Onderstepoort J. vet. Res. 57, 281–282 (1990)

RESEARCH COMMUNICATION

SEROLOGICAL REACTIONS TO *LEPTOSPIRA* SPECIES IN BUFFALO (*SYNCERUS CAFFER*) FROM THE KRUGER NATIONAL PARK

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ABSTRACT

MYBURGH, J. G., BENGIS, R. G., BESTER, C. J. J. & CHAPARRO, F., 1990. Serological reactions to *Leptospira* species in buffalo *(Syncerus caffer)* from the Kruger National Park. *Onderstepoort Journal of Veterinary Research*, 57, 281–282 (1990).

Four hundred and six serum samples from buffalo *(Syncerus caffer)* were tested for leptospirosis, using the microscopic agglutination test. Seven buffaloes (1,7 %) reacted positive and 27 (6,6 %) inconclusive. Reactions against *L. tarassovi* and *L. hardjo* were the most prevalent.

INTRODUCTION

Leptospira organisms occur in southern Africa, as demonstrated by serological surveys (Botes & Garifallou, 1967; Twigg, Sikes & Hughes, 1970; Feresu, 1987; Hunter, Flamand, Myburgh & Van der Merwe, 1988), and have been isolated by Herr, Riley, Neser, Roux & De Lange, 1982; Herr & Winnen, 1983 and Te Brugge & Dreyer, 1985. The most prevalent serovars in cattle in southern Africa are *hardjo*, *pomona, tarassovi* and *mini* (Myburgh, unpublished data, 1989). Leptospiral infections in domestic animals are usually associated with abortions in southern Africa (Herr *et al.*, 1982; Te Brugge & Dreyer, 1985).

The role played by wild animals in the epidemiology of leptospirosis has not been fully investigated. In large areas of southern Africa, game is still abundant (Smithers, 1983) and could easily infect domestic animals, or vice versa (Faine, 1982; Wanyangu, Olubayo, Rositter & Waitkins, 1987).

That *Leptospira* organisms can survive in the environment is an imoprtant factor in the epidemiology, transmission and spread of the disease (Faine, 1982; Thierman, 1984). Waterholes or streams shared by game and cattle could be a source of *Leptospira* organisms (Faine, 1982).

It was decided to test buffalo from the Kruger National Park (KNP) to determine whether antibodies against *Leptospira* species occur in these animals. Buffaloes in the KNP are relatively isolated from domestic animals, and direct contact is unlikely (Bengis, personal communication, 1990). Positive serological evidence of leptospirosis in buffalo would be an indication that buffaloes are exposed to and stimulated by *Leptospira* organisms occurring in the KNP.

MATERIALS AND METHODS

Blood samples were collected during routine culling of buffalo. A total of 406 samples were collected, from different areas in the KNP over a year. These were centrifuged and the serum was separated. The serum samples were inactivated for 30 min at 58 °C, because the KNP is a foot-and-mouth control area. The sera were frozen (−12 °C) in small plastic tubes and stored until testing.

The sera were tested, using the microscopic agglutination micro-volume technique (Sulzer & Jones, 1978; Herr, Hunter & De Lange, 1987). The following antigens were used: *canicola, copenhageni (icterohaemorrhagiae), grippotyphosa, hardjo, mini (swajizak), pomona, pyrogenes* and *tarassovi* (hyos).

Antigens were grown on liquid EMJH[1] medium and used between 4–14 days, when the growth of the leptospires exceeded 2×10^7 organisms per mℓ (Sulzer & Jones 1978). The end-point titre was taken as the dilution, where 50 % of the organisms, as compared with the negative control, were either absent or visibly agglutinated and there was a greater degree of agglutination in the immediately preceeding lower dilution. A titre of less than 160 was regarded as inconclusive and 160 and higher as positive.

RESULTS

Four hundred and six serum samples were tested and of these 7 (1,7 %) reacted with a titre of 1/160 or more and were considered positive. Twenty-seven (6,6 %) buffaloes reacted inconclusively.

The total number of reactions (positive and inconclusive) against serovars tested for are given in Fig. 1. Reactions against *L. tarassovi* and *L. hardjo* were the most prevalent.

DISCUSSION

The serology results give clear evidence of the existence of leptospirosis in buffalo from the KNP. Titres to *L. tarassovi* and *L. hardjo* are the most prevalent (Fig. 1) and the low titres recorded in the buffalo might point to carrier status.

The epidemiology of leptospirosis with regard to the role played by wild animals has not been fully investigated in southern Africa, but the occurrence of these serological reactions in buffalo indicate that they are being exposed to *Leptospira* organisms under natural conditions in an ecosystem relatively isolated (Bengis, personal communication, 1990) from direct contact with domestic animals. Fifty cattle from a farm adjacent to the KNP in the Phalaborwa area were also tested for the same serovars and reactions against *L. tarassovi* and *L. pomona* were the most prevalent (Myburgh, unpublished data, 1989).

Transmission of *Leptospira* organisms from domestic animals and wild animals other than buffalo is a possible explanation for the titres occurring in buffalo. Transmission by water, carrier animals or birds could play a very important role in the

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Received 6 July 1990—Editor

[1] Difco EMJH medium base + Difco EMJH enrichment. Difco Laboratories, Detroit, Michigan, USA

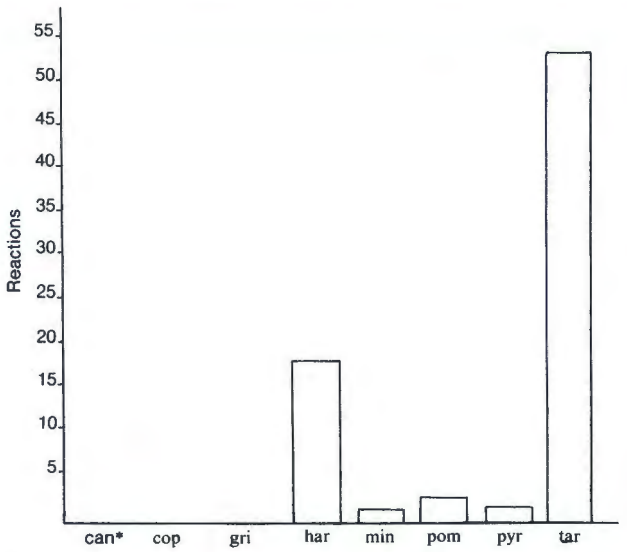

FIG. 1 Total number of reactions (positive and inconclusive) against all serovars tested for

* can = canicola
cop = copenhageni
gri = grippotyphosa
har = hardjo
min = mini
pom = pomona
pyr = pyrogenes
tar = tarassovi

epidemiology of leptospirosis in buffaloes (Faine, 1982; Thierman, 1984).

The role of wet environments, aiding in the survival of *Leptospira* species, has been demonstrated and reviewed by various authors (Kirschner & Maguire, 1957; Gordon-Smith & Turner, 1961; Henry & Johnson, 1978). These serological reactions in buffalo could indicate that water-borne transmission of these organisms might be possible by streams and effluent water flowing into the park, from outside. Buffaloes are closely associated with water, and show wallowing and mud bathing behaviour (Smithers, 1983).

Shepherd & Leman (1958) were unable to isolate leptospires from wild rodents collected in various regions of the RSA, although these were collected mainly in drier parts of the country where leptospirosis is less prevalent. The role of rodents in the epidemiology of leptospirosis should be regarded as minor at this stage.

Leptospira organisms have been isolated from birds in other parts of the world (Van der Hoeden, 1964; Thierman, 1984). The role of birds, such as vultures, which frequently visit farms and cattle carcasses outside the KNP, could play a role in transmitting the disease, but data are not available.

The serological reactions in buffalo may therefore be the result of exposure to *Leptospira* organisms excreted by buffaloes, other wild animals or domestic animals. Serological surveys and epidemiological studies in domestic and wild animals, as well as attempts to the isolate *Leptospira* organisms from these animals, should be conducted.

ACKNOWLEDGEMENTS

The authors wish to acknowledge the excellent cooperation and help of the personnel of the Directorate of Animal Health and National Parks Board.

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Printed by the Government Printer, Private Bag X85, Pretoria, 0001