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Abstract: In 1995 the North American Species Survival Plan for Cheetah Acinonyx jubatus held a workshop on feline immunodeficiency virus (FIV) to discuss the information currently available on the disease and the possible effects on the captive population of cheetah. FIV was first documented in 1986 in domestic cats and since then it has been reported in 16 non-domestic species. This paper highlights the protocols and recommendations concerning FIV that have been made by the SSP.

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Species Survival Plan (SSP) surveillance of feline immunodeficiency virus (FIV) in Cheetahs *Acinonyx jubatus* in North America

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In 1995 the North American Species Survival Plan for Cheetah *Acinonyx jubatus* held a workshop on feline immunodeficiency virus (FIV) to discuss the information currently available on the disease and the possible effects on the captive population of Cheetah. FIV was first documented in 1986 in domestic cats and since then it has been reported in 16 non-domestic species. This paper highlights the protocols and recommendations concerning FIV that have been made by the SSP.

Key-words: CITE, ELISA, FIV, lentivirus, Western blot

In 1995 the North American Species Survival Plan (SSP) for Cheetah *Acinonyx jubatus* held a workshop to formulate an action plan to: (1) bring together all the information that is currently known about feline immunodeficiency virus (FIV); (2) develop a surveillance programme for FIV detection in the captive population; (3) develop a series of recommendations and protocols regarding management of the captive population in relation to FIV (Grisham & Killmar, 1995). FIV is a lentivirus which causes an acquired immunodeficiency syndrome (AIDS) in domestic cats. The virus was first isolated in 1986 when a cattery in California reported the loss of a cat from an apparently AIDS-like disease (Pedersen *et al.*, 1987; Pedersen, 1993). Symptoms included chronic infections of the upper respiratory tract, oral cavity and skin, chronic diarrhoea and wasting, and severe anaemia which resulted in death. The characteristic approach used in lentivirus to diagnose an FIV infection is the detection of the FIV antibody. Currently the ELISA or CITE test is used as a screening assay for the FIV antibody with Western blot as the confirmatory test. Western blot is more specific and somewhat more sensitive than ELISA, especially when testing non-domestic cats. Western-blot technology is based on the separation of FIV proteins by electrophoresis so that antibodies against individual proteins in the serum of infected cats can be detected. Binding of serum antibodies of two FIV-specific bands is interpreted as a positive test. Development of a single FIV-specific band constitutes an equivocal test.

The primary modes of transmission of the disease are by fighting and biting. Close contact does not appear to be an efficient mode of transmission, although it cannot be totally excluded as a source for infection. FIV has been found in 16 non-domestic cat species including Lions *Panthera leo* and Cheetahs (Barr *et al.*, 1989; Olmsted *et al.*, 1992; Brown, Mithapala & O'Brien, 1993; Brown, Olmsted *et al.*, 1993). FIV in wild cats shows little evidence for immune suppression, associated disease or mortality. To date only two Cheetahs have had positive FIV titres although it is not clear what significance this has. Even though there are few FIV-positive Cheetahs and no associated disease, FIV is a matter of concern for zoo

managers and it needs to be monitored closely. It is important to remember that FIV strains infecting various species of cats are all different from one another. There appear to be many species-specific strains of lentivirus and it is not known if they can infect across species. The pathogenicity of lentivirus in Cheetahs and the risk of viral transmission from FIV-positive or equivocal Cheetahs to negative animals are unknown.

The consensus at the meeting was that not enough was known about the transmission and pathogenicity of FIV at this time and it was agreed that there was a need to monitor sero-prevalence of FIV in the North American population of Cheetah. The Cheetah SSP Management Group, in collaboration with its Veterinary and Infectious Disease Advisors, Margaret Barr, Suzanne Kennedy-Stoskopf, Linda Munson, James Evermann, Randy Junge, Stephen O'Brien, Michael Worley and Mitch Bush, have developed a series of recommendations as a result of this workshop, based on the current knowledge of the transmission and pathogenesis of FIV in the domestic cat. As more information on lentivirus infection in Cheetahs becomes available, these recommendations may be modified.

RECOMMENDATIONS

1. All Cheetahs should be tested by Dr Margaret Barr, Cornell University, Ithaca, NY. All samples sent to her should include the studbook number of the test animal and the name of the institution. Test results will be sent to the institution and a copy will be sent to the Species Coordinator. Serum samples will be archived for future testing when a more reliable method becomes available.

2. Cubs of less than 6 months old do not need to be tested. All animals over 6 months of age *must* be tested.

3. The Cheetah SSP *does not* endorse the movement of FIV-positive or equivocal animals between facilities. In situations where both the shipping and receiving institutions wish to transfer an FIV-positive or equivocal animal, then the veterinary and curatorial staff of both institutions and the Species Coordinator must be informed of the FIV status of the animal to be transferred and the status of both the shipping and receiving collections. If an FIV-positive or equivocal Cheetah is placed in contact with the collection at the receiving institution (i.e. not quarantined), then the collection at the receiving institution is considered positive.

4. All Cheetahs should be tested by Dr Barr 30 days prior to transfer. Results of FIV tests carried out by other laboratories *will not be accepted.*

5. Because FIV is known to contaminate semen in domestic cats, FIV-positive or equivocal Cheetahs should not be bred, nor should their semen be used for artificial insemination. If an FIV-positive or equivocal Cheetah is genetically valuable, then the Cheetah SSP and the institutions involved should evaluate these recommendations on a case by case basis. Offspring of FIV-positive or equivocal Cheetahs should be considered at risk of infection and should be monitored for sero-conversion for at least 3 years. Negative Cheetahs in 'positive collections', that is, collections with one or more FIV-positive or equivocal Cheetahs, can be included in SSP breeding recommendations.

6. Because of the ambiguity of the current tests, annual testing of previously negative Cheetahs is not required, unless those Cheetahs were in contact with an FIV-positive or equivocal Cheetah within the last 12 months. FIV-positive or equivocal Cheetahs should be tested at least annually.

7. FIV-positive or equivocal Cheetahs should not be kept in the same or adjacent enclosures and should have no direct physical or bodily fluid contact.

8. All institutions should maintain records of animal movements from area to area within that facility.

9. More sensitive and specific tests should be developed for lentivirus, specifically FIV.

10. Disease surveillance should be continued to facilitate correlation with FIV status.

Since these recommendations have been initiated, over 220 Cheetahs have been tested in North America using Western blot and ELISA test. Only two animals have tested positive for FIV and 16 animals tested equivocal. The positive/equivocal animals were housed in eight facilities.

The Cheetah SSP strongly endorses these recommendations to monitor the overall health of the North American population of Cheetahs. As more sensitive tests are developed and we obtain a better understanding of the lentivirus, especially FIV, then the recommendations will be re-addressed. The monitoring of this disease is part of the SSP's long-term goal for managing Cheetah in captivity as outlined in the Cheetah SSP Master Plan (Grisham, 1996).

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Husbandry and breeding of the Asiatic golden cat *Catopuma temminckii* at Melbourne Zoo

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The Asiatic golden cat *Catopuma temminckii* is rarely maintained in captivity and only moderate breeding success has occurred. This paper outlines the captive history, management and husbandry of the species at Melbourne Zoo which has resulted in the birth of 23 young over 23 years, 18 of which survived to 30 days. Information on reproductive parameters is also given.

Key-words: Asiatic golden cat, captive breeding, diet, introduction, management

The Asiatic golden cat *Catopuma temminckii* is a small felid which inhabits tropical rain forests of south-east Asia from Nepal, east to Burma, China, Thailand, Malaysia and Sumatra. It is threatened by habitat destruction, persecution by farmers and human activity. The Asiatic golden cat is listed as Indeterminate by IUCN (Groombridge, 1993) although application of the Mace/Lande criteria places it in the Vulnerable/Endangered category (Mace & Lande, 1991).

In January 1994 the captive population was 31.16 in 20 collections (*Int. Zoo Yb.* **34:** 449). Three subspecies have been described, *C. t. temminckii, C. t. dominicanorum* and *C. t. tristis,* although of the captive population, the majority of which is presumed pure bred, only three *C. t. temminckii* have been identified (Felid Specialist Group, 1995).

The species is rarely maintained in captivity and only moderate breeding success has occurred. ISIS records only five zoos, Cincinnati, Heidelberg, Melbourne, Munster and Wassenaar, which have bred *C. temminckii* since 1990, (ISIS, 1994). Shanghai has reported breeding to the *Yearbook* in 1991 and 1993 (*Int. Zoo Yb.* **32:** 456; **34:** 446).

This paper outlines management strategies at Melbourne Zoo which have resulted in a successful breeding programme for the species.

CAPTIVE HISTORY AT MELBOURNE ZOO

Since 1968 Melbourne Zoo has maintained *C. temminckii.* Between 1972 and 1995 20 litters were born at the Zoo and

Plate 1. A ♀ Asiatic golden cat *Catopuma temminckii* and 8 week-old cub at Melbourne Zoo. *Neil McLeod, Melbourne Zoo.*