMAL HEALTH CODE*

Paris, 8-10 August 2006

The OIE *ad hoc* Group on the OIE List of Aquatic Animal Diseases - Mollusc Team (hereinafter referred to as the *ad hoc* Group) for the OIE *Aquatic Animal Health Code* (hereinafter called the *Aquatic Code*) held its meeting at the OIE Headquarters from 8-10 August 2006.

On behalf of Dr Bernard Vallat, Director General of the OIE, Dr Sarah Kahn, Head of the International Trade Department, welcomed the members of the *ad hoc* Group and thanked them for their willingness to be involved in addressing this mandate of the OIE.

The members of the *ad hoc* Group are listed in [Appendix I](#). The Agenda adopted is given in [Appendix II](#).

1. Abalone viral mortality

The *ad hoc* Group, in the report of its July 2005 meeting, drew the attention of the OIE Aquatic Animal Health Standards Commission (hereinafter called the Aquatic Animals Commission) to this emerging disease and proposed that it be listed in Chapter 1.2.3. of the *Aquatic Code*. Information that has subsequently become available indicates both a wider distribution of the disease (recent news report from Australia) and a clearer aetiology (putative herpesvirus). Based on this information, the *ad hoc* Group updated the case definition and revised the disease information card for abalone viral mortality that had been initially prepared with assistance of Drs Shi Zhengli and Judith Handler (see [Appendix III](#)). The *ad hoc* Group thanked Chile for providing the relevant references on the viral infections of abalone.

The *ad hoc* Group recommended that the OIE Central Bureau and the Aquatic Animals Commission provide Member Countries with the information they need in order to commence efficient and accurate reporting, starting in January 2007.

2. Infection with *Terebrasabella heterouncinata*

The *ad hoc* Group addressed the request from the Aquatic Animals Commission on the sabellid worm (*Terebrasabella heterouncinata*) by developing a full assessment of the disease against the listing criteria provided in Chapter 1.2.2. of the *Aquatic Code* (see [Appendix IV](#)).

The *ad hoc* Group noted that the spread of the disease is linked to transboundary movements of live abalone for farming purposes, the disease has a serious economic impact, the disease aetiology is clear and there are robust diagnostic techniques. The *ad hoc* Group also noted that abalone farming is a sector of the aquaculture industry showing significant growth and many regions are still free from this disease.

Appendix XXXII (contd)

Appendix A (contd)

As a result of the assessment, the *ad hoc* Group recommends that infection with *Terebrasabella heterouncinata* be listed in Chapter 1.2.3. of the *Aquatic Code*.

Appendix XXXII (contd)Appendix A (contd)Appendix I

**MEETING OF THE
OIE AD HOC GROUP ON THE OIE LIST OF AQUATIC ANIMAL DISEASES - MOLLUSC TEAM -
FOR THE OIE AQUATIC ANIMAL HEALTH CODE**

Paris, 8-10 August 2006

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Appendix XXXII (contd)

Appendix A (contd)

Appendix II

**MEETING OF THE
OIE *AD HOC* GROUP ON THE OIE LIST OF AQUATIC ANIMAL DISEASES - MOLLUSC TEAM -
FOR THE OIE *AQUATIC ANIMAL HEALTH CODE***

Paris, 8-10 August 2006

Adopted Agenda

OIE List of Aquatic Animal Diseases

1. Address comments provided by Chile on the listing of abalone viral mortality
2. Assessment of the sabellid worm (infection with *Terebrasabella heterouncinata*)

Appendix XXXII (contd)Appendix A (contd)Appendix III**ABALONE VIRAL MORTALITY - DISEASE INFORMATION CARD****Pathogen information**

1. Causative agent

1.1. Pathogen type

Virus

1.2. Disease name and synonyms

Crack-shell disease of *Haliotis hannai*, *Haliotis diversicolor* viral disease and ganglioneuritis of abalone.

1.3. Pathogen common name and synonyms

Abalone icosahedral virus

1.4. Taxonomic affiliation

1.4.1. Pathogen scientific name (Genus, species, sub-species or type)

No data

1.4.2. Phylum, class, family, etc.

Putative herpesvirus

1.5. Description of the pathogen

Icosahedral virus, 90-140 nm in diameter, two-layer envelope (8-10 nm) with a smooth surface; nucleocapsid measures 70-100 nm in diameter; replicates in the nucleus and maturation takes place in cytoplasm of infected cells.

1.6. Authority (first scientific description, reference)

WANG B., LI X. & GOU C. (1997). Infection of spherical viruses from *Haliotis discus hannai* Ino. *Virologica Sinica*, **12** (4), 360–363.

1.7. Pathogen environment (fresh, brackish, marine waters)

Marine water

2. Modes of transmission

2.1. Routes of transmission (horizontal, vertical, direct, indirect)

Horizontal, per os

Given the nature of this virus vertical transmission cannot be excluded.

Appendix XXXII (contd)Appendix A (contd)Appendix III (contd)

2.2. Life cycle

No data

2.3. Associated factors (temperature salinity, etc.)

Temperature less than 24°C required for expression of the disease

2.4. Additional comments

This disease is not the same as the amyotrophia or the viral infections of glioma described in *Nordotis discus*, from Japan (Otsu and Sasaki 1997; Harada *et al.* 1993).

3. Host range

3.1. Host type

Abalone

3.2. Host scientific names

Haliotis hannai, *H. diversicolor*, *H. laevigata* and *H. rubra*

3.3. Other known or suspected hosts

No data

3.4. Affected life stage

Young to adult abalone

3.5. Additional comments

Different names are used for the host species, such as *Haliotis diversicolor*, *Haliotis diversicolor aquatilis*, *Haliotis diversicolor supertexta* and *Haliotis diversicolor diversicolor*. It is suggested that these different names should be unified under the name *Haliotis diversicolor*.

4. Geographic distribution

4.1. Region

Asia, Far East and Oceania

4.2. Country

Australia, China (People's Rep. of) and Taipei China

Disease information

5. Clinical signs and case description

5.1. Host tissues and infected organs

Reported in digestive tract, hepatopancreas, renal tissue, haemocytes and neural tissue.

Appendix XXXII (contd)

Appendix A (contd)

Appendix III (contd)

5.2. Gross observations and macroscopic lesions

Low activity, loss of appetite, decreased photophobia, decreased growth rate, increased secretion of mucus, contracted foot and mantle, black and hardened foot, dead abalone present swollen hepatopancreas and digestive tract.

5.3. Microscopic lesions and tissue abnormality

In haematoxylin and eosin stained sections of mantle, foot, gill, hepatopancreas and digestive tract, the common pathological changes are: necrosis and disorder of connective tissues of all organs; necrosis of haemocytes and epithelial cells; detachment and vacuolization of epithelial cells of foot, mantle, hepatopancreas and gills.

5.4. OIE status

Currently listed by the OIE

6. Social and economic significance

No data but significant economic importance is suspected from the various reports currently available.

7. Zoonotic importance

No data

8. Diagnostic methods

Three levels of examination procedures are used: screening methods for surveillance, presumptive diagnostic methods when abnormal mortalities occur, and confirmatory methods if available when a pathogen is encountered during screening or mortality outbreaks.

8.1. Screening methods

8.1.1. Level I

Increased mortality rates, low activity, loss of appetite, decreased photophobia, decreased growth rate, increased secretion of mucus, contracted foot and mantle, black and hardened foot, dead abalone presents swollen hepatopancreas and digestive tract.

8.1.2. Level II

In haematoxylin and eosin stained sections: haemocytic infiltration and necrotic lesions of connective tissue of all organs and in the neurolemma of cerebral ganglia and peripheral neural tissue; hypertrophy and hyperplasia of the digestive tract epithelial cells.

8.1.3. Level III

Under electron microscopy, infected cells show damage to the nuclear membrane, swelling of mitochondria and proliferation of the endoplasmic reticulum.

The nucleocapsids can be seen in the nucleus and assembled virions in the cytoplasm.

Appendix XXXII (contd)Appendix A (contd)Appendix III (contd)

8.2. Presumptive methods

8.2.1. level I: see section 8.1.1.

8.2.2. level II: see section 8.1.2.

8.2.3. level III: see section 8.1.3.

8.3. Confirmatory methods

8.3.1. level I: None

8.3.2. level II: None

8.3.3. level III: Transmission electron microscopy. See section 8.1.3.

9. Control methods

No known methods of prevention or control. Infected abalone should not be transported into areas known to be free of the disease.

Selected references

- Australian Broadcasting Corporation – Rural News Service. Herpes-like virus threatens Vic abalone stocks. Monday, 5 June 2006.
- CHANG P. *et al.* (2005). Herpes-like virus infection causing mortality of cultured abalone *Haliotis diversicolor supertexta*. *Disease of Aquatic Organisms*, **65**, 23–27.
- DAVISON A.J., TRUS B.L., CHENG N., STEVEN A.C., WATSON M.S., CUNNINGHAM C., DEUFF R.-M.L. & RENAULT T. (2005). A novel class of herpesvirus with bivalve hosts. *Journal of General Virology*, **86**, 41–53.
- FANG Y., HUANG Y., YANG J., YAN D., WU W. & NI Z. (2002). Isolation and observation of “virus disease” virus of abalone in Dongshan Fujian. *Journal of Oceanography in Taiwan Strait*, **21**(2), 199–202.
- HARADA T. *et al.* (1993). Tumors in nervous tissues of abalones, *Nordotis discus*. *Journal of Invertebrate Pathology*, **62**, 257–261.
- HUANG Y., CHEN X., WU W., YAN J. & NI Z. (2000). A diagnostic and cure report on the viral disease of *Haliotis diversicolor aquatilis*. *Fujian Veterinary and Zootechnics*, **22** (4), 5–6.
- HUANG Y., WU W., YAN J. & ZHOU W. (1999). Investigation on an exterminate disease of *Haliotis diversicolor aquatilis*. *Fujian Veterinary and Zootechnics*, **21** (3), 4–5.
- LI X., WANG B., LIU S., LIU M. & WANG Q. (1998). Studies on pathogeny and histopathology of “crack shell disease” of *Haliotis discus hannii*. *Journal of Fisheries of China*, **22**(3), 61–66.
- LI X., WANG B., LIU S. & XU J. (2000). The infection to a few kinds of shellfish inshore by a kind of virus. *Journal of Dalian Fisheries University*, **15**(2), 86–91.

Appendix XXXII (contd)Appendix A (contd)Appendix III (contd)

- NIE Z. & WANG S. (2004). The status of abalone culture in China. *Journal of Shellfisheries Research*, **23**(4), 941–946.
 - SONG Z., JI R., YAN S., CHEN C., ZHONG Y., JIANG Y. & NI Z. A sphereovirus resulted in mass mortality of *Haliotis diversicolor aquatilis*. *Journal of Fisheries of China*, **24**(5): 463–466.
 - WANG B., LI X. & GOU C. (1997). Infection of spherical viruses from *Haliotis discus hannai* Ino. *Virologica Sinica*, **12**(4), 360–363.
 - WANG J. *et al.* (2004). Virus infection in cultured abalone, *Haliotis diversicolor* Reeve in Guangdong Province, China. *Journal of Shellfisheries Research*, **23**(4), 1163–1168.
 - WANG J., SU Y., ZHANG J., HUANG Y., ZHANG Z., YAN Q. & WANG D. (1999). Spring explosive epidemic disease of abalone in Dongshan district. *Journal of Xiamen University (Natural Science)*, **38** (5), 641–644.
 - ZHANG Z., WANG J., ZHANG J., SU Y., HUAN Y. & YAN Q. (2001b). Bacterial diseases of *Haliotis diversicolor supertexta* in Dong Shan, Fujian. *Journal of Oceanography in Taiwan Strait*, **20** (2), 193–199.
 - ZHANG Z., WANG J., SU Y., YAN Q., CHI X., ZHOU H. & ZHOU Y. (2001a). Pathogen and histopathology of the epidemic disease in *Haliotis diversicolor supertexta*. *Journal of Xiamen University (Natural Science)*, **40**(4), 949–956.
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Appendix XXXII (contd)

Appendix A (contd)

Appendix IV

Infection with *Terebrasabella heterouncinata*

		Listing	Comment
A1	Loss of production due to slower growth rates, shell deformities, increased secondary infection and mortalities (1, 2). All species of abalone are susceptible.	+	Lack of quantitative data on impact in the wild; it is not possible to quantify losses.
or			
A2	No data	-	
or			
A3	Not harmful to human health	-	
and			
B4	<i>T. heterouncinata</i> is the aetiological agent of the disease (3).	+	
or			
B5	The aetiology is known (see B4).	NA	NA
and			
B6	Origin of the parasite: South Africa (4, 5) Has now spread to: Chile (6), Mexico (Baja California) (1) and USA (California) (3, 4).	+	
and			
B7	Europe, Mediterranean and Australasia	+	
and			
C8	Repeatable and robust means of detection/diagnosis can be achieved through macroscopic observation of clinical signs, microscopic observation of wet mounts, shell radiography, scanning electron microscopy	+	
		list	

Appendix XXXII (contd)

Appendix A (contd)

Appendix IV (contd)

Listing here:-

1	2	3	4	5	6	7	8	Add to the OIE list?
+	-	-	+	N/A	+	+	+	list

References

1. MCBRIDE S.C. (1998). Current status of abalone aquaculture in the Californias. *Journal of Shellfish Research*, **17**(3), 593–600.
2. SIMON C.A., KAISER H. & BRITZ P.J. (2004). Infestation of the abalone, *Haliotis midae*, by the sabellid, *Terebrasabella heterouncinata*, under intensive culture conditions, and the influence of infestation on abalone growth. *Aquaculture*, **232**, 29–40.
3. KURIS A.M. & CULVER C.S. (1999). An introduced sabellid polychaete pest infesting cultured abalones and its potential spread to other California gastropods. *Invertebrate Biology*, **118**, 391–403.
4. FITZHUGH K. & ROUSE G.W. (1999). A remarkable new genus and species of fan worm (Polychaeta: Sabellidae: Sabellinae) associated with marine gastropods. *Invertebrate Biology*, **118** (4), 357–390.
5. RUCK K.R. & COOK P.A. (1998). Sabellid infestations in the shells of South African molluscs: Implications for abalone mariculture. *Journal of Shellfish Research*, **17**, 693–699.
6. MORENO R.A., NEILL P.E. & ROZBACZYLO N. (2006). Poliquetos perforadores nativos y no indígenas en Chile: una amenaza para moluscos nativos y comerciales (Native and non-indigenous boring polychaetes in Chile: a threat to native and commercial mollusc species). *Revista Chilena de Historia Natural*, **79**, 263–278.



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**REPORT OF THE MEETING OF THE OIE AD HOC GROUP ON THE
OIE LIST OF AQUATIC ANIMAL DISEASES - CRUSTACEAN TEAM FOR THE
OIE AQUATIC ANIMAL HEALTH CODE**

Bergen (Norway) - 9, 13 and 14 October 2006

The OIE *ad hoc* Group on the OIE List of Aquatic Animal Diseases - Crustacean Team for the OIE *Aquatic Animal Health Code* (hereinafter called the *ad hoc* Group) met in Bergen (Norway) on 9, 13 and 14 October 2006.

On behalf of Dr Bernard Vallat, Director General of the OIE, Dr Francesco Berlingieri, Deputy Head of the International Trade Department, welcomed the members of the *ad hoc* Group and thanked them for their willingness to be involved in addressing this mandate of the OIE.

The members of the OIE *ad hoc* Group are listed in [Appendix I](#) and the adopted Agenda is given in [Appendix II](#).

1. Member Countries' comments on the diseases listed in Article 1.2.3.3.

The *ad hoc* Group addressed Thailand's comments suggesting the removal of Spherical baculovirus (*Penaeus monodon*-type baculovirus) (MBV) and Tetrahedral baculovirus (*Baculovirus penaei*) (BP) from Article 1.2.3.3.

The *ad hoc* Group assessed MBV against the criteria for listing an aquatic animal disease and identified point A1 in Article 1.2.2.1. as the most relevant point to the comment from Thailand:

- a) Point A1 – Thailand commented that management practices (e.g. egg washing and routine sanitation within hatcheries) can eliminate MBV and it provided references to support their position. The *ad hoc* Group considered these references, as well as other publications, including a recent paper published by a Thai research group (Chayaburakul K. *et al.*; 2004, Multiple pathogens found in growth-retarded black tiger shrimp *Penaeus monodon* cultivated in Thailand. *Diseases of Aquatic Organisms*, **60**, 89–96). This latter paper indicated that, despite management practices in the hatcheries which can eliminate MBV, the disease remains present in Thailand with a high prevalence. The *ad hoc* Group noted that MBV also remains highly prevalent in some other Member Countries and that the industry in these countries continues to consider the disease to cause significant production losses.

The *ad hoc* Group, therefore, recommends that MBV not be removed from the list of diseases at this time.

Appendix XXXII (contd)Appendix B (contd)

The *ad hoc* Group assessed BP against the criteria for listing an aquatic animal disease and identified points A1, B6 and B7 in Article 1.2.2.1. as the most relevant points to the comment from Thailand:

- b) Point A1 – Thailand commented that management practices for control of BP have been successful in hatcheries and farms in the Americas. The *ad hoc* Group agrees with this assessment, but notes that the prevalence of BP in wild broodstock, which are traded internationally, remains relatively high.
- c) Point B6 and B7 – The *ad hoc* Group noted that:
 - i) Historical records indicate that BP can cause significant production losses in *Penaeus vannamei*.
 - ii) This species is now the principal species farmed in Asia.
 - iii) There is a large trade in these animals from the Americas to Asia.
 - iv) The virus may infect other Asian penaeid species (Lightner D. (ed.). 1996. A Handbook of Shrimp Pathology and Diagnostic Procedures for Diseases of Cultured Penaeid Shrimp. World Aquaculture Society, Baton Rouge, Louisiana, USA, 304 pp.).

Considering the points made above, the *ad hoc* Group recommends that surveillance and testing for this disease remains appropriate and, therefore, recommends that BP not be removed from the list of diseases at this time.

2. Diseases listed under Article 1.2.3.3.

The *ad hoc* Group noted that there were no Member Country comments regarding the suggested removal of the footnote for necrotising hepatopancreatitis and infectious myonecrosis in Article 1.2.3.3. as proposed in the March 2006 report of the OIE Aquatic Animal Health Standards Commission (hereinafter called the Aquatic Animals Commission). The *ad hoc* Group recommends the removal of the classification as [under study] for necrotising hepatopancreatitis and infectious myonecrosis.

The *ad hoc* Group also noted that there were no Member Country comments regarding the suggested addition of white tail disease, hepatopancreatic parvovirus disease and Mourilyan virus disease as proposed in the March 2006 report of the Aquatic Animals Commission (see Appendix XXXVII of the March 2006 Aquatic Animals Commission's report for full assessment against the listing criteria). The *ad hoc* Group therefore confirms its suggestion to add the following emerging diseases to the list: white tail disease, hepatopancreatic parvovirus disease and Mourilyan virus disease.

The *ad hoc* Group prepared draft disease cards following the general template used by the Network of Aquaculture Centres in Asia-Pacific (NACA) for Mourilyan virus disease and infectious myonecrosis; these cards are attached, respectively, at Appendices III and IV. The *ad hoc* Group also provided a white tail disease card for additional information on white tail disease reporting (Appendix V).

With the intent to provide guidance to Member Countries for the diagnosis of necrotizing hepatopancreatitis, white tail disease and hepatopancreatic parvovirus disease while full *Manual of Diagnostic Tests for Aquatic Animals* chapters are developed, the *ad hoc* Group listed relevant references for the current publicly available diagnostic methods in Appendix VI. Further information on white tail disease can be found on the NACA web site (<http://www.enaca.org/modules/mydownloads/singlefile.php?cid=23&lid=828>).

.../Appendices

Appendix XXXII (contd)Appendix B (contd)Appendix I

**REPORT OF THE MEETING OF THE OIE AD HOC GROUP ON THE
OIE LIST OF AQUATIC ANIMAL DISEASES - CRUSTACEAN TEAM FOR THE
OIE AQUATIC ANIMAL HEALTH CODE**

Bergen (Norway) - 9, 13 and 14 October 2006

—————
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Appendix XXXII (contd)

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Appendix II

**REPORT OF THE MEETING OF THE OIE *AD HOC* GROUP ON THE
OIE LIST OF AQUATIC ANIMAL DISEASES - CRUSTACEAN TEAM FOR THE
OIE *AQUATIC ANIMAL HEALTH CODE***

Bergen (Norway) - 9, 13 and 14 October 2006

Adopted Agenda

- 1. Adoption of the Agenda**
- 2. OIE List of Aquatic Animal Diseases**
 - a. Address Member Countries' comments on the list of diseases
 - b. Make recommendations to the Aquatic Animals Commission on the listing of:
 - i. necrotising hepatopancreatitis
 - ii. infectious myonecrosis
 - iii. white tail disease
 - iv. hepatopancreatic parvovirus disease
 - v. Mourilyan virus disease
 - c. Prepare disease cards for the diseases proposed for listing.
- 4. Other business**

Appendix XXXII (contd)Appendix B (contd)Appendix III**MOURILYAN VIRUS - DISEASE INFORMATION CARD****Pathogen information**

1. Causative agent

1.1. Pathogen type

Virus

1.2. Disease name and synonyms

No specific disease name but acute virus infection can be found in *Penaeus monodon* displaying characteristic gross signs of mid-crop mortality syndrome and in *Penaeus japonicus* suffering idiopathic mortalities

1.3. Pathogen common name and synonyms

Mourilyan virus

1.4. Taxonomic affiliation

1.4.1. Pathogen scientific name (Genus, species, sub-species or type)

Currently unclassified

1.4.2. Phylum, class, family, etc.

Possible member of the Bunyaviridae

1.5. Description of the pathogen

Spherical to ovoid-shaped, enveloped virus (85-100 nm in diameter) with a diffuse surface structure; replicates in the cytoplasm; virion maturation occurs at endoplasmic membranes.

1.6. Authority (first scientific description, reference)

COWLEY J.A. *et al.* (2005). *Diseases of Aquatic Organisms*, **66**, 91-104.

1.7. Pathogen environment (fresh, brackish or marine waters)

Marine and brackish water

2. Modes of transmission

2.1. Routes of transmission (horizontal, vertical, direct, indirect)

Horizontal transmission via injection and likely via ingestion of infected tissue; vertical transmission has not been reported but cannot be excluded.

2.2. Life cycle

No data

Appendix XXXII (contd)Appendix B (contd)Appendix III (contd)

2.3. Associated factors (temperature, salinity, etc.)

No data

2.4. Additional comments

None

3. Host range

3.1. Host type

Shrimp

3.2. Host scientific names

Penaeus monodon, *Penaeus japonicus*

3.3. Other known or suspected hosts

No data

3.4. Affected life stage

Juvenile to adult shrimp

3.5. Additional comments

Mourilyan virus has been detected at very low levels in *Penaeus merguensis* using RT-nested PCR but a productive infection state has not been demonstrated. Minor nucleotide sequence variations (< 5%) occur between Mourilyan virus isolates from Australia, Malaysia and Thailand, indicating that strain variants exist in divergent populations of *P. monodon*. No significant sequence variation has been detected between virus isolates infecting eastern Australian *P. monodon* and *P. japonicus*, or among *P. monodon* sampled from various locations in north and eastern Australia and in Fiji, suggesting a single genetic lineage might exist in the shrimp populations in these regions.

4. Geographic distribution

4.1. Region

Asia and Pacific

4.2. Country

Known presence in Australia, Fiji, Malaysia, Thailand and Vietnam.

Disease information

5. Clinical signs and case description

5.1. Host tissues and infected organs

Lymphoid organ spheroids and stromal matrix cells of tubules, cuticular epithelium and underlying connective tissues of the stomach and of the cephalothoracic exoskeleton, antennal gland tubules, primary and secondary gill filaments, epithelial pillar cells, hepatopancreas connective tissues, the pericardial septum, epicardium and fixed phagocytes within the myocardium, haemocytes within haematopoietic tissues, glial, neurosecretory and giant cells associated with the segmental nerve ganglia, nerve cell bodies.

Appendix XXXII (contd)Appendix B (contd)Appendix III (contd)

5.2. Gross observations and macroscopic lesions

No data

5.3. Microscopic lesions and tissue abnormality

In haematoxylin and eosin stained sections of cephalothorax tissues, the presence of aggregates of cells with hypertrophied nuclei, known as spheroids, in the lymphoid organ is the most obvious pathology caused by Mourilyan virus. Spheroids numbers, the extent of cytoplasmic vacuolization within spheroid cells, and the amount of necrotic cell debris within spheroids, increase in relation to infection severity. In severe infections, ectopic spheroids may also be detected in gill and in connective tissue associated with various cephalothorax organs.

5.4. OIE status

Under consideration for listing

6. Social and economic significance

Considered to be of some economic importance due to its association with disease and mortalities in *P. monodon* and *P. japonicus*.

7. Zoonotic importance

No data

8. Diagnostic methods

Procedures leading to definitive diagnosis can include: (i) basic surveillance methods; (ii) preliminary presumptive methods when infection is suspected or abnormal mortalities occur; and (iii) confirmatory methods for suspected low-level of chronic infections and for suspected involvement in mortality outbreaks.

8.1. Surveillance methods

RT-nested PCR as described in Cowley *et al.* (2005) (*Diseases of Aquatic Organisms*, **66**, 91–104) or real-time PCR as described in Rajendran *et al.* (2006) (*Journal of Virological Methods*, **137**, 265–271) on RNA extracted from lymphoid organ, hemocytes gill tissue of juvenile or adult shrimp, on whole post-larvae.

8.2. Presumptive methods

Enlarged lymphoid organ indicating the existence of viral-induced spheroids, idiopathic mortalities in *Penaeus japonicus* and gross disease signs consistent with mid-crop mortality syndrome in *Penaeus monodon* are potential indicators of acute infection. In haematoxylin and eosin stained histological sections: the presence of Type 1 spheroids (comprising small tubule occlusions of densely packed cells) and/or Type 2 spheroids (comprising larger aggregates of cells with enlarged nuclei and variably vacuolated cytoplasm, as well as debris due to cell necrosis) in the lymphoid organ as well as ectopic spheroids in other tissues.

8.3. Confirmatory methods

In severe infections, examination of lymphoid organ and gill tissue by electron microscopy for evidence of mature enveloped virions in the cytoplasm of infected cells can assist confirmatory diagnosis. However, as mature virions only appear to occur in circumstances where infection levels are extremely high, lower-level infection may not be detected. It is recommended that *in situ* hybridization on tissue sections be used for diagnosis of moderate to high-level infection and that either RT-nested PCR or real-time RT-PCR employing RNA isolated from lymphoid organ, gill or haemocytes be used for confirmatory diagnosis irrespective of predicted infection level. Methods for electron microscopy, *in situ* hybridization and RT-nested PCR are described in Cowley *et al.* (2005) (*Diseases of Aquatic Organisms*, **66**, 91–104). The method for real-time PCR is described in Rajendran *et al.* (2006) (*Journal of Virological Methods*, **137**, 265–271).

Appendix XXXII (contd)Appendix B (contd)Appendix III (contd)

9. Control methods

No known methods of prevention or control. Infected shrimp should not be transported into areas known to be free of the virus.

Selected references

- RAJENDRAN K.V., COWLEY J.A., MCCULLOCH R.J. & WALKER P.J. (2006). A TaqMan real-time RT-PCR for quantifying Mourilyan virus infection levels in shrimp tissues. *Journal of Virological Methods*, **137**, 265–271.
 - SELLARS M.J., KEYS S.J., COWLEY J.A., MCCULLOCH R.J. & PRESTON N.P. (2005). Association of Mourilyan virus with mortalities in farm-reared *Penaeus (Marsupenaeus) japonicus* transferred to maturation tank systems. *Aquaculture*, **252**, 242–247.
 - COWLEY J.A., MCCULLOCH R.J., RAJENDRAN K.V., CADOGAN L.C., SPANN K.M. & WALKER P.J. (2005). RT-nested PCR detection of Mourilyan virus in Australian *Penaeus monodon* and its tissue distribution in healthy and moribund prawns. *Diseases of Aquatic Organisms*, **66**, 91–104.
 - COWLEY J.A., MCCULLOCH R.J., SPANN K.M., CADOGAN L.C. & WALKER P.J. (2005). Preliminary molecular and biological characterisation of Mourilyan virus (MoV): A new bunya-related virus of penaeid prawns. *In* : Walker P.J., Lester R.G. and Bondad-Reantaso M.G. (eds.). *Diseases in Asian Aquaculture V. Proceedings of the 5th Symposium on Diseases in Asian Aquaculture*, Fish Health Section, Asian Fisheries Society, Manila, pp. 113–124.
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Appendix XXXII (contd)Appendix B (contd)Appendix IV**INFECTIOUS MYONECROSIS - DISEASE INFORMATION CARD****Pathogen information**

1. Causative agent

1.1. Pathogen type

virus

1.2. Disease name and synonyms

Infectious myonecrosis (IMN)

1.3. Pathogen common name and synonyms

Infectious myonecrosis virus (IMNV)

1.4. Taxonomic affiliation

1.4.1. Pathogen scientific name (Genus species sub-species or type)

Infectious myonecrosis virus (IMNV) - proposed

1.4.2. Phylum, class, family, etc

IMNV is a putative totivirus. Phylogenetic analysis based on the RdRp clustered IMNV with *Giardia lamblia virus*, a member of the family Totiviridae.

1.5. Description of the pathogen

IMNV particles are icosahedral in shape and 40 nm in diameter, with a buoyant density of 1.366 g/ml in cesium chloride. The genome consists of a single, double-stranded (dsRNA) molecule of 7560 bp. Sequencing of the viral genome reveals two non-overlapping open reading frames (ORFs). The 59 ORF (ORF 1, nt 136–4953) encoded a putative RNA-binding protein and a capsid protein. The coding region of the RNA-binding protein is located in the first half of ORF 1 and contains a dsRNA-binding motif in the first 60 aa. The second half of ORF 1 encoded a capsid protein, as determined by amino acid sequencing, with a molecular mass of 106 kDa. The 39 ORF (ORF 2, nt 5241–7451) encodes a putative RNA-dependent RNA polymerase (RdRp).

1.6. Authority (first scientific description, reference)

POULOS B.T., TANG K.F.J., PANTOJA C.R., BONAMI J.R. & LIGHTNER D.V. (2006). Purification and characterization of infectious myonecrosis virus of penaeid shrimp. *Journal of General Virology*, **87**, 987-996.

1.7. Pathogen environment (fresh, brackish or marine waters)

IMN occurs in *Penaeus vannamei* farmed in brackish and marine water.

2. Modes of transmission

2.1. Routes of transmission (horizontal, vertical, direct, indirect)

Horizontal, via contaminated water, per os (cannibalism).

Vertical transmission is considered likely, but not experimentally documented.

Appendix XXXII (contd)Appendix B (contd)Appendix IV (contd)

2.2. Life cycle

Not applicable.

2.3. Associated factors (temperature, salinity, etc.)

Temperature and salinity effects considered as likely contributors to disease outbreaks, but no experimental data is available.

2.4. Additional comments

IMN disease is not the same disease as penaeid white tail disease. The later disease is a recently discovered disease with gross and histological signs that mimic IMN, but which is caused by a different type of virus (a nodavirus named *Penaeus vannamei* novavirus – PvNV).

3. Host range

3.1. Host type

Penaeid shrimp

3.2. Host scientific names

Natural infections: *Penaeus vannamei*

Experimental infections: *Penaeus stylirostris* and *P. monodon*

3.3. Other known or suspected hosts

Native wild penaeids in north-eastern Brazil are anecdotally reported as hosts.

3.4. Affected life stage

Late postlarvae (PL), juveniles and adults

3.5. Additional comments

None.

4. Geographic distribution

4.1. Region

North-eastern Brazil and south-east Asia.

4.2. Countries

North-eastern Brazil and Java, Indonesia.

Disease information

5. Clinical signs and case description

5.1. Host tissues and infected organs

Reported from: striated muscles (skeletal and less often cardiac), connective tissues, hemocytes, and the lymphoid organ parenchymal cells.

Appendix XXXII (contd)

Appendix B (contd)

Appendix IV (contd)

5.2. Gross observations and macroscopic lesions

Affected shrimp present focal to extensive white necrotic areas in striated (skeletal) muscles, especially in the distal abdominal segments and tail fan, which can become necrotic and reddened in some individual shrimp. These signs may have a sudden onset following stresses (e.g. capture by cast-net, feeding, sudden changes in temperature or salinity). Severely affected shrimp may have been feeding just before the onset of stress and will have a full gut. Such severely affected shrimp become moribund and mortalities can be instantaneously high and continue for several days.

Exposing the paired lymphoid organs by simple dissection will show that they are hypertrophied to 3-4 times their normal size.

5.3. Microscopic lesions and tissue abnormality

Stained or unstained tissue squashes of affected skeletal muscle or of the lymphoid organ (LO) may show abnormalities.

Tissue squashes of skeletal muscle when examined with phase or reduced light microscopy may show loss of the normal striations. Fragmentation of muscle fibers may also be apparent.

Squashes of the LO may show the presence of significant accumulations of spherical masses of cells (lymphoid organ spheroids or LOS) amongst normal LO tubules.

6. OIE status

Listed by the OIE as “under study”

7. Social and economic significance

An estimate published in a trade magazine from the Brazilian shrimp farming industry estimated the economic impact of IMN from 2002-2004 to be \$20 million (Nunes *et al.*, 2004). More recent estimates for IMN losses in Brazil are >\$100 million.

8. Zoonotic importance

None

9. Diagnostic methods

Three levels of examination procedures are used: screening methods for surveillance, presumptive diagnostic methods when abnormal mortalities occur, and confirmatory methods if available when a pathogen is encountered during screening or mortality outbreaks.

9.1. Screening methods

9.1.1. Level I

Onset of gross signs as described in section 5 (above) following handling or other episodes of stress.

Appendix XXXII (contd)Appendix B (contd)Appendix IV (contd)

9.1.2. Level II:

By histopathology using routine H&E stained paraffin sections (Bell and Lightner, 1988), shrimp with acute phase IMN present myonecrosis with characteristic coagulative necrosis of striated (skeletal) muscle fibers, often with marked edema among affected muscle fibers. Some shrimp may present with a mix of acute and older lesions. In these shrimp, the affected muscle fibers appear to progress from presenting coagulative necrosis to presenting liquefactive necrosis, which is accompanied by moderate infiltration and accumulation of hemocytes. In the most advanced lesions, hemocyte inflamed muscle fibers are replaced by a loose matrix of fibrocytes and connective tissue fibers that are interspersed with hemocytes and foci of (presumed) regenerating muscle fibers.

Significant hypertrophy of the lymphoid organ (LO) due to accumulations of lymphoid organ spheroids (LOS) is a highly consistent lesion in shrimp with acute or chronic phase IMN lesions. Often many ectopic LOS are found in other tissues not near the main body of the LO. Common locations for ectopic LOS include the hemocoelom in the gills, heart, near the antennal gland tubules, and ventral nerve cord.

9.1.3. Level III:

RT-PCR using the methods described in Poulos *et al.* (2006) and Poulos *et al.* (“in press”).

ISH using specific cDNA probes to IMNV according to the methods described in Tang *et al.* (2005).

9.2. Presumptive methods

9.2.1. Level I: see section 9.1.1.

9.2.2. Level II: see section 9.1.2.

9.2.3. Level III: see section 9.1.3.

9.3. Confirmatory methods

9.3.1. Level I: See section 9.1.1. for the available diagnostic options.

9.3.2. Level II: See section 9.1.2. for the available diagnostic options.

9.3.3. Level III: See section 9.1.3. for the available diagnostic options.

10. Control methods

No methods are known for prevention or control of IMN in farms, compartments, regions or countries using infected stocks of *Penaeus vannamei*. The use of specific pathogen-free (SPF) stocks (Wyban *et al.*, 1992) of *P. vannamei* under biosecure culture conditions (Lee & O’Byren, 2003; Lightner, 2005) is the recommended method for prevention of IMN disease.

IMNV infected broodstock (of any penaeid species), nauplii or PLs produced from infected broodstock should not be transported into areas known to be free of the disease.

Appendix XXXII (contd)

Appendix B (contd)

Appendix IV (contd)

Selected references

BELL T.A. & LIGHTNER D.V. (1988). A Handbook of Normal Penaeid Shrimp Histology. Baton Rouge, LA: World Aquaculture Society.

FAUQUET C.M., MAYO M.A., MANILOFF J., DESSELBERGER U. & BALL L.A. (editors) (2005). Totiviridae. *In* Virus Taxonomy: Classification and Nomenclature of Viruses. Eighth Report of the International Committee on the Taxonomy of Viruses, pp. 571–580. San Francisco: Elsevier.

HOLTHIUS L.B. (1980). Shrimps and prawns of the world: An annotated catalogue of species of interest to fisheries. *In* FAO Species Catalogue: FAO Fisheries Synopsis 125(1). Rome: Food and Agricultural Organization of the United Nations.

LEE C.S. & O'BRYEN P.J. (Eds.). (2003). Biosecurity in Aquaculture Production Systems: Exclusion of Pathogens and Other Undesirables. World Aquaculture Society, Baton Rouge, LA, 293 p.

LIGHTNER D.V. (2005). Biosecurity in shrimp farming: Pathogen exclusion through the use of SPF stock and routine surveillance. *Journal of the World Aquaculture Society*, **36**, 229–248.

LIGHTNER D.V., PANTOJA C.R., POULOS B.T., TANG K.F.J., REDMAN R.M., PASOS DE ANDRADE T. & BONAMI J.R. (2004). Infectious myonecrosis: New disease in Pacific white shrimp. *Global Aquaculture Advocate*, **7**, 85.

NUNES A.J.P., CUNHA-MARTINS P. & VASCONSELOS-GESTEIRA T.C. (2004). Carcinicultura ameacada. *Rev. Panoram Aquic.*, **83**, 37–51 (in Portuguese).

TANG K.F.J., PANTOJA C.R., POULOS B.T., REDMAN R.M. & LIGHTNER D.V. (2005). *In situ* hybridization demonstrates that *Litopenaeus vannamei*, *L. stylirostris* and *Penaeus monodon* are susceptible to experimental infection with infectious myonecrosis virus (IMNV). *Diseases of Aquatic Organisms*, **63**, 261–265.

WYBAN J.A., SWINGLE J.S., SWEENEY J.N. & PRUDER G.D. (1992). Development and commercial performance of high health shrimp using specific pathogen free (SPF) broodstock *Penaeus vannamei*. *In* Proceedings of the Special Session on Shrimp Farming, pp. 254–259. Edited by J. Wyban. Baton Rouge, LA: World Aquaculture Society.

Appendix XXXII (contd)

Appendix B (contd)

Appendix V

WHITE TAIL DISEASE - DISEASE CARD³
by
A.S.Sahul Hameed⁴

Pathogen information

1. Causative agent

1.1. Pathogen type: virus

1.2. Disease name and synonyms: White Tail disease (WTD)

White Muscle Disease (WMD)

1.3. Pathogen common name and synonyms:

Macrobrachium rosenbergii Nodavirus (*MrNV*) and extra small virus (XSV).

Both these viruses have been found to be associated with the disease. However, the role of *MrNV* and XSV is not yet clear.

1.4. Taxonomic affiliation

1.4.1. Pathogen scientific name: *Macrobrachium rosenbergii* Nodavirus (*MrNV*)

1.4.2. Phylum, class, family, etc.: Family: *Nodaviridae*

1.5. Description of the pathogen: *MrNV* is an icosahedral non-enveloped RNA virus with a size of 26-27 nm in diameter. Viral replication in the cytoplasm of connective tissue cells of most organs and tissues. It is composed of two linear single stranded RNAs (genome) and CP-43 (capsid) (Bonami *et al.*, 2005).

XSV is a satellite virus with a diameter of 14-16 nm, associated with *MrNV*. It consists of a linear single stranded RNA (genome) and CP-17 (capsid) (Bonami *et al.*, 2005).

1.6. Authority:

ARCIER J.M., HERMAN F., LIGHTNER D.V., REDMAN R., MARI J., BONAMI J.R. (1999). A viral disease associated with mortalities in hatchery-reared postlarvae of the giant freshwater prawn *Macrobrachium rosenbergii*. *Diseases of Aquatic Organisms*, **38**, 177-181.

QIAN D., SHI Z., ZHANG S., CAO Z., LIU W., LI L., XIE Y., CAMBOURNAC I. & BONAMI J.R. (2003). Extra small virus-like particles (XSV) and nodavirus associated with whitish muscle disease in the giant freshwater prawn, *Macrobrachium rosenbergii*. *Journal of Fish Diseases*, **26**, 521-527.

³A.S.Sahul Hameed (2005). White Tail Disease - disease card. Developed to support the NACA/FAO/OIE regional quarterly aquatic animal disease (QAAD) reporting system in the Asia-Pacific. NACA, Bangkok, Thailand. 7 pp.

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Appendix XXXII (contd)Appendix B (contd)Appendix V (contd)

SAHUL HAMEED A.S., YOGANANDHAN K., WIDADA J. S. & BONAMI J.R. (2004). Studies on the occurrence and RT-PCR detection of *Macrobrachium rosenbergii* nodavirus and extra small virus-like particles associated with white tail disease of *Macrobrachium rosenbergii* in India. *Aquaculture*, **238**, 127-133.

WIDADA J.S., DURAND S., CAMBOURNAC I., QIAN D., SHI Z., DEJONGHE E., RICHARD V. & BONAMI J.R. (2003). Genome-based detection methods of *Macrobrachium rosenbergii* nodavirus, a pathogen of the giant freshwater prawn, *Macrobrachium rosenbergii*: dot-blot, *in situ* hybridization and RT-PCR. *Journal of Fish Diseases*, **26**, 583–590.

1.7. Pathogen environment: Brackish water and Freshwater

2. Modes of transmission

2.1. Routes of transmission: Vertical and horizontal transmission (Sahul Hameed *et al.*, 2004)

2.2. Life cycle: Replication in the cytoplasm of cell

2.3. Associated factors: Unknown

2.4. Additional comments: Nil

3. Host range

3.1. Host type: Giant Freshwater prawn or Malaysian prawn

3.2. Host scientific names: *Macrobrachium rosenbergii* (De Man)

3.3. Other known or suspected hosts: Unknown so far.

3.4. Affected life stage: Larvae, post-larvae and early juvenile

3.5. Additional comments: No evidence of adult life stages being affected. Adults might act as carriers.

4. Geographic distribution

4.1. Region: Northern South America (Caribbean region) and Asia.

4.2. Country: French West Indies, Dominican Republic (Caribbean region), China, Taipei China and India.

4.3. Additional comments: Clinical signs and mortality patterns appear similar in China, Taipei China and Indian outbreaks and it may be assumed that movement of some common prawn population source might be the reason for the wide distribution of the WTD. However, further studies are required to understand the geographic distribution.

Disease information**5. Clinical signs and case description**

5.1. Host tissues and infected organs: Abdomen (Tail) is particularly milky and opaque. The discoloration appears to start at the tail extremity (telson region) and gradually progress towards the head (Figure 1). Eventually all muscles in the abdomen and cephalothorax are affected. Very few post-larvae presenting these signs survive and survivors seem to grow normally in grow-out ponds.

Appendix XXXII (contd)Appendix B (contd)Appendix V (contd)

- 5.2. Gross observations and macroscopic lesions: Affected post-larvae are more milky and opaque (Figure 1). Appearance of these clinical signs usually followed by death with variable mortality rate reaching up to 95%. The tissues most affected in moribund PLs/early juveniles are striated muscles of the abdomen and cephalothorax and intratubular connective tissue of the hepatopancreas.
- 5.3. Microscopic lesions and tissue abnormality: Multifocal areas of hyaline necrosis of muscle fibres are found in the striated muscle (Figure 2).
- 5.4. OIE status: not listed.
6. **Social and economic significance**: WTD causes significant damage to the critical life stage i.e. post-larvae of the host. Heavy mortalities of post larvae in hatcheries and pond nurseries cause significant economic loss and affect the livelihoods of primary producers.

7. **Zoonotic importance**: none

8. Diagnostic methods

8.1. Screening methods

8.1.1. Level I: none

8.1.2. Level II: none

8.1.3. Level III: RT-PCR and LAMP

Reverse Transcriptase-PCR (RT-PCR) is a method used to amplify cDNA copies of RNA. The primer sequence for *MrNV* is 5' GCG TTA TAG ATG GCA CAA GG 3' (forward) and 5' AGC TGT GAA ACT TCC ACT GG 3' (reverse) with amplified product size of 425 bp (Fig. 2). For *XSV*, 5' GGA GAA CCA TGA GAT CAC G 3' (forward) and 5' CTG CTC ATT ACT GTT CGG AGT 3' (reverse) with amplified product of 500 bp (Fig. 2) (Widada *et al.*, 2003; Sahul Hameed *et al.*, 2004a; Widada *et al.*, 2004).

LAMP (loop-mediated isothermal amplification) is intended to amplify cDNA copies of RNA. Four (*MrNV*) or six primers (*XSV*), able to recognize respectively six or eight sequences, were used. This methodology is under development (Pathogens and Immunity, CNRS/UM2, Universite Montpellier II, Montpellier, France).

8.2. Presumptive methods

8.2.1. Level I: Gross observations

Presence of post-larvae with whitish colour followed by mortality, 2 to 3 days after the conversion of first post-larva in larval rearing tanks. The abdomen (tail) becomes milky white and opaque. Mortalities reach to maximum around fifth day after the appearance of the first gross sign resulting in complete drain-out of the tank.

8.2.2. Level II: Histopathology

Histopathological changes are characterized by pale to darkly basophilic, reticulated cytoplasmic inclusions in the connective tissue cells of most organs and tissues (Tung *et al.*, 1999). Prionin methyl green staining can be used to distinguish the characteristically green-stained *MrNV* viral inclusions from hemocyte nuclei (Tung *et al.*, 1999).

Appendix XXXII (contd)Appendix B (contd)Appendix V (contd)

8.2.3. Level III: Virology

MrNV is an icosahedral non-enveloped RNA virus with a size of 26-27 nm in diameter. It is composed of two linear single stranded RNAs.

XSV has a diameter of 14-16 nm and is associated with *MrNV* with. It consists of a linear single stranded RNA.

Both the viruses have been found to be associated with the disease; however, the role of *MrNV* and XSV is not yet clear. In view of this, detection of either virus or simultaneous detection of both viruses should be reported as WTD or WTD suspicion.

8.3. Confirmatory methods

8.3.1. Level I: none

8.3.2. Level II: none

8.3.3. Level III: Reverse Transcriptase Polymerase Chain Reaction (RT-PCR) and Loop-Mediated Isothermal Amplification (LAMP)

9. **Control methods:** Because *Macrobrachium rosenbergii* is domesticated completely and an RT-PCR technique is available for commercial use, brood stock and seed screening should be strongly encouraged. The brood stock or seed tested positive for WTD must be discarded with proper zoosanitary methods. Usual sanitation and control protocols for viral infections are recommended.

10. Selected references

ARCIER J.M., HERMAN F., LIGHTNER D.V., REDMAN R., MARI J., BONAMI J.R. (1999). A viral disease associated with mortalities in hatchery-reared postlarvae of the giant freshwater prawn *Macrobrachium rosenbergii*. *Diseases of Aquatic Organisms*, **38**, 177–181.

BONAMI J.R., SHI Z., QIAN D. & WIDADA J.S. (2005). White tail disease of the giant freshwater prawn, *Macrobrachium rosenbergii*: Separation of the associated virions and characterization of *MrNV* as a new type of nodavirus. *Journal of Fish Diseases*, **28**(1), 23–32.

QIAN D., SHI Z., ZHANG S., CAO Z., LIU W., LI L., XIE Y., CAMBOURNAC I. & BONAMI J.R. (2003). Extra small virus-like particles (XSV) and nodavirus associated with whitish muscle disease in the giant freshwater prawn, *Macrobrachium rosenbergii*. *Journal of Fish Diseases*, **26**, 521–527.

ROMESTAND B. & BONAMI J.R. (2003). A sandwich enzyme linked immunosorbent assay (S-ELISA) for detection of *MrNV* in the giant freshwater prawn, *Macrobrachium rosenbergii* (de Man). *Journal of Fish Diseases*, **26**, 71–75.

SAHUL HAMEED A.S., YOGANANDHAN K., WIDADA J.S. & BONAMI J.R. (2004). Studies on the occurrence and RT-PCR detection of *Macrobrachium rosenbergii* nodavirus and extra small virus-like particles associated with white tail disease of *Macrobrachium rosenbergii* in India. *Aquaculture*, **238**, 127-133.

SAHUL HAMEED A.S., YOGANANDHAN K., WIDADA J.S. & BONAMI J.R. (2004). Experimental transmission and tissue tropism of *Macrobrachium rosenbergii* nodavirus (*MrNV*) and extra small virus like-particles in *Macrobrachium rosenbergii*. *Diseases of Aquatic Organisms*, **62**, 191-196.

Appendix XXXII (contd)Appendix B (contd)Appendix V (contd)

TUNG C.W., WANG C.S. & CHEN S.N. (1999). Histological and electron microscopic study on *Macrobrachium* muscle virus (MMV) infection in the giant freshwater prawn, *Macrobrachium rosenbergii* (de Man), cultured in Taiwan. *Journal of Fish Diseases*, **22**, 319-324.

WIDADA J.S., DURAND S., CAMBOURNAC I., QIAN D., SHI Z., DEJONGHE E., RICHARD V. & BONAMI J.R. (2003). Genome-based detection methods of *Macrobrachium rosenbergii* nodavirus, a pathogen of the giant freshwater prawn, *Macrobrachium rosenbergii*: dot-blot, *in situ* hybridization and RT-PCR. *Journal of Fish Diseases*, **26**, 583–590.

WIDADA J.S., RICHARD V., CAMBOURNAC I., SHI Z., QIAN D. & BONAMI J.R. (2004). Dot-blot hybridization and RT-PCR detection of extra small virus (XSV) associated with white tail disease of prawn *Macrobrachium rosenbergii*. *Diseases of Aquatic Organisms*, **58**, 83–87.

WIDADA J.S. & BONAMI J.R. (2004). Characteristics of the monocistronic genome of extra small virus, a virus-like particle associated with *Macrobrachium rosenbergii* nodavirus: Possible candidate for a new species of satellite virus. *Journal of General Virology*, **85**, 643–646.

YOGANANDHAN K., WIDADA J.S., BONAMI J.R. & SAHUL HAMEED A.S. (2005). Simultaneous detection of *Macrobrachium rosenbergii* nodavirus and extra small virus by a single tube, one-step multiplex RT-PCR assay. *Journal of Fish Diseases*, **28**, 65–69.

Appendix XXXII (contd)

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Appendix V (contd)



Figure 1. *Macrobrachium rosenbergii* post-larvae showing white tail disease

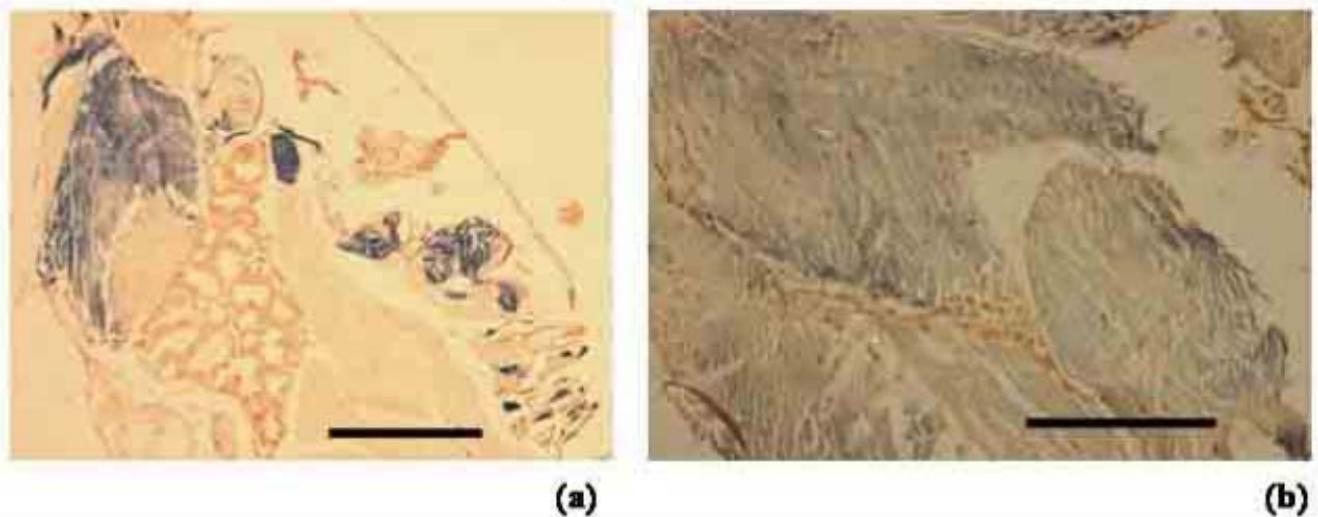


Figure 2. *In situ* hybridization, using *MrNV* probes. a) General view of the cephalothorax of an infected PL; hybridization was restricted to muscular areas while the hepatopancreas and the gills remained unaffected; bar: 500 μm . b) Positive hybridization in muscular fibrils; nuclei were virus-free and blood cells were uninfected; bar: 200 μm . (Widada *et al.*, 2003).

Appendix XXXII (contd)

Appendix B (contd)

Appendix V (contd)

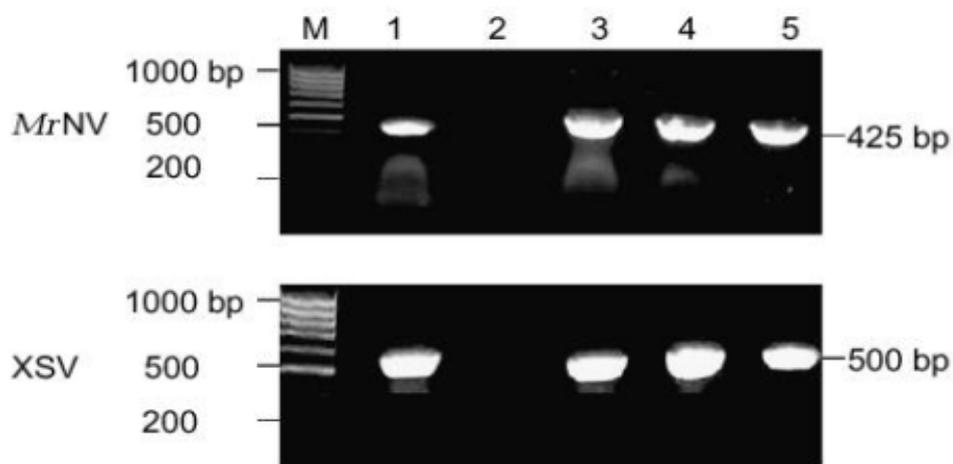


Figure 3. RT-PCR detection of *MrNV* and *XSV*

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Appendix XXXII (contd)Appendix B (contd)Appendix VI

The following references provide methods for diagnosis of necrotizing hepatopancreatitis.

BRADLEY-DUNLOP D.J., PANTOJA C. & LIGHTNER D.V. (2004). Development of monoclonal antibodies for the detection of necrotizing hepatopancreatitis in penaeid shrimp. *Diseases of Aquatic Organisms*, **60**, 233–240.

BROCK J.A. & MAIN K. (1994). A Guide to the Common Problems and Diseases of Cultured *Penaeus vannamei*. Published by the Oceanic Institute, Makapuu Point, P.O. Box 25280, Honolulu, Hawai, USA, 241 pp.

FRELIER P.F., LOY J.K. & KRUPPENBACH B. (1993). Transmission of necrotizing hepatopancreatitis in *Penaeus vannamei*. *Journal of Invertebrate Pathology*, **61**, 44–48.

FRELIER P.F., LOY J.K., LAWRENCE A.L., BRAY W.A. & BRUMBAUGH G.W. (1994). U.S. Marine Shrimp Farming Program 10th Anniversary Review, Gulf Coast Research Laboratory Special Publication No. 1. Ocean Springs, Mississippi: Gulf Research Reports. No. 1, 55–58.

FRELIER P.F., SIS R.F., BELL T.A. & LEWIS D.H. (1992). Microscopic and ultrastructural studies of necrotizing hepatopancreatitis in Texas cultured shrimp (*Penaeus vannamei*). *Veterinary Pathology*, **29**, 269–277.

KROL R.M., HAWKINS W.E. & OVERSTREET R.M. (1991). Rickettsial and mollicute infections in hepatopancreatic cells of cultured Pacific white shrimp (*Penaeus vannamei*). *Journal of Invertebrate Pathology*, **57**, 362–370.

LIGHTNER D.V., REDMAN R.M. & BONAMI J.R. (1992). Morphological evidence for a single bacterial etiology in Texas necrotizing hepatopancreatitis in *Penaeus vannamei* (Crustacea: Decapoda). *Diseases of Aquatic Organisms*, **13**, 235–239.

LIGHTNER D.V. (1993). Diseases of Cultured Penaeid Shrimp. In: CRC Handbook of Mariculture. 2nd Edition, Volume 1, Crustacean Aquaculture, McVey J.P., ed. CRC Press, Boca Raton, Florida, USA, 393–486.

LOY J.K., FRELIER P.F., VARNER P. & TEMPLETON J.W. (1996a). Detection of the etiologic agent of necrotizing hepatopancreatitis in cultured *Penaeus vannamei* from Texas and Peru by polymerase chain reaction. *Disease Aquatic Organisms*, **25**, 117–122.

LOY J.K., DEWHIRST F.E., WEBER W., FRELIER P.F., GARBAL T.L., TASCA S.I. & TEMPLETON J.W. (1996b). Molecular Phylogeny and *In situ* Detection of Etiologic Agent of Necrotizing Hepatopancreatitis in Shrimp. *Applied and Environmental Microbiology*, 3439–3445.

MORALES-COVARRUBIAS M.S. (2004). Enfermedades del camarón. Detección mediante análisis en fresco e histopatología. Editorial Trillas, SA de CV., Av. Río Churubusco 385, Col. Pedro María Anaya, México, D.F. Primera edición. ISBN: 968-24-7112-5. 1–122.

The following References provide methods for diagnosis of white tail disease.

ARCIER J.M., HERMAN F., LIGHTNER D.V., REDMAN R.M., MARI J. & BONAMI J.R. (1999). A viral disease associated with mortalities in hatchery-reared postlarvae of the giant freshwater prawn *Macrobrachium rosenbergii*. *Diseases of Aquatic Organisms*, **38**, 177–181.

BONAMI J.R., SHI Z., QIAN D. & WIDADA J.S. (2005). White tail disease of the giant freshwater prawn, *Macrobrachium rosenbergii*: Separation of the associated virions and characterization of MrNV as a new type of nodavirus. *Journal of Fish Diseases*, **28** (1), 23–32.

Appendix XXXII (contd)Appendix B (contd)Appendix VI (contd)

SAHUL HAMEED A.S., YOGANANDHAN K., WIDADA J.S. & BONAMI J.R. (2004). Studies on the occurrence of *Macrobrachium* nodavirus and extra small virus-like particles associated with white tail disease of *M. rosenbergii* in India by RT-PCR detection, *Aquaculture*, **160**, 31–45.

SAHUL HAMEED A.S., YOGANANDHAN K., WADADA J.S. & BONAMI J.R. (2004). Experimental transmission and tissue tropism of *Macrobrachium rosenbergii* nodavirus (MrNV) and extra small virus-like particles in *Macrobrachium rosenbergii*. *Diseases of Aquatic Organisms*, **62**, 191–196.

QIAN D., SHI Z., ZHANG S., CAO Z., LIU W., LI L., XIE Y., CAMBOURNAC I. & BONAMI J.R. (2003). Extra small virus-like particles (XSV) and nodavirus associated with whitish muscle disease in the giant freshwater prawn, *Macrobrachium rosenbergii*. *Journal of Fish Diseases*, **26**, 521–527.

ROMESTAND B. & BONAMI J.R. (2003). A sandwich enzyme linked immunosorbent assay (S-ELISA) for detection of MrNV in the giant freshwater prawn *Macrobrachium rosenbergii* (de Man). *Journal of Fish Diseases*, **26**, 71–75.

WIDADA J.S. & BONAMI J.R. (2004). Characteristics of the monocistronic genome of extra small virus, a virus-like particle associated with *Macrobrachium rosenbergii* nodavirus: Possible candidate for a new species of satellite virus, *Journal of General Virology*, **85**, 643–646.

WIDADA J.S., DURAND S., CAMBOURNAC I., QIAN D., SHI Z., DEJONGHE E., RICHARD V. & BONAMI J.R. (2003). Genome-based detection methods of *Macrobrachium rosenbergii* nodavirus, a pathogen of the giant freshwater prawn, *Macrobrachium rosenbergii*: dot-blot, *in situ* hybridization and RT-PCR. *Journal of Fish Diseases*, **26**, 583–590.

The following References provide methods for diagnosis of hepatopancreatic parvovirus disease.

BONAMI J.R., MARI J., POULOS B.T. & LIGHTNER D.V. (1995). Characterization of hepatopancreatic parvo-like virus, a second unusual parvovirus pathogenic for penaeid shrimps. *Journal of General Virology*, **76**, 813–817.

BONAMI J.R. (1991). Unclassified viruses of crustacea. *In*: Atlas of Invertebrate Viruses, Adams J.R. & Bonami J.R., ed. CRC Press, Boca Raton, Florida, USA, 593–622.

BONDAD-REANTASO M.G., MCGLADDERY S.E., EAST I. & SUBASINGHE R.P. (eds) (2001). Asia Diagnostic Guide to Aquatic Animal Diseases. FAO Fisheries Technical Paper 402, Supplement 2, Rome, Italy, 240 pp.

BROCK J.A. & LIGHTNER D.V. (1990). Diseases of Crustacea. Diseases caused by microorganisms. *In*: Diseases of Marine Animals, Vol. 3., Kinne O., ed. Biologische Anstalt Helgoland, Hamburg, Germany, 245–349.

CHAYABURAKUL K., NASH G., PRATANPIPAT P., SRIURARAIRATANA S. & WITHYACHUMNARNKUL (2004). Multiple pathogens found in growth-retarded black tiger shrimp *Penaeus monodon* cultivated in Thailand. *Diseases of Aquatic Organisms*, **60**, 89–96.

CHONG Y.C. & LOH H. (1984). Hepatopancreas chlamydial and parvoviral infections of farmed marine prawns in Singapore. *Singapore Veterinary Journal*, **9**, 51–56.

COLORNI A., SAMOCHA T. & COLORNI B. (1987). Pathogenic viruses introduced into Israeli mariculture systems by imported penaeid shrimp. *Bamidgeh*, **39**, 21–28.

FLEGEL T.W., NIELSEN L., THAMAVIT V., KONGTIM S. & PASHARAWIPAS T. (2004). Presence of multiple viruses in non-diseased, cultivated shrimp at harvest. *Aquaculture*, **240**, 55–68.

Appendix XXXII (contd)Appendix B (contd)Appendix VI (contd)

FULKS W. & MAIN K. (eds.). (1992). Diseases of Cultured Penaeid Shrimp in Asia and the United States. The Oceanic Institute, Makapuu Point, P.O. Box 25280, Honolulu, Hawai, USA, 392 pp.

LIGHTNER D.V. (1993). Diseases of penaeid shrimp. *In*: CRC Handbook of Mariculture. Second Edition, Crustacean Aquaculture, McVey J.P., ed. CRC Press, Boca Raton, Florida, USA, 393–486.

LIGHTNER D.V. & REDMAN R.M. (1985). A parvo like virus disease of penaeid shrimp. *Journal of Invertebrate Pathology*, **45**, 47–53.

LIGHTNER D.V. & REDMAN R.M. (1991). Hosts, geographic range and diagnostic procedures for the penaeid virus diseases of concern to shrimp culturists in the Americas. *In*: Frontiers of Shrimp Research, DeLoach P., Dougherty W.J. & Davidson M.A., eds. Elsevier, Amsterdam, the Netherlands, 173–196.

LIGHTNER D.V., REDMAN R.M., MOORE D.W. & PARK M.A. (1993). Development and application of a simple and rapid diagnostic method to studies on hepatopancreatic parvovirus of penaeid shrimp. *Aquaculture*, **116**, 15–23.

LIGHTNER D.V., REDMAN R.M., POULOS B.T., MARI J.L., BONAMI J.R. & SHARIFF M. (1994). Distinction of HPV-type viruses in *Penaeus chinensis* and *Macrobrachium rosenbergii* using a DNA probe. *Asian Fisheries Science*, **7**, 267–272.

MARI J., LIGHTNER D.V., POULOS B.T. & BONAMI J.R. (1995). Partial cloning of the genome of an unusual shrimp parvovirus (HPV): Use of gene probes in disease diagnosis. *Diseases of Aquatic Organisms*, **22**, 129–134.

PANTOJA C.R., LIGHTNER D.V. & LESTER R.J.G. (1985). Prawn virus from juvenile *Penaeus esculentus*. *In*: Second Australian National Prawn Seminar, Rothlisberg P.C., Hill B.J. & Staples d.J., eds. Second Australian National Prawn Seminar, NPS2, Cleveland, Australia, 61–64.

PANTOJA C.R. & LIGHTNER D.V. (2000). A non destructive method based on the polymerase chain reaction for the detection of hepatopancreatic parvovirus (HPV) of penaeid shrimp. *Diseases of Aquatic Organisms*, **39**, 177–182.

PANTOJA C.R. & LIGHTNER D.V. (2001). Detection of hepatopancreatic parvovirus (HPV) of penaeid shrimp by *in situ* hybridization at the electron microscope. *Diseases of Aquatic Organisms*, **44**, 87–96.

PHROMJAI J., SUKHUMSIRICHART W., PANTOJA C., LIGHTNER D.V. & FLEGEL T.W. (2001). Different reactions obtained using the same DNA detection reagents for Thai and Korean hepatopancreatic parvovirus of penaeid shrimp. *Diseases of Aquatic Organisms*, **46**, 153–158.

ROUBAL F.R., PAYNTER J.L. & LESTER R.J.G. (1989). Electron microscopic observation of hepatopancreatic parvo like virus (HPV) in the penaeid prawn, *Penaeus merguensis* de Man, from Australia. *Journal of Fish Diseases*, **12**, 199–201.



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REPORT OF THE MEETING OF THE OIE *AD HOC* GROUP ON CHAPTERS FOR MOLLUSC DISEASES FOR THE OIE *AQUATIC ANIMAL HEALTH CODE*

Paris, 8-10 August 2006

The OIE *ad hoc* Group on chapters for mollusc diseases for the OIE *Aquatic Animal Health Code* (hereinafter referred to as the *ad hoc* Group) held its meeting at the OIE Headquarters from 8 to 10 August 2006.

On behalf of Dr Bernard Vallat, Director General of the OIE, Dr Sarah Kahn, Head of the International Trade Department, welcomed the members of the *ad hoc* Group and thanked them for their willingness to be involved in addressing this mandate of the OIE. She stressed the importance of the expertise provided by the *ad hoc* Groups for the OIE's standards setting process.

The members of the OIE *ad hoc* Group are listed in [Appendix I](#). The Agenda adopted is given in [Appendix II](#).

The Chair of the *ad hoc* Group, Dr Franck Berthe, member of the Aquatic Animal Health Standards Commission (hereinafter referred to as the Aquatic Animals Commission), indicated that some of the comments received by the Aquatic Animals Commission on its August 2005 report were being referred to this *ad hoc* Group due to their technical nature. In particular, the *ad hoc* Group was requested to focus on the comments received from Member Countries regarding Articles 3., 4. and 5. of the chapters on diseases of molluscs in the OIE *Aquatic Animal Health Code* (hereinafter referred to as the *Aquatic Code*). In addition, the *ad hoc* Group was requested by the President of the Aquatic Animals Commission to address comments received from the OIE Reference Laboratory on infection with *Mikrocytos mackini*. Dr Berthe indicated that, during the second part of the meeting, the *ad hoc* Group would focus on the risks associated with the transport water for eggs and gametes, notably within the framework of the commodities listed under Article 3. of the chapters on diseases of molluscs.

Articles 3., 4. and 5. of the chapters on diseases of molluscs

The *ad hoc* Group welcomed the comments received and addressed them by revising the chapters on diseases of molluscs, as shown in [Appendices III \(Infection with *Bonamia ostreae*\)](#), [IV \(Infection with *Bonamia exitiosa*\)](#), [V \(Infection with *Haplosporidium nelsoni*\)](#), [VI \(Infection with *Marteilia refringens*\)](#), [VII \(Infection with *Mikrocytos mackini*\)](#) and [VIII \(Infection with *Xenohaliotis californiensis*\)](#).

The *ad hoc* Group noted that in all of the current chapters on diseases of molluscs, Article 3., line 1b), contains the point “non commercially sterile products (e.g. ready prepared meals) that have been heat treated in a manner to ensure the inactivation of the parasite” and it suggested to the Aquatic Animals Commission to move this point to 1a) as an additional point with the following wording: “non commercially-sterile products (e.g. ready prepared meals) that have been heat treated in a manner to ensure the inactivation of the pathogen”. In addition, the *ad hoc* Group recommended maintaining as part of 1b) a point addressing “non commercially-sterile heat treated products (e.g. ready prepared meals)”. The *ad hoc* Group suggested hyphenating the words commercially and sterile throughout the chapters on diseases of molluscs, in order to clarify the intended meaning.

Appendix XXXIII (contd)

In addressing the comment from the United States of America on “chemically preserved products” (Article 3., point 1b), the *ad hoc* Group agreed with the comment and suggested that the Aquatic Animals Commission revise this point by replacing the current words with “preserved products” in all relevant chapters on diseases of molluscs.

The *ad hoc* Group considered it necessary to justify the listing of certain commodities under Article 3. of each of the chapters on diseases of molluscs. Given the numerous comments provided by the Member Countries on the commodities listed, the *ad hoc* Group considered it useful to develop criteria to ensure a harmonised approach to the commodities listed and recommended that the Aquatic Animals Commission consider developing such criteria.

The *ad hoc* Group agreed with the comment on the scientific name of Manila clam received from the OIE Reference Laboratory on infection with *Mikrocytos mackini*. However, it considered that, in view of the ongoing taxonomic debate, the current wording should be kept as *Ruditapes philippinarum*.

Several Member Countries pointed out the apparent inconsistency in the requirements for biosecurity measures to be applied during a period of 2 or 3 years in Articles 4. and 5. The *ad hoc* Group clarified that for each disease the proposed timeframe was based on the ease of presumptive diagnosis, the likelihood of conditions conducive to clinical expression across seasons and the presence of objective clinical signs of the disease. The proposed timeframe took also into account trade requirements and reasonable animal health protection. The *ad hoc* Group prepared a table summarising the rationale for recommending the proposed timeframes used in Articles 4. and 5. of the chapters on diseases of molluscs (see Appendix IX). With regard to *Xenohaliotis californiensis*, the *ad hoc* Group liaised with the relevant OIE Reference Laboratory and concluded that the biosecurity measures should be extended to 3 years (rather than 2) because a strict temperature threshold is the critical environmental parameter.

Comments related to Article 3.

The *ad hoc* Group agreed that processing inactivates pathogens to a negligible level of risk and therefore recommended the retention of the following commodities in all of the chapters on diseases of molluscs:

- commercially-sterile canned or other heat treated products;
- preserved products (e.g. smoked, salted, pickled, marinated);
- products (e.g. ready prepared meals) that are not commercially-sterile but have been heat treated in a manner to ensure the inactivation of the parasite.

The *ad hoc* Group recognised the need to include more detailed justification for the commodities listed in Article 3. by providing a table containing the rationale and appropriate references (see Appendix X).

The *ad hoc* Group also provided the rationale for its responses to more specific comments by the Member Countries on issues not already addressed in Appendix X:

1. Thailand: The *ad hoc* Group noted that point 3 in Article 3. already addressed this issue.
2. Australia:
 - a. The *ad hoc* Group clarified that the *Aquatic Code* chapters address issues relevant to the international trade of susceptible species (as defined in the *Aquatic Code*) and therefore only those are listed in Article 2. When a pathogenic agent has an intermediate host, this has been taken into consideration when preparing the relevant disease chapters in the *Aquatic Code* and the *Manual of Diagnostic Tests for Aquatic Animals* (hereinafter referred to as the *Aquatic Manual*). Movements of the intermediate hosts *per se* are not covered by the mollusc chapters of the *Aquatic Code* because intermediate hosts are not subject to international trade.
 - b. On the comment on point 3, the *ad hoc* Group stated that there are no reported cases of diseases being transmitted to fish and crustaceans by movement of molluscs (and *vice versa*). It also suggested that this comment be also considered by the Aquatic Animals Commission since it goes beyond the mandate of the *ad hoc* Group.

3. United States of America:
 - a. The *ad hoc* Group highlighted that the definitions of “eggs” and “gametes” are given by the *Aquatic Code* and clarified that “eggs” are defined as fertilised gametes.
 - b. With regard to the possibility of “off the shell” oysters being infected with *Marteilia refringens*, the *ad hoc* Group considered that, since this commodity was listed under point 2b) of Article 2.2.4.3., it was considered to be destined for human consumption and, therefore, posed a negligible risk of transmission of disease.
4. Norway:
 - a. The fact that gametes, eggs and larvae are listed under point 1 of Article 2.2.4.3. of the *Aquatic Code* chapter on *Marteilia refringens* does not mean that they are safe commodities in relation to any other diseases. This applies to any commodity in all disease chapters.
 - b. The *ad hoc* Group clarified that when authorising importation or transit of the commodities listed under point 1, Competent Authorities should not require any *Marteilia refringens* related conditions, regardless of the *Marteilia refringens* status of the exporting country, zone or compartment. The same principle also applies to all other disease chapters.
 - c. With regard to the comment on point 1c) of Article 3., on the risk related to the unwanted species being shipped along with the commodity, the *ad hoc* Group stressed the fact the commodity itself has been shown to present no risk with regard to any given disease. Therefore, the *ad hoc* Group considered it to be the responsibility of the importing and exporting countries to ensure that trade is conducted in a manner that minimises the risk of importing unwanted species.
5. Canada: The *ad hoc* Group disagreed with the proposal to aggregate susceptible species at the genus level because of existing differences in susceptibility to *Bonamia*, for example, among ostreids and crassostreids; it is therefore recommended that species, and not genera, should be considered.-

Comments relating to Articles 4. and 5.

6. Canada:
 - a. With regard to the comment on point 1 and the request to consider the intermediate hosts for the application of biosecurity measures, the *ad hoc* Group clarified that this point 1 is concerned only with expression of the disease, which is not directly connected to the presence of an intermediate host.
 - b. With regard to the comments on the lack of specific information in the OIE standards, the *ad hoc* Group agreed and recognised that this may prevent application of point 2 in Articles 4. and 5. The *ad hoc* Group acknowledged that not all of the available information is provided by some of the *Aquatic Manual* chapters. Therefore, it recommended that all the disease chapters in the *Aquatic Manual* should include the environmental conditions conducive for the expression of the diseases and recommended the revision of the template for the *Aquatic Manual* disease chapters.

Risks associated with accompanying transport water for eggs and gametes

Australia and Canada queried whether the risks associated with the transport water had been considered when the inclusion of gametes, eggs and larvae in Article 3. had been proposed. The *ad hoc* Group reiterated that eggs and gametes *per se* are safe commodities; however, after reviewing hatchery procedures, it concluded that the risk associated with strip-spawning is not negligible in the absence of disinfection procedures. Therefore, it recommended to the Aquatic Animals Commission the removal of eggs and gametes from the list of commodities in Article 3. of all of the chapters on diseases of molluscs with the exception of the chapter on infection with *Xenohaliotis californiensis*, since abalone are not strip-spawned.

Appendix XXXIII (contd)

The *ad hoc* Group recommended that Chapter 1.5.1. of the *Aquatic Code* be updated in order to better address the treatment of the transport water, specifically for gametes, eggs and larvae. The suggested updates are provided in Appendix XI.

The *ad hoc* Group considered it necessary to gather more details on the actual nature and amount of international trade in eggs, gametes and larvae and suggested the Aquatic Animals Commission invite Member Countries to provide such information.

**REPORT OF THE MEETING OF THE OIE AD HOC GROUP ON CHAPTERS FOR
MOLLUSC DISEASES FOR THE OIE AQUATIC ANIMAL HEALTH CODE**

Paris, 8-10 August 2006

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**REPORT OF THE MEETING OF THE OIE *AD HOC* GROUP ON CHAPTERS FOR
MOLLUSC DISEASES FOR THE OIE *AQUATIC ANIMAL HEALTH CODE***

Paris, 8-10 August 2006

Adopted Agenda

Aquatic Animal Health Code

1. Address Member Countries' comments on Articles 3., 4. and 5. of the revised chapters on mollusc diseases
2. Risks associated with any accompanying transport water for eggs and gametes

CHAPTER 2.2.1.

INFECTION WITH BONAMIA OSTREAE

Article 2.2.1.1.

For the purposes of the *Aquatic Code*, infection with *Bonamia ostreae* means infection only with *Bonamia ostreae*.

Methods for surveillance, diagnosis and confirmatory identification are provided in the *Aquatic Manual*.

Article 2.2.1.2.

Scope

The recommendations in this Chapter apply to: European flat oyster (*Ostrea edulis*), Australian mud oyster (*O. angasi*), Argentinean flat oyster (*O. puelchana*), Chilean flat oyster (*O. chilensis*), Asiatic oyster (*O. denselammellosa*) and Suminoe oyster (*Crassostrea ariakensis*). These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 2.2.1.3.

Commodities

1. When authorising importation or transit of the following *commodities*, *Competent Authorities* should not require any *Bonamia ostreae* related conditions, regardless of the *Bonamia ostreae* status of the *exporting country, zone or compartment*:
 - a) From the species referred to in Article 2.2.1.2., for any purpose:
 - i) commercially-sterile canned or other heat treated products;
 - ii) ~~gametes, eggs and~~ larvae.
 - b) The following *commodities* destined for human consumption from the species referred to in Article 2.2.1.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. smoked, salted, pickled, marinated, ~~etc.~~);
 - ii) non commercially sterile products (e.g. ready prepared meals) that have been heat treated in a manner to ensure the inactivation of the parasite;
 - iii) off the shell (chilled or frozen) packaged for direct retail trade;
 - iv) half-shell (chilled).
 - c) All *commodities* from *Crassostrea gigas*, *C. virginica*, *Ruditapes decussatus*, *R. philippinarum*, *Mytilus galloprovincialis* and *M. edulis*, including the live *aquatic animal*.

For the *commodities* referred to in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

Appendix XXXIII (contd)Appendix III (contd)

2. When authorising importation or transit of the *commodities* of a species referred to in Article 2.2.1.2., other than *commodities* referred to in point 1 of Article 2.2.1.3., *Competent Authorities* should require the conditions prescribed in Articles 2.2.1.7. to 2.2.1.11. relevant to the *Bonamia ostreae* status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any other *commodity* from bivalve species not referred to in Article 2.2.1.2. (especially those of the genus *Ostrea*) ~~nor~~ in point 1c) of Article 2.2.1.3., from an *exporting country, zone or compartment* not declared free of *Bonamia ostreae*, *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of *Bonamia ostreae* and the potential consequences associated with importation of the *commodity*, prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 2.2.1.4.

***Bonamia ostreae* free country**

A country may make a *self-declaration of freedom* from *Bonamia ostreae* if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from *Bonamia ostreae* if all the areas covered by the shared water are declared *Bonamia ostreae* free *zones* (see Article 2.2.1.5.).

1. A country where none of the *susceptible species* is present may make a *self-declaration of freedom* from *Bonamia ostreae* when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where any species referred to in Article 2.2.1.2. are present but there has never been any observed occurrence of the disease for at least the past 10 years despite conditions – in all areas where the species are present – that are conducive to its clinical expression, as described in Chapter 2.2.1. of the *Aquatic Manual*, may make a *self-declaration of freedom* from *Bonamia ostreae* when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years and infection with *Bonamia ostreae* is not known to be established in wild populations.

OR

3. A country where the last known clinical occurrence was within the past 10 years or where the infection status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter 2.2.1. of the *Aquatic Manual*, may make a *self-declaration of freedom* from *Bonamia ostreae* when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.1. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Bonamia ostreae*.

OR

4. A country that has made a *self-declaration of freedom* from *Bonamia ostreae* but in which the disease is detected may not make a *self-declaration of freedom* from *Bonamia ostreae* again until the following conditions have been met:

Appendix XXXIII (contd)Appendix III (contd)

- a) on detection of the disease, the affected area was declared an *infected zone* and a *buffer zone* was established; and
- b) infected populations have been safely destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the disease, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
- c) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.1. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Bonamia ostreae*.

In the meantime, part of the non-affected area may be declared a free *zone* provided that it meets the conditions in point 3 of Article 2.2.1.5.

Article 2.2.1.5.

***Bonamia ostreae* free zone or free compartment**

A *zone* or *compartment* free from *Bonamia ostreae* may be established within the *territory* of one or more countries of infected or unknown status for infection with *Bonamia ostreae* and declared free by the *Competent Authority(ies)* of the country(ies) concerned, if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a *Bonamia ostreae* free *zone* or *compartment* if the conditions outlined below apply to all areas of the *zone* or *compartment*.

1. In a country of unknown status for *Bonamia ostreae*, a *zone* or *compartment* where none of the *susceptible species* is present may be declared free from *Bonamia ostreae* when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. In a country of unknown status for *Bonamia ostreae*, a *zone* or *compartment* where any species referred to in Article 2.2.1.2. are present but there has never been any observed occurrence of the disease for at least the past 10 years despite conditions – in all areas where the species are present – that are conducive to its clinical expression, as described in Chapter 2.2.1. of the *Aquatic Manual*, may be declared free from *Bonamia ostreae* when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years and infection with *Bonamia ostreae* is not known to be established in wild populations.

OR

3. A *zone* or *compartment* where the last known clinical occurrence was within the past 10 years or where the infection status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter 2.2.1. of the *Aquatic Manual*, may be declared free from *Bonamia ostreae* when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.1. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Bonamia ostreae*.

Appendix XXXIII (contd)Appendix III (contd)

OR

4. A *zone* previously declared free from *Bonamia ostreae* but in which the disease is detected may not be declared free from *Bonamia ostreae* again until the following conditions have been met:
- a) on detection of the disease, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been safely destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the disease, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.1. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Bonamia ostreae*.

Article 2.2.1.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from *Bonamia ostreae* following the provisions of points 1 or 2 of Articles 2.2.1.4. or 2.2.1.5., as relevant, may maintain its status as *Bonamia ostreae* free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from *Bonamia ostreae* following the provisions of point 3 of Articles 2.2.1.4. or 2.2.1.5., as relevant, may discontinue *targeted surveillance* and maintain its status as *Bonamia ostreae* free provided that conditions that are conducive to clinical expression of infection with *Bonamia ostreae*, as described in Chapter 2.2.1. of the *Aquatic Manual*, exist and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of infection with *Bonamia ostreae*, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of infection.

Article 2.2.1.7.

Importation of live animals from a country, zone or compartment declared free from *Bonamia ostreae*

When importing live *aquatic animals* of the species referred to in Article 2.2.1.2. from a country, *zone* or *compartment* declared free from *Bonamia ostreae*, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This *certificate* must certify, on the basis of the procedures described in Articles 2.2.1.4. or 2.2.1.5. (as applicable), whether the place of production of the consignment is a country, *zone* or *compartment* declared free from *Bonamia ostreae*.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.2.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.1.3.

Appendix XXXIII (contd)

Appendix III (contd)

Article 2.2.1.8.

Importation of live animals for aquaculture from a country, zone or compartment not declared free from *Bonamia ostreae*

When importing, for *aquaculture*, *aquatic animals* of the species referred to in Article 2.2.1.2. from a country, *zone* or *compartment* not declared free from *Bonamia ostreae*, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:

1. the direct delivery into and holding of the consignment in *quarantine* facilities;
2. the continuous isolation of the imported *aquatic animals* from the local environment;
3. the treatment of all effluent and waste material from the processing in a manner that ensures inactivation of *Bonamia ostreae*.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.1.3.

Article 2.2.1.9.

Importation of live animals for processing for human consumption from a country, zone or compartment not declared free from *Bonamia ostreae*

When importing, for processing for human consumption, *aquatic animals* of the species referred to in Article 2.2.1.2. from a country, *zone* or *compartment* not declared free from *Bonamia ostreae*, the *Competent Authority* of the *importing country* should require that:

1. the consignment is delivered directly to and held in *quarantine* facilities until processing and/or consumption; and
2. all effluent and waste material from the processing are treated in a manner that ensures inactivation of *Bonamia ostreae*.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.1.3.

Article 2.2.1.10.

Importation of products from a country, zone or compartment declared free from *Bonamia ostreae*

When importing *aquatic animal products* of the species referred to in Article 2.2.1.2. from a country, *zone* or *compartment* declared free from *Bonamia ostreae*, the *Competent Authority* of the *importing country* should require that the consignment be accompanied by an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This *certificate* must certify, on the basis of the procedures described in Articles 2.2.1.4. or 2.2.1.5. (as applicable), whether or not the place of production of the consignment is a country, *zone* or *compartment* declared free from *Bonamia ostreae*.

The *certificate* should be in accordance with the Model Certificate in Appendix X.X.X. (under study).

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.1.3.

Appendix XXXIII (contd)

Appendix III (contd)

Article 2.2.1.11.

Importation of products from a country, zone or compartment not declared free from *Bonamia ostreae*

When importing *aquatic animal products* of the species referred to in Article 2.2.1.2. from a country, *zone* or *compartment* not declared free from *Bonamia ostreae*, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.1.3.

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CHAPTER 2.2.2.

INFECTION WITH BONAMIA EXITIOSA

Article 2.2.2.1.

For the purposes of the *Aquatic Code*, infection with *Bonamia exitiosa* means infection only with *Bonamia exitiosa*.

Methods for surveillance, diagnosis and confirmatory identification are provided in the *Aquatic Manual*.

Article 2.2.2.2.

Scope

The recommendations in this Chapter apply to: Australian mud oyster (*Ostrea angasi*) and Chilean flat oyster (*O. chilensis*). These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 2.2.2.3.

Commodities

1. When authorising importation or transit of the following *commodities*, *Competent Authorities* should not require any *Bonamia exitiosa* related conditions, regardless of the *Bonamia exitiosa* status of the *exporting country, zone or compartment*:
 - a) From the species referred to in Article 2.2.2.2., for any purpose:
 - i) commercially-sterile canned or other heat treated products;
 - ii) ~~gametes, eggs and~~ larvae.
 - b) The following *commodities* destined for human consumption from the species referred to in Article 2.2.2.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. smoked, salted, pickled, marinated, ~~etc.~~);
 - ii) non commercially sterile products (e.g. ready prepared meals) that have been heat treated in a manner to ensure the inactivation of the parasite;
 - iii) off the shell (chilled or frozen) packaged for direct retail trade;
 - iv) half-shell (chilled).
 - c) All *commodities* from *Crassostrea gigas*, ~~*C. virginica*~~ and *Saccostrea glomerata*, including the live *aquatic animal*.

For the *commodities* referred to in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

Appendix XXXIII (contd)Appendix IV (contd)

2. When authorising importation or transit of the *commodities* of a species referred to in Article 2.2.2.2., other than *commodities* referred to in point 1 of Article 2.2.2.3., *Competent Authorities* should require the conditions prescribed in Articles 2.2.2.7. to 2.2.2.11. relevant to the *Bonamia exitiosa* status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any other *commodity* from bivalve species not referred to in Article 2.2.2.2. (especially those of the genus *Ostrea*) ~~nor~~ in point 1c) of Article 2.2.2.3., from an *exporting country, zone or compartment* not declared free of *Bonamia exitiosa*, *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of *Bonamia exitiosa* and the potential consequences associated with importation of the *commodity*, prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 2.2.2.4.

***Bonamia exitiosa* free country**

A country may make a *self-declaration of freedom* from *Bonamia exitiosa* if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from *Bonamia exitiosa* if all the areas covered by the shared water are declared *Bonamia exitiosa* free *zones* (see Article 2.2.2.5.).

1. A country where none of the *susceptible species* is present may make a *self-declaration of freedom* from *Bonamia exitiosa* when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where any species referred to in Article 2.2.2.2. are present but there has never been any observed occurrence of the disease for at least the past 10 years despite conditions – in all areas where the species are present – that are conducive to its clinical expression, as described in Chapter 2.2.2. of the *Aquatic Manual*, may make a *self-declaration of freedom* from *Bonamia exitiosa* when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years and infection with *Bonamia exitiosa* is not known to be established in wild populations.

OR

3. A country where the last known clinical occurrence was within the past 10 years or where the infection status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter 2.2.2. of the *Aquatic Manual*, may make a *self-declaration of freedom* from *Bonamia exitiosa* when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.2. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Bonamia exitiosa*.

OR

4. A country that has made a *self-declaration of freedom* from *Bonamia exitiosa* but in which the disease is detected may not make a *self-declaration of freedom* from *Bonamia exitiosa* again until the following conditions have been met:

Appendix XXXIII (contd)Appendix IV (contd)

- a) on detection of the disease, the affected area was declared an *infected zone* and a *buffer zone* was established; and
- b) infected populations have been safely destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the disease, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
- c) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.2. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Bonamia exitiosa*.

In the meantime, part of the non-affected area may be declared a free *zone* provided that it meets the conditions in point 3 of Article 2.2.2.5.

Article 2.2.2.5.

***Bonamia exitiosa* free zone or free compartment**

A *zone* or *compartment* free from *Bonamia exitiosa* may be established within the *territory* of one or more countries of infected or unknown status for infection with *Bonamia exitiosa* and declared free by the *Competent Authority(ies)* of the country(ies) concerned, if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a *Bonamia exitiosa* free *zone* or *compartment* if the conditions outlined below apply to all areas of the *zone* or *compartment*.

1. In a country of unknown status for *Bonamia exitiosa*, a *zone* or *compartment* where none of the *susceptible species* is present may be declared free from *Bonamia exitiosa* when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. In a country of unknown status for *Bonamia exitiosa*, a *zone* or *compartment* where any species referred to in Article 2.2.2.2. are present but there has never been any observed occurrence of the disease for at least the past 10 years despite conditions – in all areas where the species are present – that are conducive to its clinical expression, as described in Chapter 2.2.2. of the *Aquatic Manual*, may be declared free from *Bonamia exitiosa* when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years and infection with *Bonamia exitiosa* is not known to be established in wild populations.

OR

3. A *zone* or *compartment* where the last known clinical occurrence was within the past 10 years or where the infection status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter 2.2.2. of the *Aquatic Manual*, may be declared free from *Bonamia exitiosa* when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.2. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Bonamia exitiosa*.

Appendix XXXIII (contd)Appendix IV (contd)

OR

4. A *zone* previously declared free from *Bonamia exitiosa* but in which the disease is detected may not be declared free from *Bonamia exitiosa* again until the following conditions have been met:
- a) on detection of the disease, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been safely destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the disease, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.2. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Bonamia exitiosa*.

Article 2.2.2.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from *Bonamia exitiosa* following the provisions of points 1 or 2 of Articles 2.2.2.4. or 2.2.2.5., as relevant, may maintain its status as *Bonamia exitiosa* free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from *Bonamia exitiosa* following the provisions of point 3 of Articles 2.2.2.4. or 2.2.2.5., as relevant, may discontinue *targeted surveillance* and maintain its status as *Bonamia exitiosa* free provided that conditions that are conducive to clinical expression of infection with *Bonamia exitiosa*, as described in Chapter 2.2.2. of the *Aquatic Manual*, exist and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of infection with *Bonamia exitiosa*, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of infection.

Article 2.2.2.7.

Importation of live animals from a country, zone or compartment declared free from *Bonamia exitiosa*

When importing live *aquatic animals* of the species referred to in Article 2.2.2.2. from a country, *zone* or *compartment* declared free from *Bonamia exitiosa*, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This *certificate* must certify, on the basis of the procedures described in Articles 2.2.2.4. or 2.2.2.5. (as applicable), whether the place of production of the consignment is a country, *zone* or *compartment* declared free from *Bonamia exitiosa*.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.2.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.2.3.

Appendix XXXIII (contd)

Appendix IV (contd)

Article 2.2.2.8.

Importation of live animals for aquaculture from a country, zone or compartment not declared free from *Bonamia exitiosa*

When importing, for *aquaculture*, *aquatic animals* of the species referred to in Article 2.2.2.2. from a country, *zone* or *compartment* not declared free from *Bonamia exitiosa*, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:

1. the direct delivery into and holding of the consignment in *quarantine* facilities;
2. the continuous isolation of the imported *aquatic animals* from the local environment;
3. the treatment of all effluent and waste material from the processing in a manner that ensures inactivation of *Bonamia exitiosa*.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.2.3.

Article 2.2.2.9.

Importation of live animals for processing for human consumption from a country, zone or compartment not declared free from *Bonamia exitiosa*

When importing, for processing for human consumption, *aquatic animals* of the species referred to in Article 2.2.2.2. from a country, *zone* or *compartment* not declared free from *Bonamia exitiosa*, the *Competent Authority* of the *importing country* should require that:

1. the consignment is delivered directly to and held in *quarantine* facilities until processing and/or consumption; and
2. all effluent and waste material from the processing are treated in a manner that ensures inactivation of *Bonamia exitiosa*.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.2.3.

Article 2.2.2.10.

Importation of products from a country, zone or compartment declared free from *Bonamia exitiosa*

When importing *aquatic animal products* of the species referred to in Article 2.2.2.2. from a country, *zone* or *compartment* declared free from *Bonamia exitiosa*, the *Competent Authority* of the *importing country* should require that the consignment be accompanied by an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This *certificate* must certify, on the basis of the procedures described in Articles 2.2.2.4. or 2.2.2.5. (as applicable), whether or not the place of production of the consignment is a country, *zone* or *compartment* declared free from *Bonamia exitiosa*.

The *certificate* should be in accordance with the Model Certificate in Appendix X.X.X. (under study).

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.2.3.

Appendix XXXIII (contd)

Appendix IV (contd)

Article 2.2.2.11.

Importation of products from a country, zone or compartment not declared free from *Bonamia exitiosa*

When importing *aquatic animal products* of the species referred to in Article 2.2.2.2. from a country, *zone* or *compartment* not declared free from *Bonamia exitiosa*, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.2.3.

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CHAPTER 2.2.3.

INFECTION WITH HAPLOSPORIDIUM NELSONI

Article 2.2.3.1.

For the purposes of the *Aquatic Code*, infection with *Haplosporidium nelsoni* means infection only with *Haplosporidium nelsoni*.

Methods for surveillance, diagnosis and confirmatory identification are provided in the *Aquatic Manual* (under study).

Article 2.2.3.2.

Scope

The recommendations in this Chapter apply to: Pacific oyster (*Crassostrea gigas*) and Eastern oyster (*C. virginica*). These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 2.2.3.3.

Commodities

1. When authorising importation or transit of the following *commodities*, *Competent Authorities* should not require any *Haplosporidium nelsoni* related conditions, regardless of the *Haplosporidium nelsoni* status of the *exporting country, zone or compartment*:
 - a) From the species referred to in Article 2.2.3.2., for any purpose:
 - i) commercially-sterile canned or cooked products;
 - ii) ~~gametes, eggs and~~ larvae.
 - b) The following *commodities* destined for human consumption from the species referred to in Article 2.2.3.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. smoked, salted, pickled, marinated, ~~etc.~~);
 - ii) products (e.g. ready prepared meals) that have been heat treated in a manner to ensure the inactivation of the parasite;
 - iii) off the shell (chilled or frozen) packaged for direct retail trade;
 - iv) half-shell (chilled).
 - c) All *commodities* from *Crassostrea ariakensis*, including the live *aquatic animal*.

For the *commodities* referred to in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

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2. When authorising importation or transit of the *commodities* of a species referred to in Article 2.2.3.2., other than *commodities* referred to in point 1 of Article 2.2.3.3., *Competent Authorities* should require the conditions prescribed in Articles 2.2.3.7. to 2.2.3.11. relevant to the *Haplosporidium nelsoni* status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any other *commodity* from bivalve species not referred to in Article 2.2.3.2. nor in point 1c) of Article 2.2.3.3., from an *exporting country, zone or compartment* not declared free of *Haplosporidium nelsoni*, *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of *Haplosporidium nelsoni* and the potential consequences associated with importation of the *commodity*, prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 2.2.3.4.

***Haplosporidium nelsoni* free country**

A country may make a *self-declaration of freedom* from *Haplosporidium nelsoni* if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from *Haplosporidium nelsoni* if all the areas covered by the shared water are declared *Haplosporidium nelsoni* free *zones* (see Article 2.2.3.5.).

1. A country where none of the *susceptible species* is present may make a *self-declaration of freedom* from *Haplosporidium nelsoni* when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where any species referred to in Article 2.2.3.2. are present but there has never been any observed occurrence of the disease for at least the past 10 years despite conditions – in all areas where the species are present – that are conducive to its clinical expression, as described in Chapter 2.2.3. of the *Aquatic Manual*, may make a *self-declaration of freedom* from *Haplosporidium nelsoni* when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years and infection with *Haplosporidium nelsoni* is not known to be established in wild populations.

OR

3. A country where the last known clinical occurrence was within the past 10 years or where the infection status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter 2.2.3. of the *Aquatic Manual*, may make a *self-declaration of freedom* from *Haplosporidium nelsoni* when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.3. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Haplosporidium nelsoni*.

OR

4. A country that has made a *self-declaration of freedom* from *Haplosporidium nelsoni* but in which the disease is detected may not make a *self-declaration of freedom* from *Haplosporidium nelsoni* again until the following conditions have been met:

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- a) on detection of the disease, the affected area was declared an *infected zone* and a *buffer zone* was established; and
- b) infected populations have been safely destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the disease, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
- c) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.3. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Haplosporidium nelsoni*.

In the meantime, part of the non-affected area may be declared a free *zone* provided that it meets the conditions in point 3 of Article 2.2.3.5.

Article 2.2.3.5.

***Haplosporidium nelsoni* free zone or free compartment**

A *zone* or *compartment* free from *Haplosporidium nelsoni* may be established within the *territory* of one or more countries of infected or unknown status for infection with *Haplosporidium nelsoni* and declared free by the *Competent Authority(ies)* of the country(ies) concerned, if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a *Haplosporidium nelsoni* free *zone* or *compartment* if the conditions outlined below apply to all areas of the *zone* or *compartment*.

1. In a country of unknown status for *Haplosporidium nelsoni*, a *zone* or *compartment* where none of the *susceptible species* is present may be declared free from *Haplosporidium nelsoni* when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. In a country of unknown status for *Haplosporidium nelsoni*, a *zone* or *compartment* where any species referred to in Article 2.2.3.2. are present but there has never been any observed occurrence of the disease for at least the past 10 years despite conditions – in all areas where the species are present – that are conducive to its clinical expression, as described in Chapter 2.2.3. of the *Aquatic Manual*, may be declared free from *Haplosporidium nelsoni* when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years and infection with *Haplosporidium nelsoni* is not known to be established in wild populations.

OR

3. A *zone* or *compartment* where the last known clinical occurrence was within the past 10 years or where the infection status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter 2.2.3. of the *Aquatic Manual*, may be declared free from *Haplosporidium nelsoni* when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.3. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Haplosporidium nelsoni*.

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OR

4. A *zone* previously declared free from *Haplosporidium nelsoni* but in which the disease is detected may not be declared free from *Haplosporidium nelsoni* again until the following conditions have been met:
- a) on detection of the disease, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been safely destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the disease, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.3. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Haplosporidium nelsoni*.

Article 2.2.3.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from *Haplosporidium nelsoni* following the provisions of points 1 or 2 of Articles 2.2.3.4. or 2.2.3.5., as relevant, may maintain its status as *Haplosporidium nelsoni* free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from *Haplosporidium nelsoni* following the provisions of point 3 of Articles 2.2.3.4. or 2.2.3.5., as relevant, may discontinue *targeted surveillance* and maintain its status as *Haplosporidium nelsoni* free provided that conditions that are conducive to clinical expression of infection with *Haplosporidium nelsoni*, as described in Chapter 2.2.3. of the *Aquatic Manual*, exist and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of infection with *Haplosporidium nelsoni*, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of infection.

Article 2.2.3.7.

Importation of live animals from a country, zone or compartment declared free from *Haplosporidium nelsoni*

When importing live *aquatic animals* of the species referred to in Article 2.2.3.2. from a country, *zone* or *compartment* declared free from *Haplosporidium nelsoni*, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This *certificate* must certify, on the basis of the procedures described in Articles 2.2.3.4. or 2.2.3.5. (as applicable), whether the place of production of the consignment is a country, *zone* or *compartment* declared free from *Haplosporidium nelsoni*.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.2.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.3.3.

Article 2.2.3.8.

Importation of live animals for aquaculture from a country, zone or compartment not declared free from *Haplosporidium nelsoni*

When importing, for *aquaculture*, *aquatic animals* of the species referred to in Article 2.2.3.2. from a country, *zone* or *compartment* not declared free from *Haplosporidium nelsoni*, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:

1. the direct delivery into and holding of the consignment in *quarantine* facilities;
2. the continuous isolation of the imported *aquatic animals* from the local environment;
3. the treatment of all effluent and waste material from the processing in a manner that ensures inactivation of *Haplosporidium nelsoni*.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.3.3.

Article 2.2.3.9.

Importation of live animals for processing for human consumption from a country, zone or compartment not declared free from *Haplosporidium nelsoni*

When importing, for processing for human consumption, *aquatic animals* of the species referred to in Article 2.2.3.2. from a country, *zone* or *compartment* not declared free from *Haplosporidium nelsoni*, the *Competent Authority* of the *importing country* should require that:

1. the consignment is delivered directly to and held in *quarantine* facilities until processing and/or consumption; and
2. all effluent and waste material from the processing are treated in a manner that ensures inactivation of *Haplosporidium nelsoni*.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.3.3.

Article 2.2.3.10.

Importation of products from a country, zone or compartment declared free from *Haplosporidium nelsoni*

When importing *aquatic animal products* of the species referred to in Article 2.2.3.2. from a country, *zone* or *compartment* declared free from *Haplosporidium nelsoni*, the *Competent Authority* of the *importing country* should require that the consignment be accompanied by an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This *certificate* must certify, on the basis of the procedures described in Articles 2.2.3.4. or 2.2.3.5. (as applicable), whether or not the place of production of the consignment is a country, *zone* or *compartment* declared free from *Haplosporidium nelsoni*.

The *certificate* should be in accordance with the Model Certificate in Appendix X.X.X. (under study).

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.3.3.

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Article 2.2.3.11.

Importation of products from a country, zone or compartment not declared free from *Haplosporidium nelsoni*

When importing *aquatic animal products* of the species referred to in Article 2.2.3.2. from a country, *zone* or *compartment* not declared free from *Haplosporidium nelsoni*, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.3.3.

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CHAPTER 2.2.4.

INFECTION WITH MARTEILIA REFRINGENS

Article 2.2.4.1.

For the purposes of the *Aquatic Code*, infection with *Marteilia refringens* means infection only with *Marteilia refringens*.

Methods for surveillance, diagnosis and confirmatory identification are provided in the *Aquatic Manual*.

Article 2.2.4.2.

Scope

The recommendations in this Chapter apply to: European flat oyster (*Ostrea edulis*), Australian mud oyster (*O. angasi*), Argentinean oyster (*O. puelchana*) and Chilean flat oyster (*O. chilensis*), ~~as well as~~ blue mussel (*Mytilus edulis*) and Mediterranean mussel (*M. galloprovincialis*). These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 2.2.4.3.

Commodities

1. When authorising importation or transit of the following *commodities*, *Competent Authorities* should not require any *Marteilia refringens* related conditions, regardless of the *Marteilia refringens* status of the *exporting country, zone or compartment*:
 - a) From the species referred to in Article 2.2.4.2., for any purpose:
 - i) commercially-sterile canned or other heat treated products;
 - ii) ~~gametes, eggs and~~ larvae.
 - b) The following *commodities* destined for human consumption from the species referred to in Article 2.2.4.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. smoked, salted, pickled, marinated, ~~etc.~~);
 - ii) non commercially sterile products (e.g. ready prepared meals) that have been heat treated in a manner to ensure the inactivation of the parasite;
 - iii) off the shell (chilled or frozen) packaged for direct retail trade;
 - iv) half-shell (chilled).
 - c) All *commodities* from *Crassostrea gigas*, including the live *aquatic animal*.

For the *commodities* referred to in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

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2. When authorising importation or transit of the *commodities* of a species referred to in Article 2.2.4.2., other than *commodities* referred to in point 1 of Article 2.2.4.3., *Competent Authorities* should require the conditions prescribed in Articles 2.2.4.7. to 2.2.4.11. relevant to the *Marteilia refringens* status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any other *commodity* from bivalve species not referred to in Article 2.2.4.2. (especially ~~those~~ the other species of the genera *Ostrea* and *Mytilus*) nor in point 1c) of Article 2.2.4.3., from an *exporting country, zone or compartment* not declared free of *Marteilia refringens*, *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of *Marteilia refringens* and the potential consequences associated with importation of the *commodity*, prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 2.2.4.4.

***Marteilia refringens* free country**

A country may make a *self-declaration of freedom* from *Marteilia refringens* if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from *Marteilia refringens* if all the areas covered by the shared water are declared *Marteilia refringens* free *zones* (see Article 2.2.4.5.).

1. A country where none of the *susceptible species* is present may make a *self-declaration of freedom* from *Marteilia refringens* when *basic biosecurity conditions* have been met continuously in the country for at least the past 3 years.

OR

2. A country where any species referred to in Article 2.2.4.2. is present but there has never been any observed occurrence of the disease for at least the past 10 years despite conditions – in all areas where the species are present – that are conducive to its clinical expression, as described in Chapter 2.2.4. of the *Aquatic Manual*, may make a *self-declaration of freedom* from *Marteilia refringens* when *basic biosecurity conditions* have been met continuously in the country for at least the past 3 years and infection with *Marteilia refringens* is not known to be established in wild populations.

OR

3. A country where the last known clinical occurrence was within the past 10 years or where the infection status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter 2.2.4. of the *Aquatic Manual*, may make a *self-declaration of freedom* from *Marteilia refringens* when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 3 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.4. of the *Aquatic Manual*, has been in place for at least the last 2 of the past 3 years without detection of *Marteilia refringens*.

OR

4. A country that has made a *self-declaration of freedom* from *Marteilia refringens* but in which the disease is detected may not make a *self-declaration of freedom* from *Marteilia refringens* again until the following conditions have been met:

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- a) on detection of the disease, the affected area was declared an *infected zone* and a *buffer zone* was established; and
- b) infected populations have been safely destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the disease, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
- c) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.4. of the *Aquatic Manual*, has been in place for at least the last 2 of the past 3 years without detection of *Marteilia refringens*.

In the meantime, part of the non-affected area may be declared a free *zone* provided that it meets the conditions in point 3 of Article 2.2.4.5.

Article 2.2.4.5.

***Marteilia refringens* free zone or free compartment**

A *zone* or *compartment* free from *Marteilia refringens* may be established within the *territory* of one or more countries of infected or unknown status for infection with *Marteilia refringens* and declared free by the *Competent Authority(ies)* of the country(ies) concerned, if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a *Marteilia refringens* free *zone* or *compartment* if the conditions outlined below apply to all areas of the *zone* or *compartment*.

1. In a country of unknown status for *Marteilia refringens*, a *zone* or *compartment* where none of the *susceptible species* is present may be declared free from *Marteilia refringens* when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 3 years.

OR

2. In a country of unknown status for *Marteilia refringens*, a *zone* or *compartment* where any species referred to in Article 2.2.4.2. is present but there has never been any observed occurrence of the disease for at least the past 10 years despite conditions – in all areas where the species are present – that are conducive to its clinical expression, as described in Chapter 2.2.4. of the *Aquatic Manual*, may be declared free from *Marteilia refringens* when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 3 years and infection with *Marteilia refringens* is not known to be established in wild populations.

OR

3. A *zone* or *compartment* where the last known clinical occurrence was within the past 10 years or where the infection status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter 2.2.4. of the *Aquatic Manual*, may be declared free from *Marteilia refringens* when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 3 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.4. of the *Aquatic Manual*, has been in place for at least the last 2 of the past 3 years without detection of *Marteilia refringens*.

Appendix XXXIII (contd)Appendix VI (contd)

OR

4. A *zone* previously declared free from *Marteilia refringens* but in which the disease is detected may not be declared free from *Marteilia refringens* again until the following conditions have been met:
 - a) on detection of the disease, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been safely destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the disease, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.4. of the *Aquatic Manual*, has been in place for at least the last 2 of the past 3 years without detection of *Marteilia refringens*.

Article 2.2.4.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from *Marteilia refringens* following the provisions of points 1 or 2 of Articles 2.2.4.4. or 2.2.4.5., as relevant, may maintain its status as *Marteilia refringens* free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from *Marteilia refringens* following the provisions of point 3 of Articles 2.2.4.4. or 2.2.4.5., as relevant, may discontinue *targeted surveillance* and maintain its status as *Marteilia refringens* free provided that conditions that are conducive to clinical expression of infection with *Marteilia refringens*, as described in Chapter 2.2.4. of the *Aquatic Manual*, exist and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of infection with *Marteilia refringens*, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of infection.

Article 2.2.4.7.

Importation of live animals from a country, zone or compartment declared free from *Marteilia refringens*

When importing live *aquatic animals* of the species referred to in Article 2.2.4.2. from a country, *zone* or *compartment* declared free from *Marteilia refringens*, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This *certificate* must certify, on the basis of the procedures described in Articles 2.2.4.4. or 2.2.4.5. (as applicable), whether the place of production of the consignment is a country, *zone* or *compartment* declared free from *Marteilia refringens*.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.2.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.4.3.

Article 2.2.4.8.

Importation of live animals for aquaculture from a country, zone or compartment not declared free from *Marteilia refringens*

When importing, for *aquaculture*, *aquatic animals* of the species referred to in Article 2.2.4.2. from a country, *zone* or *compartment* not declared free from *Marteilia refringens*, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:

1. the direct delivery into and holding of the consignment in *quarantine* facilities;
2. the continuous isolation of the imported *aquatic animals* from the local environment;
3. the treatment of all effluent and waste material from the processing in a manner that ensures inactivation of *Marteilia refringens*.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.4.3.

Article 2.2.4.9.

Importation of live animals for processing for human consumption from a country, zone or compartment not declared free from *Marteilia refringens*

When importing, for processing for human consumption, *aquatic animals* of the species referred to in Article 2.2.4.2. from a country, *zone* or *compartment* not declared free from *Marteilia refringens*, the *Competent Authority* of the *importing country* should require that:

1. the consignment is delivered directly to and held in *quarantine* facilities until processing and/or consumption; and
2. all effluent and waste material from the processing are treated in a manner that ensures inactivation of *Marteilia refringens*.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.4.3.

Article 2.2.4.10.

Importation of products from a country, zone or compartment declared free from *Marteilia refringens*

When importing *aquatic animal products* of the species referred to in Article 2.2.4.2. from a country, *zone* or *compartment* declared free from *Marteilia refringens*, the *Competent Authority* of the *importing country* should require that the consignment be accompanied by an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This *certificate* must certify, on the basis of the procedures described in Articles 2.2.4.4. or 2.2.4.5. (as applicable), whether or not the place of production of the consignment is a country, *zone* or *compartment* declared free from *Marteilia refringens*.

The *certificate* should be in accordance with the Model Certificate in Appendix X.X.X. (under study).

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.4.3.

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Article 2.2.4.11.

Importation of products from a country, zone or compartment not declared free from *Marteilia refringens*

When importing *aquatic animal products* of the species referred to in Article 2.2.4.2. from a country, *zone* or *compartment* not declared free from *Marteilia refringens*, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.4.3.

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CHAPTER 2.2.5.

INFECTION WITH MIKROCYTOS MACKINI

Article 2.2.5.1.

For the purposes of the *Aquatic Code*, infection with *Mikrocytos mackini* means infection only with *Mikrocytos mackini*.

Methods for surveillance, diagnosis and confirmatory identification are provided in the *Aquatic Manual* (under study).

Article 2.2.5.2.

Scope

The recommendations in this Chapter apply to: European flat oyster (*Ostrea edulis*), Olympia oyster (*O. conchaphila*), Pacific oyster (*Crassostrea gigas*) and Eastern oyster (*C. virginica*). These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 2.2.5.3.

Commodities

1. When authorising importation or transit of the following *commodities*, *Competent Authorities* should not require any *Mikrocytos mackini* related conditions, regardless of the *Mikrocytos mackini* status of the *exporting country, zone or compartment*:
 - a) From the species referred to in Article 2.2.5.2., for any purpose:
 - i) commercially-sterile canned or other heat treated products;
 - ii) ~~gametes, eggs and~~ larvae.
 - b) The following *commodities* destined for human consumption from the species referred to in Article 2.2.5.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. smoked, salted, pickled, marinated, ~~etc.~~);
 - ii) non commercially sterile products (e.g. ready prepared meals) that have been heat treated in a manner to ensure the inactivation of the parasite;
 - iii) off the shell (chilled or frozen) packaged for direct retail trade.
 - c) All commodities from *Panope abrupta*, including the live aquatic animal.

For the *commodities* referred to in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

2. When authorising importation or transit of the *commodities* of a species referred to in Article 2.2.5.2., other than *commodities* referred to in point 1 of Article 2.2.5.3., *Competent Authorities* should require the conditions prescribed in Articles 2.2.5.7. to 2.2.5.11. relevant to the *Mikrocytos mackini* status of the *exporting country, zone or compartment*.

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3. When considering the importation or transit of any other *commodity* from bivalve species not referred to in Article 2.2.5.2. ~~nor in Article 2.2.5.3. point 1c)~~, from an *exporting country*, *zone* or *compartment* not declared free of *Mikrocytos mackini*, *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of *Mikrocytos mackini* and the potential consequences associated with importation of the *commodity*, prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 2.2.5.4.

***Mikrocytos mackini* free country**

A country may make a *self-declaration of freedom* from *Mikrocytos mackini* if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from *Mikrocytos mackini* if all the areas covered by the shared water are declared *Mikrocytos mackini* free *zones* (see Article 2.2.5.5.).

1. A country where none of the *susceptible species* is present may make a *self-declaration of freedom* from *Mikrocytos mackini* when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where any species referred to in Article 2.2.5.2. are present but there has never been any observed occurrence of the disease for at least the past 10 years despite conditions – in all areas where the species are present – that are conducive to its clinical expression, as described in Chapter 2.2.5. of the *Aquatic Manual*, may make a *self-declaration of freedom* from *Mikrocytos mackini* when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years and infection with *Mikrocytos mackini* is not known to be established in wild populations.

OR

3. A country where the last known clinical occurrence was within the past 10 years or where the infection status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter 2.2.5. of the *Aquatic Manual*, may make a *self-declaration of freedom* from *Mikrocytos mackini* when:

- a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
- b) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.5. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Mikrocytos mackini*.

OR

4. A country that has made a *self-declaration of freedom* from *Mikrocytos mackini* but in which the disease is detected may not make a *self-declaration of freedom* from *Mikrocytos mackini* again until the following conditions have been met:

- a) on detection of the disease, the affected area was declared an *infected zone* and a *buffer zone* was established; and

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- b) infected populations have been safely destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the disease, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
- c) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.5. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Mikrocytos mackini*.

In the meantime, part of the non-affected area may be declared a free *zone* provided that it meets the conditions in point 3 of Article 2.2.5.5.

Article 2.2.5.5.

***Mikrocytos mackini* free zone or free compartment**

A *zone* or *compartment* free from *Mikrocytos mackini* may be established within the *territory* of one or more countries of infected or unknown status for infection with *Mikrocytos mackini* and declared free by the *Competent Authority(ies)* of the country(ies) concerned, if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a *Mikrocytos mackini* free *zone* or *compartment* if the conditions outlined below apply to all areas of the *zone* or *compartment*.

1. In a country of unknown status for *Mikrocytos mackini*, a *zone* or *compartment* where none of the *susceptible species* is present may be declared free from *Mikrocytos mackini* when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. In a country of unknown status for *Mikrocytos mackini*, a *zone* or *compartment* where any species referred to in Article 2.2.5.2. are present but there has never been any observed occurrence of the disease for at least the past 10 years despite conditions – in all areas where the species are present – that are conducive to its clinical expression, as described in Chapter 2.2.5. of the *Aquatic Manual*, may be declared free from *Mikrocytos mackini* when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years and infection with *Mikrocytos mackini* is not known to be established in wild populations.

OR

3. A *zone* or *compartment* where the last known clinical occurrence was within the past 10 years or where the infection status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter 2.2.5. of the *Aquatic Manual*, may be declared free from *Mikrocytos mackini* when:

- a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
- b) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.5. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Mikrocytos mackini*.

OR

4. A *zone* previously declared free from *Mikrocytos mackini* but in which the disease is detected may not be declared free from *Mikrocytos mackini* again until the following conditions have been met:

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- a) on detection of the disease, the affected area was declared an *infected zone* and a *buffer zone* was established; and
- b) infected populations have been safely destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the disease, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
- c) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.5. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Mikrocytos mackini*.

Article 2.2.5.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from *Mikrocytos mackini* following the provisions of points 1 or 2 of Articles 2.2.5.4. or 2.2.5.5., as relevant, may maintain its status as *Mikrocytos mackini* free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from *Mikrocytos mackini* following the provisions of point 3 of Articles 2.2.5.4. or 2.2.5.5., as relevant, may discontinue *targeted surveillance* and maintain its status as *Mikrocytos mackini* free provided that conditions that are conducive to clinical expression of infection with *Mikrocytos mackini*, as described in Chapter 2.2.5. of the *Aquatic Manual*, exist and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of infection with *Mikrocytos mackini*, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of infection.

Article 2.2.5.7.

Importation of live animals from a country, zone or compartment declared free from *Mikrocytos mackini*

When importing live *aquatic animals* of the species referred to in Article 2.2.5.2. from a country, *zone* or *compartment* declared free from *Mikrocytos mackini*, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This *certificate* must certify, on the basis of the procedures described in Articles 2.2.5.4. or 2.2.5.5. (as applicable), whether the place of production of the consignment is a country, *zone* or *compartment* declared free from *Mikrocytos mackini*.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.2.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.5.3.

Article 2.2.5.8.

Importation of live animals for aquaculture from a country, zone or compartment not declared free from *Mikrocytos mackini*

When importing, for *aquaculture*, *aquatic animals* of the species referred to in Article 2.2.5.2. from a country, *zone* or *compartment* not declared free from *Mikrocytos mackini*, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:

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1. the direct delivery into and holding of the consignment in *quarantine* facilities;
2. the continuous isolation of the imported *aquatic animals* from the local environment;
3. the treatment of all effluent and waste material from the processing in a manner that ensures inactivation of *Mikrocytos mackini*.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.5.3.

Article 2.2.5.9.

Importation of live animals for processing for human consumption from a country, zone or compartment not declared free from *Mikrocytos mackini*

When importing, for processing for human consumption, *aquatic animals* of the species referred to in Article 2.2.5.2. from a country, *zone* or *compartment* not declared free from *Mikrocytos mackini*, the *Competent Authority* of the *importing country* should require that:

1. the consignment is delivered directly to and held in *quarantine* facilities until processing and/or consumption; and
2. all effluent and waste material from the processing are treated in a manner that ensures inactivation of *Mikrocytos mackini*.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.5.3.

Article 2.2.5.10.

Importation of products from a country, zone or compartment declared free from *Mikrocytos mackini*

When importing *aquatic animal products* of the species referred to in Article 2.2.5.2. from a country, *zone* or *compartment* declared free from *Mikrocytos mackini*, the *Competent Authority* of the *importing country* should require that the consignment be accompanied by an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This *certificate* must certify, on the basis of the procedures described in Articles 2.2.5.4. or 2.2.5.5. (as applicable), whether or not the place of production of the consignment is a country, *zone* or *compartment* declared free from *Mikrocytos mackini*.

The *certificate* should be in accordance with the Model Certificate in Appendix X.X.X. (under study).

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.5.3.

Article 2.2.5.11.

Importation of products from a country, zone or compartment not declared free from *Mikrocytos mackini*

When importing *aquatic animal products* of the species referred to in Article 2.2.5.2. from a country, *zone* or *compartment* not declared free from *Mikrocytos mackini*, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.5.3.

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CHAPTER 2.2.8.
INFECTION
WITH XENOHALIOTIS CALIFORNIENSIS

Article 2.2.8.1.

For the purposes of the *Aquatic Code*, infection with *Xenohaliotis californiensis* means infection only with *Xenohaliotis californiensis*.

Methods for surveillance, diagnosis and confirmatory identification are provided in the *Aquatic Manual*.

Article 2.2.8.2.

Scope

The recommendations in this Chapter apply to: black abalone (*Haliotis cracherodii*), white abalone (*H. sorenseni*), red abalone (*H. rufescens*), pink abalone (*H. corrugata*), green abalone (*H. fulgens*), flat abalone (*H. wallalensis*) and Japanese abalone (*H. discus-hannai*). These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 2.2.8.3.

Commodities

1. When authorising importation or transit of the following *commodities*, *Competent Authorities* should not require any *Xenohaliotis californiensis* related conditions, regardless of the *Xenohaliotis californiensis* status of the *exporting country*, *zone* or *compartment*:
 - a) From the species referred to in Article 2.2.8.2., for any purpose:
 - i) commercially-sterile canned or other heat treated products;
 - ii) gametes, eggs and larvae;
 - iii) shells.
 - b) The following *commodities* destined for human consumption from the species referred to in Article 2.2.8.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. smoked, salted, pickled, marinated, ~~etc.~~);
 - ii) non commercially sterile products (e.g. ready prepared meals) that have been heat treated in a manner to ensure the inactivation of the bacterium ~~parasite~~;
 - iii) off the shell, eviscerated abalone (chilled or frozen) packaged for direct retail trade.

For the *commodities* referred to in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

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2. When authorising importation or transit of the *commodities* of a species referred to in Article 2.2.8.2., other than *commodities* referred to in point 1 of Article 2.2.8.3., *Competent Authorities* should require the conditions prescribed in Articles 2.2.8.7. to 2.2.8.11. relevant to the *Xenobalotus californiensis* status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any other *commodity* from mollusc species not referred to in Article 2.2.8.2. (especially those of the genus *Haliotis*) from an *exporting country, zone or compartment* not declared free of *Xenobalotus californiensis*, *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of *Xenobalotus californiensis* and the potential consequences associated with importation of the *commodity*, prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 2.2.8.4.

***Xenobalotus californiensis* free country**

A country may make a *self-declaration of freedom* from *Xenobalotus californiensis* if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from *Xenobalotus californiensis* if all the areas covered by the shared water are declared *Xenobalotus californiensis* free *zones* (see Article 2.2.8.5.).

1. A country where none of the *susceptible species* is present may make a *self-declaration of freedom* from *Xenobalotus californiensis* when *basic biosecurity conditions* have been met continuously in the country for at least the past 32 years.

OR

2. A country where any species referred to in Article 2.2.8.2. are present but there has never been any observed occurrence of the disease for at least the past 10 years despite conditions – in all areas where the species are present – that are conducive to its clinical expression, as described in Chapter 2.2.8. of the *Aquatic Manual*, may make a *self-declaration of freedom* from *Xenobalotus californiensis* when *basic biosecurity conditions* have been met continuously in the country for at least the past 32 years and infection with *Xenobalotus californiensis* is not known to be established in wild populations.

OR

3. A country where the last known clinical occurrence was within the past 10 years or where the infection status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter 2.2.8. of the *Aquatic Manual*, may make a *self-declaration of freedom* from *Xenobalotus californiensis* when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 32 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.8. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Xenobalotus californiensis*.

OR

4. A country that has made a *self-declaration of freedom* from *Xenobalotus californiensis* but in which the disease is detected may not make a *self-declaration of freedom* from *Xenobalotus californiensis* again until the following conditions have been met:

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- a) on detection of the disease, the affected area was declared an *infected zone* and a *buffer zone* was established; and
- b) infected populations have been safely destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the disease, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
- c) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.8. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Xenobalotus californiensis*.

In the meantime, part of the non-affected area may be declared a free *zone* provided that it meets the conditions in point 3 of Article 2.2.8.5.

Article 2.2.8.5.

***Xenobalotus californiensis* free zone or free compartment**

A *zone* or *compartment* free from *Xenobalotus californiensis* may be established within the *territory* of one or more countries of infected or unknown status for infection with *Xenobalotus californiensis* and declared free by the *Competent Authority(ies)* of the country(ies) concerned, if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a *Xenobalotus californiensis* free *zone* or *compartment* if the conditions outlined below apply to all areas of the *zone* or *compartment*.

1. In a country of unknown status for *Xenobalotus californiensis*, a *zone* or *compartment* where none of the *susceptible species* is present may be declared free from *Xenobalotus californiensis* when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 32 years.

OR

2. In a country of unknown status for *Xenobalotus californiensis*, a *zone* or *compartment* where any species referred to in Article 2.2.8.2. are present but there has never been any observed occurrence of the disease for at least the past 10 years despite conditions – in all areas where the species are present – that are conducive to its clinical expression, as described in Chapter 2.2.8. of the *Aquatic Manual*, may be declared free from *Xenobalotus californiensis* when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 32 years and infection with *Xenobalotus californiensis* is not known to be established in wild populations.

OR

3. A *zone* or *compartment* where the last known clinical occurrence was within the past 10 years or where the infection status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter 2.2.8. of the *Aquatic Manual*, may be declared free from *Xenobalotus californiensis* when:

- a) *basic biosecurity conditions* have been met continuously for at least the past 32 years; and
- b) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.8. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Xenobalotus californiensis*.

OR

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4. A *zone* previously declared free from *Xenobalotus californiensis* but in which the disease is detected may not be declared free from *Xenobalotus californiensis* again until the following conditions have been met:
- a) on detection of the disease, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been safely destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the disease, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and 2.2.8. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *Xenobalotus californiensis*.

Article 2.2.8.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from *Xenobalotus californiensis* following the provisions of points 1 or 2 of Articles 2.2.8.4. or 2.2.8.5., as relevant, may maintain its status as *Xenobalotus californiensis* free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from *Xenobalotus californiensis* following the provisions of point 3 of Articles 2.2.8.4. or 2.2.8.5., as relevant, may discontinue *targeted surveillance* and maintain its status as *Xenobalotus californiensis* free provided that conditions that are conducive to clinical expression of infection with *Xenobalotus californiensis*, as described in Chapter 2.2.8. of the *Aquatic Manual*, exist and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of infection with *Xenobalotus californiensis*, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of infection.

Article 2.2.8.7.

Importation of live animals from a country, zone or compartment declared free from *Xenobalotus californiensis*

When importing live *aquatic animals* of the species referred to in Article 2.2.8.2. from a country, *zone* or *compartment* declared free from *Xenobalotus californiensis*, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This *certificate* must certify, on the basis of the procedures described in Articles 2.2.8.4. or 2.2.8.5. (as applicable), whether the place of production of the consignment is a country, *zone* or *compartment* declared free from *Xenobalotus californiensis*.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.2.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.8.3.

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Appendix VIII (contd)

Article 2.2.8.8.

Importation of live animals for aquaculture from a country, zone or compartment not declared free from *Xenohaliotis californiensis*

When importing, for *aquaculture*, *aquatic animals* of the species referred to in Article 2.2.8.2. from a country, *zone* or *compartment* not declared free from *Xenohaliotis californiensis*, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:

1. the direct delivery into and holding of the consignment in *quarantine* facilities;
2. the continuous isolation of the imported *aquatic animals* from the local environment;
3. the treatment of all effluent and waste material from the processing in a manner that ensures inactivation of *Xenohaliotis californiensis*.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.8.3.

Article 2.2.8.9.

Importation of live animals for processing for human consumption from a country, zone or compartment not declared free from *Xenohaliotis californiensis*

When importing, for processing for human consumption, *aquatic animals* of the species referred to in Article 2.2.8.2. from a country, *zone* or *compartment* not declared free from *Xenohaliotis californiensis*, the *Competent Authority* of the *importing country* should require that:

1. the consignment is delivered directly to and held in *quarantine* facilities until processing and/or consumption; and
2. all effluent and waste material from the processing are treated in a manner that ensures inactivation of *Xenohaliotis californiensis*.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.8.3.

Article 2.2.8.10.

Importation of products from a country, zone or compartment declared free from *Xenohaliotis californiensis*

When importing *aquatic animal products* of the species referred to in Article 2.2.8.2. from a country, *zone* or *compartment* declared free from *Xenohaliotis californiensis*, the *Competent Authority* of the *importing country* should require that the consignment be accompanied by an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country*.

This *certificate* must certify, on the basis of the procedures described in Articles 2.2.8.4. or 2.2.8.5. (as applicable), whether or not the place of production of the consignment is a country, *zone* or *compartment* declared free from *Xenohaliotis californiensis*.

The *certificate* should be in accordance with the Model Certificate in Appendix X.X.X. (under study).

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.8.3.

Appendix XXXIII (contd)

Appendix VIII (contd)

Article 2.2.8.11.

Importation of products from a country, zone or compartment not declared free from *Xenohaliotis californiensis*

When importing *aquatic animal products* of the species referred to in Article 2.2.8.2. from a country, *zone* or *compartment* not declared free from *Xenohaliotis californiensis*, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* referred to in point 1 of Article 2.2.8.3.

— text deleted

Rationale for recommending the different timeframes used in Articles 4. and 5. of the mollusc disease chapters

DISEASE	RATIONALE	TIMEFRAME FOR BASIC BIOSECURITY CONDITIONS
Infection with <i>Bonamia ostreae</i>	presumptive diagnosis: easy critical environmental parameters: temperature clinical signs: present	2
Infection with <i>Bonamia exitiosa</i>	presumptive diagnosis: easy in <i>Ostrea chilensis</i> and difficult in <i>O. angasi</i> critical environmental parameters: temperature clinical signs: absent in <i>O. chilensis</i> and present in <i>O. angasi</i>	2
Infection with <i>Haplosporidium nelsoni</i>	presumptive diagnosis: easy critical environmental parameters: temperature and salinity clinical signs: absent but with high mortality	2
Infection with <i>Marteilia refringens</i>	presumptive diagnosis: easy critical environmental parameters: temperature and salinity clinical signs: absent	3
Infection with <i>Mikrocytos mackini</i>	presumptive diagnosis: easy critical environmental parameters: temperature clinical signs: present	2
Infection with <i>Perkinsus marinus</i>	presumptive diagnosis: easy critical environmental parameters: temperature and salinity (cryptic stages present below 12 parts per thousand) clinical signs: absent	3
Infection with <i>Perkinsus olseni</i>	presumptive diagnosis: easy critical environmental parameters: temperature and salinity clinical signs: present in venerid clams	3
Infection with <i>Xenohalictis californiensis</i>	presumptive diagnosis: easy critical environmental parameters: temperature (threshold 17°C) clinical signs: variable	3

Rationale for the commodities listed in Article 3. of the mollusc disease chapters

DISEASE	COMMODITY	RATIONALE
Infection with <i>Bonamia ostreae</i>	1a) larvae	Disease is caused by a protistan parasite which cannot infect mollusc gametes, eggs and larvae. The earliest detections of <i>Bonamia ostreae</i> are in 6-month-old oysters. However, hatchery procedures cannot avoid contamination of water containing gametes and eggs by presence of the pathogen. Water used for transport of larvae is separated from the water containing gametes and is treated to avoid contamination. [*Lynch <i>et al.</i> (2005). <i>Journal of Shellfish Research</i> , 24 , 664.] [*Tigé. (1982). <i>Science et Pêche</i> , 328 , 3-13.]
	1b) off the shell (chilled or frozen) packaged for direct retail trade	The meat is potentially infectious material, but if destined for immediate human consumption it is considered safe. No alternative usage (e.g. baits or feed) is known.
	1b) half-shell (chilled)	The meat is potentially infectious material, but if destined for immediate human consumption it is considered safe. No alternative usage (e.g. baits or feed) is known. The shell (and the residual part of the adductor muscle) is unlikely to transmit the pathogen.
	1c) All commodities from <i>Crassostrea gigas</i> , <i>C. virginica</i> , <i>Ruditapes decussatus</i> , <i>R. philippinarum</i> , <i>Mytilus galloprovincialis</i> and <i>M. edulis</i> , including the live aquatic animal.	[*Culloty <i>et al.</i> (1999). <i>DAO</i> , 37 , 73-80.] [*Renault <i>et al.</i> (1995). <i>Bulletin of the EAFP</i> , 15 , 78-80 for <i>C. virginica</i> , unpublished surveillance data, Maine, USA.]
Infection with <i>Bonamia exitiosa</i>	1a) larvae	Disease is caused by a protistan parasite which cannot infect mollusc gametes, eggs and larvae. No cases of infection have been reported in oyster spat. However, hatchery procedures cannot avoid contamination of water containing gametes and eggs by presence of the pathogen. Water used for transport of larvae is separated from the water containing gametes and is treated to avoid contamination.
	1b) off the shell (chilled or frozen) packaged for direct retail trade	The meat is potentially infectious material, but if destined for immediate human consumption it is considered safe. No alternative usage (e.g. baits or feed) is known.
	1b) half-shell (chilled)	The meat is potentially infectious material, but if destined for immediate human consumption it is considered safe. No alternative usage (e.g. baits or feed) is known. The shell (and the residual part of the adductor muscle) is unlikely to transmit the pathogen. 50% of survival after 2 days outside the host. [*Cranfield <i>et al.</i> (2005). <i>ICES Journal of Marine Sciences</i> , 62 , 3-13.]

Appendix XXXIII (contd)

Appendix X (contd)

Infection with <i>Bonamia exitiosa</i> (contd)	1c) All commodities from <i>Crassostrea gigas</i> and <i>Saccostrea glomerata</i> , including the live aquatic animal	There are reported cases where these species have been living with infected susceptible species without evidence of infection despite active surveillance. [*Hine and Thorne. (2000). DAO, 40 , 67-78.]
Infection with <i>Haplosporidium nelsoni</i>	1a) larvae	Disease is caused by a protistan parasite which cannot infect mollusc gametes, eggs and larvae. However, hatchery procedures cannot avoid contamination of water containing gametes and eggs by presence of the pathogen. Water used for transport of larvae is separated from the water containing gametes and is treated to avoid contamination. Horizontal direct transmission has been tested unsuccessfully. [*Haskin and Andrews. (1988). AFS special publication, 18 , 5-22.]
	1b) off the shell (chilled or frozen) packaged for direct retail trade	The meat is potentially infectious material, but if destined for immediate human consumption it is considered safe. No alternative usage (e.g. baits or feed) is known.
	1b) half-shell (chilled)	The meat is potentially infectious material, but if destined for immediate human consumption it is considered safe. No alternative usage (e.g. baits or feed) is known. The shell (and the residual part of the adductor muscle) is unlikely to transmit the pathogen.
	1c) All commodities from <i>Crassostrea ariakensis</i> , including the live aquatic animal	There are reported cases where these species have been living with infected susceptible species without evidence of infection despite active surveillance. [*Calvo <i>et al.</i> (2001). <i>Journal of Shellfish Research</i> , 20 , 221-229.]
Infection with <i>Marteilia refringens</i>	1a) larvae	Disease is caused by a protistan parasite which cannot infect mollusc gametes, eggs and larvae. However, hatchery procedures cannot avoid contamination of water containing gametes and eggs by presence of the pathogen. Water used for transport of larvae is separated from the water containing gametes and is treated to avoid contamination. Horizontal direct transmission has been tested unsuccessfully. [*Berthe <i>et al.</i> (1998). DAO, 44 , 135-144.]
	1b) off the shell (chilled or frozen) packaged for direct retail trade	The meat is potentially infectious material, but if destined for immediate human consumption it is considered safe. No alternative usage (e.g. baits or feed) is known.
	1b) half-shell (chilled)	The meat is potentially infectious material, but if destined for immediate human consumption it is considered safe. No alternative usage (e.g. baits or feed) is known. The shell (and the residual part of the adductor muscle) is unlikely to transmit the pathogen. The infection is restricted to the gills and digestive epithelia.

Appendix XXXIII (contd)

Appendix X (contd)

Infection with <i>Marteilia refringens</i> (contd)	1c) All commodities from <i>Crassostrea gigas</i> , including the live aquatic animal	There are reported cases where these species have been living with infected susceptible species without evidence of infection despite active surveillance. Reports of <i>Marteilia refringens</i> in <i>Crassostrea gigas</i> are restricted to plasmodia primordia in the upper digestive tract with no sign of sporulation. [*Cahour. (1979). <i>Mar. Fish. Rev.</i> , 41 (1-2), 19-20.]
Infection with <i>Mikrocytos mackini</i>	1a) larvae	Disease is caused by a protistan parasite which cannot infect mollusc gametes, eggs and larvae. However, hatchery procedures cannot avoid contamination of water containing gametes and eggs by presence of the pathogen. Water used for transport of larvae is separated from the water containing gametes and is treated to avoid contamination.
	1b) off the shell (chilled or frozen) packaged for direct retail trade	The meat is potentially infectious material, but if destined for immediate human consumption it is considered safe. No alternative usage (e.g. baits or feed) is known. Shell poses a risk because of remanent adductor muscle which is a site of infection.
	1c) All commodities from <i>Panope abrupta</i> , including the live aquatic animal	[*Bower <i>et al.</i> (2005). <i>JIP</i> , 88 , 95-99.]
Infection with <i>Perkinsus marinus</i>		This protistan parasite has free living stages (all infective) and is resistant to a range of salinities, chemical treatments and temperatures [*Bushek <i>et al.</i> (1997). <i>Journal of Shellfish Research</i> , 16 , 3-30.] [*Bushek and Howell. (2000). The effect of UV irradiation on <i>Perkinsus marinus</i> and in potential use to reduce transmission via shellfish effluents. NRAC, N.8.]. Direct transmission of the parasite has been reported. [*Burreson and Calvo. (1996). <i>Journal of Shellfish Research</i> , 15 , 17-34.]
Infection with <i>Perkinsus olseni</i>		This protistan parasite has free living stages (all infective) and is resistant to a range of salinities, chemical treatments and temperatures. [*Goggin <i>et al.</i> (1990). <i>Journal of Shellfish Research</i> , 9 (1), 145-148.] Direct transmission of the parasite has been reported. [Goggin and Lester. (1995). <i>Australian Journal of Marine and Fresh Water Research</i> , 46 , 639-646.] Very non-host-specific: Infects both bivalves and gastropods. [*Goggin <i>et al.</i> (1989). <i>DAO</i> , 7 , 55-59.]
Infection with <i>Xenohalotis californiensis</i>	1a) gametes, eggs and larvae	Obligate intracellular parasite of the gut epithelium. Early stages of abalone do not feed nor do they have an open digestive tract. In addition, natural spawning is used in hatcheries to collect gametes.
	1a) shells	Shells are an internationally traded commodity. The pathogenic agent is confined to the epithelial tissue of the gut. Shells are therefore not regarded as a risk.

Appendix XXXIII (contd)

Appendix X (contd)

Infection with <i>Xenohalotis californiensis</i> (contd)	1b) off the shell eviscerated abalone (chilled or frozen) packaged for direct retail trade	The pathogenic agent is confined to the epithelial tissue of the gut, which is removed during processing.
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CHAPTER 1.5.1.

RECOMMENDATIONS FOR TRANSPORT

Article 1.5.1.1.

General arrangements

1. These arrangements should be compulsory in all countries either by legislative or regulatory texts and methods of application should be described in a manual available to all concerned.
2. *Vehicles (or containers)* used for the *transport* of *aquatic animals* shall be designed, constructed and fitted in such a way as to withstand the weight of the *aquatic animals* and water and to ensure their safety and welfare during *transportation*. *Vehicles* shall be thoroughly cleansed and disinfected before use according to the guidelines given in the *Aquatic Code*.
3. *Vehicles (or containers)* in which *aquatic animals* are confined during *transport* by sea or by air shall be secured to maintain optimal conditions for the *aquatic animals* during *transport*, and to allow easy access by the attendant.

Article 1.5.1.2.

Particular arrangements for containers

1. The construction of *containers* intended for *transportation* of *aquatic animals* shall be such that the release of water, etc., is prevented during *transport*.
2. In the case of the *transportation* of *aquatic animals*, provision shall be made to enable preliminary observation of the contents of *containers*.
3. *Containers* in transit in which there are *aquatic animal products* shall not be opened unless the *Competent Authorities* of the *transit country* consider it necessary. If this is the case, *containers* shall be subject to precautions taken to avoid any *risk* of contamination.
4. *Containers* shall be loaded only with one kind of product or, at least, with products not susceptible to contamination by one another.
5. It rests with each country to decide on the facilities it requires for the *transport* and importation of *aquatic animals* and *aquatic animal products* in *containers*.

Article 1.5.1.3.

Particular arrangements for the transport of aquatic animals by air

1. The stocking densities for the *transport* of *aquatic animals* in aircraft or *containers* should be determined by taking the following into consideration:
 - a) the total cubic metres of available space for each type of *aquatic animal*;
 - b) the oxygenation capacity of the equipment attached to the aircraft and *containers* while on the ground and during all stages of the flight.

Appendix XXXIII (contd)Appendix XI (contd)

With regard to fish, molluscs and crustaceans, the space reserved for each aquatic animal species in the aircraft or *containers* that have been fitted for the separate *transportation* of several *aquatic animals* or for the *transportation* of groups of *aquatic animals* should comply with acceptable densities specified for the species in question.

2. The International Air Transport Association (IATA) Regulations for live animals (which are approved by the OIE) may be adopted if they do not conflict with national legislative arrangements. (Copies of these Regulations are obtainable from the International Air Transport Association, 800 Place Victoria, P.O. Box 113, Montreal, Quebec H4Z 1M1, Canada.)

Article 1.5.1.4.

Disinfection and other sanitary measures

1. *Disinfection* and all zoo-sanitary work should be carried out in order to:
 - a) avoid all unjustified inconvenience and to prevent damage or injury to the health of people and *aquatic animals*;
 - b) avoid damage to the structure of the *vehicle* or its appliances;
 - c) prevent, as far as possible, any damage to *aquatic animal products*, fish *eggs* as well as mollusc and crustacean larvae.
2. On request, the *Competent Authority* shall issue the transporters with a certificate indicating the measures that have been applied to all *vehicles*, the parts of the *vehicle* that have been treated, the methods used and the reasons that led to the application of the measures.

In the case of aircraft, the certificate may be replaced, on request, by an entry in the General Declaration of the aircraft.

3. Likewise, the *Competent Authority* shall issue on request:
 - a) a certificate showing the date of arrival and departure of the *aquatic animals*;
 - b) a certificate to the shipper or exporter, the consignee and transporter or their representatives, indicating the measures applied.

Article 1.5.1.5.

Transportation water

Water to be used for transportation of aquatic animals should be appropriately treated in order to minimise the risk of transferring pathogens. The specific recommendations are provided in the Chapter on "Disinfection" of the Aquatic Code.

Appendix XXXIII (contd)

Appendix XI (contd)

Article 1.5.1.56.

Treatment of transportation water

During *transportation* of *aquatic animals*, the transporter should not be permitted to evacuate and replace the water in the *transport* tanks except on specifically designated sites in the national *territory*. The waste and rinsing water should not be emptied into a drainage system that is directly connected to an aquatic environment where *aquatic animals* are present. The water from the tanks should therefore either be disinfected by a recognised process (for example, 50 mg iodine or chlorine/litre for one hour), or sprayed over land that does not drain into waters containing *aquatic animals*. Each country shall designate the sites in their national *territories* where these operations can be carried out.

Article 1.5.1.67.

Discharge of infected material

The *Competent Authority* shall take all practical measures to prevent the discharge of any infective material into internal or territorial waters.

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October 2006

**REPORT OF THE MEETING OF THE OIE AD HOC GROUP ON THE
CHAPTERS FOR CRUSTACEAN DISEASES FOR THE OIE AQUATIC ANIMAL HEALTH CODE**

Bergen (Norway) - 9, 13 and 14 October 2006

The OIE *ad hoc* Group on Chapters for Crustacean Diseases for the OIE *Aquatic Animal Health Code* (hereafter referred to as the *ad hoc* Group) met in Bergen (Norway) on 9, 13 and 14 October 2006.

On behalf of Dr Bernard Vallat, Director General of the OIE, Dr Francesco Berlingieri, Deputy Head of the International Trade Department, welcomed the members of the *ad hoc* Group and thanked them for their willingness to be involved in addressing this important work of the OIE.

The members of the OIE *ad hoc* Group are listed in [Appendix I](#) and the Agenda adopted is given in [Appendix II](#).

Member Countries' comments on draft chapters on crustacean diseases

The *ad hoc* Group addressed the comments received from Member Countries on draft chapters on crustacean diseases. The revised chapters were amended as shown at [Appendices III to XIV](#). The text is presented as clean text using as a basis the text presented to Member Countries in the March 2006 report of the Aquatic Animal Health Standards Commission (hereafter referred to as the Aquatic Animals Commission); the modifications introduced in this meeting are shown as double underlined text, with deleted text in ~~strikeout~~.

The *ad hoc* Group provided additional explanation to the following Member Countries' comments:

1. New Zealand

- a) New Zealand questioned if targeted surveillance should also be carried out on wild crustaceans in the vicinity of a farm site as opposed to only farmed animals. The *ad hoc* Group noted that surveillance on wild crustacean populations should be considered in the context of the intended use of the resulting information (e.g. if the surveillance data is intended to support a disease freedom claim for a compartment, zone or country). Hence, sampling on wild populations in surveillance programme is appropriate for declaring a free country while it might not be necessary for a compartment where biosecurity measures may exclude wild crustaceans. Reference should be made to the existing Chapter 1.1.4. on Requirement for Surveillance for International Recognition of Freedom from Infection (the revision is in progress).
- b) On the need for continued maintenance of surveillance after the declaration of a free country, the *ad hoc* Group felt that Article 6 on maintenance of free status provides details on this issue.

Appendix XXXIV (contd)

- c) The *ad hoc* Group clarified that point 4a in Article 4 refers to *buffer zone* as currently defined in the OIE *Aquatic Animal Health Code* (hereafter referred to as the *Aquatic Code*). The requirement for targeted surveillance is included in point 4c.
- d) On the question on whether the development of a corresponding *Manual of Diagnostic Tests for Aquatic Animals* (hereafter referred to as the *Aquatic Manual*) chapter for infectious myonecrosis would be developed by the time the *Aquatic Code* Chapter is adopted. The *ad hoc* Group referred to the Aquatic Animals Commission recommendation to use the disease cards (following the format used by NACA) for Member Country reporting purposes until a chapter on the disease is adopted and included in the *Aquatic Manual*. This would apply to any newly listed disease.

2. Australia

- a) Australia and New Zealand commented that in Article 3, point 1b-ii and point 1a-iv are redundant. The *ad hoc* Group agreed and removed point 1b-ii from all relevant chapters. The *ad hoc* Group agrees with Australia on the fact that there may be other means of cooking (other than boiling) that could be included in this point and encourages Australian experts to provide detailed recommendation on what additional methods should be included.
- b) The *ad hoc* Group clarified that point 3 in Article 3 refers to all commodities from any species not referred to in Article 2. It amended the article to clarify the issue.
- c) The *ad hoc* Group believes that the definition of yellow head disease, as represented in Article 4.1.3.1., does include gill-associated virus, but agreed with the difficulty on differentiation between yellow head disease virus and gill-associated virus. It suggested that any proposal on this be postponed until further clarification on the subject of viral strains differentiation becomes available. The *ad hoc* Group noted that the forthcoming International Conference of OIE Reference Laboratories and Collaborating Centres, where the issue will be a topic of a special workshop, may provide a forum to discuss and initiate resolutions leading to a workable solution to current problems with aquatic animal disease issues relating to disease agents with multiple virulent and avirulent strains.

3. European Community

- a) The *ad hoc* Group acknowledged the concerns raised on the list of safe commodities and on the time periods in the chapter on crayfish plague. The Group suggested the author of the corresponding *Aquatic Manual* Chapter be consulted and asked to provide guidance on the commodities listed in Article 4.1.7.3. The *ad hoc* Group would welcome any suggestions on the time periods and any rationale.
- b) The EC commented that, because there are no methods validated for the purpose of screening populations for the presence of *A. astaci*, compliance with Articles 4.1.7.4., 4.1.7.5. and 4.1.7.6. is not possible. The *ad hoc* Group notes that methods for screening populations are described in the *Aquatic Manual*, but agrees that these are not yet validated. However, the *ad hoc* Group pointed out that very few methods in the *Aquatic Manual* for screening populations have been validated. Nonetheless, the methods, which still need to be validated, are provided in the *Aquatic Manual* for reasons of generally recognised reliability, sensitivity, specificity and utility.

The *ad hoc* Group noted several European Community comments on Article 3 that referred to the fish and mollusc disease chapters. The *ad hoc* Group suggested the Aquatic Animals Commission addresses these comments with a consistent approach throughout the *Aquatic Code* disease chapters.

Appendix XXXIV (contd)

In relation to New Zealand's comment, the *ad hoc* Group recognised the need to draw this concern to the Aquatic Animals Commission because of its relevance to all disease chapters. Specifically, the requirement in point 4b of both Articles 4 and 5 requiring "infected populations have been destroyed or removed from the infected zone" may not be feasible when wild populations in the zone are considered. An outcome based approach through targeted surveillance is addressed by point 4c.

The *ad hoc* Group welcomed the constructive comment from the European Community on a proposed additional point for regaining the free status for a compartment. The *ad hoc* Group recommended that this issue be addressed by the Aquatic Animals Commission with a horizontal approach. The *ad hoc* Group acknowledged that the development of this concept is ongoing and recommended that point 4 be made applicable to compartments. This modification is included in the revised chapters.

The *ad hoc* Group harmonised the name of the susceptible species present in the scope of the disease chapters accordingly to the indication of the Aquatic Animals Commission to use the FAO taxonomic guide (Holthuis, L.B. 1980. FAO Species Catalog. Vol. 1 - Shrimp and Prawns of the World. FAO Fisheries Synopsis No. 125, FAO, Rome. 271 p.).

Considering the proposed listing of white tail disease, hepatopancreatic parvovirus disease and Mourilyan virus disease, the *ad hoc* Group drafted the corresponding *Aquatic Code* Chapters (see Appendices XII to XIV) for the Aquatic Animals Commission's consideration.

.../Appendices

**MEETING OF THE
OIE AD HOC GROUP ON CHAPTERS FOR CRUSTACEAN DISEASES
FOR THE OIE AQUATIC ANIMAL HEALTH CODE**

Bergen (Norway) - 9, 13 and 14 October 2006

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**MEETING OF THE
OIE AD HOC GROUP ON CHAPTERS FOR CRUSTACEAN DISEASES
FOR THE OIE AQUATIC ANIMAL HEALTH CODE**

Bergen (Norway) - 9, 13 and 14 October 2006

Adopted Agenda

1. Adoption of the Agenda
2. Aquatic Animal Health Code
 - a. Address Member Countries' comments on the revised chapters on crustacean diseases
3. Other business

CHAPTER 4.1.1.

TAURA SYNDROME

Article 4.1.1.1.

For the purposes of the *Aquatic Code*, Taura syndrome (TS) means *infection* with Taura syndrome virus (TSV). *Taura syndrome virus* is classified as a species in the family *Dicistroviridae*. Common synonyms are listed in Chapter 4.1.1. of the *Aquatic Manual*.

Methods for surveillance and diagnosis are provided in the *Aquatic Manual*.

Article 4.1.1.2.

Scope

The recommendations in this Chapter apply to: Pacific white shrimp or whiteleg shrimp (*Penaeus vannamei*), blue shrimp (*P. stylirostris*), northern white shrimp (*P. setiferus*), southern white shrimp (*P. schmitti*), greasyback prawn (*Metapenaeus ensis*) and giant tiger prawn (*P. monodon*). These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 4.1.1.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* of the *importing country* should not require any TS related conditions, regardless of the TS status of the *exporting country*, *zone* or *compartment*.
 - a) For the species referred to in Article 4.1.1.2. for any purpose:
 - i) commercially sterile canned products;
 - ii) boiled products (e.g. boiled whole shrimp or tails, lobsters, crabs);
 - iii) extracted chitin;
 - iv) crustacean meals or by-products made non-infectious by heating or drying (e.g. flame dried or sun dried);
 - v) crustacean products made non-infectious through processing as dry feeds (e.g. pelleted or extruded feeds);
 - vi) biological samples preserved for diagnostic applications in such a manner as to inactivate the TSV (e.g. formalin or alcohol preserved samples).
 - b) The following products destined for human consumption from species referred to in Article 4.1.1.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. salted, pickled, marinated, pastes, etc.);

Appendix XXXIV (contd)Appendix III (contd)

- ii) products that have been heat treated or dried (e.g. ready prepared meals) in a manner to ensure inactivation of the pathogen.

For the *commodities* listed in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

2. When authorising the importation or transit of the *commodities* of a species referred to in Article 4.1.1.2., other than those listed in point 1 of Article 4.1.1.3., the *Competent Authorities* of the *importing country* should require the conditions prescribed in Articles 4.1.1.7. to 4.1.1.11. relevant to the TS status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any ~~other~~ *commodity* of a species not referred to in Article 4.1.1.2. but which could reasonably be expected to be a potential TSV carrier from an *exporting country, zone or compartment* not declared free of TS, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of TSV, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 4.1.1.4.

Taura syndrome free country

A country may make a *self-declaration of freedom* from TS if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from TS if all the areas covered by the shared water are declared TS free countries or zones (see Article 4.1.1.5.).

1. A country where none of the *susceptible species* referred to in Article 4.1.1.2. is present may make a *self-declaration of freedom* from TS when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where the species referred to in Article 4.1.1.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from TS when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

3. A country where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from TS when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the last 2 years without detection of TSV.

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OR

4. A country that has previously made a *self-declaration of freedom* from TS but in which the *disease* is subsequently detected may not make a *self-declaration of freedom* from TS again until the following conditions have been met:
- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of TSV.

In the meantime, part of the non-affected area may be declared a free *zone* provided that they meet the conditions in point 3 of Article 4.1.1.5.

Article 4.1.1.5.

Taura syndrome free zone or free compartment

A *zone* or *compartment* within the *territory* of one or more countries not declared free from TS may be declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a TS free *zone* or *compartment* if all the relevant *Competent Authorities* confirm that the conditions have been met.

1. A *zone* or *compartment* where none of the *susceptible species* referred to in Article 4.1.1.2. is present may be declared free from TS when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. A *zone* or *compartment* where the species referred to in Article 4.1.1.2. are present but in which there has not been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from TS when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

3. A *zone* or *compartment* where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from TS when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place, through the *zone* or *compartment*, for at least the past 2 years without detection of TSV.

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OR

4. A *zone* previously declared free from TS but in which the *disease* is detected may not be declared free from TS again until the following conditions have been met:
- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of TSV.

Article 4.1.1.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from TS following the provisions of points 1 or 2 of Articles 4.1.1.4. or 4.1.1.5. (as relevant) may maintain its status as TS free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from TS following the provisions of point 3 of Articles 4.1.1.4. or 4.1.1.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as TS free provided that conditions that are conducive to clinical expression of TS, as described in Chapter X.X.X. of the *Aquatic Manual*, exist, and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of TS, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 4.1.1.7.

Importation of live aquatic animals from a country, zone or compartment declared free from Taura syndrome

When importing live *aquatic animals* of species referred to in Article 4.1.1.2. from a country, *zone* or *compartment* declared free from TS, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.1.4. or 4.1.1.5. (as applicable), the place of production of the *commodity* ~~consignment~~ is a country, *zone* or *compartment* declared free from TS.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.3.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.1.3.

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Article 4.1.1.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from Taura syndrome

1. When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 4.1.1.2. from a country, *zone* or *compartment* not declared free from TS, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:
 - a) the direct delivery into and holding of the consignment in *quarantine* facilities;
 - b) the continuous isolation of the imported live *aquatic animals* and their first generation progeny from the local environment;
 - c) the treatment of all effluent and waste materials from the processing in a manner that ensures inactivation of TSV.
2. If the intention of the introduction is the establishment of new genetic lines, international standards, such as the Guidelines of the International Council for the Exploration of the Seas (ICES), should be followed.
3. For the purposes of the *Aquatic Code*, the ICES Guidelines may be summarised to the following main points:
 - a) identify stock of interest (cultured or wild) in its current location;
 - b) evaluate stock's health/*disease* history;
 - c) take and test samples for TSV, pests and general health/*disease* status;
 - d) import and quarantine in a secure facility a founder (F-0) population;
 - e) produce F-1 generation from the F-0 stock in *quarantine*;
 - f) culture F-1 stock and at critical times in its development (life cycle) sample and test for TSV and perform general examinations for pests and general health/*disease* status;
 - g) if TSV is not detected, pests are not present, and the general health/*disease* status of the stock is considered to meet the *basic biosecurity conditions* of the *importing country*, *zone* or *compartment*, the F-1 stock may be defined as TS free or specific pathogen free (SPF) for TSV;
 - h) release SPF F-1 stock from *quarantine* for *aquaculture* or stocking purposes in the country, *zone* or *compartment*.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.1.3.

Article 4.1.1.9.

Importation of live aquatic animals for human consumption from a country, zone or compartment not declared free from Taura syndrome

When importing, for human consumption, live *aquatic animals* of species referred to in Article 4.1.1.2. from a country, *zone* or *compartment* not declared free from TS, the *Competent Authority* of the *importing country* should require that:

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1. the consignment be delivered directly to and held in isolation until consumption; and
3. all effluent, dead *aquatic animals* and waste materials from the processing be treated in a manner that ensures inactivation of TSV.

Member Countries should consider introducing internal measures to prevent such *commodities* being used for any purpose other than for human consumption.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.1.3.

Article 4.1.1.10.

Importation of aquatic animal products from a country, zone or compartment declared free from Taura syndrome

When importing *aquatic animal products* of species referred to in Article 4.1.1.2. from a country, *zone* or *compartment* declared free from TS, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.1.4. or 4.1.1.5. (as applicable), the place of production of the consignment is a country, *zone* or *compartment* declared free from TS.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.2.2.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.1.3.

Article 4.1.1.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from Taura syndrome

When importing *aquatic animal products* of species referred to in Article 4.1.1.2. from a country, *zone* or *compartment* not declared free from TS, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.1.3.

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CHAPTER 4.1.2.

WHITE SPOT DISEASE

Article 4.1.2.1.

For the purposes of the *Aquatic Code*, white spot disease (WSD) means *infection* with white spot syndrome virus (WSSV). *White spot syndrome virus 1* is classified as a species in the genus *Whispovirus* of the family *Nimaviridae*. Common synonyms are listed in Chapter 4.1.2. of the *Aquatic Manual*.

Methods for surveillance and diagnosis are provided in the *Aquatic Manual*.

Article 4.1.2.2.

Scope

The recommendations in this Chapter apply to all decapod (order *Decapoda*) crustaceans from marine, brackish and freshwater sources. These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 4.1.2.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* of the *importing country* should not require any WSD related conditions, regardless of the WSD status of the *exporting country*, *zone* or *compartment*.
 - a) For the species referred to in Article 4.1.2.2. for any purpose:
 - i) commercially sterile canned products;
 - ii) boiled products (e.g. boiled whole shrimp or tails, lobsters, crabs);
 - iii) chemically extracted chitin;
 - iv) crustacean meals or by-products made non-infectious by heating or drying (e.g. flame dried or sun dried);
 - v) crustacean products made non-infectious through processing as dry feeds (e.g. pelleted or extruded feeds);
 - vi) biological samples preserved for diagnostic applications in such a manner as to inactivate the WSSV (e.g. formalin or alcohol preserved samples).
 - b) The following products destined for human consumption from species referred to in Article 4.1.2.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. salted, pickled, marinated, pastes, etc.);

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- ii) ~~products that have been heat treated or dried (e.g. ready prepared meals) in a manner to ensure the inactivation of the pathogen.~~

For the *commodities* listed in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

2. When authorising the importation or transit of the *commodities* of a species referred to in Article 4.1.2.2., other than those listed in point 1 of Article 4.1.2.3., the *Competent Authorities* of the *importing country* should require the conditions prescribed in Articles 4.1.2.7. to 4.1.2.11. relevant to the WSD status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any ~~other~~ *commodity* of a species not referred to in Article 4.1.2.2. but which could reasonably be expected to be a potential WSSV carrier from an *exporting country, zone or compartment* not declared free of WSD, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of WSSV, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 4.1.2.4.

White spot disease free country

A country may make a *self-declaration of freedom* from WSD if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from WSD if all the areas covered by the shared water are declared WSD free countries or zones (see Article 4.1.2.5.).

1. A country where none of the *susceptible species* referred to in Article 4.1.2.2. is present may make a *self-declaration of freedom* from WSD when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where the species referred to in Article 4.1.2.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from WSD when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

3. A country where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from WSD when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the last 2 years without detection of WSSV.

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OR

4. A country that has previously made a *self-declaration of freedom* from WSD but in which the *disease* is subsequently detected may not make a *self-declaration of freedom* from WSD again until the following conditions have been met:
- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of WSSV.

In the meantime, part of the non-affected area may be declared a free *zone* provided that they meet the conditions in point 3 of Article 4.1.2.5.

Article 4.1.2.5.

White spot disease free zone or free compartment

A *zone* or *compartment* within the *territory* of one or more countries not declared free from WSD may be declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a WSD free *zone* or *compartment* if all the relevant *Competent Authorities* confirm that the conditions have been met.

1. A *zone* or *compartment* where none of the *susceptible species* referred to in Article 4.1.2.2. is present may be declared free from WSD when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. A *zone* or *compartment* where the species referred to in Article 4.1.2.2. are present but in which there has not been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from WSD when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

3. A *zone* or *compartment* where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from WSD when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place, through the *zone* or *compartment*, for at least the past 2 years without detection of WSSV.

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OR

4. A *zone* previously declared free from WSD but in which the *disease* is detected may not be declared free from WSD again until the following conditions have been met:
- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of WSSV.

Article 4.1.2.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from WSD following the provisions of points 1 or 2 of Articles 4.1.2.4. or 4.1.2.5. (as relevant) may maintain its status as WSD free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from WSD following the provisions of point 3 of Articles 4.1.2.4. or 4.1.2.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as WSD free provided that conditions that are conducive to clinical expression of WSD, as described in Chapter X.X.X. of the *Aquatic Manual*, exist, and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of WSD, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 4.1.2.7.

Importation of live aquatic animals from a country, zone or compartment declared free from white spot disease

When importing live *aquatic animals* of species referred to in Article 4.1.2.2. from a country, *zone* or *compartment* declared free from WSD, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.2.4. or 4.1.2.5. (as applicable), the place of production of the commodity ~~consignment~~ is a country, *zone* or *compartment* declared free from WSD.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.3.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.2.3.

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Article 4.1.2.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from white spot disease

1. When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 4.1.2.2. from a country, *zone* or *compartment* not declared free from WSD, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:
 - a) the direct delivery into and holding of the consignment in *quarantine* facilities;
 - b) the continuous isolation of the imported live *aquatic animals* and their first generation progeny from the local environment;
 - c) the treatment of all effluent and waste materials from the processing in a manner that ensures inactivation of WSSV.
2. If the intention of the introduction is the establishment of new genetic lines, international standards, such as the Guidelines of the International Council for the Exploration of the Seas (ICES), should be followed.
3. For the purposes of the *Aquatic Code*, the ICES Guidelines may be summarised to the following main points:
 - a) identify stock of interest (cultured or wild) in its current location;
 - b) evaluate stock's health/*disease* history;
 - c) take and test samples for WSSV, pests and general health/*disease* status;
 - d) import and quarantine in a secure facility a founder (F-0) population;
 - e) produce F-1 generation from the F-0 stock in *quarantine*;
 - f) culture F-1 stock and at critical times in its development (life cycle) sample and test for WSSV and perform general examinations for pests and general health/*disease* status;
 - g) if WSSV is not detected, pests are not present, and the general health/*disease* status of the stock is considered to meet the *basic biosecurity conditions* of the *importing country*, *zone* or *compartment*, the F-1 stock may be defined as WSD free or specific pathogen free (SPF) for WSSV;
 - h) release SPF F-1 stock from *quarantine* for *aquaculture* or stocking purposes in the country, *zone* or *compartment*.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.2.3.

Article 4.1.2.9.

Importation of live aquatic animals for human consumption from a country, zone or compartment not declared free from white spot disease

When importing, for human consumption, live *aquatic animals* of species referred to in Article 4.1.2.2. from a country, *zone* or *compartment* not declared free from WSD, the *Competent Authority* of the *importing country* should require that:

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1. the consignment be delivered directly to and held in isolation until consumption; and
2. all effluent, dead *aquatic animals* and waste materials from the processing be treated in a manner that ensures inactivation of WSSV.

Member Countries should consider introducing internal measures to prevent such *commodities* being used for any purpose other than for human consumption.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.2.3.

Article 4.1.2.10.

Importation of aquatic animal products from a country, zone or compartment declared free from white spot disease

When importing *aquatic animal products* of species referred to in Article 4.1.2.2. from a country, *zone* or *compartment* declared free from WSD, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.2.4. or 4.1.2.5. (as applicable), the place of production of the consignment is a country, *zone* or *compartment* declared free from WSD.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.2.2.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.2.3.

Article 4.1.2.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from white spot disease

When importing *aquatic animal products* of species referred to in Article 4.1.2.2. from a country, *zone* or *compartment* not declared free from WSD, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.2.3.

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CHAPTER 4.1.3.

YELLOWHEAD DISEASE

Article 4.1.3.1.

For the purposes of the *Aquatic Code*, yellowhead disease (YHD) means *infection* with yellow head virus (YHV). YHV and the related *Gill-associated virus* are classified as a species in the genus *Okavirus*, family *Roniviridae*, order *Nidovirales*. Common synonyms are listed in Chapter 4.1.3. of the *Aquatic Manual*.

Methods for surveillance and diagnosis are provided in the *Aquatic Manual*.

Article 4.1.3.2.

Scope

The recommendations in this Chapter apply to: giant tiger prawn (*Penaeus monodon*), brown tiger prawn (*P. esculentus*) and Kuruma prawn (*P. japonicus*). These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 4.1.3.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* of the *importing country* should not require any YHD related conditions, regardless of the YHD status of the *exporting country, zone or compartment*.
 - a) For the species referred to in Article 4.1.3.2. for any purpose:
 - i) commercially sterile canned products;
 - ii) boiled products (e.g. boiled whole shrimp or tails, lobsters, crabs);
 - iii) chemically extracted chitin;
 - iv) crustacean meals or by-products made non-infectious by heating or drying (e.g. flame dried or sun dried);
 - v) crustacean products made non-infectious through processing as dry feeds (e.g. pelleted or extruded feeds);
 - vi) biological samples preserved for diagnostic applications in such a manner as to inactivate the YHV (e.g. formalin or alcohol preserved samples).
 - b) The following products destined for human consumption from species referred to in Article 4.1.3.2 which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. salted, pickled, marinated, pastes, etc.);
 - ii) products that have been heat treated or dried (e.g. ready prepared meals) in a manner to ensure inactivation of the pathogen.

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For the *commodities* listed in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

2. When authorising the importation or transit of the *commodities* of a species referred to in Article 4.1.3.2., other than those listed in point 1 of Article 4.1.3.3., the *Competent Authorities* of the *importing country* should require the conditions prescribed in Articles 4.1.3.7. to 4.1.3.11. relevant to the YHD status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any ~~other~~ *commodity* of a species not referred to in Article 4.1.3.2. but which could reasonably be expected to be a potential YHV carrier from an *exporting country, zone or compartment* not declared free of YHD, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of YHV, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 4.1.3.4.

Yellowhead disease free country

A country may make a *self-declaration of freedom* from YHD if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from YHD if all the areas covered by the shared water are declared YHD free countries or zones (see Article 4.1.3.5.).

1. A country where none of the *susceptible species* referred to in Article 4.1.3.2. is present may make a *self-declaration of freedom* from YHD when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where the species referred to in Article 4.1.3.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from YHD when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

3. A country where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from YHD when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the last 2 years without detection of YHV.

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OR

4. A country that has previously made a *self-declaration of freedom* from YHD but in which the *disease* is subsequently detected may not make a *self-declaration of freedom* from YHD again until the following conditions have been met:
- on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of YHV.

In the meantime, part of the non-affected area may be declared a free *zone* provided that they meet the conditions in point 3 of Article 4.1.3.5.

Article 4.1.3.5.

Yellowhead disease free zone or free compartment

A *zone* or *compartment* within the *territory* of one or more countries not declared free from YHD may be declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a YHD free *zone* or *compartment* if all the relevant *Competent Authorities* confirm that the conditions have been met.

- A *zone* or *compartment* where none of the *susceptible species* referred to in Article 4.1.3.2. is present may be declared free from YHD when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

- A *zone* or *compartment* where the species referred to in Article 4.1.3.2. are present but in which there has not been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from YHD when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

- A *zone* or *compartment* where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from YHD when:
 - basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place, through the *zone* or *compartment*, for at least the past 2 years without detection of YHV.

Appendix XXXIV (contd)Appendix V (contd)

OR

4. A *zone* previously declared free from YHD but in which the *disease* is detected may not be declared free from YHD again until the following conditions have been met:
 - a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of YHV.

Article 4.1.3.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from YHD following the provisions of points 1 or 2 of Articles 4.1.3.4. or 4.1.3.5. (as relevant) may maintain its status as YHD free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from YHD following the provisions of point 3 of Articles 4.1.3.4. or 4.1.3.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as YHD free provided that conditions that are conducive to clinical expression of YHD, as described in Chapter X.X.X. of the *Aquatic Manual*, exist, and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of YHD, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 4.1.3.7.

Importation of live aquatic animals from a country, zone or compartment declared free from yellowhead disease

When importing live *aquatic animals* of species referred to in Article 4.1.3.2. from a country, *zone* or *compartment* declared free from YHD, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.3.4. or 4.1.3.5. (as applicable), the place of production of the commodity ~~consignment~~ is a country, *zone* or *compartment* declared free from YHD.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.3.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.3.3.

Article 4.1.3.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from yellowhead disease

1. When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 4.1.3.2. from a country, *zone* or *compartment* not declared free from YHD, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:

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- a) the direct delivery into and holding of the consignment in *quarantine* facilities;
 - b) the continuous isolation of the imported live *aquatic animals* and their first generation progeny from the local environment;
 - c) the treatment of all effluent and waste materials from the processing in a manner that ensures inactivation of YHV.
2. If the intention of the introduction is the establishment of new genetic lines, international standards, such as the Guidelines of the International Council for the Exploration of the Seas (ICES), should be followed.
 3. For the purposes of the *Aquatic Code*, the ICES Guidelines may be summarised to the following main points:
 - a) identify stock of interest (cultured or wild) in its current location;
 - b) evaluate stock's health/*disease* history;
 - c) take and test samples for YHV, pests and general health/*disease* status;
 - d) import and quarantine in a secure facility a founder (F-0) population;
 - e) produce F-1 generation from the F-0 stock in *quarantine*;
 - f) culture F-1 stock and at critical times in its development (life cycle) sample and test for YHV and perform general examinations for pests and general health/*disease* status;
 - g) if YHV is not detected, pests are not present, and the general health/*disease* status of the stock is considered to meet the *basic biosecurity conditions* of the *importing country*, *zone* or *compartment*, the F-1 stock may be defined as YHD free or specific pathogen free (SPF) for YHV;
 - h) release SPF F-1 stock from *quarantine* for *aquaculture* or stocking purposes in the country, *zone* or *compartment*.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.3.3.

Article 4.1.3.9.

Importation of live aquatic animals for human consumption from a country, zone or compartment not declared free from yellowhead disease

When importing, for human consumption, live *aquatic animals* of species referred to in Article 4.1.3.2. from a country, *zone* or *compartment* not declared free from YHD, the *Competent Authority* of the *importing country* should require that:

1. the consignment be delivered directly to and held in isolation until consumption; and
2. all effluent, dead *aquatic animals* and waste materials from the processing be treated in a manner that ensures inactivation of YHV.

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Member Countries should consider introducing internal measures to prevent such *commodities* being used for any purpose other than for human consumption.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.3.3.

Article 4.1.3.10.

Importation of aquatic animal products from a country, zone or compartment declared free from yellowhead disease

When importing *aquatic animal products* of species referred to in Article 4.1.3.2. from a country, *zone* or *compartment* declared free from YHD, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.3.4. or 4.1.3.5. (as applicable), the place of production of the consignment is a country, *zone* or *compartment* declared free from YHD.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.2.2.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.3.3.

Article 4.1.3.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from yellowhead disease

When importing *aquatic animal products* of species referred to in Article 4.1.3.2. from a country, *zone* or *compartment* not declared free from YHD, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.3.3.

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CHAPTER 4.1.4.

TETRAHEDRAL BACULOVIROSIS

Article 4.1.4.1.

For the purposes of the *Aquatic Code*, tetrahedral baculovirosis means *infection* with *Baculovirus penaei* (BPV). This virus is closely related to *Penaes monodon baculovirus* (Chapter 4.1.5.) which has been classified as a tentative species in the genus *Nucleopolyhedrovirus*. Common synonyms are listed in Chapter 4.1.4. of the *Aquatic Manual*.

Methods for surveillance and diagnosis are provided in the *Aquatic Manual*.

Article 4.1.4.2.

Scope

The recommendations in this Chapter apply to the following genera: *Penaes*, *Trachypenaes* and *Protrachypene*. These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 4.1.4.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* of the *importing country* should not require any tetrahedral baculovirosis related conditions, regardless of the tetrahedral baculovirosis status of the *exporting country*, *zone* or *compartment*.
 - a) For the species referred to in Article 4.1.4.2. for any purpose:
 - i) commercially sterile canned products;
 - ii) boiled products (e.g. boiled whole shrimp or tails, lobsters, crabs);
 - iii) chemically extracted chitin;
 - iv) crustacean meals or by-products made non-infectious by heating or drying (e.g. flame dried or sun dried);
 - v) crustacean products made non-infectious through processing as dry feeds (e.g. pelleted or extruded feeds);
 - vi) biological samples preserved for diagnostic applications in such a manner as to inactivate the BPV (e.g. formalin or alcohol preserved samples).
 - b) The following products destined for human consumption from species referred to in Article 4.1.4.2 which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. salted, pickled, marinated, pastes, etc.);

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- ii) products that have been heat treated or dried (e.g. ready prepared meals) in a manner to ensure inactivation of the pathogen;
- iii) ~~de-headed and de-veined~~ “de-veined” (intestine removed) shrimp tails.

For the *commodities* listed in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

2. When authorising the importation or transit of the *commodities* of a species referred to in Article 4.1.4.2., other than those listed in point 1 of Article 4.1.4.3., the *Competent Authorities* of the *importing country* should require the conditions prescribed in Articles 4.1.4.7. to 4.1.4.11., relevant to the tetrahedral baculovirus status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any ~~other~~ *commodity* of a species not referred to in Article 4.1.4.2. but which could reasonably be expected to be a potential BPV carrier from an *exporting country, zone or compartment* not declared free of tetrahedral baculovirus, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of BPV, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 4.1.4.4.

Tetrahedral baculovirus free country

A country may make a *self-declaration of freedom* from tetrahedral baculovirus if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from tetrahedral baculovirus if all the areas covered by the shared water are declared tetrahedral baculovirus free countries or zones (see Article 4.1.4.5.).

1. A country where none of the *susceptible species* referred to in Article 4.1.4.2. is present may make a *self-declaration of freedom* from tetrahedral baculovirus when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where the species referred to in Article 4.1.4.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from tetrahedral baculovirus when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

3. A country where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from tetrahedral baculovirus when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the last 2 years without detection of BPV.

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OR

4. A country that has previously made a *self-declaration of freedom* from tetrahedral baculovirus but in which the *disease* is subsequently detected may not make a *self-declaration of freedom* from tetrahedral baculovirus again until the following conditions have been met:
- on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of BPV.

In the meantime, part of the non-affected area may be declared a free *zone* provided that they meet the conditions in point 3 of Article 4.1.4.5.

Article 4.1.4.5.

Tetrahedral baculovirus free zone or free compartment

A *zone* or *compartment* within the *territory* of one or more countries not declared free from tetrahedral baculovirus may be declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a tetrahedral baculovirus free *zone* or *compartment* if all the relevant *Competent Authorities* confirm that the conditions have been met.

- A *zone* or *compartment* where none of the *susceptible species* referred to in Article 4.1.4.2. is present may be declared free from tetrahedral baculovirus when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

- A *zone* or *compartment* where the species referred to in Article 4.1.4.2. are present but in which there has not been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from tetrahedral baculovirus when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

- A *zone* or *compartment* where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from tetrahedral baculovirus when:
 - basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place, through the *zone* or *compartment*, for at least the past 2 years without detection of BPV.

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OR

4. A *zone* previously declared free from tetrahedral baculovirus but in which the *disease* is detected may not be declared free from tetrahedral baculovirus again until the following conditions have been met:
- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of BPV.

Article 4.1.4.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from tetrahedral baculovirus following the provisions of points 1 or 2 of Articles 4.1.4.4. or 4.1.4.5. (as relevant) may maintain its status as tetrahedral baculovirus free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from tetrahedral baculovirus following the provisions of point 3 of Articles 4.1.4.4. or 4.1.4.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as tetrahedral baculovirus free provided that conditions that are conducive to clinical expression of tetrahedral baculovirus, as described in Chapter X.X.X. of the *Aquatic Manual*, exist, and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of tetrahedral baculovirus, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 4.1.4.7.

Importation of live aquatic animals from a country, zone or compartment declared free from tetrahedral baculovirus

When importing live *aquatic animals* of species referred to in Article 4.1.4.2. from a country, *zone* or *compartment* declared free from tetrahedral baculovirus, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.4.4. or 4.1.4.5. (as applicable), the place of production of the commodity consignment is a country, *zone* or *compartment* declared free from tetrahedral baculovirus.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.3.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.4.3.

Article 4.1.4.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from tetrahedral baculovirus

1. When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 4.1.4.2. from a country, *zone* or *compartment* not declared free from tetrahedral baculovirus, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:
 - a) the direct delivery into and holding of the consignment in *quarantine* facilities;
 - b) the continuous isolation of the imported live *aquatic animals* and their first generation progeny from the local environment;
 - c) the treatment of all effluent and waste materials from the processing in a manner that ensures inactivation of BPV.
2. If the intention of the introduction is the establishment of new genetic lines, international standards, such as the Guidelines of the International Council for the Exploration of the Seas (ICES), should be followed.
3. For the purposes of the *Aquatic Code*, the ICES Guidelines may be summarised to the following main points:
 - a) identify stock of interest (cultured or wild) in its current location;
 - b) evaluate stock's health/*disease* history;
 - c) take and test samples for BPV, pests and general health/*disease* status;
 - d) import and quarantine in a secure facility a founder (F-0) population;
 - e) produce F-1 generation from the F-0 stock in *quarantine*;
 - f) culture F-1 stock and at critical times in its development (life cycle) sample and test for BPV and perform general examinations for pests and general health/*disease* status;
 - g) if BPV is not detected, pests are not present, and the general health/*disease* status of the stock is considered to meet the *basic biosecurity conditions* of the *importing country*, *zone* or *compartment*, the F-1 stock may be defined as tetrahedral baculovirus free or specific pathogen free (SPF) for BPV;
 - h) release SPF F-1 stock from *quarantine* for *aquaculture* or stocking purposes in the country, *zone* or *compartment*.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.4.3.

Article 4.1.4.9.

Importation of live aquatic animals for human consumption from a country, zone or compartment not declared free from tetrahedral baculovirus

When importing, for human consumption, live *aquatic animals* of species referred to in Article 4.1.4.2. from a country, *zone* or *compartment* not declared free from tetrahedral baculovirus, the *Competent Authority* of the *importing country* should require that:

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1. the consignment be delivered directly to and held in isolation until consumption; and
2. all effluent, dead *aquatic animals* and waste materials from the processing be treated in a manner that ensures inactivation of BPV.

Member Countries should consider introducing internal measures to prevent such *commodities* being used for any purpose other than for human consumption.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.4.3.

Article 4.1.4.10.

Importation of aquatic animal products from a country, zone or compartment declared free from tetrahedral baculovirus

When importing *aquatic animal products* of species referred to in Article 4.1.4.2. from a country, *zone* or *compartment* declared free from tetrahedral baculovirus, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.4.4. or 4.1.4.5. (as applicable), the place of production of the consignment is a country, *zone* or *compartment* declared free from tetrahedral baculovirus.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.2.2.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.4.3.

Article 4.1.4.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from tetrahedral baculovirus

When importing *aquatic animal products* of species referred to in Article 4.1.4.2. from a country, *zone* or *compartment* not declared free from tetrahedral baculovirus, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.4.3.

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CHAPTER 4.1.5.

SPHERICAL BACULOVIRIOSIS

Article 4.1.5.1.

For the purposes of the *Aquatic Code*, spherical baculovirus means *infection* with *Penaeus monodon* baculovirus (MBV). *Penaeus monodon baculovirus* is classified as a tentative species in the genus *Nucleopolyhedrovirus*. Common synonyms are listed in Chapter 4.1.5. of the *Aquatic Manual*.

Methods for surveillance and diagnosis are provided in the *Aquatic Manual*.

Article 4.1.5.2.

Scope

The recommendations in this Chapter apply to the following genera: *Penaeus* and *Metapenaeus*. These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 4.1.5.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* of the *importing country* should not require any spherical baculovirus related conditions, regardless of the spherical baculovirus status of the *exporting country*, *zone* or *compartment*.
 - a) For the species referred to in Article 4.1.5.2. for any purpose:
 - i) commercially sterile canned products;
 - ii) boiled products (e.g. boiled whole shrimp or tails, lobsters, crabs);
 - iii) chemically extracted chitin;
 - iv) crustacean meals or by-products made non-infectious by heating or drying (e.g. flame dried or sun dried);
 - v) crustacean products made non-infectious through processing as dry feeds (e.g. pelleted or extruded feeds);
 - vi) biological samples preserved for diagnostic applications in such a manner as to inactivate the MBV (e.g. formalin or alcohol preserved samples).
 - b) The following products destined for human consumption from species referred to in Article 4.1.5.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. salted, pickled, marinated, pastes, etc.);
 - ii) products that have been heat treated or dried (e.g. ready prepared meals) in a manner to ensure inactivation of the pathogen;

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- iii) ~~de-headed and de-veined~~ “de-veined” (intestine removed) shrimp tails.

For the *commodities* listed in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

2. When authorising the importation or transit of the *commodities* of a species referred to in Article 4.1.5.2., other than those listed in point 1 of Article 4.1.5.3., the *Competent Authorities* of the *importing country* should require the conditions prescribed in Articles 4.1.5.7. to 4.1.5.11. relevant to the spherical baculovirus status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any ~~other~~ *commodity* of a species not referred to in Article 4.1.5.2. but which could reasonably be expected to be a potential MBV carrier from an *exporting country, zone or compartment* not declared free of spherical baculovirus, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of MBV, and the potential consequences, associated with the importation of the *commodity*, prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 4.1.5.4.

Spherical baculovirus free country

A country may make a *self-declaration of freedom* from spherical baculovirus if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from spherical baculovirus if all the areas covered by the shared water are declared spherical baculovirus free countries or zones (see Article 4.1.5.5.).

1. A country where none of the *susceptible species* referred to in Article 4.1.5.2. is present may make a *self-declaration of freedom* from spherical baculovirus when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where the species referred to in Article 4.1.5.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from spherical baculovirus when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

3. A country where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from spherical baculovirus when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the last 2 years without detection of MBV.

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OR

4. A country that has previously made a *self-declaration of freedom* from spherical baculovirus but in which the *disease* is subsequently detected may not make a *self-declaration of freedom* from spherical baculovirus again until the following conditions have been met:
- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of MBV.

In the meantime, part of the non-affected area may be declared a free *zone* provided that they meet the conditions in point 3 of Article 4.1.5.5.

Article 4.1.5.5.

Spherical baculovirus free zone or free compartment

A *zone* or *compartment* within the *territory* of one or more countries not declared free from spherical baculovirus may be declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a spherical baculovirus free *zone* or *compartment* if all the relevant *Competent Authorities* confirm that the conditions have been met.

1. A *zone* or *compartment* where none of the *susceptible species* referred to in Article 4.1.5.2. is present may be declared free from spherical baculovirus when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. A *zone* or *compartment* where the species referred to in Article 4.1.5.2. are present but in which there has not been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from spherical baculovirus when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

3. A *zone* or *compartment* where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from spherical baculovirus when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place, through the *zone* or *compartment*, for at least the past 2 years without detection of MBV.

Appendix XXXIV (contd)Appendix VII (contd)

OR

4. A *zone* previously declared free from spherical baculovirus but in which the *disease* is detected may not be declared free from spherical baculovirus again until the following conditions have been met:
- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of MBV.

Article 4.1.5.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from spherical baculovirus following the provisions of points 1 or 2 of Articles 4.1.5.4. or 4.1.5.5. (as relevant) may maintain its status as spherical baculovirus free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from spherical baculovirus following the provisions of point 3 of Articles 4.1.5.4. or 4.1.5.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as spherical baculovirus free provided that conditions that are conducive to clinical expression of spherical baculovirus, as described in Chapter X.X.X. of the *Aquatic Manual*, exist, and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of spherical baculovirus, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 4.1.5.7.

Importation of live aquatic animals from a country, zone or compartment declared free from spherical baculovirus

When importing live *aquatic animals* of species referred to in Article 4.1.5.2. from a country, *zone* or *compartment* declared free from spherical baculovirus, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.5.4. or 4.1.5.5. (as applicable), the place of production of the commodity ~~consignment~~ is a country, *zone* or *compartment* declared free from spherical baculovirus.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.3.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.5.3.

Appendix XXXIV (contd)Appendix VII (contd)

Article 4.1.5.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from spherical baculovirus

1. When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 4.1.5.2. from a country, *zone* or *compartment* not declared free from spherical baculovirus, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:
 - a) the direct delivery into and holding of the consignment in *quarantine* facilities;
 - b) the continuous isolation of the imported live *aquatic animals* and their first generation progeny from the local environment;
 - c) the treatment of all effluent and waste materials from the processing in a manner that ensures inactivation of MBV.
2. If the intention of the introduction is the establishment of new genetic lines, international standards, such as the Guidelines of the International Council for the Exploration of the Seas (ICES), should be followed.
3. For the purposes of the *Aquatic Code*, the ICES Guidelines may be summarised to the following main points:
 - a) identify stock of interest (cultured or wild) in its current location;
 - b) evaluate stock's health/*disease* history;
 - c) take and test samples for MBV, pests and general health/*disease* status;
 - d) import and quarantine in a secure facility a founder (F-0) population;
 - e) produce F-1 generation from the F-0 stock in *quarantine*;
 - f) culture F-1 stock and at critical times in its development (life cycle) sample and test for MBV and perform general examinations for pests and general health/*disease* status;
 - g) if MBV is not detected, pests are not present, and the general health/*disease* status of the stock is considered to meet the *basic biosecurity conditions* of the *importing country*, *zone* or *compartment*, the F-1 stock may be defined as spherical baculovirus free or specific pathogen free (SPF) for MBV;
 - h) release SPF F-1 stock from *quarantine* for *aquaculture* or stocking purposes in the country, *zone* or *compartment*.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.5.3.

Article 4.1.5.9.

Importation of live aquatic animals for human consumption from a country, zone or compartment not declared free from spherical baculovirus

When importing, for human consumption, live *aquatic animals* of species referred to in Article 4.1.5.2. from a country, *zone* or *compartment* not declared free from spherical baculovirus, the *Competent Authority* of the *importing country* should require that:

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1. the consignment be delivered directly to and held in isolation until consumption; and
2. all effluent, dead *aquatic animals* and waste materials from the processing be treated in a manner that ensures inactivation of MBV.

Member Countries should consider introducing internal measures to prevent such *commodities* being used for any purpose other than for human consumption.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.5.3.

Article 4.1.5.10.

Importation of aquatic animal products from a country, zone or compartment declared free from spherical baculovirus

When importing *aquatic animal products* of species referred to in Article 4.1.5.2. from a country, *zone* or *compartment* declared free from spherical baculovirus, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.5.4. or 4.1.5.5. (as applicable), the place of production of the consignment is a country, *zone* or *compartment* declared free from spherical baculovirus.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.2.2.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.5.3.

Article 4.1.5.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from spherical baculovirus

When importing *aquatic animal products* of species referred to in Article 4.1.5.2. from a country, *zone* or *compartment* not declared free from spherical baculovirus, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.5.3.

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CHAPTER 4.1.6.

**INFECTIOUS HYPODERMAL AND
HAEMATOPOIETIC NECROSIS**

Article 4.1.6.1.

For the purposes of the *Aquatic Code*, infectious hypodermal and haematopoietic necrosis (IHHN) means *infection* with infectious hypodermal and haematopoietic necrosis virus (IHHNV). IHHNV is classified as the species *Penaeus stylirostris densovirus* in the genus *Brevidensovirus* in the family *Parvoviridae*.

Methods for surveillance and diagnosis are provided in the *Aquatic Manual*.

Article 4.1.6.2.

Scope

The recommendations in this Chapter apply to: *Penaeus monodon*, *P. vannamei* and *P. stylirostris*. These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 4.1.6.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* of the *importing country* should not require any IHHN related conditions, regardless of the IHHN status of the *exporting country*, *zone* or *compartment*.
 - a) For the species referred to in Article 4.1.6.2. for any purpose:
 - i) commercially sterile canned products;
 - ii) boiled products (e.g. boiled whole shrimp or tails, lobsters, crabs);
 - iii) chemically extracted chitin;
 - iv) crustacean meals or by-products made non-infectious by heating or drying (e.g. flame dried or sun dried);
 - v) crustacean products made non-infectious through processing as dry feeds (e.g. pelleted or extruded feeds);
 - vi) biological samples preserved for diagnostic applications in such a manner as to inactivate the IHHNV (e.g. formalin or alcohol preserved samples).
 - b) The following products destined for human consumption from species referred to in Article 4.1.6.2 which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. salted, pickled, marinated, pastes, etc.);

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- ii) products that have been heat treated or dried (e.g. ready prepared meals) in a manner to ensure inactivation of the pathogen.

For the *commodities* listed in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

2. When authorising the importation or transit of the *commodities* of a species referred to in Article 4.1.6.2., other than those listed in point 1 of Article 4.1.6.3., the *Competent Authorities* of the *importing country* should require the conditions prescribed in Articles 4.1.6.7. to 4.1.6.11. relevant to the IHHN status of the *exporting country*, *zone* or *compartment*.
3. When considering the importation or transit of any ~~other~~ *commodity* of a species not referred to in Article 4.1.6.2. but which could reasonably be expected to be a potential IHHNV carrier from an *exporting country*, *zone* or *compartment* not declared free of IHHN, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of IHHNV, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 4.1.6.4.

Infectious hypodermal and haematopoietic necrosis free country

A country may make a *self-declaration of freedom* from IHHN if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from IHHN if all the areas covered by the shared water are declared IHHN free countries or zones (see Article 4.1.6.5.).

1. A country where none of the *susceptible species* referred to in Article 4.1.6.2. is present may make a *self-declaration of freedom* from IHHN when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where the species referred to in Article 4.1.6.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from IHHN when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

3. A country where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from IHHN when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the last 2 years without detection of IHHNV.

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OR

4. A country that has previously made a *self-declaration of freedom* from IHHN but in which the *disease* is subsequently detected may not make a *self-declaration of freedom* from IHHN again until the following conditions have been met:
- on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of IHHNV.

In the meantime, part of the non-affected area may be declared a free *zone* provided that they meet the conditions in point 3 of Article 4.1.6.5.

Article 4.1.6.5.

Infectious hypodermal and haematopoietic necrosis free zone or free compartment

A *zone* or *compartment* within the *territory* of one or more countries not declared free from IHHN may be declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared an IHHN free *zone* or *compartment* if all the relevant *Competent Authorities* confirm that the conditions have been met.

- A *zone* or *compartment* where none of the *susceptible species* referred to in Article 4.1.6.2. is present may be declared free from IHHN when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

- A *zone* or *compartment* where the species referred to in Article 4.1.6.2. are present but in which there has not been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from IHHN when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

- A *zone* or *compartment* where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from IHHN when:
 - basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place, through the *zone* or *compartment*, for at least the past 2 years without detection of IHHNV.

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OR

4. A *zone* previously declared free from IHHN but in which the *disease* is detected may not be declared free from IHHN again until the following conditions have been met:
- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of IHHNV.

Article 4.1.6.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from IHHN following the provisions of points 1 or 2 of Articles 4.1.6.4. or 4.1.6.5. (as relevant) may maintain its status as IHHN free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from IHHN following the provisions of point 3 of Articles 4.1.6.4. or 4.1.6.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as IHHN free provided that conditions that are conducive to clinical expression of IHHN, as described in Chapter X.X.X. of the *Aquatic Manual*, exist, and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of IHHN, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 4.1.6.7.

Importation of live aquatic animals from a country, zone or compartment declared free from infectious hypodermal and haematopoietic necrosis

When importing live *aquatic animals* of species referred to in Article 4.1.6.2. from a country, *zone* or *compartment* declared free from IHHN, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.6.4. or 4.1.6.5. (as applicable), the place of production of the commodity ~~consignment~~ is a country, *zone* or *compartment* declared free from IHHN.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.3.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.6.3.

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Article 4.1.6.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from infectious hypodermal and haematopoietic necrosis

1. When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 4.1.6.2. from a country, *zone* or *compartment* not declared free from IHHN, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:
 - a) the direct delivery into and holding of the consignment in *quarantine* facilities;
 - b) the continuous isolation of the imported live *aquatic animals* and their first generation progeny from the local environment;
 - c) the treatment of all effluent and waste materials from the processing in a manner that ensures inactivation of IHHNV.
2. If the intention of the introduction is the establishment of new genetic lines, international standards, such as the Guidelines of the International Council for the Exploration of the Seas (ICES), should be followed.
3. For the purposes of the *Aquatic Code*, the ICES Guidelines may be summarised to the following main points:
 - a) identify stock of interest (cultured or wild) in its current location;
 - b) evaluate stock's health/*disease* history;
 - c) take and test samples for IHHNV, pests and general health/*disease* status;
 - d) import and quarantine in a secure facility a founder (F-0) population;
 - e) produce F-1 generation from the F-0 stock in *quarantine*;
 - f) culture F-1 stock and at critical times in its development (life cycle) sample and test for IHHNV and perform general examinations for pests and general health/*disease* status;
 - g) if IHHNV is not detected, pests are not present, and the general health/*disease* status of the stock is considered to meet the *basic biosecurity conditions* of the *importing country*, *zone* or *compartment*, the F-1 stock may be defined as IHHN free or specific pathogen free (SPF) for IHHNV;
 - h) release SPF F-1 stock from *quarantine* for *aquaculture* or stocking purposes in the country, *zone* or *compartment*.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.6.3.

Article 4.1.6.9.

Importation of live aquatic animals for human consumption from a country, zone or compartment not declared free from infectious hypodermal and haematopoietic necrosis

When importing, for human consumption, live *aquatic animals* of species referred to in Article 4.1.6.2. from a country, *zone* or *compartment* not declared free from IHHN, the *Competent Authority* of the *importing country* should require that:

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1. the consignment be delivered directly to and held in isolation until consumption; and
2. all effluent, dead *aquatic animals* and waste materials from the processing be treated in a manner that ensures inactivation of IHHNV.

Member Countries should consider introducing internal measures to prevent such *commodities* being used for any purpose other than for human consumption.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.6.3.

Article 4.1.6.10.

Importation of aquatic animal products from a country, zone or compartment declared free from infectious hypodermal and haematopoietic necrosis

When importing *aquatic animal products* of species referred to in Article 4.1.6.2. from a country, *zone* or *compartment* declared free from IHHN, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.6.4. or 4.1.6.5. (as applicable), the place of production of the consignment is a country, *zone* or *compartment* declared free from IHHN.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.2.2.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.6.3.

Article 4.1.6.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from infectious hypodermal and haematopoietic necrosis

When importing *aquatic animal products* of species referred to in Article 4.1.6.2. from a country, *zone* or *compartment* not declared free from IHHN, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.6.3.

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CHAPTER 4.1.7.

CRAYFISH PLAGUE

Article 4.1.7.1.

For the purposes of the *Aquatic Code*, crayfish plague means *infection* with *Aphanomyces astaci* Schikora. This organism is a member of a group commonly known as the water moulds (the Oomycetida). Common synonyms are listed in Chapter 4.1.7. of the *Aquatic Manual*.

Methods for surveillance and diagnosis are provided in the *Aquatic Manual*.

Article 4.1.7.2.

Scope

The recommendations in this Chapter apply to all species of crayfish in all three crayfish families (*Cambaridae*, *Astacidae*, and *Parastacidae*). These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Crayfish plague is most severe in European crayfish species including the noble crayfish (*Astacus astacus*), the white claw crayfish (*Austropotamobius pallipes*), stone crayfish (*Austropotamobius torrentium*), and the Turkish crayfish (*Astacus leptodactylus*). In general, the Parastacidae and the Astacidae (except *Pacifastacus*) are highly susceptible, while the Cambaridae are resistant to *disease*, but are potential carriers.

Article 4.1.7.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* of the *importing country* should not require any crayfish plague related conditions, regardless of the crayfish plague status of the *exporting country*, *zone* or *compartment*.
 - a) For the species referred to in Article 4.1.7.2. for any purpose:
 - i) commercially sterile canned products;
 - ii) boiled products (e.g. cooked whole shrimp or tails, lobsters, crabs);
 - iii) chemically extracted chitin;
 - iv) crustacean meals or by-products made non-infectious by heating (>60°C for >5 minutes) or drying by-product (e.g. flame dried or sun dried);
 - v) crustacean products made non-infectious during processing as dry feeds (e.g. pelleted or extruded feeds);
 - vi) biological samples preserved for diagnostic applications in such a manner as to inactivate the *A. astaci* (e.g. formalin or alcohol preserved samples);
 - vii) frozen products that have been subjected to -10°C or lower temperatures for at least 24 hours.

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- b) The following products destined for human consumption from species referred to in Article 4.1.7.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
- i) chemically preserved products (e.g. salted, pickled, marinated, pastes, etc.);
 - ii) products that have been heat treated or dried (e.g. ready prepared meals) in a manner to ensure inactivation of the pathogen.

For the *commodities* listed in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

2. When authorising the importation or transit of the *commodities* of a species referred to in Article 4.1.7.2., other than those listed in point 1 of Article 4.1.7.3., the *Competent Authorities* of the *importing country* should require the conditions prescribed in Articles 4.1.7.7. to 4.1.7.11. relevant to the crayfish plague status of the *exporting country*, *zone* or *compartment*.
3. When considering the importation or transit of any ~~other~~ *commodity* of a species not referred to in Article 4.1.7.2. but which could reasonably be expected to be a potential *A. astaci* carrier from an *exporting country*, *zone* or *compartment* not declared free of crayfish plague, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of *A. astaci*, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 4.1.7.4.

Crayfish plague free country

A country may make a *self-declaration of freedom* from crayfish plague if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *water catchment* or with one or more other countries, it can only make a *self-declaration of freedom* from crayfish plague if all the areas covered by the shared water are declared crayfish plague free countries or zones (see Article 4.1.7.5.).

1. A country where none of the *susceptible species* referred to in Article 4.1.7.2. is present may make a *self-declaration of freedom* from crayfish plague when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where the species referred to in Article 4.1.7.2. are present but there has never been any observed occurrence of the *disease* for at least the past 25 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from crayfish plague when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

3. A country where the last observed occurrence of the *disease* was within the past 10 ~~25~~ years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from crayfish plague when:

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- a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
- b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the last 5 years without detection of *A. astaci*.

OR

4. A country that has previously made a *self-declaration of freedom* from crayfish plague but in which the *disease* is subsequently detected may not make a *self-declaration of freedom* from crayfish plague again until the following conditions have been met:
 - a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 5 years without detection of *A. astaci*.

In the meantime, part of the non-affected area may be declared a free *zone* provided that they meet the conditions in point 3 of Article 4.1.7.5.

Article 4.1.7.5.

Crayfish plague free zone or free compartment

A *zone* or *compartment* within the *territory* of one or more countries not declared free from crayfish plague may be declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a crayfish plague free *zone* or *compartment* if all the relevant *Competent Authorities* confirm that the conditions have been met.

1. A *zone* or *compartment* where none of the *susceptible species* referred to in Article 4.1.7.2. is present may be declared free from crayfish plague when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. A *zone* or *compartment* where the species referred to in Article 4.1.7.2. are present but in which there has not been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from crayfish plague when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

3. A *zone* or *compartment* where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from crayfish plague when:

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- a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
- b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place, through the *zone* or *compartment*, for at least the past 2 years without detection of *A. astaci*.

OR

- 4. A *zone* previously declared free from crayfish plague but in which the *disease* is detected may not be declared free from crayfish plague again until the following conditions have been met:
 - a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of *A. astaci*.

Article 4.1.7.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from crayfish plague following the provisions of points 1 or 2 of Articles 4.1.7.4. or 4.1.7.5. (as relevant) may maintain its status as crayfish plague free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from crayfish plague following the provisions of point 3 of Articles 4.1.7.4. or 4.1.7.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as crayfish plague free provided that conditions that are conducive to clinical expression of crayfish plague, as described in Chapter X.X.X. of the *Aquatic Manual*, exist, and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of crayfish plague, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 4.1.7.7.

Importation of live aquatic animals from a country, zone or compartment declared free from crayfish plague

When importing live *aquatic animals* of species referred to in Article 4.1.7.2. from a country, *zone* or *compartment* declared free from crayfish plague, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.7.4. or 4.1.7.5. (as applicable), the place of production of the commodity ~~consignment~~ is a country, *zone* or *compartment* declared free from crayfish plague.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.3.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.7.3.

Article 4.1.7.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from crayfish plague

1. When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 4.1.7.2. from a country, *zone* or *compartment* not declared free from crayfish plague, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:
 - a) the direct delivery into and holding of the consignment in *quarantine* facilities;
 - b) the continuous isolation of the imported live *aquatic animals* and their first generation progeny from the local environment;
 - c) the treatment of all effluent and waste materials from the processing in a manner that ensures inactivation of *A. astaci*.
2. If the intention of the introduction is the establishment of new genetic lines, international standards, such as the Guidelines of the International Council for the Exploration of the Seas (ICES), should be followed.
3. For the purposes of the *Aquatic Code*, the ICES Guidelines may be summarised to the following main points:
 - a) identify stock of interest (cultured or wild) in its current location;
 - b) evaluate stock's health/*disease* history;
 - c) take and test samples for *A. astaci*, pests and general health/*disease* status;
 - d) import and quarantine in a secure facility a founder (F-0) population;
 - e) produce F-1 generation from the F-0 stock in *quarantine*;
 - f) culture F-1 stock and at critical times in its development (life cycle) sample and test for *A. astaci* and perform general examinations for pests and general health/*disease* status;
 - g) if *A. astaci* is not detected, pests are not present, and the general health/*disease* status of the stock is considered to meet the *basic biosecurity conditions* of the *importing country*, *zone* or *compartment*, the F-1 stock may be defined as crayfish plague free or specific pathogen free (SPF) for *A. astaci*;
 - h) release SPF F-1 stock from *quarantine* for *aquaculture* or stocking purposes in the country, *zone* or *compartment*.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.7.3.

Article 4.1.7.9.

Importation of live aquatic animals for human consumption from a country, zone or compartment not declared free from crayfish plague

When importing, for human consumption, live *aquatic animals* of species referred to in Article 4.1.7.2. from a country, *zone* or *compartment* not declared free from crayfish plague, the *Competent Authority* of the *importing country* should require that:

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1. the consignment be delivered directly to and held in isolation until consumption; and
2. all effluent, dead *aquatic animals* and waste materials from the processing be treated in a manner that ensures inactivation of *A. astaci*.

Member Countries should consider introducing internal measures to prevent such *commodities* being used for any purpose other than for human consumption.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.7.3.

Article 4.1.7.10.

Importation of aquatic animal products from a country, zone or compartment declared free from crayfish plague

When importing *aquatic animal products* of species referred to in Article 4.1.7.2. from a country, *zone* or *compartment* declared free from crayfish plague, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.7.4. or 4.1.7.5. (as applicable), the place of production of the consignment is a country, *zone* or *compartment* declared free from crayfish plague.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.2.2.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.7.3.

Article 4.1.7.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from crayfish plague

When importing *aquatic animal products* of species referred to in Article 4.1.7.2. from a country, *zone* or *compartment* not declared free from crayfish plague, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.7.3.

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CHAPTER 4.1.9.

INFECTIOUS MYONECROSIS

Article 4.1.9.1.

For the purposes of the *Aquatic Code*, infectious myonecrosis (IMN) means *infection* with infectious myonecrosis virus (IMNV). This virus is similar to members of the family *Totiviridae*.

Methods for surveillance and diagnosis are provided in the *Aquatic Manual*.

Article 4.1.9.2.

Scope

The recommendations in this Chapter apply to: Pacific white shrimp (*Penaeus vannamei*). These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 4.1.9.3.

Commodities

1. When authorising importation or transit of the following *commodities*, the *Competent Authorities* of the *importing country* should not require any IMN related conditions, regardless of the IMN status of the *exporting country*, *zone* or *compartment*.
 - a) For the species referred to in Article 4.1.9.2. for any purpose:
 - i) commercially sterile canned products;
 - ii) boiled products (e.g. boiled whole shrimp or tails, lobsters, crabs);
 - iii) chemically extracted chitin;
 - iv) crustacean meals or by-products made non-infectious by heating or drying (e.g. flame dried or sun dried);
 - v) crustacean products made non-infectious through processing as dry feeds (e.g. pelleted or extruded feeds);
 - vi) biological samples preserved for diagnostic applications in such a manner as to inactivate the IMNV (e.g. formalin or alcohol preserved samples).
 - b) The following products destined for human consumption from species referred to in Article 4.1.9.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. salted, pickled, marinated, pastes, etc.);
 - ii) products that have been heat treated or dried (e.g. ready prepared meals) in a manner to ensure inactivation of the pathogen.

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For the *commodities* listed in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

2. When authorising the importation or transit of the *commodities* of a species referred to in Article 4.1.9.2., other than those listed in point 1 of Article 4.1.9.3., the *Competent Authorities* of the *importing country* should require the conditions prescribed in Articles 4.1.9.7. to 4.1.9.11. relevant to the IMN status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any ~~other~~ *commodity* of a species not referred to in Article 4.1.9.2. but which could reasonably be expected to be a potential IMNV carrier from an *exporting country, zone or compartment* not declared free of IMN, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of IMNV, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 4.1.9.4.

Infectious myonecrosis free country

A country may make a *self-declaration of freedom* from IMN if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from IMN if all the areas covered by the shared water are declared IMN free countries or zones (see Article 4.1.9.5.).

1. A country where none of the *susceptible species* referred to in Article 4.1.9.2. is present may make a *self-declaration of freedom* from IMN when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where the species referred to in Article 4.1.9.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from IMN when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

3. A country where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from IMN when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the last 2 years without detection of IMNV.

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OR

4. A country that has previously made a *self-declaration of freedom* from IMN but in which the *disease* is subsequently detected may not make a *self-declaration of freedom* from IMN again until the following conditions have been met:
- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of IMNV.

In the meantime, part of the non-affected area may be declared a free *zone* provided that they meet the conditions in point 3 of Article 4.1.9.5.

Article 4.1.9.5.

Infectious myonecrosis free zone or free compartment

A *zone* or *compartment* within the *territory* of one or more countries not declared free from IMN may be declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared an IMN free *zone* or *compartment* if all the relevant *Competent Authorities* confirm that the conditions have been met.

1. A *zone* or *compartment* where none of the *susceptible species* referred to in Article 4.1.9.2. is present may be declared free from IMN when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. A *zone* or *compartment* where the species referred to in Article 4.1.9.2. are present but in which there has not been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from IMN when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

3. A *zone* or *compartment* where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from IMN when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place, through the *zone* or *compartment*, for at least the past 2 years without detection of IMNV.

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OR

4. A *zone* previously declared free from IMN but in which the *disease* is detected may not be declared free from IMN again until the following conditions have been met:
- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of IMNV.

Article 4.1.9.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from IMN following the provisions of points 1 or 2 of Articles 4.1.9.4. or 4.1.9.5. (as relevant) may maintain its status as IMN free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from IMN following the provisions of point 3 of Articles 4.1.9.4. or 4.1.9.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as IMN free provided that conditions that are conducive to clinical expression of IMN, as described in Chapter X.X.X. of the *Aquatic Manual*, exist, and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of IMN, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 4.1.9.7.

Importation of live aquatic animals from a country, zone or compartment declared free from infectious myonecrosis

When importing live *aquatic animals* of species referred to in Article 4.1.9.2. from a country, *zone* or *compartment* declared free from IMN, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.9.4. or 4.1.9.5. (as applicable), the place of production of the commodity consignment is a country, *zone* or *compartment* declared free from IMN.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.3.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.9.3.

Article 4.1.9.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from infectious myonecrosis

1. When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 4.1.9.2. from a country, *zone* or *compartment* not declared free from IMN, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:
 - a) the direct delivery into and holding of the consignment in *quarantine* facilities;
 - b) the continuous isolation of the imported live *aquatic animals* and their first generation progeny from the local environment;
 - c) the treatment of all effluent and waste materials from the processing in a manner that ensures inactivation of IMNV.
2. If the intention of the introduction is the establishment of new genetic lines, international standards, such as the Guidelines of the International Council for the Exploration of the Seas (ICES), should be followed.
3. For the purposes of the *Aquatic Code*, the ICES Guidelines may be summarised to the following main points:
 - a) identify stock of interest (cultured or wild) in its current location;
 - b) evaluate stock's health/*disease* history;
 - c) take and test samples for IMNV, pests and general health/*disease* status;
 - d) import and quarantine in a secure facility a founder (F-0) population;
 - e) produce F-1 generation from the F-0 stock in *quarantine*;
 - f) culture F-1 stock and at critical times in its development (life cycle) sample and test for IMNV and perform general examinations for pests and general health/*disease* status;
 - g) if IMNV is not detected, pests are not present, and the general health/*disease* status of the stock is considered to meet the *basic biosecurity conditions* of the *importing country*, *zone* or *compartment*, the F-1 stock may be defined as IMN free or specific pathogen free (SPF) for IMNV;
 - h) release SPF F-1 stock from *quarantine* for *aquaculture* or stocking purposes in the country, *zone* or *compartment*.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.9.3.

Article 4.1.9.9.

Importation of live aquatic animals for human consumption from a country, zone or compartment not declared free from infectious myonecrosis

When importing, for human consumption, live *aquatic animals* of species referred to in Article 4.1.9.2. from a country, *zone* or *compartment* not declared free from IMN, the *Competent Authority* of the *importing country* should require that:

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1. the consignment be delivered directly to and held in isolation until consumption; and
2. all effluent, dead *aquatic animals* and waste materials from the processing be treated in a manner that ensures inactivation of IMNV.

Member Countries should consider introducing internal measures to prevent such *commodities* being used for any purpose other than for human consumption.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.9.3.

Article 4.1.9.10.

Importation of aquatic animal products from a country, zone or compartment declared free from infectious myonecrosis

When importing *aquatic animal products* of species referred to in Article 4.1.9.2. from a country, *zone* or *compartment* declared free from IMN, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.9.4. or 4.1.9.5. (as applicable), the place of production of the consignment is a country, *zone* or *compartment* declared free from IMN.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.2.2.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.9.3.

Article 4.1.9.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from infectious myonecrosis

When importing *aquatic animal products* of species referred to in Article 4.1.9.2. from a country, *zone* or *compartment* not declared free from IMN, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.9.3.

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CHAPTER 4.1.10.

NECROTISING HEPATOPANCREATITIS

Article 4.1.10.1.

For the purposes of the *Aquatic Code*, necrotising hepatopancreatitis (NHP) means *infection* with necrotising hepatopancreatitis bacteria (NHP-B). This obligate intracellular bacterium is a member of the order α -Proteobacteria.

Methods for surveillance and diagnosis are provided in the *Aquatic Manual*.

Article 4.1.10.2.

Scope

The recommendations in this Chapter apply to: Pacific white shrimp (*Penaeus vannamei*), blue shrimp (*P. stylirostris*), northern white shrimp (*P. setiferus*) and northern brown shrimp (*P. aztecus*). These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 4.1.10.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* of the *importing country* should not require any NHP related conditions, regardless of the NHP status of the *exporting country*, *zone* or *compartment*.
 - a) For the species referred to in Article 4.1.10.2. for any purpose:
 - i) commercially sterile canned products;
 - ii) boiled products (e.g. boiled whole shrimp or tails, lobsters, crabs);
 - iii) chemically extracted chitin;
 - iv) crustacean meals or by-products made non-infectious by heating or drying (e.g. flame dried or sun dried);
 - v) crustacean products made non-infectious through processing as dry feeds (e.g. pelleted or extruded feeds);
 - vi) biological samples preserved for diagnostic applications in such a manner as to inactivate the NHP-B (e.g. formalin or alcohol preserved samples);
 - vii) frozen products.
 - b) The following products destined for human consumption from species referred to in Article 4.1.10.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:

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- i) chemically preserved products (e.g. salted, pickled, marinated, pastes, etc.);
- ii) products that have been heat treated or dried (e.g. ready prepared meals) in a manner to ensure inactivation of the pathogen;
- iii) ~~de-headed and de-veined~~ “de-veined” (intestine removed) shrimp tails.

For the *commodities* listed in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

2. When authorising the importation or transit of the *commodities* of a species referred to in Article 4.1.10.2., other than those listed in point 1 of Article 4.1.10.3., the *Competent Authorities* of the *importing country* should require the conditions prescribed in Articles 4.1.10.7. to 4.1.10.11. relevant to the NHP status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any ~~other~~ *commodity* of a species not referred to in Article 4.1.10.2. but which could reasonably be expected to be a potential NHP-B carrier from an *exporting country, zone or compartment* not declared free of NHP, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of NHP-B, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 4.1.10.4.

Necrotising hepatopancreatitis free country

A country may make a *self-declaration of freedom* from NHP if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from NHP if all the areas covered by the shared water are declared NHP free countries or zones (see Article 4.1.10.5.).

1. A country where none of the *susceptible species* referred to in Article 4.1.10.2. is present may make a *self-declaration of freedom* from NHP when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where the species referred to in Article 4.1.10.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from NHP when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

3. A country where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from NHP when:

- a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and

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- b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the last 2 years without detection of NHP-B.

OR

4. A country that has previously made a *self-declaration of freedom* from NHP but in which the *disease* is subsequently detected may not make a *self-declaration of freedom* from NHP again until the following conditions have been met:
- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of NHP-B.

In the meantime, part of the non-affected area may be declared a free *zone* provided that they meet the conditions in point 3 of Article 4.1.10.5.

Article 4.1.10.5.

Necrotising hepatopancreatitis free zone or free compartment

A *zone* or *compartment* within the *territory* of one or more countries not declared free from NHP may be declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a NHP free *zone* or *compartment* if all the relevant *Competent Authorities* confirm that the conditions have been met.

1. A *zone* or *compartment* where none of the *susceptible species* referred to in Article 4.1.10.2. is present may be declared free from NHP when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. A *zone* or *compartment* where the species referred to in Article 4.1.10.2. are present but in which there has not been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from NHP when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

3. A *zone* or *compartment* where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from NHP when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and

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- b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place, through the *zone* or *compartment*, for at least the past 2 years without detection of NHP-B.

OR

4. A *zone* previously declared free from NHP but in which the *disease* is detected may not be declared free from NHP again until the following conditions have been met:
- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of NHP-B.

Article 4.1.10.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from NHP following the provisions of points 1 or 2 of Articles 4.1.10.4. or 4.1.10.5. (as relevant) may maintain its status as NHP free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from NHP following the provisions of point 3 of Articles 4.1.10.4. or 4.1.10.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as NHP free provided that conditions that are conducive to clinical expression of NHP, as described in Chapter X.X.X. of the *Aquatic Manual*, exist, and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of NHP, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 4.1.10.7.

Importation of live aquatic animals from a country, zone or compartment declared free from necrotising hepatopancreatitis

When importing live *aquatic animals* of species referred to in Article 4.1.10.2. from a country, *zone* or *compartment* declared free from NHP, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.10.4. or 4.1.10.5. (as applicable), the place of production of the commodity consignment is a country, *zone* or *compartment* declared free from NHP.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.3.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.10.3.

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Article 4.1.10.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from necrotising hepatopancreatitis

1. When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 4.1.10.2. from a country, *zone* or *compartment* not declared free from NHP, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:
 - a) the direct delivery into and holding of the consignment in *quarantine* facilities;
 - b) the continuous isolation of the imported live *aquatic animals* and their first generation progeny from the local environment;
 - c) the treatment of all effluent and waste materials from the processing in a manner that ensures inactivation of NHP-B.
2. If the intention of the introduction is the establishment of new genetic lines, international standards, such as the Guidelines of the International Council for the Exploration of the Seas (ICES), should be followed.
3. For the purposes of the *Aquatic Code*, the ICES Guidelines may be summarised to the following main points:
 - a) identify stock of interest (cultured or wild) in its current location;
 - b) evaluate stock's health/*disease* history;
 - c) take and test samples for NHP-B, pests and general health/*disease* status;
 - d) import and quarantine in a secure facility a founder (F-0) population;
 - e) produce F-1 generation from the F-0 stock in *quarantine*;
 - f) culture F-1 stock and at critical times in its development (life cycle) sample and test for NHP-B and perform general examinations for pests and general health/*disease* status;
 - g) if NHP-B is not detected, pests are not present, and the general health/*disease* status of the stock is considered to meet the *basic biosecurity conditions* of the *importing country*, *zone* or *compartment*, the F-1 stock may be defined as NHP free or specific pathogen free (SPF) for NHP-B;
 - h) release SPF F-1 stock from *quarantine* for *aquaculture* or stocking purposes in the country, *zone* or *compartment*.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.10.3.

Article 4.1.10.9.

Importation of live aquatic animals for human consumption from a country, zone or compartment not declared free from necrotising hepatopancreatitis

When importing, for human consumption, live *aquatic animals* of species referred to in Article 4.1.10.2. from a country, *zone* or *compartment* not declared free from NHP, the *Competent Authority* of the *importing country* should require that:

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1. the consignment be delivered directly to and held in isolation until consumption; and
2. all effluent, dead *aquatic animals* and waste materials from the processing be treated in a manner that ensures inactivation of NHP-B.

Member Countries should consider introducing internal measures to prevent such *commodities* being used for any purpose other than for human consumption.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.10.3.

Article 4.1.10.10.

Importation of aquatic animal products from a country, zone or compartment declared free from necrotising hepatopancreatitis

When importing *aquatic animal products* of species referred to in Article 4.1.10.2. from a country, *zone* or *compartment* declared free from NHP, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.10.4. or 4.1.10.5. (as applicable), the place of production of the consignment is a country, *zone* or *compartment* declared free from NHP.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.2.2.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.10.3.

Article 4.1.10.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from necrotising hepatopancreatitis

When importing *aquatic animal products* of species referred to in Article 4.1.10.2. from a country, *zone* or *compartment* not declared free from NHP, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.10.3.

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CHAPTER 4.1.11.

WHITE TAIL DISEASE

Article 4.1.11.1.

For the purposes of the *Aquatic Code*, white tail disease (WTD) means *infection* with macrobrachium nodavirus (MrNV). This virus has yet to be formally classified.

Methods for surveillance and diagnosis are provided in the *Aquatic Manual*.

Article 4.1.11.2.

Scope

The recommendations in this Chapter apply to: the giant fresh water prawn (*Macrobrachium rosenbergii*). Other common names are listed in the *Aquatic Manual*. These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 4.1.11.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* of the *importing country* should not require any WTD related conditions, regardless of the WTD status of the *exporting country*, *zone* or *compartment*.
 - a) For the species referred to in Article 4.1.11.2. for any purpose:
 - i) commercially sterile canned products;
 - ii) boiled products (e.g. boiled whole shrimp or tails, lobsters, crabs);
 - iii) chemically extracted chitin;
 - iv) crustacean meals or by-products made non-infectious by heating or drying (e.g. flame dried or sun dried);
 - v) crustacean products made non-infectious through processing as dry feeds (e.g. pelleted or extruded feeds);
 - vi) biological samples preserved for diagnostic applications in such a manner as to inactivate the MrNV (e.g. formalin or alcohol preserved samples).
 - b) The following products destined for human consumption from species referred to in Article 4.1.11.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. salted, pickled, marinated, pastes, etc.);
 - ii) products that have been heat treated or dried (e.g. ready prepared meals) in a manner to ensure inactivation of the pathogen.

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For the *commodities* listed in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

2. When authorising the importation or transit of the *commodities* of a species referred to in Article 4.1.11.2., other than those listed in point 1 of Article 4.1.11.3., the *Competent Authorities* of the *importing country* should require the conditions prescribed in Articles 4.1.11.7. to 4.1.11.11. relevant to the WTD status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any ~~other~~ *commodity* of a species not referred to in Article 4.1.11.2. but which could reasonably be expected to be a potential MrNV carrier from an *exporting country, zone or compartment* not declared free of WTD, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of MrNV, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 4.1.11.4.

White tail disease free country

A country may make a *self-declaration of freedom* from WTD if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from WTD if all the areas covered by the shared water are declared WTD free countries or zones (see Article 4.1.11.5.).

1. A country where none of the *susceptible species* referred to in Article 4.1.11.2. is present may make a *self-declaration of freedom* from WTD when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where the species referred to in Article 4.1.11.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from WTD when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

3. A country where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from WTD when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the last 2 years without detection of MrNV.

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OR

4. A country that has previously made a *self-declaration of freedom* from WTD but in which the *disease* is subsequently detected may not make a *self-declaration of freedom* from WTD again until the following conditions have been met:
- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of MrNV.

In the meantime, part of the non-affected area may be declared a free *zone* provided that they meet the conditions in point 3 of Article 4.1.11.5.

Article 4.1.11.5.

White tail disease free zone or free compartment

A *zone* or *compartment* within the *territory* of one or more countries not declared free from WTD may be declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a WTD free *zone* or *compartment* if all the relevant *Competent Authorities* confirm that the conditions have been met.

1. A *zone* or *compartment* where none of the *susceptible species* referred to in Article 4.1.11.2. is present may be declared free from WTD when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

2. A *zone* or *compartment* where the species referred to in Article 4.1.11.2. are present but in which there has not been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from WTD when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

3. A *zone* or *compartment* where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from WTD when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place, through the *zone* or *compartment*, for at least the past 2 years without detection of MrNV.

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OR

4. A *zone* previously declared free from WTD but in which the *disease* is detected may not be declared free from WTD again until the following conditions have been met:
- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of MrNV.

Article 4.1.11.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from WTD following the provisions of points 1 or 2 of Articles 4.1.11.4. or 4.1.11.5. (as relevant) may maintain its status as WTD free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from WTD following the provisions of point 3 of Articles 4.1.11.4. or 4.1.11.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as WTD free provided that conditions that are conducive to clinical expression of WTD, as described in Chapter X.X.X. of the *Aquatic Manual*, exist, and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of WTD, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 4.1.11.7.

Importation of live aquatic animals from a country, zone or compartment declared free from white tail disease

When importing live *aquatic animals* of species referred to in Article 4.1.11.2. from a country, *zone* or *compartment* declared free from WTD, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.11.4. or 4.1.11.5. (as applicable), the place of production of the commodity consignment is a country, *zone* or *compartment* declared free from WTD.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.3.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.11.3.

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Article 4.1.11.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from white tail disease

1. When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 4.1.11.2. from a country, *zone* or *compartment* not declared free from WTD, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:
 - a) the direct delivery into and holding of the consignment in *quarantine* facilities;
 - b) the continuous isolation of the imported live *aquatic animals* and their first generation progeny from the local environment;
 - c) the treatment of all effluent and waste materials from the processing in a manner that ensures inactivation of MrNV.
2. If the intention of the introduction is the establishment of new genetic lines, international standards, such as the Guidelines of the International Council for the Exploration of the Seas (ICES), should be followed.
3. For the purposes of the *Aquatic Code*, the ICES Guidelines may be summarised to the following main points:
 - a) identify stock of interest (cultured or wild) in its current location;
 - b) evaluate stock's health/*disease* history;
 - c) take and test samples for MrNV, pests and general health/*disease* status;
 - d) import and quarantine in a secure facility a founder (F-0) population;
 - e) produce F-1 generation from the F-0 stock in *quarantine*;
 - f) culture F-1 stock and at critical times in its development (life cycle) sample and test for MrNV and perform general examinations for pests and general health/*disease* status;
 - g) if MrNV is not detected, pests are not present, and the general health/*disease* status of the stock is considered to meet the *basic biosecurity conditions* of the *importing country*, *zone* or *compartment*, the F-1 stock may be defined as WTD free or specific pathogen free (SPF) for MrNV;
 - h) release SPF F-1 stock from *quarantine* for *aquaculture* or stocking purposes in the country, *zone* or *compartment*.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.11.3.

Article 4.1.11.9.

Importation of live aquatic animals for human consumption from a country, zone or compartment not declared free from white tail disease

When importing, for human consumption, live *aquatic animals* of species referred to in Article 4.1.11.2. from a country, *zone* or *compartment* not declared free from WTD, the *Competent Authority* of the *importing country* should require that:

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1. the consignment be delivered directly to and held in isolation until consumption; and
2. all effluent, dead *aquatic animals* and waste materials from the processing be treated in a manner that ensures inactivation of MrNV.

Member Countries should consider introducing internal measures to prevent such *commodities* being used for any purpose other than for human consumption.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.11.3.

Article 4.1.11.10.

Importation of aquatic animal products from a country, zone or compartment declared free from white tail disease

When importing *aquatic animal products* of species referred to in Article 4.1.11.2. from a country, *zone* or *compartment* declared free from WTD, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.11.4. or 4.1.11.5. (as applicable), the place of production of the consignment is a country, *zone* or *compartment* declared free from WTD.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.2.2.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.11.3.

Article 4.1.11.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from white tail disease

When importing *aquatic animal products* of species referred to in Article 4.1.11.2. from a country, *zone* or *compartment* not declared free from WTD, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.11.3.

CHAPTER 4.1.12.

HEPATOPANCREATIC PARVOVIRUS DISEASE

Article 4.1.12.1.

For the purposes of the *Aquatic Code*, hepatopancreatic parvovirus disease (HPVD) means *infection* with hepatopancreatic parvovirus (HPV). It is considered to be a member of the subfamily of the *Densovirinae* in the family *Parvoviridae*.

Methods for surveillance and diagnosis are provided in the *Aquatic Manual*.

Article 4.1.12.2.

Scope

The recommendations in this Chapter apply to: Indian white shrimp (*Penaeus indicus*), black tiger shrimp (*Penaeus monodon*), Pacific white shrimp (*Penaeus vannamei*) and Pacific blue shrimp (*P. stylirostris*). These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 4.1.12.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* of the *importing country* should not require any HPVD related conditions, regardless of the HPVD status of the *exporting country*, *zone* or *compartment*.
 - a) For the species referred to in Article 4.1.12.2. for any purpose:
 - i) commercially sterile canned products;
 - ii) boiled products (e.g. boiled whole shrimp or tails, lobsters, crabs);
 - iii) chemically extracted chitin;
 - iv) crustacean meals or by-products made non-infectious by heating or drying (e.g. flame dried or sun dried);
 - v) crustacean products made non-infectious through processing as dry feeds (e.g. pelleted or extruded feeds);
 - vi) biological samples preserved for diagnostic applications in such a manner as to inactivate the HPV (e.g. formalin or alcohol preserved samples).
 - b) The following products destined for human consumption from species referred to in Article 4.1.12.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. salted, pickled, marinated, pastes, etc.);

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- ii) products that have been heat treated or dried (e.g. ready prepared meals) in a manner to ensure inactivation of the pathogen;
- iii) de-headed and “de-veined” (intestine removed) shrimp tails.

For the *commodities* listed in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

2. When authorising the importation or transit of the *commodities* of a species referred to in Article 4.1.12.2., other than those listed in point 1 of Article 4.1.12.3., the *Competent Authorities* of the *importing country* should require the conditions prescribed in Articles 4.1.12.7. to 4.1.12.11. relevant to the HPVD status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any ~~other~~ *commodity* of a species not referred to in Article 4.1.12.2. but which could reasonably be expected to be a potential HPV carrier from an *exporting country, zone or compartment* not declared free of HPVD, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of HPV, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 4.1.12.4.

Hepatopancreatic parvovirus disease free country

A country may make a *self-declaration of freedom* from HPVD if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from HPVD if all the areas covered by the shared water are declared HPVD free countries or zones (see Article 4.1.12.5.).

1. A country where none of the *susceptible species* referred to in Article 4.1.12.2. is present may make a *self-declaration of freedom* from HPVD when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where the species referred to in Article 4.1.12.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from HPVD when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

3. A country where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from HPVD when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the last 2 years without detection of HPV.

Appendix XXXIV (contd)Appendix XIII (contd)

OR

4. A country that has previously made a *self-declaration of freedom* from HPVD but in which the *disease* is subsequently detected may not make a *self-declaration of freedom* from HPVD again until the following conditions have been met:
- on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of HPV.

In the meantime, part of the non-affected area may be declared a free *zone* provided that they meet the conditions in point 3 of Article 4.1.12.5.

Article 4.1.12.5.

Hepatopancreatic parvovirus disease free zone or free compartment

A *zone* or *compartment* within the *territory* of one or more countries not declared free from HPVD may be declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a HPVD free *zone* or *compartment* if all the relevant *Competent Authorities* confirm that the conditions have been met.

- A *zone* or *compartment* where none of the *susceptible species* referred to in Article 4.1.12.2. is present may be declared free from HPVD when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

- A *zone* or *compartment* where the species referred to in Article 4.1.12.2. are present but in which there has not been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from HPVD when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

- A *zone* or *compartment* where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from HPVD when:
 - basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place, through the *zone* or *compartment*, for at least the past 2 years without detection of HPV.

Appendix XXXIV (contd)Appendix XIII (contd)

OR

4. A *zone* previously declared free from HPVD but in which the *disease* is detected may not be declared free from HPVD again until the following conditions have been met:
- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of HPV.

Article 4.1.12.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from HPVD following the provisions of points 1 or 2 of Articles 4.1.12.4. or 4.1.12.5. (as relevant) may maintain its status as HPVD free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from HPVD following the provisions of point 3 of Articles 4.1.12.4. or 4.1.12.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as HPVD free provided that conditions that are conducive to clinical expression of HPVD, as described in Chapter X.X.X. of the *Aquatic Manual*, exist, and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of HPVD, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 4.1.12.7.

Importation of live aquatic animals from a country, zone or compartment declared free from hepatopancreatic parvovirus disease

When importing live *aquatic animals* of species referred to in Article 4.1.12.2. from a country, *zone* or *compartment* declared free from HPVD, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.12.4. or 4.1.12.5. (as applicable), the place of production of the commodity consignment is a country, *zone* or *compartment* declared free from HPVD.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.3.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.12.3.

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Article 4.1.12.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from hepatopancreatic parvovirus disease

1. When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 4.1.12.2. from a country, *zone* or *compartment* not declared free from HPVD, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:
 - a) the direct delivery into and holding of the consignment in *quarantine* facilities;
 - b) the continuous isolation of the imported live *aquatic animals* and their first generation progeny from the local environment;
 - c) the treatment of all effluent and waste materials from the processing in a manner that ensures inactivation of HPV.
2. If the intention of the introduction is the establishment of new genetic lines, international standards, such as the Guidelines of the International Council for the Exploration of the Seas (ICES), should be followed.
3. For the purposes of the *Aquatic Code*, the ICES Guidelines may be summarised to the following main points:
 - a) identify stock of interest (cultured or wild) in its current location;
 - b) evaluate stock's health/*disease* history;
 - c) take and test samples for HPV, pests and general health/*disease* status;
 - d) import and quarantine in a secure facility a founder (F-0) population;
 - e) produce F-1 generation from the F-0 stock in *quarantine*;
 - f) culture F-1 stock and at critical times in its development (life cycle) sample and test for HPV and perform general examinations for pests and general health/*disease* status;
 - g) if HPV is not detected, pests are not present, and the general health/*disease* status of the stock is considered to meet the *basic biosecurity conditions* of the *importing country*, *zone* or *compartment*, the F-1 stock may be defined as HPVD free or specific pathogen free (SPF) for HPV;
 - h) release SPF F-1 stock from *quarantine* for *aquaculture* or stocking purposes in the country, *zone* or *compartment*.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.12.3.

Article 4.1.12.9.

Importation of live aquatic animals for human consumption from a country, zone or compartment not declared free from hepatopancreatic parvovirus disease

When importing, for human consumption, live *aquatic animals* of species referred to in Article 4.1.12.2. from a country, *zone* or *compartment* not declared free from HPVD, the *Competent Authority* of the *importing country* should require that:

Appendix XXXIV (contd)Appendix XIII (contd)

1. the consignment be delivered directly to and held in isolation until consumption; and
2. all effluent, dead *aquatic animals* and waste materials from the processing be treated in a manner that ensures inactivation of HPV.

Member Countries should consider introducing internal measures to prevent such *commodities* being used for any purpose other than for human consumption.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.12.3.

Article 4.1.12.10.

Importation of aquatic animal products from a country, zone or compartment declared free from hepatopancreatic parvovirus disease

When importing *aquatic animal products* of species referred to in Article 4.1.12.2. from a country, *zone* or *compartment* declared free from HPVD, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.12.4. or 4.1.12.5. (as applicable), the place of production of the consignment is a country, *zone* or *compartment* declared free from HPVD.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.2.2.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.12.3.

Article 4.1.12.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from hepatopancreatic parvovirus disease

When importing *aquatic animal products* of species referred to in Article 4.1.12.2. from a country, *zone* or *compartment* not declared free from HPVD, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.12.3.

CHAPTER 4.1.13.

MOURILYAN VIRUS DISEASE

Article 4.1.13.1.

For the purposes of the *Aquatic Code*, Mourilyan virus disease (MoVD) means *infection* with infection with Mourilyan virus (MoV). This virus is similar to members of the *Bunyaviridae*, but has yet to be formally classified.

Methods for surveillance and diagnosis are provided in the *Aquatic Manual*.

Article 4.1.13.2.

Scope

The recommendations in this Chapter apply to: black tiger shrimp (*Penaeus monodon*) and kuruma shrimp (*Penaeus japonicus*). These recommendations also apply to any other *susceptible species* referred to in the *Aquatic Manual* when traded internationally.

Article 4.1.13.3.

Commodities

1. When authorising the importation or transit of the following *commodities*, the *Competent Authorities* of the *importing country* should not require any MoVD related conditions, regardless of the MoVD status of the *exporting country*, *zone* or *compartment*.
 - a) For the species referred to in Article 4.1.13.2. for any purpose:
 - i) commercially sterile canned products;
 - ii) boiled products (e.g. boiled whole shrimp or tails, lobsters, crabs);
 - iii) chemically extracted chitin;
 - iv) crustacean meals or by-products made non-infectious by heating or drying (e.g. flame dried or sun dried);
 - v) crustacean products made non-infectious through processing as dry feeds (e.g. pelleted or extruded feeds);
 - vi) biological samples preserved for diagnostic applications in such a manner as to inactivate the MoV (e.g. formalin or alcohol preserved samples).
 - b) The following products destined for human consumption from species referred to in Article 4.1.13.2. which have been prepared in such a way as to minimise the likelihood of alternative uses:
 - i) chemically preserved products (e.g. salted, pickled, marinated, pastes, etc.);

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- ii) products that have been heat treated or dried (e.g. ready prepared meals) in a manner to ensure inactivation of the pathogen.

For the *commodities* listed in point 1b), Member Countries should consider introducing internal measures to prevent the *commodity* being used for any purpose other than for human consumption.

2. When authorising the importation or transit of the *commodities* of a species referred to in Article 4.1.13.2., other than those listed in point 1 of Article 4.1.13.3., the *Competent Authorities* of the *importing country* should require the conditions prescribed in Articles 4.1.13.7. to 4.1.13.11. relevant to the MoVD status of the *exporting country, zone or compartment*.
3. When considering the importation or transit of any ~~other~~ *commodity* of a species not referred to in Article 4.1.13.2. but which could reasonably be expected to be a potential MoV carrier from an *exporting country, zone or compartment* not declared free of MoVD, the *Competent Authorities* of the *importing country* should conduct an analysis of the risk of introduction, establishment and spread of MoV, and the potential consequences, associated with the importation of the *commodity* prior to a decision. The *exporting country* should be informed of the outcome of this assessment.

Article 4.1.13.4.

Mourilyan virus disease free country

A country may make a *self-declaration of freedom* from MoVD if it meets the conditions in points 1, 2, 3 or 4 below.

If a country shares a *zone* with one or more other countries, it can only make a *self-declaration of freedom* from MoVD if all the areas covered by the shared water are declared MoVD free countries or zones (see Article 4.1.13.5.).

1. A country where none of the *susceptible species* referred to in Article 4.1.13.2. is present may make a *self-declaration of freedom* from MoVD when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

2. A country where the species referred to in Article 4.1.13.2. are present but there has never been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from MoVD when *basic biosecurity conditions* have been met continuously in the country for at least the past 2 years.

OR

3. A country where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may make a *self-declaration of freedom* from MoVD when:
 - a) *basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - b) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the last 2 years without detection of MoV.

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OR

4. A country that has previously made a *self-declaration of freedom* from MoVD but in which the *disease* is subsequently detected may not make a *self-declaration of freedom* from MoVD again until the following conditions have been met:
- on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of MoV.

In the meantime, part of the non-affected area may be declared a free *zone* provided that they meet the conditions in point 3 of Article 4.1.13.5.

Article 4.1.13.5.

Mourilyan virus disease free zone or free compartment

A *zone* or *compartment* within the *territory* of one or more countries not declared free from MoVD may be declared free by the *Competent Authority(ies)* of the country(ies) concerned if the *zone* or *compartment* meets the conditions referred to in points 1, 2, 3 or 4 below.

If a *zone* or *compartment* extends over more than one country, it can only be declared a MoVD free *zone* or *compartment* if all the relevant *Competent Authorities* confirm that the conditions have been met.

- A *zone* or *compartment* where none of the *susceptible species* referred to in Article 4.1.13.2. is present may be declared free from MoVD when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

- A *zone* or *compartment* where the species referred to in Article 4.1.13.2. are present but in which there has not been any observed occurrence of the *disease* for at least the past 10 years despite conditions that are conducive to its clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from MoVD when *basic biosecurity conditions* have been met continuously in the *zone* or *compartment* for at least the past 2 years.

OR

- A *zone* or *compartment* where the last observed occurrence of the *disease* was within the past 10 years or where the *infection* status prior to *targeted surveillance* was unknown, for example because of the absence of conditions conducive to clinical expression, as described in Chapter X.X.X. of the *Aquatic Manual*, may be declared free from MoVD when:
 - basic biosecurity conditions* have been met continuously for at least the past 2 years; and
 - targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place, through the *zone* or *compartment*, for at least the past 2 years without detection of MoV.

Appendix XXXIV (contd)Appendix XIV (contd)

OR

4. A *zone* previously declared free from MoVD but in which the *disease* is detected may not be declared free from MoVD again until the following conditions have been met:
- a) on detection of the *disease*, the affected area was declared an *infected zone* and a *buffer zone* was established; and
 - b) infected populations have been destroyed or removed from the *infected zone* by means that minimise the risk of further spread of the *disease*, and the appropriate *disinfection* procedures (see *Aquatic Manual*) have been completed; and
 - c) *targeted surveillance*, as described in Chapters 1.1.4. and X.X.X. of the *Aquatic Manual*, has been in place for at least the past 2 years without detection of MoV.

Article 4.1.13.6.

Maintenance of free status

A country, *zone* or *compartment* that is declared free from MoVD following the provisions of points 1 or 2 of Articles 4.1.13.4. or 4.1.13.5. (as relevant) may maintain its status as MoVD free provided that *basic biosecurity conditions* are continuously maintained.

A country, *zone* or *compartment* that is declared free from MoVD following the provisions of point 3 of Articles 4.1.13.4. or 4.1.13.5. (as relevant) may discontinue *targeted surveillance* and maintain its status as MoVD free provided that conditions that are conducive to clinical expression of MoVD, as described in Chapter X.X.X. of the *Aquatic Manual*, exist, and *basic biosecurity conditions* are continuously maintained.

However, for declared free *zones* or *compartments* in infected countries and in all cases where conditions are not conducive to clinical expression of MoVD, *targeted surveillance* needs to be continued at a level determined by the *Competent Authority* on the basis of the likelihood of *infection*.

Article 4.1.13.7.

Importation of live aquatic animals from a country, zone or compartment declared free from Mourilyan virus disease

When importing live *aquatic animals* of species referred to in Article 4.1.13.2. from a country, *zone* or *compartment* declared free from MoVD, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.13.4. or 4.1.13.5. (as applicable), the place of production of the commodity consignment is a country, *zone* or *compartment* declared free from MoVD.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.1.3.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.13.3.

Article 4.1.13.8.

Importation of live aquatic animals for aquaculture from a country, zone or compartment not declared free from Mourilyan virus disease

1. When importing, for *aquaculture*, live *aquatic animals* of species referred to in Article 4.1.13.2. from a country, *zone* or *compartment* not declared free from MoVD, the *Competent Authority* of the *importing country* should assess the risk and apply risk mitigation measures such as:
 - a) the direct delivery into and holding of the consignment in *quarantine* facilities;
 - b) the continuous isolation of the imported live *aquatic animals* and their first generation progeny from the local environment;
 - c) the treatment of all effluent and waste materials from the processing in a manner that ensures inactivation of MoV.
2. If the intention of the introduction is the establishment of new genetic lines, international standards, such as the Guidelines of the International Council for the Exploration of the Seas (ICES), should be followed.
3. For the purposes of the *Aquatic Code*, the ICES Guidelines may be summarised to the following main points:
 - a) identify stock of interest (cultured or wild) in its current location;
 - b) evaluate stock's health/*disease* history;
 - c) take and test samples for MoV, pests and general health/*disease* status;
 - d) import and quarantine in a secure facility a founder (F-0) population;
 - e) produce F-1 generation from the F-0 stock in *quarantine*;
 - f) culture F-1 stock and at critical times in its development (life cycle) sample and test for MoV and perform general examinations for pests and general health/*disease* status;
 - g) if MoV is not detected, pests are not present, and the general health/*disease* status of the stock is considered to meet the *basic biosecurity conditions* of the *importing country*, *zone* or *compartment*, the F-1 stock may be defined as MoVD free or specific pathogen free (SPF) for MoV;
 - h) release SPF F-1 stock from *quarantine* for *aquaculture* or stocking purposes in the country, *zone* or *compartment*.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.13.3.

Article 4.1.13.9.

Importation of live aquatic animals for human consumption from a country, zone or compartment not declared free from Mourilyan virus disease

When importing, for human consumption, live *aquatic animals* of species referred to in Article 4.1.13.2. from a country, *zone* or *compartment* not declared free from MoVD, the *Competent Authority* of the *importing country* should require that:

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1. the consignment be delivered directly to and held in isolation until consumption; and
2. all effluent, dead *aquatic animals* and waste materials from the processing be treated in a manner that ensures inactivation of MoV.

Member Countries should consider introducing internal measures to prevent such *commodities* being used for any purpose other than for human consumption.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.13.3.

Article 4.1.13.10.

Importation of aquatic animal products from a country, zone or compartment declared free from Mourilyan virus disease

When importing *aquatic animal products* of species referred to in Article 4.1.13.2. from a country, *zone* or *compartment* declared free from MoVD, the *Competent Authority* of the *importing country* should require an *international aquatic animal health certificate* issued by the *Competent Authority* of the *exporting country* or a *certifying official* approved by the *importing country* attesting that, on the basis of the procedures described in Articles 4.1.13.4. or 4.1.13.5. (as applicable), the place of production of the consignment is a country, *zone* or *compartment* declared free from MoVD.

The *certificate* should be in accordance with the Model Certificate in Appendix 4.2.2.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.13.3.

Article 4.1.13.11.

Importation of aquatic animal products from a country, zone or compartment not declared free from Mourilyan virus disease

When importing *aquatic animal products* of species referred to in Article 4.1.13.2. from a country, *zone* or *compartment* not declared free from MoVD, the *Competent Authority* of the *importing country* should assess the risk and apply appropriate risk mitigation measures.

This Article does not apply to *commodities* listed in point 1 of Article 4.1.13.3.



REPORT OF THE MEETING OF THE OIE AD HOC GROUP ON AMPHIBIAN DISEASES
Paris, 11-13 September 2006

The OIE *ad hoc* Group on Amphibian Diseases (hereinafter referred to as the *ad hoc* Group) held its meeting at the OIE Headquarters from 11 to 13 September 2006.

The members of the OIE *ad hoc* Group are listed in [Appendix I](#). The Agenda adopted is given in [Appendix II](#).

On behalf of Dr Bernard Vallat, Director General of the OIE, Dr Sarah Kahn, Head of the International Trade Department, welcomed the members of the *ad hoc* Group and thanked them for their willingness to be involved in addressing this issue for the OIE. She recalled the OIE mandate, under the Sanitary and Phyto-sanitary Agreement of the World Trade Organisation (the SPS Agreement), to safeguard animal health and public health in world trade by publishing health standards for international trade in animals and animal products. She indicated that this *ad hoc* Group would need to advise the OIE Aquatic Animal Health Standards Commission (the Aquatic Animals Commission) on whether OIE standards should be developed for international trade in amphibians.

Prof. Barry Hill, the Chair of the *ad hoc* Group, presented the terms of reference and explained the work previously done and the position of the Aquatic Animals Commission on the issue of amphibian diseases. He also presented the disease listing criteria present in Chapter 1.2.2. of the OIE *Aquatic Animal Health Code* (the *Aquatic Code*); the *ad hoc* Group acknowledged that these criteria would eventually apply to amphibian diseases if OIE standards are to be developed for them. The terms of reference are appended at [Appendix III](#).

1. Review of the published scientific information

Prior to the meeting the *ad hoc* Group members had provided copies of a number of scientific papers dealing with international trade in amphibians and related diseases. The *ad hoc* Group considered this information, the relevant references to which are provided in [Appendices IV and V](#), and highlighted the following points:

- a) Global trade in amphibians
 - i) *For human consumption.* Amphibians, primarily *Rana* spp. and *Leptodactylus* spp. frogs, are traded internationally as food items for human consumption being derived from wild-caught populations and increasingly from frog farms (Teixeira *et al.*, 2001). Data on wild-caught and farmed amphibian production for food show a rise in total annual production to 6,657 tonnes from 1987-1998 (Teixeira *et al.*, 2001). During this period, the most important producers were Asian and Latin American countries and the biggest consumers were North American, European and the domestic markets in some Asian countries (Teixeira *et al.*, 2001). In the USA alone, an average of 777,309 live individual bullfrogs were imported annually between 1998 and 2002 (Schlaepfer *et al.*, 2005). This is an underestimate of the total trade, which includes body parts and products, and other species of ranids (Schlaepfer *et al.*, 2005). The FAO considered the US import market in farmed frogs for human consumption to be 'clearly not yet satisfied' (Teixeira *et al.*, 2001). The *ad hoc* Group noted that it is therefore likely that the international trade will continue to rapidly grow and, without appropriate animal health standards, it is inevitable that there will be further distribution of infectious diseases of amphibians.

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The *ad hoc* Group noted that both the Consortium for Conservation Medicine report (CCM report, 2006) and the FAO report (Teixeira *et al.*, 2001) found data to be incomplete and the availability of accurate data “still far from desirable” (Teixeira *et al.*, 2001). The committee extrapolated from data in Schlaepfer *et al.* (2005) to estimate a total global trade in live frogs for food of 5,000,000 per annum. However, this is likely to be a gross underestimate because of the high volume of trade in amphibian parts and the lack of data from some key countries. An example of the latter is China, for which only data from one study in Hong Kong are available. The Hong Kong study (Lau *et al.*, 1996) reports that 6,000,000 wild-caught edible frogs were imported to Hong Kong from Thailand during a 1-year study period (this figure is not included in the values provided by FAO). A number of other countries exist where amphibians are widely consumed and data have not been reported, and it is likely that the true size of the global trade in amphibians for food is in the tens of millions per annum. It may be that the true volume of trade is significantly higher. This, and the lack of more up-to-date information highlights the need for member countries to respond to the questionnaire below.

The *ad hoc* Group reproduced Table 1 below (Teixeira *et al.*, 2001) to highlight the increased production of ranid frogs for human consumption. A detailed report on this can be found on the Consortium for Conservation Medicine web site (CCM report 2006).

Country	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Argentina	0	0	0	0	0	0	50	50	50	50	50	50
Bangladesh	2318	2824	2685	739	318	771	700	700	0	0	0	0
Brazil	10	29	40	60	90	120	140	165	304	415	522	570
Cuba	224	235	203	137	96	73	52	52	62	69	46	28
India	0	13	15	29	-	-	-	-	-	-	-	-
Indonesia	689	1582	1342	1590	1957	2666	2411	2111	2194	1793	1390	1330
Mexico	1327	1007	461	868	309	350	352	350	547	414	2063	1229
Romania	29	0	0	0	0	2	0	0	0	0	0	41
Taiwan PC	-	-	327	134	188	784	2052	1132	1378	1259	730	1700
Thailand	20	20	6	5	18	131	321	353	137	1600	1570	1600
Turkey	-	-	-	-	1321	648	750	851	864	740	160	100
Uruguay	0	1	0	-	-	-	-	-	15	3	3	3
USA	1	4	1	0	9	18	20	17	5	2	9	6
TOTAL	4618	5715	5080	3562	4306	5563	6848	5781	5556	6345	6543	6657

Table 1: Production (in tonnes) of ranid frogs for human consumption, broken down by country. Source: (Teixeira *et al.*, 2001). It is important to note that these data are incomplete. For example, China is a major producer and consumer of frogs for consumption (see text above), but data are not listed in the table above. Asian countries are the most important producers of amphibians for human consumption, and produce 19.43% of US imports (Parker and Lilly 2004). Amphibians produced for this trade are often traded internationally. For example, between 1998 and 2002 inclusive, the U.S.A. which is one of the largest markets in amphibians for food, imported 14.7 million live amphibians (4 million for human consumption) and 5.2 million kg of amphibian products (Schlaepfer *et al.*, 2005). Asia is probably the second largest market for frog leg consumption in the world, but the data are far less complete.

Appendix XXXV (contd)

- ii) *For the pet industry.* There has been a large, robust international trade in amphibians for the pet industry over the past few decades. In the UK, amphibians constitute around 15% of the number of species listed for sale by retailers and wholesalers of herpetofauna, in a trade that involved around 1,000,000 individuals (reptiles and amphibians) per annum during the 1990s (Smart and Bride, 1993). Accurate figures for the global trade in pet amphibians are not available, but the global pet/zoo trade in CITES-listed amphibians alone was around 120,000 per annum between 1998 and 2002 inclusive (Schlaepfer *et al.*, 2005). The *ad hoc* Group noted that the only consistent official data on international trade in amphibians for pets is collected by the US Fish and Wildlife Service, under the Law Enforcement Management Information System. Some of these data were analyzed by Schlaepfer *et al.* (2005) showing that an average of 1,005,717 individuals were shipped across US borders each year between 1998 and 2002 for this trade. However, even with these impressive US FWS datasets, data are somewhat incomplete, with only a small number of commonly traded species identified as species in the database. The *ad hoc* Group extrapolated from data published by Schlaepfer *et al.* (2005) to estimate the global trade in amphibians for pets and derived a figure of greater than 6,000,000 individuals per annum.
- iii) *For laboratory animals.* There is an extensive trade in wild caught ranid species in the United States of America (Daszak *et al.*, 2004) and *Bufo marinus* in Australia (Speare, pers. comm.) for laboratory use. *Xenopus* spp. (especially *X. laevis*) have been traded globally since 1934 as laboratory animals, initially for pregnancy testing and more recently for immunological and other scientific purposes (Weldon *et al.*, 2004). During 1998-2004 approximately 10,000 *Xenopus laevis* were exported per year from South Africa (Weldon, 2005). Both wild caught and captive bred *Xenopus* spp. continue to be traded internationally and feral populations are now established in at least 4 countries.

b) Amphibian diseases

Amphibians experience infectious diseases caused by viruses, bacteria, fungi, protozoa, helminths and arthropods (Whitaker and Wright, 2001). Some diseases are represented only by isolated reports, but could potentially be devastating should they be introduced to naïve populations. Other diseases are well recognised as being highly pathogenic to susceptible captive and wild populations.

The *ad hoc* Group considered that there are two pathogens of particular importance. One pathogen, the amphibian chytrid fungus (*Batrachochytrium dendrobatidis*), causes chytridiomycosis which has become pandemic in wild amphibians, resulting in loss of amphibian populations across 5 continents. The other is a viral genus, Ranavirus, which contains a number of closely related species. Ranaviral disease has been seen in captive amphibians and in epizootics in wild amphibians in North America and the United Kingdom. Apart from causing high rates of mortality in amphibians, some members of this genus can also infect fish and reptiles, resulting in morbidity and mortality.

- i) *Chytridiomycosis.* After considering published literature on chytridiomycosis, the *ad hoc* Group concluded that the amphibian chytrid fungus, *B. dendrobatidis*, has a remarkably low host specificity since it has infected at least 143 species of amphibians from 43 genera, 19 families and 2 orders, indicating that globally probably most or all species of amphibians could be infected (Department of Environment and Heritage - Australia 2006). However, after infection, the morbidity and mortality caused by chytridiomycosis varies with the species of amphibian and the environmental conditions, mortality increasing with lower temperature (Berger *et al.*, 2004; Retallick *et al.*, 2004; McDonald *et al.*, 2005). Some species of amphibians, when infected, have

Appendix XXXV (contd)

a high level of resistance to disease (e.g. the American bullfrog *Rana catesbeiana* and the African clawed toad *X. laevis*) and their involvement in the amphibian trade means they are ideal carriers (Daszak *et al.*, 2004; Weldon *et al.*, 2004). At the other end of the disease spectrum some species are highly susceptible and, when infected in the wild, populations decline, resulting in an increase in their threatened species status and even driving species to extinction (Berger, *et al.*, 1998; Schoegel *et al.*, 2005; Department of Environment and Heritage - Australia 2006). The *ad hoc* Group concluded that chytridiomycosis has been a cause of decline in wild amphibian populations in 5 continents, North and South America, Australasia, Europe, and Africa. There are no records of chytridiomycosis from Asia. In Australia, infection with the chytrid fungus resulting in chytridiomycosis was listed as a key threatening process and a threat abatement plan has been implemented (Department of Environment and Heritage - Australia 2006). Australia has set a high standard in developing a national strategy to address the impact of chytridiomycosis.

Experience in Australia, Panama and the United States of America indicate that the appearance of *B. dendrobatidis* is associated with local mortality in wild amphibians (Berger *et al.*, 1998; Lips *et al.*, 2006; Daszak *et al.*, 1999). The *ad hoc* Group noted that once established, chytridiomycosis spreads as an epidemic wave travelling up to 100 km per year into uninfected populations (Laurance *et al.*, 1996, Lips *et al.*, 2006). Once the epidemic wave has passed, infection with *B. dendrobatidis* becomes endemic and populations of amphibians may remain stable, decline or increase although surviving populations are more vulnerable to other threats (Retallick *et al.*, 2004; McDonald *et al.*, 2005; Kriker and Hero, 2006).

Complete data on the distribution of *B. dendrobatidis* are not available but the *ad hoc* Group concluded that many countries are likely to still be free of infection and that this status is under threat from the importation of live amphibians. Infection with *B. dendrobatidis* has been found in amphibians in the food trade, pet trade and scientific trade (see Appendix IV). The *ad hoc* Group agreed that chytridiomycosis causes mortality in amphibians being traded and that infected animals in the international trade are a risk to amphibian populations in the importing country.

- ii) *Ranaviruses*. The *ad hoc* Group examined the literature on amphibian ranaviruses and noted that amphibian ranaviruses form a very closely related group with frog virus 3 as the type species (Hyatt *et al* 2000; Chinchar 2002; Do *et al* 2005). Amphibian ranaviruses have been responsible for epizootics in amphibians in captivity and in the wild, but wild epizootics detected in North America and the United Kingdom have been localized and appear not to result in long term population declines (Wolf *et al* 1968; Cunningham *et al* 1996; Greer *et al* 2005; Jancovich *et al* 2005). Some of the amphibian ranaviruses, notably Bohle iridovirus, have been experimentally transmitted to fish and reptiles (Moody and Owens 1994; Ariel 1997).

Ranavirus infection has been found in amphibians in the food trade, the pet trade and the scientific trade amongst others (see Appendix IV). The *ad hoc* Group agreed that ranaviruses cause mortality in amphibians being traded and that infected animals in the international trade are a risk to amphibian populations, fish and reptiles in the importing countries.

2. Questionnaire on trade in live amphibians and related disease occurrence

The *ad hoc* Group discussed the “Questionnaire on amphibian diseases” distributed in 2002 by the OIE and the feedback received from Member Countries. Following the indications of the Aquatic Animals Commission, which considered that more data needed to be collected, the *ad hoc* Group prepared a new “Questionnaire on amphibian trade and diseases”; this questionnaire is appended at Appendix VII for Aquatic Animals Commission’s consideration.

The *ad hoc* Group recommends that the Aquatic Animals Commission requests the OIE to dispatch this questionnaire to all OIE Member Countries along with a copy of this report.

.../Appendices

**MEETING OF THE OIE AD HOC GROUP ON
AMPHIBIAN DISEASES**

Paris, 11-13 September 2006

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**MEETING OF THE OIE *AD HOC* GROUP ON
AMPHIBIAN DISEASES**

Paris, 11-13 September 2006

Agenda

1. Adoption of the Agenda
2. Presentation of the terms of reference
3. Scientific information on transmissible diseases in amphibians
4. Questionnaire on trade in live amphibians and related disease occurrence
5. Other business

TERMS OF REFERENCE

1. To review the published scientific information on transmissible diseases in amphibians and the evidence for their transfer by international trade in live amphibians and their products or other means.
 2. To draft a questionnaire for Member Countries on import and export trade in live amphibians and related disease occurrence in captive and wild amphibian populations and submit the draft to the Aquatic Animal Health Standards Commission meeting in October 2006.
 3. To evaluate the responses on the questionnaire.
 4. To submit a report addressing points 1 and 3 to the Aquatic Animal Health Standards Commission, with recommendations on whether OIE standards should be developed for international trade in amphibians.
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Type of trade	chytridiomycosis	ranaviral disease
Human consumption	Garner <i>et al.</i> (2006) Hanselmann <i>et al.</i> (2004) Mazzoni <i>et al.</i> (2003)	Ahne <i>et al.</i> (1998) Fijan <i>et al.</i> (1991) Mişcalencu <i>et al.</i> (1981) Galli <i>et al.</i> (2006) Kanchanakhan (1998) Schloegel unpublished data.
Laboratory animals	Daszak <i>et al.</i> (2004) Reed <i>et al.</i> (2000) Weldon <i>et al.</i> (2004) Weldon (2005)	Zupanovic <i>et al.</i> (1998)
Pet trade	Cunningham A. A. <i>et al.</i> (2005) Mutschmann F. <i>et al.</i> (2000) Groff <i>et al.</i> (1991) Berger <i>et al.</i> (1999)	Hyatt <i>et al.</i> (2000)
Zoo	Nichols <i>et al.</i> (1998) Pessier <i>et al.</i> (1999) Nichols <i>et al.</i> (2001) Raverty and Reynolds (2001) Oevermann <i>et al.</i> (2005) Schloegel <i>et al.</i> (2006)	
Other	Ornamental pond frog trade Groff <i>et al.</i> (1991)	Fishing bait Jancovich <i>et al.</i> (2005) Biological control Zupanovic <i>et al.</i> (1998)

References

- AHNE W., BEARZOTTI M., BREMONT M. & ESSBAUER S. (1998). Comparison of European systemic piscine and amphibian iridoviruses with epizootic haematopoietic necrosis virus and frog virus 3. *Zentralbl Veterinarmed [B]*, **45**(6), 373–383.
- ARIEL E. (1997). Pathology and serological aspects of Bohle Iridovirus infections in six selected water-associated reptiles in North Queensland. PhD Thesis. James Cook University: Townsville.
- BERGER L., SPEARE R., DASZAK P., GREEN E.D., CUNNINGHAM A.A., GOGGIN C.L., SLOCOMBE R., RAGAN M.A., HYATT A.D., McDONALD K.R., HINES H.B., LIPS K.R., MARANTELLI G. & PARKES H. (1998). Chytridiomycosis causes amphibian mortality associated with population declines in the rainforests of Australia and Central America. *Proceedings of National Academy of Science*, **95**(15), 9031-9036.
- BERGER L., SPEARE R., HINES H., MARANTELLI G., HYATT A.D., McDONALD K.R., SKERRATT L.F., OLSEN V., CLARKE J.M., GILLESPIE G., MAHONY M., SHEPPARD N., WILLIAMS C. & TYLER M. (2004). Effect of season and temperature on mortality in amphibians due to chytridiomycosis. *Australian Veterinary Journal*, **82**, 31–36.
- BERGER L., SPEARE R. & HYATT A. (1999). Chytrid fungi and amphibian declines: Overview, implications and future directions. *In Declines and Disappearances of Australian Frogs*. Ed. A. Campbell. Environment Australia: Canberra, 23–33.
- BERGER L. (2001). Diseases in Australian frogs. PhD Thesis, James Cook University, Townsville.
- BOLLINGER T.K., MAO J., SCHOCK D., BRIGHAM R.M. & CHINCHAR V.G. (2004). Pathology, isolation, and preliminary molecular characterization of a novel iridovirus from tiger salamanders in Saskatchewan. *Journal of Wildlife Diseases*, **35**(3), 413–429.
- CCM report 2006. The Global Trade in Amphibians: Summary Interim Report of a CCM Study. Consortium for Conservation Medicine. Text available at: http://www.conservationmedicine.org/factsheets/Amphib_trade_interim_report_06.pdf
- CHINCHAR V.G. (2002) Ranaviruses (family Iridoviridae): Emerging cold-blooded killers. *Arch. Virol.*, **147**(3), 447–470.
- CUNNINGHAM A.A., GARNER T.W.J., AGUILAR-SANCHEZ V., BANKS B., FOSTER J., SAINSBURY A.W., PERKINS M., WALKER S.F., HYATT A.D. & FISHER M.C. (2005). Emergence of amphibian chytridiomycosis in Britain. *Veterinary Record*, **157**(13), 386–387.
- CUNNINGHAM A.A., LANGTON T.E., BENNETT P.M., LEWIN J.F., DRURY S.E., GOUGH R.E. & MACGREGOR S.K. (1996). Pathological and microbiological findings from incidents of unusual mortality of the common frog (*Rana temporaria*). *Philos. Trans. R. Soc. Lond. B Biol. Sci.*, **351**(1347), 1539–1557.
- DASZAK P., BERGER L., CUNNINGHAM A.A., HYATT A.D., GREEN D.E. & SPEARE R. (1999). Emerging infectious diseases and amphibian population declines. *Emerging Infectious Diseases*, **5**, 735–748.
- DASZAK P., STRIEBY A., CUNNINGHAM A.A., LONGCORE J.E., BROWN C.C. & PORTER D. (2004). Experimental evidence that the bullfrog (*Rana catesbeiana*) is a potential carrier of chytridiomycosis, an emerging fungal disease of amphibians. *Herpetological Journal*, **14**(4), 201–207.
- Department of Environment and Heritage - Australia 2006. Threat Abatement Plan for infection of amphibians with chytrid fungus resulting in chytridiomycosis. i) Threat Abatement Plan. ii) Background Document. Australian Government Department of Environment and Heritage; Canberra. 2006. Available at: <http://www.deh.gov.au/biodiversity/threatened/publications/tap/chytrid/index.html>

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DO J.W., CHA S.J., KIM J.S., AN E.J., LEE N.S., CHOI H.J., LEE C.H., PARK M.S., KIM J.W., KIM Y.C. & PARK J.W. (2005). Phylogenetic analysis of the major capsid protein gene of iridovirus isolates from cultured flounders *Paralichthys olivaceus* in Korea. *Dis. Aquat. Organ.*, **64**(3), 193–200.

FIJAN N., MATASIN Z., PETRINEC Z., VALPOTIC I. & ZWILLENBERG L.O. (1991) Isolation of an iridovirus-like agent from the green frog (*Rana esculenta* L.). *Veterinarski arhiv.*, **61**, 151–158.

GALLI L., PEREIRA A., MARQUEZ A. *et al.* (2006). Ranavirus detection by PCR in cultured tadpoles (*Rana catesbeiana* Shaw, 1802) from South America. *Aquaculture*, **257**(1-4), 78–82.

GARNER T.W.J., PERKINS M.W., GOVINDARAJULU P., SEGLIE D., WALKER S., CUNNINGHAM A.A. & FISHER M.C. (2006). The emerging pathogen *Batrachochytrium dendrobatidis* globally infects introduced populations of the North American bullfrog, *Rana catesbeiana*. *Biology Letters*, doi:10.1098/rsbl.2006.0494.

GREER A.L., BERRILL M. & WILSON P.J. (2005). Five amphibian mortality events associated with ranavirus infection in south central Ontario, Canada. *Dis. Aquat. Organ.*, **67**(1-2), 9–14.

GROFF J.M., MUGHANNAM A., MCDOWELL T.S., WONG A., DYKSTRA M.J., FRYE F.L. & HEDRICK R.P. (1991). An epizootic of cutaneous zygomycosis in cultured dwarf African clawed frogs (*Hymenochirus curtipes*) due to *Basidiobolus ranarum*. *Journal of Medical and Veterinary Mycology*, **29**(4), 215–223.

HANSELMANN R., RODRIGUEZ A., LAMPO M., FAJARDO-RAMOS L., AGUIRRE A.A., KILPATRICK A.M., RODRIGUEZ J.P. & DASZAK P. (2004). Presence of an emerging pathogen of amphibians in introduced bullfrogs *Rana catesbeiana* in Venezuela. *Biological Conservation*, **120**, 115–119.

HYATT A.D., GOULD A.R., ZUPANOVIC Z., CUNNINGHAM A.A., HENGSTBERGER S., WHITTINGTON R.J., KATTENBELT J. & COUPAR B.E.H. (2000). Comparative studies of piscine and amphibian iridoviruses. *Archives of Virology*, **145**(2), 301–331.

JANCOVICH J.K., DAVIDSON E.W., PARAMESWARAN N., MAO J., CHINCHAR V.G., COLLINS J.P., JACOBS B.L. & STORFER A. (2005). Evidence for emergence of an amphibian iridoviral disease because of human-enhanced spread. *Molecular Ecology*, **14**(1), 213–24.

JANCOVICH J.K., DAVIDSON E.W., SEILER A., JACOBS B.L. & COLLINS J.P. (2001). Transmission of the *Ambystoma tigrinum* virus to alternative hosts. *Diseases of Aquatic Organisms*, **46**(3), 159–163.

KANCHANAKHAN S. (1998). An Ulcerative Disease of the Cultured Tiger Frog, *Rana tigrina*, in Thailand: Virological Examination. *AAHRI Newsletter Article*, **7**(2), Available from: http://www.fisheries.go.th/aahri/Health_new/AAHRI/AAHRI/Topics/Newsletter/art35.htm

KRIGER K.M. & HERO J.M. (2006). Survivorship in wild frogs infected with chytridiomycosis. *EcoHealth*, **3**, DOI 10.1007/s10393-006-0027-7.

LAU M., ADES G., GOODYER N. & ZOU F.-S. (1996). Wildlife Trade in Southern China including Hong Kong and Macau. *In* Conserving China's Biodiversity. J. MacKinnon, W. Sung, & *et. al.* editors. China Environmental Science Press, Beijing, 141-159.

LAURANCE W.F., McDONALD K.R. & SPEARE R. (1996). Catastrophic declines of Australian rain forest frogs: Support for the epidemic disease hypothesis. *Conservation Biology*, **10**, 406–413.

LIPS K.R., BREM F., BRENES R., REEVE J.D., ALFORD R.A., VOYLES J., CAREY C., LIVO L., PESSIER A.P. & COLLINS J.P. (2006). Emerging infectious disease and the loss of biodiversity in a Neotropical amphibian community. *Proceedings of the National Academy of Science of USA*, **102**, 3165–3170.

Appendix XXXV (contd)Appendix V (contd)

- MAZZONI R., CUNNINGHAM A.C., DASZAK P., APOLO A., PERDOMO E. & SPERANZA G. (2003). Emerging pathogen of wild amphibians in frogs (*Rana catesbiana*) farmed for international trade. *Emerging Infectious Diseases*, **9**(8), 995–998. Available from: <http://www.cdc.gov/ncidod/EID/vol9no8/03-0030.htm>
- MCDONALD K.R., MENDEZ D., MULLER R., FREEMAN A.B. & SPEARE R. (2005). Decline in the prevalence of chytridiomycosis in upland frog populations in North Queensland, Australia. *Pacific Conservation Biology*, **11**(2), 114–120.
- MIȘCALENCU D., ALFY M. EL., MAILAT F. & MIHANSCU G. R. (1981) Viral particles in the hepatocytes of *Rana esculenta* (L.), *Revue Roumaine de Médecine-Virologie*, **32**, 123–125.
- MOODY N.J.G. & OWENS L. (1994). Experimental demonstration of the pathogenicity of a frog virus, Bohle iridovirus, for a fish species, barramundi – *Lates calcarifer*. *Diseases of Aquatic Organisms*, **18**(2), 95–102.
- MUTSCHMANN F., BERGER L., ZWART P. & GAEDICKE C. (2000). [Chytridiomycosis in amphibians-first report in Europe] *Berl Munch Tierarztl Wochenschr*, **113**(10), 380–383. [In German]
- NICHOLS D.K., LAMIRANDE E.W., PESSIER A.P. & LONGCORE J.E. (2001). Experimental transmission of cutaneous chytridiomycosis in dendrobatid frogs. *Journal of Wildlife Diseases*, **37**(1), 1–11.
- NICHOLS D.K., PESSIER A.P. & LONGCORE J.E. (1998). Cutaneous chytridiomycosis: an emerging disease? *Proceedings of the American Association of Zoo Veterinarians*, 269–271.
- OEVERMANN VON A., SCHILDGER B., FELDMAN S. & ROBERT N. (2005). Chytridiomycosis in amphibians (*Dyscophus antongilii*) in Switzerland. [In German] *Tierärztliche Umschau*, **60**, 211–217.
- PARKER J.M., MIKAELIAN I., HAHN N. & DIGGS HE. (2002). Clinical diagnosis and treatment of epidermal chytridiomycosis in African clawed frogs (*Xenopus tropicalis*). *Comparative Medicine*, **52**(3), 265–268.
- PARKER P.M. & LILLY E. (2004). The World Market for Frogs' Legs: A 2005 Global Trade Perspective. ICON Group Ltd., San Diego.
- PESSIER A.P., NICHOLS D.K., LONGCORE J.E. & FULLER M.S. (1999). Cutaneous chytridiomycosis in poison dart frogs (*Dendrobates* spp.) and White's tree frogs (*Litoria caerulea*). *Journal of Veterinary Diagnostic Investigation*, **11**, 194–199.
- RAVERTY S. & REYNOLDS T. (2001). Cutaneous chytridiomycosis in dwarf aquatic frogs (*Hymenochirus boettgeri*) originating from southeast Asia and in a western toad (*Bufo boreas*) from northeastern British Columbia. *Canadian Veterinary Journal*, **42**(5), 385–386.
- REED K.D., RUTH G.R., MEYER J.A. & SHUKLA S.K. (2000). *Chlamydia pneumoniae* infection in a breeding colony of African clawed frogs (*Xenopus tropicalis*). *Emerging Infectious Diseases*, **6**(2), 196–199.
- RETALLICK R.W.R., MCCALLUM H. & SPEARE R. (2004). Endemic infection of the amphibian chytrid fungus in a frog community post-decline. *PLoS Biology*, **2**(11), e351.
- SCHLAEPFER M.A., HOOVER C. & DODD C.K. (2005). Challenges in evaluating the impact of the trade in amphibians and reptiles on wild populations. *Bioscience*, **55**, 256–264.
- SCHOEGEL L.M., HERO J.M., BERGER L., SPEARE R., MCDONALD K. & DASZAK P. (2005). The decline of the sharp-snouted day frog (*Taudactylus acutirostris*): The first documented case of extinction by infection in a free-ranging wildlife species? *EcoHealth*, **3**, 35–40.

Appendix XXXV (contd)Appendix V (contd)

SMART A. C. & BRIDE I. G. (1993). The UK trade in live reptiles and amphibians: A report to the RSPCA on the nature and status of the reptile and amphibian pet trade between 1980 and 1992. Royal Society for the Prevention of Cruelty to Animals, Horsham, West Sussex, United Kingdom.

TEIXEIRA R.D., PEREIRA MELLO S.C.R. & LIMA DOS SANTOS C.A.M. (2001). The World Market for Frog Legs. Food and Agriculture Organization of the United Nations, Globefish Research Programme, Rome, Italy.

WELDON C., DU PREEZ L.H., HYATT A.D., MULLER R. & SPEARE R. (2004). Origin of the amphibian chytrid fungus. *Emerging Infectious Diseases*, **10**(12), 2100–2105. Available from: <http://www.cdc.gov/ncidod/EID/vol10no12/pdfs/03-0804.pdf>

WELDON C. (2005). Chytridiomycosis, an emerging infectious disease of amphibians in South Africa. PhD Thesis. North West University, Potchefstroom, South Africa.

WHITAKER B. R. & WRIGHT K. N. (2001). Amphibian Medicine and Captive Husbandry. Krieger Publishing Co., Malabar, Florida, USA, 570 pp.

WOLF K., BULLOCK G.L., DUNBAR C.E. & QUIMBY M.C. (1968). Tadpole edema virus: A viscerotropic pathogen for anuran amphibians. *Journal of Infectious Diseases*, **118**, 253–262.

ZUPANOVIC Z., LOPEZ G., HYATT A.D., GREEN B., BARTRAN G., PARKES H., WHITTINGTON R.J. & SPEARE R. (1998). Giant toads *Bufo marinus* in Australia and Venezuela have antibodies against "ranaviruses". *Diseases of Aquatic Organisms*, **32**, 1–8.

Questionnaire on International Amphibian Trade and Diseases

The international trade in live amphibians and their products is a multi million dollar industry. This includes international trade of amphibians for human consumption, laboratory animals, pet-trade and zoo animals. Despite recognition by the FAO of significant growth in the global trade of amphibians for human consumption, the data collection on this and other trade in amphibians is still inadequate. The OIE *ad hoc* Group on Amphibian Diseases has concluded that infectious diseases of global concern are spread by, and also affect, these trades. There is currently a pandemic of chytridiomycosis with devastating effects on amphibian populations world-wide and multiple, recurring epizootics of ranaviral disease on a global scale. The *ad hoc* Group considers that these two diseases probably meet the OIE listing criteria (Chapter 1.2.2. of the *Aquatic Animal Health Code*).

The Aquatic Animal Health Standards Commission has considered Member Countries' requests to include amphibian diseases in the scope of the OIE. The Commission requests Member Countries to provide information by replying to this questionnaire so that it can reach a decision on whether OIE standards should be developed for international trade in amphibians.

Country: _____

Name of Delegate: _____

Date: _____

Please tick the appropriate boxes.

1. International trade in amphibians

Does your country trade in amphibians or amphibian products?

- Yes No

If yes, what is the nature of the trade?

- human consumption pet trade
 laboratory animals zoo animals
 other, please specify:

Appendix XXXV (contd)

Appendix VI (contd)

5. Amphibian diseases

Have any amphibian diseases been reported in your country?

- Yes No

If yes, which diseases have been recorded (please tick box):

Disease	Farmed Amphibians	Other Captive Amphibians	Wild Amphibians
Chytridiomycosis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ranaviral disease	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other diseases (please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. Legislation on amphibian issues

Other than for CITES purposes, does your country have legislation covering amphibian trade?

- Yes No

If yes, which is the responsible body:

Does your country have legislation covering amphibian disease issues?

- Yes No

If yes, which is the responsible body:

Kindly return this questionnaire, if possible by fax or E-mail,
(if E-mail is used, please also mail paper copy)
to the **OIE International Trade Department**
E-mail: trade.dept@oie.int

Fax.: Fax: +33 1 42 67 09 87
before 1st February 2007

Questionnaire on Amphibian International Trade and Diseases

The international trade in live amphibians and their products is a multi million dollar industry. This includes international trade of amphibians for human consumption, laboratory animals, pet-trade and zoo animals. Despite recognition by the FAO of significant growth in the global trade of amphibians for human consumption, the data collection on this and other trade in amphibians is still inadequate. The OIE *ad hoc* Group on Amphibian Diseases has concluded that infectious diseases of global concern are spread by, and also affect, these trades. There is currently a pandemic of chytridiomycosis with devastating effects on amphibian populations world-wide and multiple, recurring epizootics of ranaviral disease on a global scale. The *ad hoc* Group considers that these two diseases probably meet the OIE listing criteria (Chapter 1.2.2. of the *Aquatic Animal Health Code*).

The Aquatic Animal Health Standards Commission has considered Member Countries' requests to include amphibian diseases in the scope of the OIE. The Commission requests Member Countries to provide information by replying to this questionnaire so that it can reach a decision on whether OIE standards should be developed for international trade in amphibians.

Country: _____

Name of Delegate: _____

Date: _____

Please tick the appropriate boxes.

1. International trade in amphibians

Does your country trade in amphibians or amphibian products?

- Yes No

If yes, what is the nature of the trade?

- human consumption pet trade
 laboratory animals zoo animals
 other, please specify:

5. Amphibian diseases

Have any amphibian diseases been reported in your country?

- Yes No

If yes, which diseases have been recorded (please tick box):

Disease	Farmed Amphibians	Other Captive Amphibians	Wild Amphibians
Chytridiomycosis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ranaviral disease	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other diseases (please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. Legislation on amphibian issues

Other than for CITES purposes, does your country have legislation covering amphibian trade?

- Yes No

If yes, which is the responsible body:

Does your country have legislation covering amphibian disease issues?

- Yes No

If yes, which is the responsible body:

7. Amphibian diseases and OIE

In your view, should the remit of the OIE be extended to included amphibian diseases?

- Yes No

Appendix XXXVI (contd)

If OIE needs to obtain further information on amphibian diseases in your country, who would be the most appropriate person to contact? (please provide contact details)

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Kindly return this questionnaire, if possible by fax or E-mail,
(if E-mail is used, please also mail paper copy)
to the **OIE International Trade Department**
E-mail: trade.dept@oie.int
Fax: +33 1 42 67 09 87
before 15th January 2007

OIE Aquatic Animal Health Standards Commission Position Paper on Pathogen Strain Differentiation

The number and power of techniques that are available for the description of pathogens, typing of isolates and development of diagnostic tests has significantly increased over the past three decades along with development of biotechnologies (1). Molecular biology plays a particularly prominent role in this respect as related techniques such as polymerase chain reaction (PCR), and sister techniques are often perceived as the ultimate perfect tests. With permanent quest for improving specificity and sensitivity of tests, targeting genes of phylogenetic interest - such as rDNA sub-units – has rapidly become a common approach. This has inconspicuously but readily drawn taxonomy in the front line. The paradox here is that while taxonomists have become more and more rare (2), flurries of sequence datasets have literally revolutionised taxonomy.

Taxonomy is the study of organisms for the purpose of their systematic. Classically, it proceeds through three major steps that are: 1) description of organisms, 2) delineation of taxons, a step that is also called classification, and 3) use of specific characteristics for identification purpose. In this context, information provided by the characterisation of an organism may eventually be used in a diagnostic procedure. With time, enthusiasm for and success of DNA sequencing have both led to the practice of taxonomy by non-taxonomists. This has sometimes resulted in confusion between the three tiers of taxonomy: description, classification and identification.

Indeed the delineation of biological organisms into taxonomic groups inherently contains an arbitrary facet that may be difficult to accept if not clearly understood⁵. Furthermore, the commonly accepted assumption that DNA sequences *per se* overcome that subjectivity is one of hazardous misperceptions. Here we want to stress that taxonomic judgement must be based on a polyphasic approach. The polyphasic approach uses a spectrum of independent characteristics, e.g. morphological, biochemical, molecular, serological, epidemiological, etc. (3, 4).

Pathogen differentiation will influence listing and reporting, which in turn can have serious implications for international trade in live animals and their products. For the purpose of this paper, we consider pathogen strain differentiation in the particular context of the OIE standards for aquatic animal health.

When listing a disease, it is of critical importance to know whether its causative agent has been clearly established (5). It is important to know whether only certain strains of the pathogen cause the disease of concern. There are examples where only some virulent strains, but not all strains, of the same species cause the disease of concern. In such cases, robust differential diagnostic means are essential to avoid inaccurate reporting and implementation of inappropriate control measures.

Based on the above considerations, the Aquatic Animals Commission proposes a set of guiding principles for appropriate pathogen differentiation.

Guiding principles for appropriate pathogen differentiation

1. Taxonomy consists of the description of organisms, their classification, and identification by specific characteristics;
2. Taxon characteristic(s) may eventually be used in diagnostic procedures;

⁵ If taking the image of organising some filing cabinet, one senses the pressing need to determine where a file should be placed, and the need for users to be able to retrieve those files. Obviously, the design of a filing method is of a central importance. Ideally, the filing method should avoid, on one hand, multiplying folders which ultimately would contain single files, and, on the other hand, reducing the number of folders with a low level of identity. Both extreme situations render filing useless and file retrieving cumbersome. Where this image is trivial, it is not without having connections with taxonomy.

Appendix XXXVII (contd)

3. However, taxonomy is part of a cognitive science and distinct from development of diagnostic assays;
4. When and where applicable, guidelines established by international committees for taxonomy must be followed;
5. Taxonomic decisions should be based on a polyphasic approach and proposals to recognise certain strains of a pathogen must similarly be, where applicable, based on considerations of, for example, virulence, pathology, epidemiology, molecular information, and ultrastructure characteristics;
6. Proposals to distinguish a strain or type of a pathogen as the cause of the disease of concern must be accompanied by a robust and validated diagnostic, or typing, technique;
7. For the purpose of OIE aquatic animal standards, proposals for recognition of distinct pathogen strains of OIE listed diseases of aquatic animal should be submitted to the OIE Aquatic Animals Commission, which may propose their inclusion as new standards in the *Aquatic Code* and *Manual* for adoption by Member Countries. This must be subject to regular review;
8. Pathogen strains may eventually be proposed for listing in place of entire pathogen species.

Bibliographic references

1. WALKER P. & SUBASINGHE R.P. (2000). DNA-based Molecular Diagnostic Techniques. Research needs for standardization and validation of the detection of aquatic animal pathogens and diseases. *FAO Fisheries Technical Paper*, n°395, 93 pp.
 2. GASTON K.J. & MAY R.M. (1992). Taxonomy of taxonomists. *Nature*, **356**, 281-282.
 3. STERUD E., MO T.A., COLLINS C.M. & CUNNINGHAM C.O. (2002). The use of host specificity, pathogenicity, and molecular markers to differentiate between *Gyrodactylus salaris* Malmberg, 1957 and *G. thymalli* Zitnan, 1960 (Monogenea: Gyrodactylidae). *Parasitology*, **124**, 203-213.
 4. LE ROUX F., LORENZO G., PEYRET P., AUDEMARD C., FIGUERAS A.J., VIVARÈS C.P., GOUY M. & BERTHE F. (2001). Molecular evidence for the existence of two species of *Marteilia* in Europe. *Journal of Eukaryotic Microbiology*, **48**, 449-454.
 5. OIE (2006). Chapter 1.2.2. Criteria for listing aquatic animal diseases. *In: Aquatic Animal Health Code*, Ninth Edition. World Organisation for Animal Health (OIE), Paris, France, 18-20
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COMMISSION WORK PLAN FOR 2007/2008
<i>Aquatic Animal Health Code</i>
<ul style="list-style-type: none"> • Ongoing review of the list of diseases <ul style="list-style-type: none"> • Review emerging diseases
<ul style="list-style-type: none"> • Finalise disease chapter for <i>Gyrodactylus salaris</i> after Member Countries' comments • Update the disease chapters for Part 2
<ul style="list-style-type: none"> • Prepare text for disease chapters for gaining and regaining freedom for compartments
<ul style="list-style-type: none"> • Harmonise horizontal chapters with those in the <i>Terrestrial Code</i> <ul style="list-style-type: none"> • Zoning and compartmentalisation • Aquatic animal health surveillance • Model certificates • Handling and disposal of carcasses and wastes of aquatic animals
<ul style="list-style-type: none"> • Draft guidelines on animal health issues related to aquatic animal feed
<ul style="list-style-type: none"> • Aquatic animal welfare guidelines
<ul style="list-style-type: none"> • Antimicrobial resistance in the field of aquatic animals
<i>Manual of Diagnostic Tests for Aquatic Animals</i>
<ul style="list-style-type: none"> • Develop general surveillance chapter and guidelines for surveillance for individual diseases with the assistance of <i>ad hoc</i> groups and other experts
<ul style="list-style-type: none"> • Revise Chapter on methods for disinfection of aquaculture establishments
Meetings
<ul style="list-style-type: none"> • Make presentations on the activities of the Aquatic Animals Commission at the Conferences of the OIE Regional Commissions
<ul style="list-style-type: none"> • Assist in the implementation of recommendations adopted by the OIE Regional Commission for Asia, the Far East and Oceania in 2003, and endorsed by the OIE International Committee of the OIE in 2004
<ul style="list-style-type: none"> • 1st International Conference of OIE Reference Laboratories and Collaborating Centres
Other issues
<ul style="list-style-type: none"> • Consider the report from the <i>ad hoc</i> Group on Amphibian Diseases and formulate recommendations on the inclusion of amphibians in the remit of OIE standards
<ul style="list-style-type: none"> • Update the Commission's web pages
<ul style="list-style-type: none"> • Consider new candidates for OIE Reference Laboratories for listed diseases
<ul style="list-style-type: none"> • Coordination of a publication on "Changing trends in managing aquatic animal disease emergencies" under the <i>Rev. Sci. Tech.</i> series

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