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Occurrence of serological reactions for serogroup Sejroe (CTG and Prajtino) in female buffalo in the state of Pernambuco, Brazil

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ABSTRACT

The objective of this study was to evaluate the occurrence of anti-*Leptospira* spp. antibodies in female buffalo in the state of Pernambuco. A total of 123 female buffalo blood samples were collected from five properties distributed in the state of Pernambuco. The microscopic agglutination test was used to study anti-*Leptospira* spp. antibodies. The occurrence of anti-*Leptospira* spp. antibodies was 28.5% (35/123; CI 20.7–37.3%) and on different properties, the occurrence ranged from 28.6% to 80.0%, with 100% of the properties showing animals with positive results. The serovars of the serogroup Sejroe with a higher incidence were Hardjoprajtino (CTG strain, 49.1%) and Hardjo (Prajtino genotype, 43.2%), followed by serogroup Grippotyphosa with the Grippotyphosa serovar (3.9%), serogroup Pomona with the Pomona serovar (1.9%), and the Icterohaemorrhagiae serovar Copenhageni (1.9%). This was the first record of the occurrence of anti-*Lepstospira* spp. antibodies in female buffalo in the state of Pernambuco. Control measures are necessary to prevent health and economic losses, given that the agent involved affects animal reproduction, triggering drops in conception rates or even clinical cases of abortion.

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Introduction

Leptospirosis is an anthropozoonosis of wide geographic distribution that occurs in rural and urban areas and is caused by pathogenic bacteria belonging to the Spirochaetales order, Leptospiraceae family, and *Leptospira* genus.[1] In tropical and subtropical countries, it shows a high prevalence as a consequence of the temperature and humidity conditions that favor the persistence of the bacteria in the environment.[2]

In cattle raising, leptospirosis is an important cause of production drops associated with to reproductive issues.[3] In infected pregnant females, the bacteria can cross the placenta at any stage of the pregnancy, causing embryonic losses, abortions, stillbirths, or debilitated births.[4] However, estrus repetition is a characteristic that can be observed for many months.[5]

In Brazil, many studies on the prevalence of different *Leptospira* spp. serovars in buffalo have been conducted, permitting an understanding of the disease's epidemiology, which reflects the ecological relationship between humans and chronically infected mammalian reservoirs.[6] In the state of São Paulo, Vasconcellos et al.[7] isolated *Leptospira santarosai* from buffalo of Vale do Ribeira, whereas Favero et al.[8] found 43.7% positives in 879 serum samples with a higher frequency of the serovars Hardjo (43.3%) and Wolffi (32.5%). In the state of Pará, Silva et al.,[9] researching agglutinins of anti-*Leptospira*, verified a 67.7% positivity rate in 127 analyzed serum samples, of which 15.7% were reactive to serovar Hardjo. Viana et al.,[10] in the state of Amazonas, obtained 80.0% positives (164/205) with a higher frequency of serogroup Autumnalis variant autumnalis and serogroup Sejroe and varieties Hardjo and Wolffi.

The epidemiological importance of leptospirosis in buffalo must be considered: infected animals may act as sources of infection for other animals raised on the same property as well as for people who manage them because as carriers, buffalo eliminate the agent into the environment, mainly through urine[2] (p601). Among the main risk factors involving leptospirosis in buffalo are their access to diverse ecosystems and their habit of bathing in rivers, creeks, and flooded areas.[11]

Observing the lack of data on this disease in the northeast region of the country and the economic losses related to leptospirosis in buffalo, the objective of this study was to determine the occurrence of anti-*Leptospira* spp. antibodies in buffalo originating from herds in the state of Pernambuco, Brazil.

Methodology

Study area

A transversal study design was carried out through convenience sampling, not probabilities, in five counties distributed in the state of Pernambuco, Brazil. The properties were chosen for convenience, including the counties of Quipapá (5 animals), Ribeirão (42 animals), Canhotinho (21 animals), Agrestina (5 animals), and ÁguaPreta (50 animals).

Sampling

In total, 123 blood samples were collected from female buffalo of reproductive age, with or without a history of reproductive problems, raised on a semi-intensive or extensive regimen, and with no history of vaccination for leptospirosis.

Sample collection

Blood samples were obtained by venipuncture of the coccygeal vein using Vacutainer® disposable 25 × 0.8 mm needles and sterilized 5-mL Vacutainer® tubes. Afterward, the samples were packed into isothermal boxes containing recyclable ice and forwarded to the laboratory where they were centrifuged at 900 × *g* for 10 min. After this procedure, the samples were filled in polypropylene tubes, properly identified, and stored in a freezer at −20 °C until processing.

Serum analysis

For the study of anti-*Leptospira* spp. antibodies, the microscopic agglutination test (MAT) was used. Samples considered positive were those with titrations equal to or higher than 100.[12] When coagglutinations occurred between different serovars with the same titration, both serovars were considered reactive, and in cases of different titrations, the serovar with the higher titration prevailed. Titrations of the seropositive samples were carried out by employing a dilution of 1:100 to 1:3200,[13] employing the serogroups for herbivores, available at the Serviço de Diagnóstico de Zoonoses (SDZ) UNESP Botucatu – São Paulo (Table 1).

Table 1 – Relation of serogroups, serovars, and strain of *Leptospira* spp. utilized in the Serviço de Diagnóstico de Zoonoses (SDZ), UNESP Botucatu – São Paulo, 2016.

Leptospira serovar	Serogroup	Strain
L. interrogans sv Bratislavia	Australis	Jez-bratislava
L. borgpetersenii sv Castellonis	Ballum	Castllon
L. interrogans sv Canicola	Canicola	Hond Utrecht IV
L. interrogans sv Djasiman	Djasiman	Djasiman
L. kirshneri sv Grippotyphosa	Grippotyphosa	Moska v
L. interrognas sv Copenhageni	Icterohaemorraghiae	M 20
L. interrogans sv Icterohaemorraghiae	Icterohaemorraghiae	RGA
L. interrogans sv Pomona	Pomona	Pomona
L. interrogans sv Pyrogenes	Pyrogenes	Salinem
L. interrogans sv Wolffi	Sejroe	3705
L. borgpeterseni sv Tarassovi	Shermani	Perepelicinou Mitis Johnson
L. borgpetersenii sv Hardjo	Hardjobovis	Sponselee
L. borgpetersenii sv Mini	Mini	Sari
L. interrogans sv Hardjo (genoypePrajtino)	Sejroe	Hardjoprajtino
L. interrogans sv Hardjo (strain CTG)	Sejroe	Hardjo CTG
L. interrogans sv Hardjo (genotype Bovis)	Sejroe	Hardjobovis
L. santarosai sv Guaricura	Sejroe	Bov G

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