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

Paris, 17 - 19 September 1996

The fourth meeting of the Group was held on 17-19 September 1996 at the OIE Central Bureau. It was opened by Dr J. Blancou, Director General of the OIE, who welcomed the participants (Appendix I). Dr V.F. Nettles sent his apologies. Dr M.H. Woodford was elected chairperson of the meeting. The agenda (Appendix II) was approved.

The main objectives of the Group at this meeting were to review progress made in the preceding year for the collection and reporting of those wildlife diseases of concern to Member Countries, and to discuss important emerging diseases of wildlife such as tuberculosis, transmissible spongiform encephalopathies and Ebola virus infection.

1. Epidemiological review of selected wildlife diseases 1995-1996

**List A**

**Rinderpest in Cape buffalo and other wild animals**

No further cases of rinderpest were recorded among Cape buffaloes (*Syncerus caffer*) in the Tsavo ecosystem after June 1995. There were, however, suspect but unconfirmed cases involving lesser kudu (*Tragelaphus imberbis*), bushbuck (*T. scriptus*) and giraffe (*Giraffa camelopardalis*) in the Meru area of Kenya in 1995. Serosurveillance showed that the epidemic had been more extensive than originally thought, with seropositive animals found south (Mkomazi, Tanzania), east (Tana river) and west (Amboseli) of the original outbreak identified in Tsavo West, Kenya, in 1993/94.

**Foot and mouth disease in impala**

An outbreak of foot and mouth disease (FMD) (caused by type SAT2 virus) in impala (*Aepyceros melampus*) in the southeastern corner of the Kruger National Park (South Africa) was identified in November 1995. Intensive surveillance in the surrounding area demonstrated that this outbreak had in fact started in September 1995, slightly to the east of where the first confirmed cases were identified. This outbreak then spread north and northwest between contiguous impala herds along two main water courses, and reached the Skukuza area by May/June 1996. Infection rates of between 30 and 59% were recorded in different herds. Thereafter the infection spread into the Sabi Sand game reserve along the entire length of the Sand river. No new cases were seen after July and at the end of this epizootic, a total area of 3200 sq. km had been affected. FMD lesions were not seen in any wildlife species other than impala, and no spread to the adjoining vaccinated cattle populations occurred.
Newcastle disease

In Africa, the widespread outbreaks of velogenic pneumotropic Newcastle disease in poultry (1994/1995) were repeated in 1995/1996. Significant mortality of farmed ostriches (*Struthio camelus*) was reported from Zimbabwe, Namibia and South Africa. In young ostriches the virus is frequently reported to be neurotropic with accompanying neurological signs.

An outbreak of velogenic Newcastle disease occurred in Canada in double-crested cormorants (*Phalacrocorax auritus*) in the summer of 1995.

Newcastle disease has been observed in 40 rock doves (*Columbia spp.*) in Finland.

Isolated cases of Newcastle disease infection were recorded in common buzzard (*Buteo buteo*) in Germany, houbara bustard (*Chlamydotis undulata*) in Saudi Arabia, feral pigeon in the United Kingdom (UK) miscellaneous waterfowl in Italy and lapwing (*Vanellus vanellus*) in the Netherlands.

Classical swine fever

Since January 1996, there have been two outbreaks of this disease in Austria, both in wild boar (*Sus scrofa*). In the second outbreak which occurred in the Lower Austrian Province bordering Slovakia, two animals of about 90 adults in a hunting area were found dead. Diagnosis was by immunofluorescence test and virus isolation. Directive 80/217/EEC of the European Commission on Hunting Wild Boar is in effect.

Classical swine fever has been reported in 170 wild boars in Germany. The infection was considered to have disappeared from Rheinland-Pfalz and lower Saxony but a new focus has appeared in Brandenburg. This disease has also been reported from France, Italy, Lithuania and Slovakia.

African swine fever in wild boar

African swine fever is endemic in free-ranging wild boars in Nuoro province on the island of Sardinia (Italy).

Rabies

Rabies is endemic in many African countries in both domestic animals and wildlife. In most areas domestic dogs appear to be the major reservoir and role player in the epidemiology of this disease with regular 'spillover' of canid virus biotype into various wildlife and other domestic species. In other areas, mongooses (*Viverridae*) are involved as maintenance hosts involving the viverrid virus biotype which also occasionally and opportunistically infects other species.

In Kenya suspect rabies cases were reported from Nairobi in a hyena (*Crocuta crocuta*), from Lamu in a baboon (*Papio cynocephalus*) and from Wamba in a bat eared fox (*Otocyon megalotis*).

In Botswana sporadic cases of rabies occurred in jackals (*Canis mesomelas*) and bat eared foxes.

In Turkmenistan, rabies is reported to be a problem in domestic dogs, jackals (*Canis aureus*) and small wild carnivores.

Wildlife relocation, usually for sporting purposes, continues to present problems for the control of rabies in United States of America (USA). Foxes (*Vulpes* spp), coyotes (*Canis latrans*) and racoons (*Procyon lotor*) have all been translocated and have been implicated in the spread of host-adapted rabies virus strains to parts of the US where they were previously unknown.

In Russia, 'Arctic' rabies has been reported in Arctic foxes, (*Alopex lagopus*), reindeer (*Rangifer tarandus*) and domestic dogs in the Arkhangelsk and Magadan regions and Jamal and Taimyr peninsulas. Rabies has also occurred in central Russia in red foxes and racoon dogs (*Nyctereutes procyonoides*).

In the north western districts of Greenland, rabies is considered to be endemic in Arctic foxes.
Due to the success of oral vaccination of foxes against rabies in Europe the prevalence is still dramatically decreasing in Belgium, France, Germany, Luxembourg and Switzerland. The supplemental hand delivery of baited vaccines, close to occupied burrows in spring has proved to enhance rabies eradication where cubs and juveniles are difficult to immunise by the usual aerial distribution.

In Ethiopia, the Ethiopian wolf (*Canis simiensis*), which is the most endangered canid in the world, has declined in numbers by two thirds in the past decade. This decline is believed to have been due to concurrent epidemics of canine rabies and canine distemper.

**Bat rabies**

Different strains of Lyssavirus were isolated from the following species of bats:

- A European bat lyssavirus type 2 in a Daubenton's bat (*Myotis daubentoni*, thought to be an immigrant) from Sussex (UK) in June 1996.

- A third isolation of European bat lyssavirus type 1 from a serotine bat (*Eptesicus serotinus*) was reported in the centre of France. Several isolations of this virus have been made in other European countries.

**Brucellosis**

*Brucella suis* infection has been reported in northern Russia (Jamal, Tidan and Taimyr peninsulas, and north Jacutia) in wild and domestic reindeer.

Sporadic cases of bovine brucellosis (*B. abortus*), with carpal hygroma, have been observed in Cape buffalo in the Kruger National Park, South Africa.

An unnamed *Brucella* spp. has been isolated from a range of marine mammals off the west coast of Scotland. There was no evidence of clinical disease, although some animals had infected skin lesions.

**Bovine tuberculosis**

Bovine tuberculosis in wildlife is reported under paragraph 5.

**Avian mycobacteriosis**

Avian tuberculosis (mycobacteriosis) has been observed in two red deer (*Cervus elaphus*) in Sweden and in two rough-legged buzzards (*Buteo lagopus*) and one tawny owl (*Strix aluco*) in Norway. A few sporadic cases have been recorded in wild birds and mammals in the UK, and has been suspected in a thrush (*Turdus* spp.) in France.

Significant mortality occurred amongst lesser flamingos (*Phoeniconaias minor*) in some lakes in the Rift Valley system in East Africa. Coincident was an unseasonable bloom of algae in the lakes. Histopathology revealed lesions compatible with avian mycobacteriosis. It is speculated that algal toxicity overwhelmed the birds which were already debilitated by mycobacteriosis.

**Tularaemia**

Tularaemia has been reported during the year in the central part of Russia in hares (*Lepus europaeus*) and muskrats (*Ondatra zibethicus*).

Tularaemia is reported in hares (*L. europaeus* and *L. timidus*) in Austria, France, Finland, Italy and Sweden.
**Trichinella spiralis**

Trichinella spiralis is reported in brown bears (*Ursus arctos*) and humans in the Kamchatka peninsula, Russia, and in wild boars in central Russia (Rysan and Kursk regions).

Trichinella spiralis has also been seen in red foxes (*Vulpes vulpes*) in Norway and Germany, and in polar bears (*Ursus maritimus*) in Spitzbergen (Norway). This parasite also occurs in polar bears, Arctic foxes, walruses (*Odobenus rosmarus*) and sled dogs in Greenland.

A special study of trichinellosis in Sweden in 1995 revealed many cases in red foxes. Trichinellosis is very common in red fox populations in mountain areas throughout Europe.

**Aujeszky’s disease**

A serological survey revealed 67 positive wild boars in Germany and confirmed that the infection is still prevalent in France, Italy and Spain. Captive herds of wild boars are suspected to play a role in the maintenance of the virus.

**Viral haemorrhagic disease of rabbits**

Viral haemorrhagic disease has been observed in wild rabbits in France, Germany, Spain, Sweden and the UK. The infection occurred for the first time in Ireland.

In Australia, the rabbit calicivirus was tested for three years at the Australian Animal Health Laboratory (AAHL) then was released for trial in the field on Wardang Island, South Australia, in March 1995. In October 1995, the virus escaped from the trials and spread to Yunta and the Flinders ranges in South Australia, is now spreading in South Australia and has reached New South Wales, Queensland, Victoria and Western Australia. The first case was confirmed in eastern Victoria last month. In South Australia, three new infection sites have been confirmed in the southeast of the State. No further positive cases have been reported in the Northern Territory, and monitoring is now being undertaken in the Simpson desert. In Western Australia, outbreaks have been confirmed in the Fraser ranges, east of Norseman and at a station east of Kalgoorlie. The virus remains confined to the south-east corner of Queensland.

Transmission studies on some indigenous marsupials including koalas (*Phascolarctos cinereus*) have been negative. Currently national registration of the virus under a Commonwealth Act as an agricultural product and as an agent organism for biological control is being sought. Research on various aspects of the epidemiology of virus is being undertaken by Commonwealth Scientific Industrial Research Organisation (CSIRO) Wildlife and Ecology Department. These investigations include its spread and occurrence, pathogenicity, vectors, viral persistence and survivability, and the interaction between rabbit calicivirus diseases and myxomatosis. The aforementioned research will last for a period of two years and may not be completed prior to the approval of a coordinated national release of the virus.

**Anthrax**

In South Africa, the following outbreaks of anthrax were reported in wildlife:

a) In the greater Kruger National Park complex, 19 cases including 1 elephant (*Loxodonta africana*), 10 greater kudus (*Tragelaphus strepsiceros*), 1 lion (*Panthera leo*), 2 Burchell's zebras (*Equus burchelli*) and 5 impalas were confirmed.

b) In the Kimberley area of the Northern Cape province, anthrax was confirmed in 6 kudus, 1 roan antelope (*Hippotragus equinus*), 1 gemsbok (*Oryx gazella*) and 1 springbok (*Antidorcas marsupialis*).

c) In the Ellisras area of the Northern province, sporadic cases of anthrax were reported in greater kudus.
In Namibia, predominantly in the Etosha National Park, anthrax was confirmed in 27 wildebeest, 1 eland (Taurotragus spp.), 3 elephants, 1 red hartebeest (Alcelaphus spp.), 6 gemsbok (Oryx gazella), 7 springbok and 30 Burchell's zebras. Elsewhere in Namibia, one blesbok (Damaliscus dorcas) and 2 sable antelopes (Hippotragus niger) also succumbed to anthrax.

In Kenya, sporadic cases of anthrax were reported in buffalo, impalas and elephants in Nairobi National Park and Tsavo park (Chuluyu).

In Zimbabwe, 2 lions, 2 leopards (Panthera pardus) and 7 cheetahs (Acinonyx jubatus) at the Norton Lion Park died of anthrax after being fed infected cattle carcasses.

**Chlamydiosis**

Serological evidence of infection was noticed in a broad range of birds and mammals in France, Saudi Arabia, Spain and the UK. *Chlamydia psittaci* caused mortality in collared doves (*Streptopelia decaocto*) in the Nottingham area (UK) during June/September 1995.

**Duck virus enteritis**

Mortality was observed in mallards (*Anas platyrhynchos*) in Gloucestershire (UK).

**Echinococcosis**

The adult form of the tapeworm *Echinococcus granulosus* was found in one wolf (*Canis lupus*) in Spain as well as in three of eight wolves examined in Italy.

**Salmonellosis**

Salmonellosis, including bovine salmonellosis and *Salmonella typhimurium* infection was recorded in 5 hares (*Lepus europaeus*) in France, 35 hedgehogs (*Erinaceus erinaceus*) in Finland and 17 in the UK. The infection was diagnosed in several dead wild birds in France, Finland and Sweden. Incidents of mortality involving 130 garden birds were reported throughout England in 1995 and 21 birds examined: S. *typhimurium* (phage types 1, 40, 129, 56A and 160) were isolated from Green finches (*Carduelis chloris*), house sparrow (*Passer domesticus*) and blue tits (*Parus caeruleus*).

There have been several outbreaks of *Salmonella* infections in humans in the USA contracted from captive reptiles exhibited in zoos. Iguanas (*Iguana iguana*), of which some 796,000 were reported to be kept as pets in 1993 in the USA, have also been found to frequently shed *Salmonella* spp. in their faeces and infect their owners.

**Sarcoptic mange**

There is an increasing concern about sarcoptic mange in montane populations of ungulates chamois (*Rupicapra rupicapra* and *R. r. pyrenaica*) and various species or subspecies of ibex (*Capra* sp.) in European mediterranean countries. Several small isolated populations, sometimes apparently contaminated by domestic livestock, have been driven to extinction by an outbreak of mange. It is a matter of debate between game managers and wildlife veterinarians whether ivermectin treatment, either oral or by darting, should be carried out in such cases.

Mange has been reported in red foxes in Denmark, Sweden, Norway and Finland, and in racoon dogs (*Nyctereutes procyonoides*) and European lynxes (*Lynx lynx*) in Finland.
**European brown hare syndrome**

European brown hare syndrome is considered endemic but locally epidemic in Austria, Denmark, France, Finland, Germany, Italy, Sweden and the UK.

**House finch conjunctivitis**

This disease of small passerine birds continues to spread and affected birds have been reported in 20 United States of the USA and three Canadian provinces. The impact on house finch populations is unknown but there is a high mortality in untreated birds held in captivity. The disease is largely confined to house finches (*Carpodacus mexicanus*) but recently the pathogen has been isolated from affected American goldfinches (*Carduelis tristis*).

Molecular studies of house finch *Mycoplasma gallisepticum* isolates suggest that they differ from strains which commonly infect domestic poultry, but experimental work has shown that young turkeys and chickens can develop severe disease when inoculated with house finch isolates. However, infection has been slow to cross from infected house finches to chickens sharing the same pen.

**Equine protozoal myeloencephalitis**

Once known as "Wobbler Syndrome", equine protozoal myeloencephalitis (EPM) is a severe and often fatal disease of horses which occurs when sarcocystis protozoa infect the spinal cord. Recently a link has been established between an opossum parasite and the disease in horses. The Virginia opossum (*Didelphis marsupialis*) is the definitive host of a unicellular intestinal parasite, *Sarcocystis falciformis*. Opossums excrete the sporocysts in their faeces and birds that ingest the sporocysts develop sarcocysts in their muscles. The cycle is completed when an opossum eats an infected bird. It is presumed that horses become infected when they eat forage contaminated by opossum faeces. In horses the protozoa invade and multiply in the central nervous system. No vaccine exists yet for horses and the success of drug treatment depends on early diagnosis.

**Uncinia spp.**

This parasitic nematode continues to infest fur seals (*Arctocephalus* spp.) on Komandor Island in Russia where it causes a high mortality of seal pups.

**Canine parvovirus**

Canine parvovirus (CPV) has been demonstrated serologically in red foxes in Germany and in wolves (4/4) in Italy. ELISA tests on scats conducted in Italy and France confirmed that the virus is commonly circulating in natural populations of wolves. Recent reports suggest that CPV can limit wolf population growth in North America.

**Manatee epizootic in Florida**

Throughout a period of nearly 8 weeks in the spring of 1996, 155 manatee (*Trichetus manatus*) carcasses were recovered from an 80 nautical mile stretch of the southwestern Florida coast (USA). This event followed an extremely cold and persistent winter and in the presence of an extreme Red Tide. No conclusive evidence of a potential etiologic agent has been found.

**Ebola/Reston virus at a Texas primate facility**

In April 1996, a variant of the Ebola virus, now known as Ebola/Reston, was confirmed in at least 2 rhesus macaques (*Macaca fascicularis*) at a facility in Alice, Texas (USA), following a shipment of 100 of these animals from the Philippines.
Ebola virus in humans in Gabon

In February 1996, the World Health Organization (WHO) reported an outbreak of Ebola virus in Gabonais villagers who had contracted the infection after handling, butchering and eating a chimpanzee (*Pan troglodytes*) which they had found dead. Thirteen of 20 affected people who had handled or eaten the chimpanzee died in the village of Mayibout, about 240 miles east of Libreville. There are unconfirmed reports of the finding of other animals dead in the forest at this time. These included another chimpanzee, three gorillas (*Gorilla gorilla*), an antelope and a wild cat. Villagers in the area are said to know of regular deaths of the great apes from disease, to often eat found carcasses and to occasionally suffer fatal results.

Ebola virus elsewhere in West Africa

In December 1995 a Liberian refugee turned up in the Ivory Coast suffering from Ebola infection but he survived, as did the Swiss woman researcher who had contracted Ebola in late 1994 after performing an autopsy on a dead chimpanzee in the Tai forest near the Ivorian border with Liberia. It is said that up to 30 chimpanzees which died in the Tai forest in late 1994 were infected with a strain of Ebola virus. The Ivorian strain appears to be less virulent, at least for humans, than the Zairean or Gambian strains.

A search for a wild reservoir of Ebola virus continues. It has been suggested that this may be found in arboreal rodents which infect colobus monkeys (*Colobus satanas*) which in turn infect chimpanzees when the monkeys are killed and eaten by this ape.

Serological evidence for the presence in *Pteropus* bats of a *paramyxovirus* related to equine *morbillivirus* in Australia.

Two outbreaks of a previously unknown disease in horses and humans occurred in Queensland in 1994. The outbreaks occurred within one month of each other in Brisbane and Mackay, which are about 1000 kms apart. In the Brisbane incident, 21 horses were affected of which 14 died or were destroyed after severe clinical signs of acute respiratory disease. In the two human cases, less well defined clinical signs occurred and one patient died. In the Mackay outbreak, two horses became seriously ill and died and one person also died. The name 'equine *morbillivirus* (EMV)' has been proposed for a *paramyxovirus* isolated from four of the Brisbane horses and the first human who died. A serological survey has revealed the presence of EMV antibodies in the sera of *Pteropus* spp. bats (fruit bats or flying foxes). The search for a wildlife reservoir of the EMV virus continues.¹

Canine distemper in lions and wild dogs

In Kenya, no further confirmed cases of canine distemper in lions were reported from the Mara system since June 1995. Serosurveillance at that time revealed an antibody prevalence of about 67% with all ages and sexes represented. A mortality rate of 30% was estimated in the outbreak. Unconfirmed reports of hyaena deaths were also received. A second follow up serosurveillance action, a year later gave some evidence that the surviving lions may be losing their acquired immunity. An extended mass vaccination campaign of Masai dogs is underway in an attempt to prevent a recurrence of this epidemic.

In Botswana, canine distemper was diagnosed in wild dogs (*Lycaon pictus*) in the Chobe National Park. A further seven wild dog packs were suspected to have become infected in the Moremi Game Reserve.

Encephalomyocarditis in elephants

Following the outbreak of encephalomyocarditis (EMC) in free ranging elephants in the Kruger National Park reported in 1994/1995, sporadic deaths in bull elephants with occasional clusters have been reported. Unfortunately, most carcasses were found in an advanced stage of decomposition, making meaningful necropsies and specimen

¹ On 17 October 1996 the OIE Delegate of Australia informed the OIE that a bat *paramyxovirus* which appears to be identical to the equine *morbillivirus* has been isolated from three species of flying foxes in south-east Queensland. Further investigations are ongoing.
collection impossible. Anthrax and poaching were however eliminated as possible causes of death, making EMC the most likely differential diagnosis.

**Parafilaria in buffalo**

The parasite which was previously reported to cause a seasonal ulcerative dermatitis in buffalo in the Kruger National Park has now been identified as *Parafilaria bassoni*.

**Stephanofilaria in hippopotami**

The parasite which was previously reported to cause button shaped skin ulcerations in hippopotami (*Hippopotamus amphibius*) in the Kruger National Park, has been now been identified as *Stephanofilaria thelazioides*, a new species of worm.

**Floppy trunk syndrome in elephants**

Nine cases of this syndrome, which is characterised by a progressive ascending paralysis of the trunk, were seen in the Kruger National Park during the past year. Complete necropsies were performed on three elephants, where special attention was paid to the brain and trunk enervation. No aetiologically specific macro or microscopic lesions were found. Atrophy of the trunk muscles and Wallerian degeneration of the facial nerve branches supplying the trunk, as were described in elephants from Lake Kariba in Zimbabwe, were also found. The aetiology of this disease still remains to be elucidated.

**Verminous brain cysts in bushbuck**

A syndrome in which severe centre nervous system depression was the most notable clinical sign was reported in bushbuck (*Tragelaphus scriptus*) in the Aberdares National Park in Kenya. Histological examination revealed brain cysts with a nematode parasite embedded in the brain tissue. The parasite is yet to be identified, but is thought to be fly-borne, as there was a coincident increase in 'fly worry' at the time.

**Kangaroo blindness in Australia**

A syndrome causing blindness was initially seen in kangaroos (*Macropus* spp.) in South Australia in late 1993. The problem was subsequently seen in large numbers of kangaroos in New South Wales and Victoria in early 1994. The number of affected animals increased from July to October 1994 and peaked in February 1995. Histopathologic changes were characterised by a severe inflammatory chorioretinitis, with some animals also showing brain lesions. Clinically the animals could feed and maintain condition but if disturbed they were obviously blind. Two insect borne-viruses so far have been isolated by the CSIRO Australian Animal Health Laboratory and transmission studies have shown that one of these viruses (Wallal) was the causative agent. The disease was confined to wild grey and red kangaroos (*M. rufus*) and has not been seen in captivity.

**Schistosomiasis in sable antelope**

Once again, schistosomiasis was diagnosed as a cause of mortality in sable antelope (*Hippotagus niger*) in small game parks in Zimbabwe. Pathologenic burdens of *Haemonchus* and *Strongyloides* were also noted in some of these animals.

**Trichinella - like infection in farmed crocodiles**

A *Trichinella* - like parasite has been found in farmed crocodiles (*Crocodylus niloticus*) in Zimbabwe. Research has been initiated to identify this parasite and its the epidemiology of the infection.

**Trypanosomosis in Virginia**

*Trypanosoma cruzi*, the protozoal haemoparasite which causes Chaga's disease in humans and is transmitted by reduvid bugs in Latin America, has been isolated from fox hounds in Virginia (USA). The extension of the range of this parasite presents a risk of the formation of new wildlife reservoirs of infection.

**Herpesvirus in falcons**
There has been an outbreak of herpesvirus infection at the Peregrine Fund World Centre for Birds of Prey at Boise, Idaho (USA). Of 108 Aplomado falcons (*Falco femoralis*) hatched in 1996, 67 have died. Four of 102 peregrine falcon (*Falco peregrinus*) hatchlings have also died. Coturnix quail used as food are believed to be the source of the infection.

**Die-off of Bighorn sheep**

In February 1996 bacterial pneumonia was believed to have killed 200 Rocky Mountain bighorn sheep (*Ovis canadensis*) in Hell's Canyon in Oregon (USA). In an effort to prevent the spread of the disease, the area of the initial outbreak was depopulated by capturing all the remaining live sheep and translocating them to a captive holding facility in Idaho. Further mortality began occurring in the animals after 17 days in captivity despite intensive treatment. After 3 ½ months only eight of the original 72 captive sheep were still alive. Bacterial pneumonia caused by a variety of organisms has been identified as the possible cause of the deaths.

**Cane toad control in Australia**

Recently viruses from Venezuela have been transferred to the Australian Animal Health Laboratory for investigation as possible biological control against cane toads (*Bufo marinus*) It has been shown that these toads are controlled by naturally occurring viruses in Venezuela.

**Tortoise mortality**

The Galapagos National Park Service (GNPS) and the Charles Darwin Research Station (CDRS) have, since the beginning of August 1996, been investigating the deaths of several giant tortoises in the area of "El Chato", a visitor site in the Tortoise Reserve within the Galapagos National Park on Santa Cruz Island. To date 8 tortoises have been found dead and nine more appear to be sick. International experts in tortoise diseases are engaged in a diagnostic investigation which, they say, may take some time. GNPS has closed the "El Chato" area to tourism and has stressed that there is no danger to tourists visiting the Galapagos National Park.

**Morbillivirus in Polar bears in Russia and United States of America**

Serological evidence has been found of morbillivirus infection in polar bears in Alaska and Russia.

**Lassa fever in Sierra Leone**

From January 1 to July 21 1996, 246 cases of human Lassa fever have been reported in Sierra Leone. Of these 73 were fatal. The multimammate mouse (*Arvicanthis* spp.) is believed to be a reservoir of the Lassa fever virus.

**Hantavirus infection**

An epidemic of hantavirus infection in humans (haemorrhagic fever with renal syndrome) was reported during the winter 1995/1996 in Europe. The bank vole (*Clethrionomys glareolus*) and to a lesser extent field mice (*Apodemus* spp.) are considered to be the reservoir of infection, which is known in Belgium, Finland and in France where five foci were localised during this outbreak.

**Botulism**

Fifteen outbreaks of botulism were reported in 1995 in France. Several outbreaks occurred also during the summer of 1996. Recorded mortality involved many thousands of birds and occasionally other vertebrates. If botulism episodes are regarded as common in Europe, it is a concern that bird mortality resulting from this intoxication (mainly from type C) could be currently increasing in importance. It is not clear if an improvement of the reporting network, more interest in the problem, or a real increase in incidence can explain the current situation.

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Ostrich/emu diseases in Australia

Ostrich fading syndrome (OFS) affected chicks in New South Wales, Victoria, Queensland and Western Australia during the hatching season in 1995. Since then cases have continued to be seen, however the syndrome seems to be a little more diffuse in the population. A retrovirus was isolated last year by the West Australian Agriculture Department and transmission studies are now in progress. Those trials that have been conducted have proved to be inconclusive. Current theories are that the retrovirus may not be the cause of OFS or that it may be the cause in conjunction with some other factor. Tests at the CSIRO Australian Animal Health Laboratory have ruled out any major exotic diseases of poultry as the cause of the disease. Ostrich farms in Southeast Queensland found that improving management and husbandry of chicks is reducing the incidence of OFS. A reasonably common histopathological finding in chicks as well as subadults and occasionally adults in Southeast Queensland is cardiomyopathy. This finding is often seen in birds that die from seemingly unrelated diseases such as enteritis or septicaemia.

Meningeal worm

*Elaphostrongylus* infection has been observed in moose (*Alces alces*) and red deer (*Cervus elaphus*) in Norway and Sweden.

Otodectic mange

This disease has been observed to affect Arctic foxes (*Alopex lagopus*) in Iceland.

Koala research

A recent study showed the presence of a previously unreported chlamydial infection of the rectum of a koala. The koala also had chronic chlamydial cystitis, prostatitis and urethritis. Implications of this are that the infection may have been acquired through sexual transmission or through an ascending urogenital tract infection via the common vestibule, and that the proctitis may represent a reservoir of infection for other koalas.

2. Deer diseases

Deer farming has during the last decades become more and more popular worldwide and is today an important agricultural activity in many parts in America, Europe and Austral Asia. Farmed deer normally live under semi-domesticated conditions in large enclosures and frequently have contact with wild deer. Because of this, the risk of transmission of diseases between wild and farmed deer should always be taken into consideration.

The farming of deer also leads to trade in these animals and translocations are associated with the risk of introduction of new diseases into new areas and into wild populations of deer.

Wild deer are found in north and south America, Europe, North Africa, Asia, Australia and New Zealand. Most species are numerous and popular game animals, providing large quantities of meat for hunters and other economic benefits in many parts of the world.

There are many diseases of deer that should be taken into consideration. Some frequently occurring diseases are zoonoses, like bovine tuberculosis, and others are transmissible between deer and domestic ruminants, like paratuberculosis or brucellosis. Others pose potential risk for humans when consuming deer meat. There are also less frequently occurring diseases that are important for other reasons, like rabies, epizootic haemorragic disease, deer herpesvirus and chronic wasting disease.

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3. Contraception in wildlife

In July 1996, the 4th International Conference on Fertility Control for Wildlife Management was held on Great Keppel Island, Queensland (Australia). Dr M. Artois participated in and reported on the Conference. The Conference offered an opportunity to overview the current situation of this topic. Regarding the problems caused in agriculture, range management and nature conservation by certain animal species whose numbers exceed their ecological carrying capacity, contraception for wildlife is now considered an option for population control. Different protein constituents of the fertilisation process have the potential to induce anti-reproductive antibodies when properly delivered. It is hoped that contraceptives for wildlife will be long-lasting, cheap, safe, reversible, more species specific and more humane than traditional methods for reducing populations. Administration of such contraceptive vaccines to wildlife and their effect on the targeted and other species raise 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 immuncontraceptive vaccines, may be difficult to contain within the target population. Advantages and disadvantages of the various techniques need intensive investigation and evaluation as to safety must be made.

4. Transmissible spongiform encephalopathies in wildlife

During recent years, primarily because of the bovine spongiform encephalopathy (BSE) epizootic in cattle in the UK, there has been increased international concern about transmissible spongiform encephalopathies (TSE) in wildlife. Supporting this concern are the reports on the occurrence of BSE in animals other than cattle such as antelopes and wild carnivores in UK zoos. It seems clear, however, that in these cases the animals were infected by contaminated feed.

TSE in native free living wildlife is to date only known to occur in deer in North America were it manifests itself as Chronic wasting disease (CWD) which has occurred in captive white-tailed deer (Odocoileus virginianus), mule deer (O. hemionus) and wapiti (Cervus canadensis) in Colorado and Wyoming, USA, since the late 1960s. During the past three decades, over 100 cases of CWD have been reported. The majority of cases occurred in captive deer, but the disease has also been seen in free-ranging deer living near the affected penned animals. In 1996, CWD was diagnosed in an elk in Saskatchewan, Canada which had been imported from South Dakota, USA, in 1989.

Deer with CWD show progressive weight loss, increased thirst and urination, excessive salivation and behavioural aberrations. There is evidence that CWD can be transmitted both vertically and horizontally. No human health problems have been associated with CWD in cervids in North America. Based on the information available to date, CWD appears to be neither BSE nor scrapie, but rather a unique TSE of native American cervids.

There are no reports of TSE/CWD in deer from other parts of the world. The chronic wasting disease reported to occur in moose (Alces alces) in Sweden is most probably a different entity, since no spongiform encephalopathy is found in these animals.

5. Bovine tuberculosis

Bovine tuberculosis is rapidly emerging as one of the most significant infectious diseases of free-living wildlife in many parts of the word. Historically, this disease has been predominately reported in captive wildlife collections in a wide range of species, worldwide. More recently however, bovine tuberculosis is being increasingly reported in free-ranging wildlife populations, and this is a cause of grave concern for the following reasons:

a) in most cases, tuberculosis is an alien disease in these free-ranging wildlife populations, which are often immunologically naive with minimal innate resistance to Mycobacterium bovis.
b) in wildlife, bovine tuberculosis is an insidious disease, and most infected animals will only show clinical signs once advanced pathology has developed. By that time, they have usually been highly infectious for a considerable period, increasing the probability of horizontal spread, particularly in gregarious species.

c) bovine tuberculosis has the potential to infect a wide species spectrum, and 'spill over' of infection has already been recorded from primary gregarious wildlife maintenance hosts into low density satellite or associated species.

d) there is no practical treatment regime for free-ranging wildlife, and no effective vaccine, or vaccination protocol, have yet been developed. Alternative control measures such as depopulation of infected herds are both ecologically and morally unpalatable to many people.

e) sensitive and specific ante-mortem tests are currently only available for wild bovids and cervids, and even these should be considered to be herd tests rather than definitive for certification of individuals.

f) zoosanitary and regulatory considerations may result in infected parks and game reserves becoming 'conservation islands' with no export of animals being allowed from these wildlife areas until sensitive and specific individual diagnostic tests become available. If one considers that 90% of the world's free ranging black (*Diceros bicornis*) and white rhinoceros (*Ceratotherium simum*) populations reside in the tuberculosis infected Kruger National Park and Umfolosi and Hluhluwe Game Reserves in South Africa, this is indeed a frightening prospect.

g) many countries worldwide have spent vast amounts of money over the past decades to eradicate bovine tuberculosis from their national cattle herds. Some countries have already achieved this objective and others are close to attaining bovine tuberculosis free status. The spectre of a new source of bovine tuberculosis infection in a sylvatic maintenance host is a nightmare for most Veterinary Services who have gone through the arduous and expensive process of eradicating tuberculosis from their cattle herds.

**The current known status of bovine tuberculosis in free ranging wildlife**

- Bovine tuberculosis has been diagnosed in Cape Buffalo and warthogs (*Phacochoerus aethiopicus*) in the Queen Elizabeth National Park in Uganda.
- Bovine tuberculosis has been reported to be responsible for up to 10% of mortality in Red Lechwe (*Kobus leche*) on the Lochinvar Ranch on the Kafue flats in Zambia.
- Bovine tuberculosis is spreading rapidly amongst the southern buffalo herds in the Kruger National Park as well as in the Hluhluwe/Umfolosi Game Reserves in South Africa. 'Spillover' of infection into cheetah, lion, greater kudu and chacma baboons (*Papio ursinus*) has also been documented in these areas.
- Bovine tuberculosis was reported to be present in certain captive elk (*Cervus canadensis*) and deer herds in eight States in the USA and the number of infected herds has subsequently been substantially reduced by test and slaughter techniques. 'Spill over' of infection from infected captive deer herds into wild deer has been reported on a few occasions. A more recent focus has been reported in wild white-tailed deer in Michigan. This infected focus involves a relatively small area of approximately 132 square miles, and sampling of hunter kills recently yielded a significant number of positive carcasses.
- Tuberculosis infected buffalo (*Bison bison*) continue to pose a threat to the genetically pure subspecific wood buffalo (*B. b. athabascae*) in the Wood Buffalo National Park in Canada.
- Tuberculosis continues to be a major agricultural economic problem in New Zealand where introduced brush-tailed possums (*Trichosurus vulpecula*), and to a lesser extent feral ferrets and feral domestic cats, act as sylvatic reservoirs of infection for free-ranging and farmed cervids and cattle.
• Bovine tuberculosis has been reported in wild boar in Liguria, Italy, from 1988 to 1994. During this period, 164 of the 1183 carcasses examined had tuberculous lesions. During the 1995/1996 hunting season, 300 tuberculous lesions were found in the 2500 animals examined.

• In People's Republic of China and Taipei China, bovine tuberculosis is a significant problem in farmed deer, and Bacille bilié de Calmette-Guérin (BCG) vaccination is currently employed in an attempt to reduce the incidence of disease.

• In Ireland and the south-west of the UK, numerous cases of tuberculosis were recorded in badgers and sporadic cases in deer have occurred in Ireland and the UK.

• Several cases of tuberculosis have occurred in farmed deer in Sweden, where a control and eradication programme for this disease in deer is in effect. The disease has been absent from cattle since 1978.

• More than 200,000 feral water buffalo (Bubalus arnee) as well as many feral domestic cattle have been destroyed in the Northern Territory of Australia in a successful effort to rid this country of these free-ranging maintenance hosts.

6. Regulations and diagnostic specimens

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Regulations which require the issue of permits by both the exporting and importing country for bonafide diagnostic specimens derived from "Appendix 1, wild animals" continue to frustrate rapid diagnosis of some wildlife diseases. Efforts are being made to resolve this unsatisfactory situation.

7. Zoonoses transmitted from non-human primates

Regarding the draft Chapter 3.9.1. of the OIE International Animal Health Code on zoonoses transmitted from non-human primates, the Working Group considers that skin tests for tuberculosis, if carried out at intervals of more than 10 days and less than 90 days, may sensitise or desensitise the tested primates and produce false positives or negatives. The Group recommends that the gamma interferon test (human) should be investigated as a possible alternate or additional test for tuberculosis. The Group also recommends that BCG vaccine should not be used for non-human primates under any circumstances.

The Group recommends that no herpes B or Simian immunodeficiency virus (SIV) positive monkeys should be imported by Member Countries for the pet trade or for zoological collections. It also recommends quarantine rather than serological testing should be imposed for short-incubation diseases.

8. Communication and liaison within wildlife disease groups and organisations

This matter was discussed at length and it was agreed to request the Director General to correspond with the international wildlife veterinary/disease associations listed below to request their officers to report significant wildlife disease events directly to the OIE:

1. International Union for the Conservation of Nature (IUCN) Veterinary Specialist Group
2. Wildlife Disease Association
3. World Association of Wildlife Veterinarians
4. American Association of Wildlife Veterinarians
5. European Association of Zoo and Wildlife Veterinarians
9. Foot and mouth disease and wildlife

The Group examined the revisions to Chapter 2.1.1 of the *International Animal Health Code* which were proposed by the Foot and Mouth Disease (FMD) and Other Epizootics Commission in their meeting of 10-12 September 1996. They noted that these revisions could benefit some Member Countries who have, with considerable effort and resources, contained endemic wildlife FMD within certain zones and should obtain international recognition for this achievement.

10. Other business

The Group took note of the recommendations of the January 1996 meeting of the OIE Strategic Planning Group. After discussion members decided that they would prefer to meet annually rather than biennially. However, in order to assist the OIE to remain within its budget for the Group activities it was decided that some members would endeavour to obtain external funding for all or some of their expenses. If this can be arranged, an annual meeting should be possible. The next meeting is tentatively planned for September or October 1997.

11. Recommendations

**Recommendation on bovine tuberculosis**

The Working Group on Wildlife Diseases recommends that:

a) Measures should be implemented by national authorities to prevent the introduction of bovine tuberculosis into free-ranging wild animal populations. Once bovine tuberculosis becomes established in a free-ranging species, the process is almost irreversible with current diagnostic, therapeutic and logistical options. Depopulation of infected foci, where possible, is the only costly and unpopular solution.

This disease, in wildlife, appears to be progressive in individuals, in herds and between herds, and at high prevalence rates may result in significant morbidity and mortality which may affect population dynamics. Conservation and both consumptive and non-consumptive wildlife utilisation may be affected.

Furthermore, the presence of tuberculosis in a wild population has important consequences for wildlife conservation and management when translocation projects for reintroduction or restocking are planned.

The implications of the presence of a feral or sylvatic maintenance cycle for this disease for tuberculosis eradication programmes in domestic cattle are also significant.

b) Where possible tuberculosis surveillance in wildlife should be carried out whenever wild animal carcasses became available, e.g. road kills, hunter kills, population management culls and any incidental mortality. The carcass examiners should be instructed to intensively examine all lymphnodes (multiple incisions) lungs (palpation), as well as all visceral organs. All suspect pyogranulomatous lesions should be sampled and tested in accordance with the OIE *Manual*. Frozen tissue should also be collected for later culture if necessary. Where mycobacteriosis is confirmed, it is essential to culture and identify the causative organism.

c) Full support should be given to research on the development of sensitive and specific ante-morten tests for bovine tuberculosis in wildlife, as well as the development of a safe and effective vaccine.

d) All confirmed cases of bovine tuberculosis in wildlife should be reported to the members (regional coordinators) of the OIE Working Group on Wildlife Diseases or directly to the OIE Central Bureau.
Recommendation on contraception in wildlife

The Working Group on Wildlife Diseases, having been informed of the discussions at the International Conference on Fertility Control for Wildlife Management held at Great Keppel Island, Queensland, Australia, and having read and debated the relevant Conference document, supports the use of immunocontraception in free ranging feral or exotic wildlife, but does not support its use in indigenous wildlife populations where traditional consumptive population reduction techniques are adequate and offer less long term risk.

It concurs with the recommendations of the American Association of Wildlife Veterinarians which in 1994 recommended that fertility control only be considered an acceptable means of population regulation in free ranging animals when the following criteria are met:

1. Fertility control is limited to site-specific, well defined subpopulations of species or subspecies that are not classified as threatened or endangered as defined by either the US Fish and Wildlife Service or the World Conservation Union;

2. Fertility control be employed so as not to alter the gene pool of the species or subspecies as a whole;

3. Short and long-term effects of fertility control on population or subpopulation dynamics, including age structure and behavioural effects, be evaluated through modelling;

4. All fertility control agents and methods of delivery be fully considered for each species and circumstance;

5. The fertility control agent employed not adversely affect the health of the treated animal, other species sharing the habitat or predators, scavengers and humans consuming treated animals;

6. The fertility control agent be effective only on the target species and not transmissible to other animals, or if this is not possible, then the effect on non target species be evaluated and risk assessments made prior to employment;

7. The employment for fertility control be evaluated in each circumstance by the appropriate regulatory and wildlife management agencies with full public participation in the evaluation process; and

8. Cost of the fertility control programmes be borne by the agencies or segments of the public that will receive the direct benefits.

.../Appendices
REPORT OF THE MEETING OF THE OIE WORKING GROUP

ON WILDLIFE DISEASES

Paris, 17-19 September 1996

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

1. Epidemiological review of selected wildlife diseases 1995-1996
2. Deer diseases
3. Contraception in wildlife
4. Spongiform encephalopathies in wildlife
5. Bovine tuberculosis
6. CITES regulations and diagnostic specimens
7. Zoonoses transmitted from non-human primates
8. Communication and liaison within wildlife disease groups and organisations
9. Proposed revisions to FMD Code
10. Other business
11. Recommendations of the OIE Wildlife Working Group

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