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REPORT OF THE MEETING OF THE OIE WORKING GROUP ON WILDLIFE DISEASES

Paris, 9 – 11 February 2004

The meeting of the OIE Working Group on Wildlife Diseases was held from 9 to 11 February 2004 at the OIE Headquarters, Paris. Dr Bernard Vallat, the OIE Director General, welcomed all the participants extending a warm welcome to Dr V. Caporale, President of the OIE Scientific Commission for Animal Diseases who was honouring the meeting by his presence. He also wished plenty of success to the new President of the Group, Dr Roy Bengis. He stressed the increasing importance of the work of the Group regarding the role of wildlife in emerging infectious diseases. He complimented the Group for the new questionnaire which has created additional awareness on the part of Member Countries most of which have already appointed contact persons to report on diseases of wildlife to the OIE under the supervision of the OIE Delegate. He explained how the members of the Group are nominated by the Director General and subsequently approved by the OIE International Committee. He added that observers are invited at the request of the President in consultation with the Director General and may only be assigned responsibilities by the President. The meeting was chaired by Dr R. Bengis and Drs Ted Leighton and Marc Artois were appointed rapporteurs.

The agenda and list of participants are given in Appendices I and II respectively.

1. Epidemiological review of selected wildlife diseases in 2003

List A diseases

African swine fever (ASF)

An outbreak of ASF occurred in farmed wild boar (*Sus scrofa)* in the Limpopo Province of **South Africa**. Thirty-six of 40 animals in the group died or were killed humanely *in extremis.* The four surviving animals, which appeared healthy, were destroyed, and ASF virus was cultured from their lymph nodes. A major epidemic of ASF occurred in domestic swine in the **Democratic Republic of Congo**. Outbreaks were also reported in domestic swine in **Senegal**. These outbreaks generally have a wild porcine / tampan causal link

Avian influenza

(Discussed under Agenda Item 6, below)

Bluetongue

In the United States of America (USA), bluetongue virus (BTV) types 10 and 17 were isolated from 5 wild white-tailed deer (*Odocoileus virginianus*), BTV-10 was isolated from a pronghorn antelope (*Antilocapra americana*), and BTV-13 was isolated from a bighorn sheep (*Ovis canadensis*).

Classical swine fever (CSF)

Dr Artois reported to the Working Group on CSF in wild boar (*Sus scrofa*) in Europe. The report included current information on the distribution of infected wild boar populations, disease surveillance activity and a brief description of the experimental program of oral vaccination of wild boar underway in Germany and Luxembourg. In 2003 this disease was reported from **France**, **Germany**, **Luxembourg** and **Slovakia**. Outbreaks in domestic pigs in Slovakia apparently are linked to the persistence of the infection in wild boar in this country. Different approaches have been taken to control CSF in wild boar: such as increased hunting to reduce boar numbers, strategically timed moratoriums on hunting to reduce disturbance and prevent dispersal of infected boar to new areas, and vaccination to reduce the number of susceptible animals. Each technique had varying results. All of these approaches are under evaluation in Europe.

Foot and Mouth Disease (FMD)

FMD was reported in 50 axis deer (*Cervus axis*) and in three elephants (*Elaphus maximus*) in **Bangladesh**. The virus types were not revealed.

In **South Africa**, there is continued serological evidence of persistent cycling of an SAT 2 virus in impala (*Aepyceros melampus)* in the west-central region of the Kruger National Park. Sero-prevalence during four temporally distinct random sampling sessions ranged from 20 % to 42%. These impalas showed no clinical signs, and no virus has yet been isolated. The Kruger National Park is in the endemically infected buffalo zone and this zone status was once again re-affirmed during a random sample of 637 adult buffalo (*Syncerus caffer)* from 31 spatially distinct herds in the northern districts of the Park. A massive 99.7% of these buffalo were sero-positive for FMD, with most animals showing strong positive titres to all three SAT serotypes. Virus was also isolated from 10 buffalo during this survey. In **Zimbabwe**, there is continued serological evidence of FMD virus (type unspecified) cycling in greater kudu (*Tragelaphus strepsiceros).* Clinical disease with lesions was also apparent, and some kudus are reported to have died after developing secondary septic arthritis of the distal limb joints. It is estimated that more than 500 kudus have been infected. In **Botswana,** FMD was diagnosed clinically and confirmed serologically in a male greater kudu, during a focal outbreak in cattle. Virus isolation from the kudu was not successful.

Newcastle disease

Newcastle disease (highly pathogenic avian paramyxovirus-1) occurred in at least three different colonies of Double-crested cormorants (*Phalacrocorax auritus*) in the boreal forest zone of west-central **Canada** in summer 2003. Approximately 3,000 dead birds were counted. In the **USA**, mortality of low numbers of double-crested cormorants due to Newcastle disease was observed in Wisconsin and New York/Vermont.

Peste des petits ruminants (PPR)

Mauritania reported the detection of PPR infection in five warthogs (*Phacochoerus africanus)* during an active outbreak in sheep and goats. The diagnosis was made serologically using a specific ELISA test, and was confirmed by antigen detection. **Senegal** also reported serological evidence of PPR infection in warthogs during a major outbreak recorded in sheep and goats. PPR was also reported in small stock in the **Democratic Republic of Congo**. Suspect cases of PPR were reported in gazelles in **Sudan**, but were not confirmed in the laboratory.

Rift Valley fever (RVF)

Mauritania reported the detection of antibodies (virus neutralisation test) to RVF in seven warthogs during an active outbreak of this disease in sheep and goats. A major epidemic of RVF was also reported in sheep and goats in **Senegal**.

List B diseases

Anthrax

In **South Africa**, sporadic cases of anthrax were diagnosed in Limpopo Province (Greater Kruger National Park) in buffalo and impala, and in Northern Cape Province in roan antelope (*Hippotragus taurinus).* In **Zimbabwe**, a cheetah died of anthrax at a captive lion and cheetah exhibit. Anthrax in cattle is fairly widespread in Zimbabwe and the source of infection of this cheetah was probably from feeding infected meat. Confirmed deaths from anthrax were reported in eland and bushbuck (*Tragelaphus scriptus)* in Lake Mburo National Park in **Uganda.** Buffalo mortalities from anthrax were reported from **Sudan**, but were not confirmed in a laboratory. Anthrax is considered endemic in the Etosha National Park in northern **Namibia**.

Anthrax has been reported in a nilgai (*Boselaphus tragocamelus*) in **Bangladesh**.

Avian cholera

A significant outbreak of avian cholera occurred in a sea-bird breeding colony on Dyer Island off the southern Cape coast of **South Africa**. Over 4,000 carcasses, mainly cormorants, were collected and incinerated. Several outbreaks of avian cholera have been previously documented on this island during the past decade. The causes of these outbreaks are probably multifactorial, and include population densities and local over-abundance, declining fish stocks and human disturbances.

Bovine tuberculosis (BTB)

A survey of the northern buffalo herds in the Kruger National Park (KNP), **South Africa**, showed that this disease is spreading northwards at a faster rate than was anticipated. BTB was detected at low prevalence in most of the buffalo herds south of the Shingwidzi river, and a few herds north of this river. This means that approximately 80% of all Kruger buffalo herds are now infected. For the first time, BTB was diagnosed and confirmed in impala in the greater Kruger ecosystem. Two emaciated impala ewes from a game ranch bordering the Kruger National Park were submitted for necropsy and found to have macroscopic disseminated pulmonary lesions, from which *Mycobacterium bovis* was cultured. BTB was also confirmed in nine lions (*Panthera leo)* and a leopard (*Panthera pardus)* in the KNP during 2003. BTB was also confirmed in buffalo, lions and a kudu in the Hluhluwe / Umfolozi Park and in several kudus in the Spioenkop game reserve in Kwazulu/Natal. BTB continues to smoulder in lechwe (*Kobus lechwe)* in the Kafue / Lochinvar region of **Zambia,** and in buffaloes and warthogs in the Queen Elizabeth National Park in **Uganda**.

BTB was reported in seven macaques (*Macaca mulatta*) in **Bangladesh** and in four spotted deer (*Cervus axis*) in **India**.

BTB remains endemic in free-roaming herds of wood bison in and around Wood Buffalo National Park in northern **Canada**. The bison management plan in place includes no-bison buffer zones, killing of stray bison and other measures to minimize risk of disease spread to healthy wild bison, farmed bison or cattle. BTB has been confirmed in 21 elk in and around Riding Mountain National Park in Manitoba since 1997: 10 were found through an annual hunter-kill surveillance program, including one in 2003, and 11 through a capture, test and cull program initiated in 2003. This disease also was confirmed in two white-tailed deer around Riding Mountain National Park in Manitoba through the annual hunter-kill surveillance program (1 in 2001 and 1 in 2003).

In the **USA**, BTB is endemic in white-tailed deer in the north-eastern portion of Michigan's Lower Peninsula. BTB has been confirmed in 481 wild white-tailed deer and wapiti from 1994-2003. Apparent spillover to other wildlife species including raccoon (*Procyon lotor*), coyote (*Canis latrans*), black bear (*Ursus americanus*), and bobcat (*Felis rufus*) has been documented, but these species are not regarded as significant in the epidemiology of tuberculosis in the area. Reduction of the deer population density and restrictions on baiting and supplemental feeding of deer were implemented in order to eliminate BTB from the state in the late 1990s. Beginning in the winter of 2003-2004, Michigan wildlife authorities began a new strategy involving capture and blood testing of

individual deer for BTB. Following collection of a blood sample, a radio collar is placed on the animal and it is released. If test results for the animal are positive, the animal will be tracked by radio telemetry and euthanised.

Brucellosis

Bovine brucellosis (*B. abortus*) was confirmed in six African buffaloes on game ranches in Mpumalanga and Limpopo Provinces of **South Africa**.

Bovine brucellosis remains endemic in free-roaming herds of American Bison in and around Wood Buffalo National Park in northern **Canada**. The bison management plan in place includes no-bison buffer zones, killing of stray bison, and other measures to minimize risk of disease spread to healthy wild bison, farmed bison or cattle. Rangiferine brucellosis (*B. suis* biovar 4) remains endemic in major herds of free-roaming caribou from Alaska to Hudson Bay, but not east of Hudson Bay, in northern Canada. Rangiferine brucellosis also remains endemic in a free-roaming herd of reindeer near Tuktoyaktuk in the Northwest Territories in extreme northern Canada. Movement controls are in place to prevent the translocation of these species from endemic areas. Bovine brucellosis is endemic in wapiti (*Cervus elaphus nelsonii*) and bison (*Bison bison*) in the Greater Yellowstone Area in the western **USA**.

Rabies

In **Namibia,** the major rabies epidemic reported in greater kudu in 2002 (estimated 2,500 cases) continues to smoulder. During 2003, 23 kudu specimens submitted were positive on fluorescent antibody test. In addition, 22 cases were confirmed in black backed jackal (*Canis mesomelas),* 3 cases in honey badgers (*Mellivora capensis),* 2 cases in hyaena (*Crocuta crocuta)* and one each in cheetah (*Acinonyx jubatus), s*uricate (*Suricata suricata),* Eland (*Taurotragus oryx)* and common duiker (*Sylvicapra grimmea).*

In **Ethiopia,** a significant outbreak of rabies occurred in the highly endangered Ethiopian wolf *(Canis simensis)* population in Bale Mountain National Park. The outbreak was first detected in August 2003, and 18 wolves were found dead in the initial survey. The Ethiopian wolf is a social canid, that lives in packs. Its range is limited to high altitude Afro-alpine montane meadows and moorlands, where this species has evolved as a rodent hunting specialists. Relict populations totalling less than 500 individuals now inhabit this last range stronghold of the Bale /Arsi Massif. The Ethiopian wolf is without doubt the most threatened canid in the world, and it would be a conservation catastrophe if this species is allowed to become extinct. This wolf's range has also suffered dramatic human encroachment and degradation during the past few decades, and domestic dogs appear to be the source of the current rabies outbreak. A previous rabies epidemic in 1991 and 1992 killed approximately 65% of the known Bale mountain wolf population. Control of the disease is currently being attempted by ring vaccination of domestic dogs in the surrounding areas, plus the strategic mechanical capture and parental vaccination of wolves closest to, and in line with, the spatial and directional spread of the disease. The immune response to vaccination is being assessed by recapture and re-sampling. The potential use of oral bait GMO vaccines in these wolves is currently being debated. As of 23 December, 65 – 75% of the Web valley sub-population had died of rabies. A total of 34 individuals from 10 adjoining packs have been vaccinated, which represents about 50% of the immediate population at risk.

In **Ghana**, rabies was reported in a green monkey *(Cercopethicus aethiops)* and a Patas monkey *(Erythrocebus patas).* In **Botswana,** rabies was diagnosed and confirmed in a hyaena and an African wildcat *(Felix lybica)*. In **Zimbabwe**, rabies was diagnosed in both black-backed jackal and side striped jackal *(Canis adustus).* It was also diagnosed in a lioness, a brown hyaena *(Hyaena brunnea)* and a white-tailed mongoose *(Ichneumia albicauda).* In **South Africa**, scattered cases of rabies involving the viverid biotype was confirmed in 46 yellow mongoose *(Cynictus penicillata*), 2 slender mongoose (*Herpestes sanguinea)*, 2 small grey mongoose *(Herpestes pulverulenta),*1 water mongoose *(Rhynchogale melleri),* 1 Cape ground squirrel *(Geosciurus inauris)* and 1 suricate. Also in South Africa, sporadic cases of rabies involving the canid biotype were diagnosed in 8 black-backed jackal, 1 side striped jackal, 20 bat-eared fox *(Otocyon megalotis),* 1 Cape fox *(Vulpes chama),* 3 African wild-cat*,* 2 small-spotted genet *(Genetta genetta)* and 2 kudu.

Rabies was reported in a wolf *(Canis lupus)* and in four captive Sloth bears in **India**. The exact location of these two occurrences was not revealed.

Tularemia

An increased number of human and animal cases of tularemia has been observed in **Sweden** in recent years and the disease is now occurring in areas where it has not been seen before. More than 500 human cases were recorded in 2003 andepidemic outbreaks seem to be relatively more frequent in the European continent in recent years. The disease was also observed in several mountain hares *(Lepus timidus),* European brown hares *(Lepus europaeus),* and squirrels *(Sciurus vulgaris)*. The reason for this expansion is unknown. Tularemia was also reported from **Austria**, **Finland**, **France** and **USA**.

Other diseases

West Nile virus

The geographic distribution of West Nile virus (WNV) has progressively spread since the virus was first recognised in the USA in 1999, and the resulting morbidity and mortality associated with human, equine, and wildlife infection continue to increase. The 2002 and 2003 WNV epidemics will go on record as being the largest recognized human arboviral meningoencephalitis epidemics in the Western Hemisphere and the largest WNV meningoencephalitis epidemics ever recorded.

As of 6 February 2004, a total of 9,122 human cases of WNV infection with 223 deaths had been reported in the **USA** from 45 states and the District of Columbia for the calendar year of 2003. Four states (Colorado, Nebraska, South Dakota, and Texas) have accounted for nearly 70% of the total number of confirmed human cases in the USA, and approximately one half of the fatalities recorded during 2003. There have been 737 presumptive West Nile viraemic blood donors reported to the CDC[1].

Many states continue to use surveillance of dead wild birds, mosquitoes, or sentinel animals, either singly or in combination, to detect WNV. In 2003, 11,350 dead wild birds with WNV infection were reported from 43 states and the District of Columbia. A total of 7,725 WNV-positive mosquito pools were reported from 38 states and the District of Columbia. Additionally, WNV sero-conversions were reported in 1,377 sentinel chicken flocks from 15 states and in 61 sentinel horses in 4 states.

Infections of non-sentinel animals also have been reported. West Nile viral infection has been confirmed in horses (4,146), dogs (30), squirrels (17), 1 cat, and unidentified animals (32) from 41 states. Only 4 states (Hawaii, Alaska, Nevada, and Oregon) have remained entirely free of WNV infection of any animal species since the appearance of the virus in North America

In **Canada**, there was a parallel extension of the range of the virus westward to the eastern side of the Rocky Mountains. The greatest intensity of virus activity and of human infections was on the western side of its range in Canada, in the prairie provinces of Alberta, Saskatchewan and Manitoba. Virus activity was detected from Alberta in the West to Nova Scotia on the east Coast. Virus activity appears restricted to warmer southern areas of the country.

Intensified surveillance of wild birds and mosquitoes has yielded additional arbovirus isolations. In Georgia and West Virginia, isolates of **eastern equine encephalitis virus, Highlands J virus, Cache Valley virus, Flanders virus, Keystone virus,** and **Potosi virus** have been obtained from dead wild birds or mosquito pools.

Avian vacuolar myelinopathy

Avian vacuolar myelinopathy (AVM) continues to occur in a low number of reservoirs in the south-eastern **USA**. Through early 2004, AVM has been suspected or confirmed in the deaths of approximately 100 bald eagles (*Haliaeetus leucoencephalus*) and has been confirmed in seven other wild bird species, primarily water-associated birds such as coots, ducks, and geese. The cause of AVM and its source remain unknown despite extensive field and laboratory research. The disease has been reproduced experimentally in red-tailed hawks (*Buteo jamaicensis*) and domestic chickens by feeding them tissues from American coots (*Fulica americanus*)

1 CDC: Centres for Disease Control and Prevention (www.cdc.gov)

with AVM. Additionally, chickens that ingested submerged vegetation collected from a lake during an AVM outbreak developed brain lesions while those that consumed submerged vegetation collected from a lake without AVM did not develop lesions. The predominant submerged vegetation species was identical at both locations suggesting that the cause of AVM is present in materials associated with the vegetation rather than the vegetation itself.

Botulism

Type E botulism recurs annually in late summer and fall in **Canada**. Many diagnoses are presumptive, based upon patterns of events and absence of other lesions. Only a portion of suspect incidents are confirmed by mouse inoculation and protection tests. This year, the disease is thought to have occurred on Lake Huron, Lake Erie and the eastern end of Lake Ontario, where it was confirmed in several species of gull.

Chronic wasting disease

Chronic wasting disease (CWD) was first recognised as an illness of mule deer (*Odocoileus hemionus*) at a research facility in Colorado, USA, in the 1960s. First thought to be a nutritional problem, CWD later was identified as a transmissible spongiform encephalopathy (TSE). CWD subsequently was identified in mule deer and wapiti (*Cervus elaphus nelsoni*) in other research herds in Colorado and Wyoming, as well as in two zoological collections. Through the 1980s and 1990s, CWD was found in wild mule deer, white-tailed deer (*Odocoileus virginianus*), and wapiti in a small portion of northeast Colorado and adjacent southeast Wyoming and this area came to be recognised as the CWD endemic area. Beginning in 1996, CWD was found within captive, commercial wapiti herds in several US states and two Canadian provinces, and since 2000 it has been detected in wild cervids outside the endemic area.

The origin of CWD, which differs distinctly from other TSEs such as scrapie and bovine spongiform encephalopathy, remains unknown. Natural infections have been found only in the 3 above species, although it is suspected that other subspecies of *Cervus elaphus* could be susceptible. The susceptibility of other cervid species is unknown. In experimental trials, 4 of 13 cattle that received infective material via intracerebral inoculation developed spongiform encephalopathy, whereas cattle co-housed with infected deer in ongoing studies have not developed clinical disease after several years. The World Health Organisation and the CDC[1] in the USA have stated that there is currently no evidence that CWD is transmissible to humans; however they recommend that exposure to the CWD agent be avoided while they continue to evaluate potential risk, if any.

Among privately owned captive cervids, CWD has been diagnosed in 40 captive elk herds in Saskatchewan (Canada); 11 in Colorado, 7 in South Dakota, 4 in Nebraska, 2 in Minnesota (USA), and one each in Kansas, Montana, Oklahoma, Wisconsin (USA), and Alberta (Canada). There are extensive epidemiological links among many of the infected herds; however, the source of CWD in some herds remains unidentified. Nearly all of these herds have been destroyed and owners received indemnity funds from federal and/or state animal health agencies in most instances. Since September 2002, CWD has been found in captive white-tailed deer herds in Wisconsin and Alberta, as well as in one captive whitetail that was killed 6 months after escaping into the wild in southeast Wisconsin.

The recognised distribution of CWD among wild cervids has broadened since 2000 as a result of intensified surveillance with infected populations now confirmed in eight states and Saskatchewan. Infected animals have been found north (Wyoming), west (in Colorado, Wyoming, and Utah), and south (Colorado) of the historic endemic area boundary as well as in adjacent western Nebraska to the east. Beginning in late 2001, CWD was detected at locations remote from the endemic area in Saskatchewan, northwest Nebraska, South Dakota, New Mexico, Wisconsin, and Illinois. The source of these infections is unknown, although in some instances there is spatial correlation with infected captive herds. The spread of CWD in both directions between captive and wild cervids is suspected, but has not been proven. However, the dramatic increase in the recognised distribution of CWD in North America in 2002 caused unprecedented concern for this wildlife disease among wildlife managers, animal health officials, captive cervid operators, politicians, hunters, and the general public. As a consequence of increased concerns and the availability of some government funding for CWD monitoring and management, surveillance increased substantially from 2002-2003 with approximately 150,000 wild deer and wapiti tested in the USA.

Programs to control CWD in captive and wild cervids have been initiated or are under development. In Canada, CWD is now a reportable disease and mandatory testing for CWD must be conducted on all captive cervids in several provinces. More than 19 million US dollars have been spent in disease control efforts. In the USA, a Proposed Rule was published in the Federal Register on 24 December 2003, with the goals of eliminating CWD from captive deer and wapiti and to reduce the potential interstate movement of captive cervids at risk for CWD. The proposed program would require mandatory participation for captive cervid operations engaged in interstate shipment. Herd monitoring, individual animal identification, and disease response plans are integral components of the program, and herds could become certified after five years of participation with no evidence of CWD. Individual states are free to develop more stringent regulations and some have banned importation of live deer and wapiti.

Free-ranging cervids are under the jurisdiction of state or provincial wildlife management agencies in the USA and Canada and these agencies have initiated or expanded programs to detect CWD in wild animals, to control CWD where it occurs, and to measure the progress of control efforts. In Saskatchewan, hunting regulations have been liberalised to reduce wild deer population densities where positive wild deer have been found. In south-west Wisconsin, where CWD was detected in early 2002, an eradication zone was established in which the objective is to totally eliminate all wild deer. Additionally, wild deer populations will be greatly reduced within a management zone surrounding the disease eradication zone in order to slow or prevent the spread of CWD. In areas where CWD is regarded as endemic in wild cervids, management objectives generally are aimed at reducing prevalence and preventing expansion.

In the summer of 2002, the United States Departments of Agriculture and the Interior collaborated with state wildlife management and animal health agencies, universities, and other organisations to develop the *Plan for Assisting States, Federal Agencies, and Tribes in Managing CWD in Wild and Captive Cervids*. The plan, which is dependent upon unified federal funding that has not yet been provided, calls for cooperation and communication between all interest groups and outlines objectives within the areas of surveillance, research, diagnostics, disease management, information, and education.

Ebola virus (for discussion-see Report Item 5).

Two outbreaks of Ebola fever occurred in the **Republic of the Congo** during 2003. The first outbreak occurred in the Cuvette West region, and lasted from January to May, during which 120 people died. The outbreak was apparently initiated by people handling or consuming gorilla meat. Thereafter, human to human horizontal transmission occurred. Traditional burial customs may increase transmission rates to relatives. Health workers also have a high risk of contracting the disease. The second outbreak occurred at the end of October, in the Mbomo region, also in the district of Cuvette West. To date there have been 47 probable cases with 29 reported deaths. The epidemiology of this disease remains an enigma, because the maintenance host(s) and, hence, the source of infection of primates, has yet to be identified. Most human outbreaks can be traced back to contact with "bush meat," particularly the flesh of great apes that have been found dead or moribund.

Giant liver fluke – *Fascioloides magna*

Infection with the giant liver fluke *Fascioloides magna* in 2003 was reported from red deer (*Cervus elaphus*), chamois (*Rupicapra rupicapra*) and wild boar in France and in roe deer (*Capreolus capreolus*) in France and Austria. This North American parasite was introduced into Europe (Italy) in the late 19th century, and it causes mortality in different ungulates, domestic as well as wild. The recent findings indicate the parasite may be spreading in Europe at the moment.

Haemorrhagic disease in deer

Numerous cases of orbiviral hemorrhagic disease (HD) were confirmed in white-tailed deer by virus isolation. The majority of isolates were epizootic hemorrhagic disease virus type 2. Disease reported primarily in the southeastern, Midwestern, and western states with a particularly severe outbreak occurring in Idaho.

Monkeypox in the United States

During June and July 2003, 71 suspected human cases of monkeypox were reported in Illinois, Indiana, Kansas, Missouri, Ohio, and Wisconsin. A total of 35 cases were confirmed. Numbers of cases of this foreign disease increased from 15 May through the first week of June and subsequently declined. Most persons became ill following contact with pet prairie dogs *(Cynomys* sp.) obtained from an Illinois animal distributor or from other distributors who purchased prairie dogs from this source. Prairie dogs at the Illinois facility apparently were infected through contact with Gambian giant rats *(Cricetomys* sp.) and dormice *(Graphiurus* sp.) that originated in Ghana. This highly publicised disease outbreak in humans and pet prairie dogs occurred because of the international transport of non-domesticated animals and the growing trend of private exotic animal and captive wildlife ownership in the United States

Epidemiological and laboratory investigations identified a 9 April 2003 shipment of approximately 800 African small mammals from Ghana to a Texas animal distributor as the source of monkeypox virus introduction into the United States. The shipment contained 762 rodents, including Gambian giant rats and dormice, as well as several other rodent species. Monkeypox virus infection in six African rodents from this shipment was confirmed by CDC[1].

Although disposition of 178 (23%) of the 762 African rodents could not be investigated beyond the point of entry in Texas because of inadequate records, shipments of the African rodents were traced from Texas to distributors in six states. Some of the African rodents were purchased on 21 April 2003 by the Illinois distributor in whose facility approximately 200 prairie dogs may have been exposed. Monkeypox virus infection was confirmed by CDC[1] in four prairie dogs from this facility. A total of 93 infected or potentially infected prairie dogs were traced from the Illinois distributor to six states (Illinois, Indiana, Michigan, Missouri, South Caolina, and Wisconsin). However, an unknown number of prairie dogs, for which no records were available, died or were sold as pets at animal swap meets.

First identified in laboratory monkeys in 1958, monkeypox is a rare zoonotic disease that is endemic to the rain forests of central and western Africa. Human cases of monkeypox date to 1970. Rodents and lagomorphs also are susceptible to monkeypox virus infection. The causative agent belongs to the Orthopoxvirus family that includes variola (also known as smallpox), vaccinia (used in the smallpox vaccine), and cowpox viruses. Orthopoxviruses that occur naturally in the United States include ectromelia virus of mice, raccoonpox, skunkpox, and volepox.

Humans may be infected with monkeypox virus by bites from infected animals or through contact with blood or other fluids from the animal. The virus can spread from person-to-person through respiratory droplets, bodily fluids of infected persons, or via contact with contaminated bedding or clothing. Person-to-person transmission was not observed in the USA outbreak, although it has been documented in Africa. Signs and symptoms in laboratory-confirmed cases in humans in the USA included fever, rash, coughing, and enlarged lymph nodes. The illness ran its course in 2 to 4 weeks and no fatalities occurred, although a human case fatality rate of 1-10% has been observed in Africa.

On 11 June 2003, the US Food and Drug Administration and CDC[1] implemented a joint order banning the importation, transport, and release of the implicated animal species. On 4 November 2003, the joint order was replaced by an interim final rule that maintains the bans on importation of African rodents and the sale, distribution, transport and release into the environment of prairie dogs and six genera of African rodents. Additional disease control measures included smallpox vaccination of persons potentially exposed to monkeypox virus, state-enacted restrictions on intrastate animal shipment and trade, and recommendations regarding quarantine and euthanasia of all rodents from the 9 April shipment as well as any prairie dogs that were exposed to them.

The emergence of monkeypox in the USA this summer highlights the potential public and animal health risks posed by importation of exotic animals for commercial purposes. Exotic animal importation and trade of indigenous wildlife captured for the pet trade have been associated with previous disease outbreaks, including human salmonellosis contracted from pet reptiles, and tularemia and plague epizootics in captive prairie dogs. Although many states prohibit private ownership of prairie dogs, thousands of these animals, many of which are captured from the wild, are distributed in the United States and shipped internationally for sale as pets. The

results of recent human exposure to monkeypox virus via pet prairie dogs have been obvious. However, the potential exposure of other species and introduction of monkeypox virus into free-ranging wildlife via illegal release of implicated animals or by improper disposal of animal carcasses or litter remain unknown and of concern to public health and wildlife management agencies.

***Trypanosoma evansi* infection**

Trypanosoma evansi infection (surra) has been reported in captive lions (*Panthera leo*) and in captive tigers in **Bangladesh** and **India**. This infection, which sometimes kills these big cats, is transmitted to them by biting flies or through the consumption of infected meat.

Mass mortality of gulls in the Baltic sea

The mass mortality in the Baltic Sea among herring gulls (*Larus argentatus*) and other species of water birds noted in 2002 has also been observed in 2003. Mortality was observed in gulls, ducks, geese, swans, waders and passerines. The aetiology of the disease is still unknown, but, based on laboratory and field investigations, the origin of the disease is today believed to be some type of biotoxin or a man made toxin.

Miscellaneous Diseases in Primates

Miscellaneous diseases of free-ranging primates in central Africa

The **Democratic Republic of Congo** reported the following diseases in bonobos *(Pan paniscus)*.

- Human tuberculosis
- Human influenza with secondary pneumonia – 3 cases – all juveniles
- Human measles – 2 cases in juvenile bonobos
- Encephalomyocarditis – 5 cases – no age predilection.

It is cause for concern that three of these diseases were probably contracted from humans.

Matters arising from the report of 2003

2. Wildlife disease implications for OIE/FAO Global Framework for Transboundary Animal Diseases

Dr Sibartie reported that the document on the Global Framework on Transboundary Animal Diseases (GF-TADs) was adopted by FAO and OIE during the tripartite FAO/OIE/WHO meeting on 6 February 2004 in Rome. The document will be now distributed for comments by other potential stakeholders and submitted to the International Committee for adoption in May 2004. If adopted, there will be a meeting of selected potential donors around June 2004. This Framework is a generic management plan for transboundary animal diseases that is focussed primarily on foot and mouth disease, but will also take into consideration regional priority animal diseases such as classical swine fever, Newcastle disease and highly pathogenic avian influenza.

3. Challenges posed by Transboundary Conservation Area initiatives

Dr Bengis reported to the group on these issues, particularly as they are being raised by current initiatives underway in Africa:

> **Introduction**
>
> As Africa's conservation areas come under increasing pressure by expanding human resource needs, the transfrontier conservation area (TFCA) initiatives, from a biodiversity conservation point of view, are a welcome breath of "fresh air". In addition, the integration of land across international borders, as well as the consolidation of state and privately / communally owned land in joint ventures, may generate positive economic benefits for specific regions. These initiatives are strongly supported by conservationists, eco-tourism enterprises and the public at large, because they are the first tangible

moves that may reverse the current encroachment being experienced by existing and established conservation areas, as expanding local communities battle to survive the onslaughts of nature's climatic fluctuations and plagues which threaten their food security. The TFCA vision explores the possibility that the changing of land-use practices, from subsistence farming on marginal land to community participation in eco-tourism based enterprises, may have sustainable economic and ecologic benefits for all.

In the Southern African Development Community (SADC) region, there are currently seven TFCA's, involving land from two or more participating countries, which have already been established or which are in the process of being established and have political support, with international agreements currently at various stages of development and ratification. A further fifteen potential TFCA's have been identified by the Peace Parks Foundation in the SADC sub-region.

It is definitely not the intention of this report to portray these environmental conservation initiatives in a negative light. The message however that needs to be conveyed, is that all parties involved should enter these initiatives forewarned of the potential animal health implications and challenges that may be expected when increasing the current geographic range of certain animal pathogens and disease vectors. It is totally predictable that without barriers on international boundaries, and with biological bridges being formed by contiguous wildlife populations, that any contagious / infectious agent or vector present in any one of the participating countries or areas, may eventually spread throughout the entire TFCA. Potentially problematic infections should be identified at an early stage through surveillance and monitoring, and pro-active joint containment, and control measures should be established when and where necessary. These animal disease issues may also be compounded as a result of the enlarging wildlife / livestock interface, and this may negatively impact on adjoining communities. This conceptual document deals with some of the risk factors, and identifies some of the potential animal infections and disease vectors that may become problematic in certain African TFCA's.

Risk factors

Several important animal disease risk factors have been identified with regards to the development of TFCA's. These include :

Certain environmental factors, usually associated with geographic location, and climate, such as mean temperatures, rainfall and altitude, and the resultant habitat and landscape types, may be important considerations when assessing animal disease risks for an existing or potential TFCA. For example, it is probably the savannah ecosystems, with their enormous botanical and zoological biodiversity and heterogeneity that support the greatest variety of associated macro- and micro-parasites and vectors. In contrast, in very arid ecosystems with relatively low densities of specialised species, most contagious or vector borne- infections are unlikely to be maintained. Similarly, high altitudes montane habitats, which are cyclically subjected to freezing temperatures, are at most, seasonally suitable for certain vectors and parasites. Intermediately, the African tropical rainforests, with their high rainfall, reduced sunlight and canopy bound nutrients, mainly support certain niche-adapted species and their parasites.

The animal species mix that occurs in the participating land areas of the TFCA may also give insight into the animal disease risk. In sub-Saharan Africa certain key mammalian species have been identified as maintenance hosts or reservoirs of certain infectious agents and are therefore of epidemiological importance. For example: The role of the African buffalo in the maintenance of foot-and-mouth disease; theileriosis, has been well documented. The association of wildebeest with alcelaphine malignant catarrhal fever. The epidemiological links between wild porcines and argasid ticks in the maintenance of African swine fever, and bushbuck and ixodid ticks in the epidemiology of bovine petechial fever. Zebra and certain dung-breeding midges are linked to the dry-season cycling of African horse sickness. Although these infections are generally "silent" in their traditional hosts, these animals should be considered high disease risk species, under certain interface conditions with livestock. Similarly certain wildlife species are preferred hosts for disease vectors, e.g. the spiral horned antelopes (tragelaphids), wild porcines, buffalo, black rhino and elephant are preferred hosts for certain savannah and riverine tsetse flies.

Disease status of domestic animals adjacent to the TFCA is a major risk factor for wildlife within the area. For example, the presence of foreign animal diseases such as bovine tuberculosis or rinderpest in adjacent cattle populations places the wildlife in the TFCA at risk. Similarly, the presence of canine distemper or rabies in domestic or feral dogs at the interface may threaten wild carnivores, especially the social species – e.g. wild dog and the Ethiopian wolf.

The extent and type of the interface with adjoining domestic livestock herds is also an important animal disease risk factor. The interface may be linear, as along a fence-line, or patchy – reflecting habitat preferences of disease host. It may be focal at a shared water point, or diffuse, where range and resources are shared, as in savannah pastoral societies. A diffuse interface holds the greatest risk for animal disease transmission. Animal disease transmission at these interfaces may be bi-directional, with traditional "livestock diseases" entering wildlife populations, or indigenous wildlife infections crossing over into livestock. Both scenarios have potentially serious implications.

Conclusion

The formation of TFCA's has great potential benefits for biodiversity conservation and ecotourism, with associated regional economic spin-offs. This land use practice may have sustainable ecological and economic benefits for all. Participating nations should however be aware of the potential animal health challenges, which may arise out of these initiatives. Appropriate planning, and disease management strategies should be pro-actively put in place, in both the TFCA and adjoining communal farming areas, when and where it is deemed necessary.

The Working Group accepted the report and made the following observations:Africa appears to be the area in which this sort of initiative is occurring most intensively. A somewhat similar initiative in North America is the Yellowstone to Yukon wildlife habitat corridor project. There are also situations in North America in which national parks are established across boundaries of states, provinces and territories, and similar challenges in inter-governmental disease management have arisen in these situations. These latter are internal rather than international issues. All such transboundary initiatives demand a broad ecological assessment of the health risks each may pose, and implementation plans that take these risks into account.

4. Preparedness to a response to a foreign animal disease in wildlife.

Dr Leighton and Dr Fischer presented a report that summarized several national documents on preparedness planning for Transboundary Animal Diseases (TADs) and the inclusion of wild animals in these plans. An annotated list of planning elements shared by these national planning documents formed the greater part of the report.

Five documents pertaining to national preparedness for management of Transboundary Animal Diseases (TADs) in wild animals were reviewed:

1. *Manual on the Preparation of National Animal Disease Emergency Preparedness Plans (1999).* W.A.Geering, P.L. Roeder and T.U. Obi; Food and Agriculture Organization of the United Nations, Rome.

2. *Animal Health Australia (2003). Wild Animal Response Strategy (Version 3.1).* Australian Veterinary Emergency Plan (AUSVETPLAN), Edition 3, Primary Industries Ministerial Council of Australia and New Zealand (PIMCANZ), Canberra, ACT.

3. *Partnership, priorities and professionalism: A strategy for enhancing veterinary surveillance in the UK. (2003)*. Department of Environment, Food and Rural Affairs, London.

4. *Canada's National Wildlife Disease Strategy (Draft M-2, November 2003)*. Canadian Wildlife Directors Committee, c/o Canadian Wildlife Service, Environment Canada, Ottawa.

5. *National Emergency Response to a Highly Contagious Animal Disease* (United States Department of Agriculture, Updated March 30, 2001). The USDA's emergency response manuals currently are undergoing revision and a final draft is pending.

The review was undertaken to identify common elements in relevant disease management plans that might be used as background for preparation of OIE guidelines for development of national preparedness plans for management of TAD involving wildlife.

Only the Australian and Canadian documents are directed specifically at wild animal disease management. The FAO, United Kingdom, and USA documents are more general animal disease management plans in which wild animals are included explicitly (FAO) or implicitly (United Kingdom). By its nature and intent, the FAO document is structured precisely as guidelines to preparedness planning and, as such, is a model document for the Working Group, should the Working Group be asked to establish preparedness guidelines relevant specifically to management of TADs in wildlife. The Australian and Canadian documents are clear examples of the importance placed on wildlife in national TADs preparedness planning by two OIE Member Countries. While the five documents differ in detail and focus, the essential components of preparedness planning with respect to TADs in all five are highly similar and are identified and discussed here.

Justification for Management of TADs in Wild Animals

The documents justify all animal health management planning on the basis of their contribution to ensuring public health and food safety, viable animal-based economies, social and cultural well-being and the welfare of the animals themselves. The diseases of concern thus conform largely to those now being referred to as Transboundary Animal Diseases or TADs. Wild animals may be both reservoirs and sensitive indicators of important human and domestic animal diseases, and wild animals themselves may be important to local and regional economies and ecological stability. Wild animals can carry infectious disease-causing agents across national borders and can be negatively affected by the arrival of new pathogens. There is general agreement among the documents that it is not possible to manage TADs without full consideration of wildlife in preparedness and contingency planning.

Goals of Transboundary Animal Disease Management in Wild Animals

The documents all enunciate two primary goals:

1. Early warning of disease outbreaks
2. Early and rapid responses to disease outbreaks

These two general goals of TADs management in wild animals are to be achieved through the same programs and processes as are widely adopted for TADs control in domestic animals. However, the details of the necessary programmes and processes applied to wildlife differ in some respects from those applied to livestock or other domestic species, and thus specific processes and procedures that assure extension of national TADs management programs to wildlife species must be planned and implemented.

Essential Elements of preparedness to Manage Transboundary Animal Diseases in Wildlife

1. *Animal Demography* - The number, density and distribution of wild animal species associated with risk from TADs must be known. Response planning is impossible without this information. Species of greatest concern must be identified and accurate estimates of their demography must be made regularly. Alternatively, the methods and resources to immediately gather this information in the face of an outbreak (Australian plan) must be assured.

2. *Wildlife Disease Surveillance* - This is the overarching, key element in TADs preparedness.

"Wildlife disease surveillance must not be overlooked. Wildlife may provide a reservoir of infection for some diseases, but may also act as a sensitive indicator of diseases that are not clinically apparent in adjacent livestock populations. The latter has occurred recently with African Lineage 2 rinderpest virus in East Africa. Close cooperation is required between veterinary and wildlife authorities." (FAO - Chapter 4)

Disease Detection: The documents uniformly require surveillance for diseases in wildlife that includes full use of samples of opportunity ("passive" or "scanning" surveillance) and also statistical surveys for particular diseases in particular species or groups of species ("active" or "targeted" surveillance). The former is essential to detect new or unexpected disease occurrences while the latter is needed to assess presence or absence of specific diseases and to measure their prevalence.

Laboratory Capability: The documents give particular attention to the requirement that local, regional and national disease testing capacity must be in place for all diseases of possible concern, and that relationships between these laboratories and appropriate international Reference Laboratories and Collaborating Centres should be established to assure immediate, correct identification of TAD. Laboratories also must be capable of identifying new or unexpected diseases; their expertise and capability must not be restricted to lists of known TADs.

Information Technology: Great emphasis is placed on information technology capable of immediate data entry, centralization of data, and distribution and analysis of disease occurrence information. These IT systems must link all participants. This aspect of surveillance is tightly linked to the overall communications requirements of national TAD management plans.

Risk Analysis: Surveillance information must be reviewed and analysed. Any occurrence of a TAD that may require a management response must receive immediate risk analysis to guide the decision on whether or not to implement a response program and the nature of that response program.

3. *Contingency Response Plans*

Plans for responses to outbreaks of TADs must be made in detail and in advance of detection of important TAD through surveillance.

Generic and Specific Response Plans - TADs response plans should be of two different kinds:

i. *Generic Response Plans*: These plans are made with reference to possible outbreaks in a range of species, habitats and geographic locations, and for a range of infectious agents with different characteristics of transmission, persistence and other epidemiological factors. Generic plans facilitate responses to outbreaks of new or unanticipated diseases.

ii. *Response Plans for Specific Diseases*: Risk analysis must be undertaken to identify TAD with the greatest likelihood of occurrence in a country or region. Response plans specifically for these diseases in susceptible wild species then must be made. These plans can be highly detailed with respect to susceptible species, control or eradication measures or use of vaccination, while generic plans must remain more general.

Integration with National Disaster Plans: The documents emphasize the requirement that emergency responses to TAD should be fully integrated with the more general national plans for responding to disasters of various different kinds. National disaster plans normally include the crucial elements of planning for support by military, police and civilian authorities in carrying out the response.

Financial Plan: Funds to initiate responses to TAD outbreaks must be identified and made available for this purpose in advance of the occurrence of a disease outbreak.

"Experience has shown that delay in obtaining finances is one of the major constraints to the rapid response to emergency disease outbreaks. The application of even modest funds immediately will certainly save major expenditure later. Forward financial planning is therefore an essential component of preparedness" (FAO - Chapter 6)

Environmental and Ecological Factors: Response plans must acknowledge local environmental conditions, ecological issues and the economic value of wildlife to local and regional economies when planning response strategies. Wild animals may be of greater economic value than livestock in many regions (direct local use, tourism, ecosystem stability). In addition, disturbance of wildlife by disease control procedures may destabilize local environments in costly ways and disperse infected animals, thereby spreading the disease.

Realistic Expectations for Control of Diseases in Wildlife

"Wild animals often live in areas where their control and containment are both difficult and expensive. Moreover, control and containment could take months to achieve, and in some cases might prove impossible. Wild animals can often pass through fences designed for livestock, and their movements could frustrate attempts to contain or eliminate an emergency disease. Infected wild animals might evade and disperse a considerable distance away from attempts to contain and eliminate them. Few elements in an emergency disease outbreak will be less tractable or predictable. In some cases, a disease may change the normal behaviour of wildlife. There should be no false expectations about the ability to control wild animal populations should they become involved in an emergency disease outbreak. " (PIMCANZ p. 37)

4. *Communication Planning*

Communications among participants in the wildlife TADs program, and with external stakeholders and the public, is complex and requires advance planning. Internally, communication requirements include establishment of channels for rapid exchange of essential information and a command structure for decisions and response implementation. Externally, risk communication and public relations are essential to compliance in all aspects of the program by major and minor participants, and thus, to the program's success and effectiveness.

5. *Education*

All documents highlight the need to provide varying degrees of training and instruction to participants in TADs management programs. Educational needs range from general instruction to maintain competence of field personnel, to a national strategy to build the scientific capacity to plan and operate the program. Shortage of trained personnel at all levels has been highlighted as a major potential constraint on planning and implementation of TADs management strategies. Educational needs and person-power requirements must be assessed and met.

6. *Collaboration*

All documents consulted emphasise the complex nature of animal disease management. This is particularly true with respect to wild animals because the veterinary services normally responsible for animal disease management most often are within departments of agriculture, while expertise and authority for wildlife often are located elsewhere within the government structure and may rest largely with regional authorities. Thus, successful programs of TADs management in wildlife must proceed by means of close and transparent collaboration among diverse government agencies operating under different Acts and regulations: wildlife, fisheries, agriculture, environment and public health. Non-government organisations and the public also have strong interests in wild animals and must be considered major stakeholders in wildlife TADs management planning.

In the discussion that followed presentation of the report, several points were made. It was noted that the elements deemed essential to TADs preparedness planning in the report are also identified in the European Union document *Council Directive 2003/85/EC, Section 15, Foot and Mouth Disease in Other Species*. It was emphasised that the challenge of achieving inter-department and inter-agency collaboration and cooperation within national governments must be kept fully in mind in preparedness planning.

The Working Group sought the opinion of the OIE staff representatives as to whether or not the OIE would wish the Working Group to proceed to develop generic guidelines for national TADs preparedness planning with respect to wild animals. In response, the OIE staff noted that the International Committee is now considering matters such as important zoonotic diseases and threats posed by potential biological warfare agents to which wild animals are fully relevant and important.

It was agreed that the Working Group will review the OIE guidelines on disease surveillance and report next year on how the Group might create some additional guidelines to expand these to cover specific aspects peculiar to wildlife. The Group will use current OIE surveillance guidelines as the basis to expand the current report on preparedness planning, a task that might be completed and ready for review by the OIE Scientific Commission for Animal Diseases in 2006.

The group also agreed to prepare a generic draft plan about preparing for a foreign animal disease, expanding on the paper above to cover the essential elements:

1. *Animal Demography*
2. *Response plans*
3. *Communication planning*
4. *Education/Awareness*
5. *Collaboration*

5. Emerging infectious diseases involving wildlife

a) Severe Acute Respiratory Syndrome (SARS). Dr François Moutou spoke to the Working Group about his experience as an OIE expert in a team comprising representatives of the World Health Organization who visited China in April 2003 to work with Chinese scientists to identify possible animal sources of the SARS virus. He explained some of the agricultural and commercial practices in southern China through which wild or semi-domesticated species such as the masked palm civet (*Paguma larvata*) are acquired, raised and marketed. He presented results from recent virological studies, from China and abroad, which support a working hypothesis that the SARS virus is closely related to coronaviruses found in the masked palm civet thus implying that this species may be amongst the original source of the SARS virus.

b) Monkeypox. Dr John Fischer spoke to the Working Group about the outbreak of human monkeypox in the United States in 2003. The sources of infection for humans were native North American rodents (prairie dogs - *Cynomys* sp.) sold in the pet trade. These animals themselves had become infected through contact with rodent species imported from western Africa where infection in those species is common (see Section 1, above for more information).

c) Ebola virus. Dr Roy Bengis spoke to the Working Group about recent occurrences of Ebola virus infection in humans, gorillas and duiker in Gabon and the Republic of Congo over the past few years (see Section 1, above for more information).

d) West Nile virus. Dr Fischer and Dr Leighton spoke to the Working Group about the occurrences of West Nile virus in humans and wild animals, particularly wild birds, in the United States and Canada in 2003 (see Section 1, above for more information).

e) Bovine Tuberculosis - There was general discussion of this disease in wild animals (see Section 1, above for more information).

6. Avian Influenza in wild birds - review and update

Dr Bunn presented to the Working Group a review of avian influenza virus infections in wild birds in the context of current outbreaks of this disease reported in poultry and humans in parts of Asia:

Introduction

Influenza viruses occur worldwide and have been isolated from free-living birds.

Background points

- Virtually all H and N combinations have been isolated from birds.
- A wide variety of domestic and wild avian species are susceptible
- Wild birds, particularly those associated with aquatic environments, are the reservoirs of viruses of low virulence for poultry
- Viruses may become virulent following transmission and cycling in commercial poultry.
- All strains isolated to date from diseased birds have been either of the H5 or H7 subtype, but not all H5 or H7 strains cause disease
- There is current concern about the lack of knowledge on the prevalence of viruses of H5 and H7 subtypes in bird populations.
- Since 1996 it has become clear that avian influenza viruses may be important pathogens capable of infecting humans directly without reassortment
- Outbreaks of disease in commercial poultry has been linked to a close association between commercial poultry and waterfowl on many occasions.

Wild bird surveys

A literature review was undertaken and the following key findings emerged:

- Isolation of virus from other wild birds is completely overshadowed by the number, variety and distribution of influenza viruses isolated from waterfowl. The highest rate of detection of influenza virus is from ducks.
- The concentration of ducks, their potential to excrete high levels of virus and its ability to remain viable in an aquatic environment means that 'large' areas of the environment will be contaminated.
- Infection in a wide range of birds has been recorded.
- Different virus subtypes can be identified simultaneously within a single bird.
- The predominant subtype isolated from domestic ducks varies from year to year.
- Natural protection of ducks does not provide cross protection between influenza A subtypes.
- Influenza viruses can sweep through bird populations without having any signs of disease present.
- Studies indicate that the viruses identified in Eurasia and Australia are genetically distinct from those in North America. This most likely reflects the distinct flyways of each hemisphere.

- There is an 'avian influenza season' (at least in temperate countries) in the autumn/winter.
- Surveillance programs of wild birds when outbreaks of poultry influenza has occurred often finds little or no signs of infection.

Surveillance Recommendations

- Concentrate on ducks/waterfowl.
- Use sentinel birds (waterfowl).
- In temperate areas concentrate surveying young birds in the autumn/winter period.
- Undertake a risk assessment for the specific area (number of species, density, location to commercial operations, etc.).
- Consider longitudinal studies over a number of years.
- Surveillance is of global interest (surveillance information in one country will be important for other countries).

Main reference: Suss J., Schafer J., Sinnecker H., Webster R.G. - *Influenza subtypes in aquatic birds of eastern Germany.* Arch. Virol., (1994) 135: 101 – 114.

In discussion following the report, it was agreed that the scientific information concerning influenza viruses in birds should be very precise as to the host species that have been tested. For example, it is unlikely that all species of ducks will typically have the same prevalence of infection with the same virus strains, and epidemiological understanding of these viruses requires exact information regarding host species in virus surveys. It also was noted that technical terms applied to these viruses such as "virulent" and "highly pathogenic" (as technical terms used in regulatory veterinary medicine, both apply only to chickens) are widely misunderstood by lay persons and specialists alike. Likewise, the very loose association between H and N antigen classification and pathogenicity is widely misunderstood.

The Working Group is of the unanimous opinion that the role of wild birds in occurrences of virulent influenza A in poultry and in humans is widely misunderstood. Virulent strains of these viruses seldom have been found in wild birds, even in association with outbreaks in poultry. The possibility that the co-cycling of more than one influenza strain within a so called "mixing vessel" hosts (?? Pigs) may result in genetic exchanges and genetic shift was discussed. Such events could result in the evolution of highly pathogenic viral strains with rapid passaging and spread, especially within and between intensively farmed poultry houses, and with high risk of "cross-over" infection to humans. Control programs for virulent strains of avian influenza viruses should be focussed on biosecurity of poultry populations and protection of humans exposed to poultry.

7. *Gyps* vulture die-off in southern Asia

A severe population decline in the oriental white-backed vulture (*Gyps bengalensis*) was first noted in Keoladeo National Park, India, in the early 1990s. Since then, marked and continuing population declines of 34% to 95% have been observed in two other species of vulture, *Gyps indicus* and *Gyps tenuirostris*. These three species are now listed as "critically endangered" by Birdlife International. The population declines were associated with the post-mortem findings of renal failure and visceral gout. Searches for infectious causal agents have so far been unsuccessful. However, recent research findings indicate that in Pakistan, vulture deaths could be associated with consumption of livestock carcasses containing the veterinary drug diclofenac which is commonly used to treat lameness in livestock. This hypothesis is however not readily accepted by a neighbouring country also witnessing similar deaths in vultures. While minute amounts of diclofenac have been shown experimentally to cause fatal renal failure in vultures and traces have been found in the carcasses of field mortalities, it is not possible to state that this is the sole cause of vulture deaths in the region and further research should be undertaken.

8. Genetically Modified Organisms

Dr Bunn provided a review of this issue to the Working Group.

Briefing Paper – OIE Wildlife Working Group meeting February 2004

Purpose

For OIE to consider developing international standards for the release of genetically modified organisms (GMOs) affecting wild animals.

Background

A number of international researchers are developing immunocontraception techniques for controlling rabbits, mice and foxes. Other GM techniques are being developed to control carp and cane toads. The immunocontraception research involves designing vaccines that 'trick' the animal's immune system into treating certain proteins found on egg cells as foreign. The immune system of the vaccinated animal then reacts to these proteins in its own reproductive tract resulting in reproductive failure.

Laboratory research with mice has shown viruses (particularly the mouse cytomegalovirus) are possible vectors for the immunocontraceptive vaccine, with field trials possibly less than two years away. GM techniques for controlling the other mentioned species are not as advanced. Disseminating GMOs are being developed in New Zealand to control wild possums of Australian origin. Current research has demonstrated that virally-vectored immunocontraception is possible for at least one species (the mouse).

In Spain, a disseminating GMO has been developed (but not yet released) to protect rabbits against myxomatosis and rabbit haemorrhagic disease. In contrast to immunocontraceptive GMOs (which are designed to *reduce* the numbers of species seen as pests), the Spanish GMO is designed to *increase* the numbers of a threatened species in its native range.

OIE Involvement

The Working Group on Wildlife Diseases has already expressed concerns in its reports to the International Committee in 1994, 1996, 1998 and 2001. It has made recommendations on the potential danger of releasing genetically modified organisms that could spontaneously spread among communities of wild animals.

In 1994 and 1996 the working group stated, "*Administration of contraceptive vaccines to wildlife and their effect on the targeted and other species raises questions concerning environmental safety and animal welfare. Some of the contraceptives studied in the past or experimentally tested on a limited scale have potentially adverse effects. Infectious agents, which could be used as vectors to deliver immunocontraceptives, may be difficult to contain within the target population. Advantages and disadvantages of the various techniques need intensive investigation and evaluation as to [their] safety must be made*".

In its 1998 report, the Working Group addressed the question of vaccination of free-ranging wild rabbits against viral haemorrhagic disease (equivalent to rabbit calicivirus) with a genetically modified myxomavirus harbouring the viral haemorrhagic disease antigen. They stated: "*such vaccines should be evaluated for safety in the animal populations and, when deemed necessary, for humans. The vaccine should be safe not only for the target species, but also for the major non-target species that may be exposed to the vaccine through ingestion of baits or predation or scavenging of target species.*

Vaccine carrier organisms should not be used in wildlife populations if they are transmissible from vaccinated to non-vaccinated animals."

In their last report (2002) they stated that they still believe their observations are relevant.

The Cartagena Protocol on Biosafety

An international biosecurity protocol for living modified organisms (the Cartagena Protocol on Biosafety) came into effect on 11 September 2003. The protocol establishes an 'advance informed agreement procedure', similar to that used for the pesticide trade. It aims to ensure that countries are provided with the information necessary to make informed decisions before agreeing to the import of such organisms into their territory. Many countries still have not ratified the protocol. [www.biodiv.org/biosafety/]

One view is that this protocol will not deal adequately with the risk and potential consequences of the international spread of disseminating GMOs developed to manage wildlife, and it will not provide a process to resolve disputes prior to the release of the GMO.

Potential Issues

European rabbit

There are international implications in that spread could occur to other countries with completely different management objectives for the target species. The case of the European rabbit provides a good illustration of conflicts that need to be addressed during the development of disseminating GMOs. The rabbit is native to Spain, where it is conserved and managed as a resource for hunting and as a natural prey for endangered predators. In some other parts of Europe and in many southern hemisphere countries (Australia, New Zealand, Argentina and Chile, for example), it is a serious introduced pest. The potential for conflict is revealed starkly by recent interest in developing disseminating GMOs to manage wild rabbit populations. In Australia, research is being conducted on using a modified myxomavirus to disseminate immunosterility in female rabbits, while in Spain research on a different disseminating GMO (but again a modified myxomavirus) to disseminate protective immunity to rabit haemorrhagic disease and myxomatosis is giving promising results.

It is also possible that the GMOs could affect related non-target species (especially hares and *Sylvilagus* spp.) in other countries. Occasional hares have been recorded with infections of myxomavirus, raising the possibility that the transgenes could be transferred into the hare fibroma virus genome through genetic recombination. The GMOs could also affect one or more species in the North and South American genus *Sylvilagus*, including the original host for myxomavirus, *S. brasiliensis*. The egg proteins in hares and *Sylvilagus* are most probably sufficiently similar to those in European rabbits for the GMO to be equally effective in those species.

The Australian possum

The Australian brush-tailed possum (*Trichosurus vulpecula*) was introduced into New Zealand in 1837 to establish a fur trade. It is estimated that the New Zealand possum population now is 60-70 million. The damage to native forests is readily apparent in many areas. Possums ignore old leaves and select the best new growth. Possums compete with native birds for habitat and for food such as insects and berries. They also disturb nesting birds, eat their eggs and chicks and may impact on native land snails. Dairy and deer farmers have the added worry of possums spreading bovine tuberculosis. Twenty three per cent of the land area of New Zealand has tuberculosis-infected possums.

Sustainable biological control (immunocontraception) will reduce possum breeding. A system where the biological control agent passed naturally from possum to possum (instead of relying on baits) would be much more effective. A strong candidate for the role of vector for an immunocontraceptive protein (or toxin etc) is *Parastrongyloides trichosuri*, a nematode parasite of the possum. Favourable features of *P. trichosuri* are it:

- does not elicit a strong protective immune response in its host, so the host remains infected for long periods and is susceptible to re-infection i.e. the infection is chronic;
- does, however, elicit a host antibody response, so a protein produced by the parasite is likely to be exposed to the host immune system;
- does not cause serious pathology or morbidity in the host; and

- is capable of completing an apparently indefinite number of free-living generations outside the host. This acts to sustain and amplify its presence in the environment once released.

In Australia the brush-tailed possum is common, widespread and can be a nuisance but it is not considered a pest.

House mouse

Another research program being undertaken in Australia has as its goal to produce an effective, safe and practical anti-fertility vaccine for mice. The genes for a wide range of mouse proteins have been inserted into murine cytomegalovirus — a mouse-specific virus, and tested for their effect on breeding in laboratory mice. The ability of 'infertility vaccines' to spread and affect large numbers of mice in the field is critical for success. Major possible risks associated with such a vaccine are the risk of inadvertently exporting a genetically-modified virus overseas in live mice, and species specificity.

These examples, especially of two countries with conflicting purposes, demonstrate the potential need for an organisation like OIE to promote international standards.

Consequently, although in most cases the area of origin of a species and the area where it is an introduced pest are sufficiently isolated from each other to prevent natural spread, export prohibitions on both the pest (in case it harbours the introduced GMO) and the GMO itself are crucial.

Consequently when considering the development of a management strategy based on disseminating GMOs, countries should take into account the possible spread of the GMOs beyond their borders, and their possible impact. The following questions need to be answered: What are the likely hazards from the potential introduction of a novel organism? What could be the consequences? What mechanisms are needed to minimize the risk?

Considerations

Terrestrial Animal Health Code

The OIE *Terrestrial Animal Health Code* (the *Code*) contains standards, guidelines and recommendations designed to prevent the spread of infectious agents and diseases pathogenic to animals and humans into the importing country during trade in animals, animal genetic material and animal products.

The *Code* does not deal with the introduction of mammals that are themselves 'pests' or with the biological control of such pests. It does refer to biologicals for veterinary use (Chapter 1.5.3), including the exemplary category of conventional or genetically modified micro-organisms (no. 15 in 1.5.3.2). While the *Code* addresses the need for quality assurance in manufacturing practices for production of vaccines (Chapter 1.5.2), this section focuses on other biologicals and recommends quality assurance of all stages of manufacture, not only testing of the final product. Guidance on any form of control of unwanted mammals that are pests would be a new area for OIE. However, inclusion of this concept has been considered by OIE because no other convention or international body comprehensively covers this area. Beyond that overall topic of biocontrol of mammals that are pests, the OIE has not yet tackled GMOs as a category. Any new code established by OIE that relates to GMOs may need to deal with the development/constitution of the GMO itself (as with the manufacturing process for vaccine and biologicals referred to above).

Although the GM bio-control issue raised here does not fit easily into the OIE's current expertise, there has been increasing interest in guidance regarding wildlife diseases, and the issues of development and shipment of other biologicals may provide some interesting points regarding safety in the production process.

Regional Commission

The OIE Regional Commission for Asia, the Far East and Oceania recently agreed that the OIE Working Group on Wildlife Diseases should take another look at the issue of genetically modified organisms. It was suggested that a relevant paper be presented at the wildlife working group and also involving the Scientific Commission. "The OIE must clarify its responsibility in light of the Cartagena protocol, and would report to the International Committee in May 2004 on this issue".

Issues for discussion

1) Should OIE be involved?

2) What if, for example, a GMO for rabbit contraception was released into a country that was trying to protect its rabbit population. What could be the consequences?

3) Alternatively, what if a GMO designed to protect rabbits against myxomatosis and rabbit haemorrhagic disease was released into a country where rabbits were an introduced pest and into which these diseases had been deliberately introduced to control their numbers?

4) Might other species be affected by GMOs designed to manage rabbits (hares and *Sylvilagus* spp. in particular)?

5) What role might the OIE be required to play?

6) If the OIE should be involved what are the next steps to take? Should standards be developed to reduce the risk of transboundary spread of disseminating GMOs? If possible, should genetic safety devices be built into the GMOs themselves to ensure they operate only in the geographical area intended (note that the technology to do this is yet to be developed)?

Recommendations

That the Working Group for Wildlife Diseases:

1) Consider whether OIE should be involved.

2) Consider the factors leading to the continued development of disseminating GMOs designed to manage wildlife despite the dangers of international spread.

3) Prepare a case study for one species of vertebrate for which GMOs are currently being developed, especially taking into account:

    a) the reason(s) such a method of control is being contemplated.

    b) the unintended international spread of the GMO following its release and what the affects elsewhere could be

    c) discontinuing the development of the GMO.

4) Consider whether techniques might be able to be developed that would ensure the GMOs operate only in the geographical area intended.

5) Consider different international arrangements for managing the risks (ie, under the OIE or the Cartagena Protocol, bearing in mind that some countries developing the GMOs have not signed the Cartagena Protocol).

In its discussion of this report, the Working Group reiterated that its previous statements regarding risks and necessary cautions associated with development of GMO for use in management of wildlife diseases or control of wild animal populations remain generally valid and remain the opinion of the Working Group. The group sees particularly important risks in creation of GMO that are transmissible from animal to animal (contagious). High standards for development of such organisms should be established and should

include safety for non-target species and absence of possible alternative strategies. GMO targeted at contraception probably are a special case and require particularly high safety testing standards. The Working Group also recognizes the potential utility of contagious vaccines in response to wildlife crises. Development of GMO as one strategic option also should not preclude development of alternative approaches as both medical technology and understanding of animal ecology change. Vaccination may not be an effective approach to disease or animal population control even if new effective GMO vaccines are developed. Safety standards must include the global environment, and not just the local environment. The Working Group considers it essential that the OIE become involved in setting standards for international movement of animals and animal products associated with use of GMO vaccine organisms.

9. Links to IUCN Veterinary Specialist Group

Links with the IUCN Veterinary Specialist Group and with the World Association of Wildlife Veterinarians have been established by the Working Group. It is hoped that these links will add importantly to the wildlife disease information that reaches the Working Group each year.

10. Sensitivity and Specificity of some List A and List B diagnostic tests for wildlife diseases.

Dr Bengis reported to the group on his preliminary review of this issue.

Discussion document : livestock disease diagnostic tests : their sensitivity and specificity in wildlife

Routine diagnostic tests that have been developed and are currently used for detecting or confirming diseases in domestic livestock, have generally not been validated for wildlife. The question remains as to whether there are any essential differences in sensitivity or specificity of these tests when they are applied to wildlife samples and whether the Working Group for Wildlife Diseases should put forward suggestions for amending and updating the next edition of the OIE *Manual of Standards*.

Diagnostic tests can arbitrarily be divided into two categories :

1) **AGENT IDENTIFICATION TECHNIQUES,** which includes both **directly visual diagnostics** as well as **antigen detection** techniques.

2) **INDIRECT TECHNIQUES**

There will, however, always be some overlap in these categories.

AGENT IDENTIFICATION TECHNIQUES

a) DIRECTLY VISUAL DIAGNOSTICS

1. Macroscopic – identification of macroparasites (helminths, ectoparasites and larval myiasis) and disease vectors (winged and flightless arthropods) OR pathognomonic macroscopic lesions at necropsy.

2. Microscopic

i) Detection and identification of micro-parasites in body fluid or tissue smears, skin scrapings, faecal examinations and urine sediments. Examples are haemoparasites, anthrax bacilli, microfilaria, dermatomycoses, entero-protozoons, helminth eggs and micro-ectoparasites. Specific stains may be required.

ii) The typical light microscopic appearance or electron-microscopic features of specific diseases in histopathological organ sections, e.g. mycobacteriosis, spongiform encephalopathies, systemic mycoses, viral inclusion bodies, systemic protozoa etc, etc Specific stains may be required.

iii) Making use of fluorescent conjugates to identify aetiological agents in tissue smears,e.g. fluorescent antibody techniques used for diagnosis of rabies and clostridial infections.

iv) Immunohistochemical techniques for demonstration of the aetiological agent in tissue sections, e.g. rabies, Rift Valley fever, spongiform encephalopathies.

b) ANTIGEN DETECTION

There are various direct and indirect methods of detecting infectious agents and antigen in specimens. These include :

1. ***In vitro* or *in vivo* culture –** commonly used to isolate bacteria, viruses, fungi and some protozoa.

2. **Molecular techniques –** including PCR amplification of the agent's genetic material, and specific DNA probes to detect antigen.

What is very important is that all of these agent identification diagnostic techniques should theoretically not be affected by the species of the host, i.e. domestic livestock or wildlife. There may be some species variation in the proliferation rate or amplification of the agent, which may affect the amount and distribution of antigen in the tissues.

INDIRECT TECHNIQUES

These techniques are mainly serum / plasma based immuno-assays which rely on detecting the hosts response to the antigen. These assays directly or indirectly measure antibody levels or cellular immune responses to the specific agent, which may have resulted from exposure, infection or disease. Examples are virus neutralisation tests, all the various ELISA techniques, complement fixation tests, haemagglutination inhibition tests, precipitin tests, gamma interferon tests and intradermal antigen response tests.

Most of these tests involve the comparison of results with known positive and negative controls, and interpretation of the results depends on set "cut off" point levels. These serological tests are frequently used in specific disease surveys, or to test batches of animals prior to certification or movement. They are also used in individual diagnostics where repeat testing is used to assess sero-stability. Some indirect technique tests for specific diseases have been used for many years in certain wildlife species with excellent results. However, it is with these indirect test techniques that we may have a problem with sensitivity and specificity, and where species validation becomes important.

CURRENT KNOWLEDGE REGARDING VALIDITY OF CERTAIN DIAGNOSTIC TESTS FOR SOME OIE LISTED DISEASES IN CERTAIN SPECIES

LIST A

DISEASE	SPECIES	DIRECT I.D. TECHNIQUE	DIAGNOSTIC VALIDITY	INDIRECT TECHNIQUE	DIAGNOSTIC VALIDITY
FMD	Buffalo, antelope wild porcines	Virus isolation & culture	Excellent	ELISA, virus neutralisation	Good
Rinderpest	Buffalo, antelope & wild porcines	Virus isolation & culture	Excellent	ELISA, virus neutralisation	Good
PPR	Antelope & wild porcines	Virus isolation	Excellent	Virus neutalisation, ELISA	Good
Lumpy skin disease	Buffalo	Virus isolation	Good	Virus neutralisation	Good
Rift Valley Fever	Buffalo, antelope, camels	Virus isolation. Immunohisto -chemistry,	Good	ELISA, haemagglutination inhibition	Good
Bluetongue	Buffalo, antelope	Virus isolation, PCR - probe	Excellent	ELISA, virus neutralisation	Good

LIST B

DISEASE	SPECIES	DIRECT I.D. TECHNIQUE	DIAGNOSTIC VALIDITY	INDIRECT TECHNIQUE	DIAGNOSTIC VALIDITY
Anthrax	Multi species	Blood or tissue smear stained giemsa, culture on plet agar	Excellent	Precipitin test	Moderate
Rabies	Multi species	Fluorescent antibody test & immuno- histochemistry	Excellent	Virus neutralisation	Good
Heartwater	Wild ruminants	Brain smear stained Giemsa, PCR – probe	Excellent	ELISA, IFA	Moderate
New world screw worm	All species	Agent I.D.	Excellent		
Trichinella	All species	Trypsin digestion agent I.D.	Good	ELISA	Moderate
Bovine brucellosis	Wild ruminants	Culture and isolation	Excellent	Card test, serum agglutination test, complement fixation test	Moderate. Most elephants are anti complementary
Bovine tuberculosis	Multi species	Culture and isolation	Moderate-slow growth – overgrowth of contaminants	Tuberculin skin test, TB gamma interferon test	Tb skin test – false positives in pachyderms. Gamma interferon test – kits only available for bovids and cervids
Babesiosis	Multi species	Romanofsky stained blood smears	Good	ELISA, IFA	Moderate
Theileriosis	Multi species	Giemsa stained spleen, lymph node and blood smears. PCR – probe	Good Moderate	IFA	Moderate
Dermatophilosis	Multi species	Lesion smears	Good	--	--
Tse's	Multi species	ELISA, Histopath, immunohisto-chemistry	Excellent	--	--

The Group reviewed its considerations of this issue in 2002 and 2003, and agreed that an orderly review of the suitability to wildlife disease surveillance and diagnosis of current diagnostic tests for OIE List A and List B diseases should be undertaken. The process will involve consultation with each relevant OIE Reference Laboratory to determine what diagnostic tests are available for the disease, which of these tests would be suitable for use in some or all wild animal species, and what problems in sensitivity and specificity are recognized or anticipated when each test is applied to species for which it has not been validated. In 2005, the Working Group will report results of this inquiry for foot and mouth disease, *Chlamydia*, classical swine fever, rabies, African swine fever, African horse sickness, bovine tuberculosis, Newcastle disease, rabbit haemorrhagic disease, tularemia, bluetongue/haemorrhagic disease, vesicular stomatitis, *Brucella* (all species), rinderpest, *Trichinella*, anthrax, and avian influenza

11. Reference Laboratories and Collaborating centres

Following a recommendation by the International Committee for the OIE to nominate Collaborating Centres for wildlife diseases, the Group examined certain criteria which would enable the OIE to select those centres. Taking into account the wide diversity of animal species and the various diseases which have been considered by the Group during its ten years of activity, it appears difficult that only one institution would be capable of gathering all the necessary expertise in that area. Besides, the specific diseases occurring in different geographical locations necessitate a regional approach in order to reduce difficulties linked to distant Centres particularly in continents where transport and other means of communication are not optimal. The Group also felt that the propositions made by OIE Member Countries with respect to the evaluation of applications for consideration as OIE Collaborating Centres should take into account the following:

The centre should have:

- A wide range of expertise recognised both nationally and internationally in investigations, surveillance and the management of wildlife diseases
- An ability to rapidly mobilise competent experts including those not belonging to the institution seeking approval
- An aptitude to establish collaborations with training institutions involved in managing wildlife diseases in countries or continents other than the one in which the Centre is located in order to ensure that the OIE benefit from an effective world-wide network of expertise.

12. Global wildlife disease situation as revealed by questionnaire responses

Wildlife Disease Questionnaire

The Working Group discussed the structure and distribution of the wildlife disease questionnaire at length. The conclusions from this discussion were that the current questionnaire has been very successful thus far, and further changes to the questionnaire should be made cautiously. The questionnaire should be kept as simple as possible to facilitate its use. Some clarifications in the directions to respondents on how to fill out the questionnaire may be required. For example, only occurrences of disease in wild animals should be reported, not occurrences in domestic animals. In 2004, a single table to be filled out will be presented and respondents will be encouraged to fill it out and return it electronically. The list of diseases important to wildlife which are currently not included on OIE Lists A and B will be reviewed and shortened. All data included in the Working Group's annual report must be supplied with the full knowledge of the relevant OIE Delegate. Where information is furnished by unofficial sources, the OIE will request confirmation of such information by the relevant Delegate.

To facilitate wide participation in the annual questionnaire, the questionnaire will be sent to respondents early in the year with a reminder towards the end of the year. In addition, the meeting of the Working Group will be in the third week of February to provide respondents with more time to assemble disease information for the previous calendar year.

13. Wildlife Disease Working Group website

Mrs Caroline Malotaux (OIE Central Bureau) presented a general plan for a series of web pages related to the activities of the Working Group. The prototype site includes a home page giving access to additional pages on news and relevant events, mandate of the group and members list, meeting reports and agendas, technical items, including the annual questionnaire and information relevant to diseases in wildlife, and useful related links. The Working Group must now fill in the information for each section. All technical statements from the Working Group which will appear on these pages must be written and approved through a consultative process that includes the Central Bureau. The objective of the website is to provide information regarding disease agents in wildlife, that will be useful for animal health agencies and wildlife conservation organizations. The Group suggested that all background scientific papers written by Group members for the OIE *Scientific and Technical Review* be put as a link on the website. Updates will be made approximately twice per year. Dr Artois has agreed to serve as Working Group webmaster.

14. *OIE Scientific and Technical Review* Vol. 23 (2) 2004

This issue of the journal is to be a volume entitled *Emerging Zoonoses and Pathogens of Public Health Concern*. The President of the Working Group has been asked to prepare a chapter on the place of wild animals and their associated infectious organisms in this global health issue. Dr Bengis will circulate a chapter outline to the members of the Working Group and invite participation in preparation of the chapter. The chapter must be submitted to the editor by the end of May 2004.

15. Other matters

Two requests for information and assistance from a Delegate were received and reviewed by the Group. Both pertain to diseased wild animals in eastern Africa. Possible causes of the diseases described were considered by the members. Dr Bengis will respond to the inquiries.

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.../Appendices

Appendix I

MEETING OF THE OIE WORKING GROUP ON WILDLIFE DISEASES

Paris, 17 – 19 February 2003

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Agenda

1. Epidemiological review of selected wildlife diseases in 2003
2. Wildlife disease implications for OIE/FAO Global Framework for Transboundary Animal Diseases
3. Challenges posed by Transboundary Conservation Area initiatives
4. Preparedness to a response to a foreign animal disease in wildlife.
5. Emerging infectious diseases involving wildlife
6. Avian influenza in wild birds - review and update
7. *Gyps* vulture die-off in southern Asia
8. Genetically modified organisms
9. Links to IUCN Veterinary Specialist Group
10. Sensitivity and Specificity of some List A and List B diagnostic tests for wildlife diseases.
11. Reference Laboratories and Collaborating centres
12. Global wildlife disease situation as revealed by questionnaire responses
13. Wildlife Disease Working Group website
14. *OIE Scientific and Technical Review* Vol. 23 (2) 2004.
15. Other matters

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Appendix II

MEETING OF THE OIE WORKING GROUP ON WILDLIFE DISEASES

Paris, 17 – 19 February 2003

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