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Source: Journal of Wildlife Diseases, 35(1) : 112-114

Published By: Wildlife Disease Association

URL: https://doi.org/10.7589/0090-3558-35.1.112

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Journal of Wildlife Diseases, 35(1), 1999, pp. 112–114
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Serosurvey for Antibodies against *Brucella abortus* and *Leptospira interrogans* in Pampas Deer from Brazil

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ABSTRACT: A survey for antibodies against *Brucella abortus*, and *Leptospira interrogans* was conducted on 17 pampas deer (*Ozotocerus bezoarticus*) from Pantanal Matogrossense (State of Mato Grosso do Sul, Brazil) and on 24 pampas deer from Parque Nacional de Emas (State of Goiás, Brazil). Antibodies against *B. abortus* were detected by plate agglutination, rose Bengal, and complement fixation tests; antibodies against *Leptospira interrogans* were detected by the microscopic agglutination test. All sera were negative for *B. abortus* antibodies and all deer sera from Parque Nacional de Emas were negative for *L. interrogans* antibodies. Four (24%) of 17 sera from Pantanal Matogrossense were positive for *L. interrogans* serovar ($n = 2$) *hardjo*, *wolffi* ($n = 1$) and *mini* ($n = 1$). While these diseases do not appear to be of major importance to the health status of Pampas deer, it appears that deer are reservoir for leptospirosis in one of the study areas.

Key words: *Brucella abortus*, brucellosis, *Leptospira interrogans*, leptospirosis, *Ozotocerus bezoarticus*, Pampas deer, serologic survey.

Infection of wild species by *Brucella abortus* and *Leptospira interrogans* have been observed nearly worldwide. This is of concern regarding the influence of these infections on host reproductive rates and the possibility of wild animals acting as a source of infection for domestic animals and humans. Forbes and Tessaro (1993) confirmed that reindeer (*Rangifer tarandus*) may transmit *Brucella suis* biovar 4 to cattle, although McCorquodale and DiGiacomo (1985) concluded that wild animals have little significance in transmitting brucellosis to cattle in the USA.

In Brazil, epidemiologic studies on wild animals are rare. Surveys in other North and South American countries have detected brucellosis and leptospirosis among wild animals. The rate of *Brucella* spp. infection in wild ruminants ranged from none to moderate. Boeer et al. (1980) tested 37 white-tailed deer (*Odocoileus virginianus*) in Texas and did not find evidence of exposure to *B. abortus*. Jones et al. (1983) examined 713 white-tailed deer and found only one reactor. Ingebritsen et al. (1986) tested 628 white-tailed deer and all were serologically negative. In California, one of 355 sera from mule deer (*Odocoileus hemionus californicus*) and one of 1,613 sera from black-tailed deer (*Odocoileus hemionicus columbianus*) were serologically positive (Drew et al., 1992). Bourque and Higgins (1984) found no reactors among 208 moose (*Alces alces*) in Canada. Brucellosis is a significant problem for elk (*Cervus elhapus*) in Yellowstone National Park, USA (Rhyan et al., 1997).

In South America, *B. abortus* in wild animals has been reported. Lord and Flores (1983) tested 201 capybara (*Hydrochaeris hydrochaeris*) from Venezuela and 58% had antibodies. Moreover, these researchers obtained 23 isolates, eight identified as *B. abortus* and 15 identified as *B. suis*.

Serologic studies have shown the occurrence of antibodies to *L. interrogans* in deer, mainly in white-tailed deer, but the susceptibility of Pampas deer (*Ozotocerus hezoarticus*) to several *L. interrogans* serovars is still unknown.

Fournier et al. (1986) tested 250 white-tailed deer serum samples and 7% had antibodies to *L. interrogans* serovars *canicola*, *hardjo*, *pomona*, and *grippotyphosa*. Ingebritsen et al. (1986) found that 3% of white-tailed deer tested positive to *L. interrogans* serovars *icterohaemorrhagiae*, *pomona* and *grippotyphosa*. Goyal et al. (1992) found 88 (43%) of 204 white-tailed deer had antibodies to *L. interrogans* serovars *bratislava*, *canicola*, *grippotyphosa*,

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hardjo, *icterohaemorrhagiae*, and *pomona*. Studying 27 serum samples from captive white-tailed deer in Mexico, Parás Garcia et al. (1992) observed 23 samples reacted to serovars of the genus *Leptospira*. Reactions were most frequently observed to *L. interrogans* serovars *autumnalis*, *icterohaemorrhagiae*, and *pomona*.

In Tennessee, New et al. (1993) studied sympatric white-tailed deer and cattle and observed that antibodies to *L. interrogans* were more frequent in female than in male deer. Of 106 seropositive deer, reactants occurred to *L. interrogans* serovars *hardjo* (n = 57), *pomona* (n = 33), *icterohaemorrhagiae* (n = 15), and *canicola* (n = 1). Of 56 cattle, reactants were seen for *L. interrogans* serovars *hardjo* (n = 28) and *pomona* (n = 2).

Herein, we investigated occurrence of antibody titers to *B. abortus* and to *L. interrogans* in Pampas deer at two sites in Brazil. Forty-one Pampas deer were tested. Eight (seven adult and one young) males, and nine (seven adult and two young) females were from Pantanal Matogrossense (19°S and 56°W; State of Mato Grosso do Sul Brazil), and 12 (eight adult and four young) males and 12 (nine adult and three young) females were from Parque Nacional de Emas (18°15′S and 52°53′W; State of Goiás, Brazil). Deer were captured with a net from July to December 1995. Blood samples were collected from the jugular vein, allowed to clot and centrifuged within 24 hr of collection. Sera were removed, frozen and stored at −20 C until tested.

Sera were examined by plate agglutination, rose Bengal, and complement fixation tests, using as antigen *B. abortus* strain 1119/3, prepared by Instituto de Tecnologia do Paraná (Curitiba, State of Paraná, Brazil) according to the method of Alton et al. (1988).

Antibodies to *L. interrogans* were detected by microscopic agglutination test using live cultures in EMJH (Ellinghause-McCullough-Johnson-Harris) medium (Difco Laboratories, Detroit, Michigan, USA) (Faine, 1982). An antibody titer ≥ 1:100 was considered positive. Antigens used in this test included *L. interrogans* serovars *australis*, *autumnalis*, *balum*, *bataviae*, *brasiliensis*, *butembo*, *canicola*, *castellonis*, *grippotyphosa*, *hardjo*, *icterohaemorrhagiae*, *javanica*, *nini*, *panama*, *pomona*, *pyrogenes*, *shermani*, *tarassovi*, *whitcombi*, and *wolffi*. *Leptospira interrogans* cultures were obtained from the Center for Disease Control (Atlanta, Georgia, USA) through S. Arrudas Vasconcellos (University of São Paulo, São Paulo, Brazil).

All sera were negative for antibodies against *B. abortus*. Microscopic agglutination tests for leptospirosis were negative in deer from Parque Nacional de Emas. Four (24%) of 17 deer from Pantanal Matogrossense were positive to *L. interrogans* serovars *hardjo* (n = 2), *wolffi* n = 1, and *mini* n = 1). Agglutinating titers ranged from 1:100 to 1:200.

Brucellosis does not appear to be a problem in deer in the study areas and these animals do not seem to represent a serious risk for other domestic or wild animals. Since bovine brucellosis is common in some areas in Brazil, further studies should be conducted on wild animals in areas occupied by cattle.

The few deer seropositive for *L. interrogans* were all from Pantanal Matogrossense. The relatively low prevalence (<10%) of antibodies across all areas in this study is similar to that reported in the USA (Fournier et al., 1986). Leptospirosis does not appear to be a problem for deer in Parque Nacional de Emas, but the presence of antibodies in 24% of deer from Pantanal Matogrossense indicates they are exposed frequently to *L. interrogans*.

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Received for publication 14 January 1998.

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