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Abstract: *Hepatozoan* spp. are apicomplexan parasites occurring in a wide range of mammals, birds, reptiles and amphibians. Between 1987 and 1991 within the Serengeti ecosystem, 24 cheetahs were examined for the presence of blood parasites. Microscopical examination revealed the presence of *Hepatozoan* in the leucocytes from thirteen cheetahs (54.2%). The highest parasitaemias occurred in October-November and might possibly be associated with increased tick activity during the short rainy season and with the use of habitat with long grass.

Notes and Records

Hepatozoonosis in cheetahs and wild dogs in the Serengeti ecosystem

Hepatozoon spp. are apicomplexan parasites occurring in a wide range of mammals, birds, reptiles and amphibians. There are about 85 named species (Levine, 1988). The most common mammalian species is probably *Hepatozoon canis* (James) occurring in domestic dogs in the tropics and sub-tropics where suitable tick vectors occur. Records of *Hepatozoon* from various African carnivores have frequently been described as being *H. canis*, and even some previously named species from specific hosts have been synonymized with the dog parasite (Levine, 1988). *Hepatozoon* has been recorded previously in Serengeti carnivores, most recently by Averbeck *et al.* (1990).

Between 1987 and 1991 within the Serengeti ecosystem, 24 cheetahs (*Acinonyx jubatus* (Schreber)) and sixteen wild dogs (*Lycan pictus* (Temminck)) were examined for the presence of blood parasites. These studies were only part of larger investigations on the blood parameters of the hosts and, in the case of the wild dogs, the epidemiology of rabies (Gascoyne *et al.*, 1993). Blood samples were collected in EDTA from animals immobilized for the fitting and removal of radio collars and thin smears prepared, air dried, fixed in methanol and subsequently stained with Giemsa.

Microscopical examination revealed the presence of *Hepatozoon* in the leucocytes from thirteen cheetahs (54.2%) and thirteen wild dogs (81.5%). Of fifteen cheetahs which were re-sampled (twelve on one occasion and three on two occasions) after an interval of 3-14 months, nine had *Hepatozoon* in at least one sample (five had retained patency, two had lost it and two had gained). The highest parasitaemias occurred in October-November and might possibly be associated with increased tick activity during the short rainy season and with use of habitat with long grass. The wild dogs were sampled in all months except December and no seasonal prevalence with *Hepatozoon* was observed. These are the first records of *Hepatozoon* in African wild dogs. In addition to *Hepatozoon* three cheetahs also had low parasitaemias with intraerythrocytic piroplasms (either *Theileria* or *Babesia*). One wild dog also had microfilariae, and one had a single piroplasm, possibly *Babesia* sp.

In an earlier study Averbeck *et al.* (1990) also found a high prevalence of *Hepatozoon* infection in carnivores within the Serengeti ecosystem although they concentrated mainly on lions (100% prevalence) and included only eight cheetahs (100% prevalence). Why the prevalence of *Hepatozoon* in cheetahs from the present study was lower is not clear, but may be due to sampling throughout the year rather than restricted to a 3-month span (July to September) by Averbeck *et al.* (1990).

The pathogenicity of *Hepatozoon* in wild carnivores is unknown. Schizonts have been found in a wide range of tissues particularly in the lung, myocardium and skeletal muscle, but also in the spleen, liver and lymph nodes (McCully *et al.*, 1975). In domestic dogs, severe infections with *H. canis* have usually been

accompanied by concomitant infection with other disease agents resulting in considerable necrosis and granuloma formation in the spleen, liver and lymph nodes (McCully *et al.*, 1975). Fever, anaemia, weight loss and occasionally paralysis of the hind limbs have also been reported (Desser, 1993). Whether similar responses occur in wild carnivores is yet to be determined.

The morphology of *Hepatozoon* gametocytes in the present study indicates differences between those in cheetah and wild dogs. This suggests that synonymizing many African carnivore *Hepatozoon* spp. with *H. canis* (Levine, 1988) is clearly in error. In a recent review of *Hepatozoon*, Desser (1993) suggests that host specificity in mammals may be more prevalent than in reptiles. This view is further supported by studies in South Africa where unsuccessful attempts were made to transmit *Hepatozoon* from hyaena (*Crocuta crocuta* (Erxleben)) and jackal (*Canis mesomelas* Schreber) to domestic dogs (Basson *et al.*, 1971; McCully *et al.*, 1975). Further evidence of host specificity is presented by studies in the tick vectors. The most common vector of *H. canis* in domestic dogs is *Rhipicephalus sanguineus* (Latreille). However, specimens of *R. sanguineus*, *R. simus* Koch and *Haemaphysalis leachi* (Audouin) collected from hyaena revealed developmental stages of *Hepatozoon* only in *R. simus* (McCully *et al.*, 1975). In Tanzania, Yeoman & Walker (1967) recorded *R. simus* as the only species found on wild dogs (only three sampled) and no records of any ticks for cheetahs.

Although ixodid ticks have traditionally been considered the principal vectors of large mammal *Hepatozoon* spp., recent studies on *H. attivorae* (de Beaufort Aragao) in the South African cliff swallow *Hirundo spilodera* Sundevall have indicated both an argasid tick and a flea as vectors (Bennett, Earle & Penzhorn, 1992). Other arthropods (mites, mosquitoes and tsetse) are known to be vectors of *Hepatozoon* spp. in small mammals and reptiles (Desser, 1993). Thus the potential vectors of *Hepatozoon* in African carnivores may not be restricted only to ixodid ticks.

This paper lends weight to the suggestion that host specificity, at least to familial level, may be as prevalent in mammals as recently described for avian species of *Hepatozoon* (Bennett, Earle & Peirce, 1992). To further elucidate this question material is currently being accumulated from a wider range of African carnivores as a prelude to a taxonomic review of *Hepatozoon* species. Research is also clearly required to determine the vectors responsible for *Hepatozoon* transmission, and pathogenicity in the host.

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