

Domesticated Animals as Reservoirs of Leptospirosis in Camaguey, the Pig Factor

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ABSTRACT

The aim of this study was to evaluate the role of domesticated animals, particularly pigs, as reservoirs of leptospirosis in the province of Camaguey. The sera from 2 617 equines, 1 820 pigs, 75 ovines and caprine, and 69 canines in Camaguey were analyzed by microagglutination. Serovars Icterohaemorrhagiae, Canicola, Ballum, Australis, Pomona and Tarassovi were used as antigens for horses, pigs and dogs; whereas Icterohaemorrhagiae, Canicola, Ballum, Pomona, Hebdomadis and Sejroe were used for bovines and ovine-caprine. The variable studied was antibody proportion per species. The inclusion of Hardjo, Bratislava, Sejroe and Grippotyphosa for serum screenings in swine contributed to better understanding of the species as reservoir of Leptospirosis in the province. Due to the growing number of these animals in urban adjacent areas, this result is a warning about the underlying risk of epidemics transmitted to humans.

Key words: emerging diseases, *Leptospira*; swine, serovars, zoonosis

INTRODUCTION

Every year 500 000 cases of severe leptospirosis in humans are reported in the world; a figure that falls short from the actual incidence of the disease. In animals, the data are less accurate, but alarming, due to the numerous economic losses produced in several domesticated species (Wasiński and Dutkiewics, 2013).

In Cuba, the disease has an endemic-epidemic behavior, with changing epidemiological characteristics. It classifies among the first thirty-five causes of death. The main reservoirs are rats, pigs, dogs, and bovines (Suárez Conejero *et al.*, 2015); though its impact has no validating statistical support.

Swine is one of the targets of the disease, which is usually acquired from rodents. Pigs are one of the most important reservoirs of human pathogenic serovars, for which vaccination against leptospirosis is compulsory for swine growers (Rivero and Rago, 2011).

In the province of Camaguey, there is no updated information available about the potential of local domesticated species as reservoirs of leptospirosis. The swine population in the province is high, mostly in urban or suburban backyards (CENCOP, 2015).

The aim of this research was to evaluate the role of domesticated animals as reservoirs of leptospi-

rosis in Camaguey, with particular emphasis on swine.

MATERIALS AND METHODS

The study took place at the Provincial Laboratory of Animal Health in the city of Camaguey, and comprised ten years (January 2004 - December 2013).

The sera of 2 659 bovines, 2 617 equines, 1 820 pigs, 75 ovines and caprine, and 69 canines, in the province of Camaguey were studied. Microagglutination tests (MAT) established the presence of *Leptospira* antibodies. The serovars used as antigens for equines, swine, and canines were Icterohaemorrhagiae, Canicola, Ballum, Australis, Pomona, and Tarassovi. Icterohaemorrhagiae, Canicola, Ballum, Pomona, Heddomadis, and Sejroe (supplied by the Pedro Kouri Institute of Tropical Medicine) were used for bovines, ovines, and caprine, according to Puentes *et al.* (2009). The antibody titers for all the species established at 1/100 were considered positive; except for bovines, with 1/200.

IBM-SPSS Statistics 21 was used for statistics analysis. The simple variance analysis, and the Duncan's multiple comparison test, were made.

RESULTS AND DISCUSSION

The test of comparison of proportions for each species' antibodies showed that bovines, equines,

swine, and canines, had similar behaviors, only the bovine-caprine were different. (Fig. 1).

Three of the species (bovine, swine, and canine) have long-lasting evidence as reservoirs of the disease. Though equines do not show the same record, more recent sources have alerted on their possible involvement in this entity (Lunn, 2015), so, further research should include this species for the elevated presence of equines used in public transportation.

Ovine-caprine was the group with the lowest number of positive antibodies, which corroborated other reports on the poor involvement of this species as reservoirs (WHO, 2008). Despite the above, screening of the species must not be disregarded, as breeding and herding is becoming more popular in the country.

Leptospira interrogans (Pomona, Icterohaemorrhagiae, Canicola, Hardjo, and Bratislava), *Leptospira borgpetersenii* (Sejroe and Tarassovi), and *Leptospira kirschneri* (Grippotyphosa) can infect pigs occasionally (Divers, 2015).

Pigs have been reported as important reservoirs of pathogenic serovars to human and other species. In that sense, the WHO (2003) emphasized on vaccinating swine employees (veterinarians and growers), since they are health risks. To now, several vaccines have been developed to immunize sows during maternity, and to reduce the prevalence of the disease, and miscarriages. The effectiveness of this practice will depend greatly on proper serovar selection that can act as immunogens to the bacterins (Divers, 2015).

Puentes *et al.* (2009) included Australis serovar, which was not present in Diver's proposal (2015), in the antigenic pools for routine controls to swine, or when leptospirosis is suspected. However, Hardjo, Bratislava, Sejroe or Grippotyphosa have not been suggested, so their inclusion could be weighed now. The sum of these antigens might bring a higher impact on the species than has been reported so far. This would be an important decision to make for provinces like Camaguey, with a swine population of 148 779, of which 77 673 (66.06%) are grown by private breeders, especially in backyards (CENCOP, 2015). This growing alternative may become a risk to people with poor training, and facilities that do not meet the minimum growing requirements (Morales, 2014).

No published research has been found that links the previous to the behavior of the disease in the population of Camaguey, much less, the role of serovars in it. However, a national study led by Suárez Conejero *et al.* (2015) reported the presence of Ballum, Pomona, Canicola, Icterohaemorrhagiae, Pyrogenes, Tarassovi, Australis, Hebdomadis, Sejroe, Autumalis and Bataviae in the last five years. Their incidence was not elucidated, though. In that sense, only eight of the above-mentioned serovars were detection antigens during tests made to validate this proposal, so the domesticated species screened may well be reservoirs, a supposition that will have to be more clearly stated in further research.

CONCLUSIONS

The greatest proportion of positive antibodies to leptospirosis in Camaguey were observed in bovines, swine, canines, and equines, with no significant differences among them, but with ovine-caprine. The inclusion of Hardjo, Bratislava, Sejroe, and Grippotyphosa would be most convenient for microagglutination during screening to swine. The elevated presence of the species in backyard growing may become a potential danger for the transmission of the disease to humans in the province.

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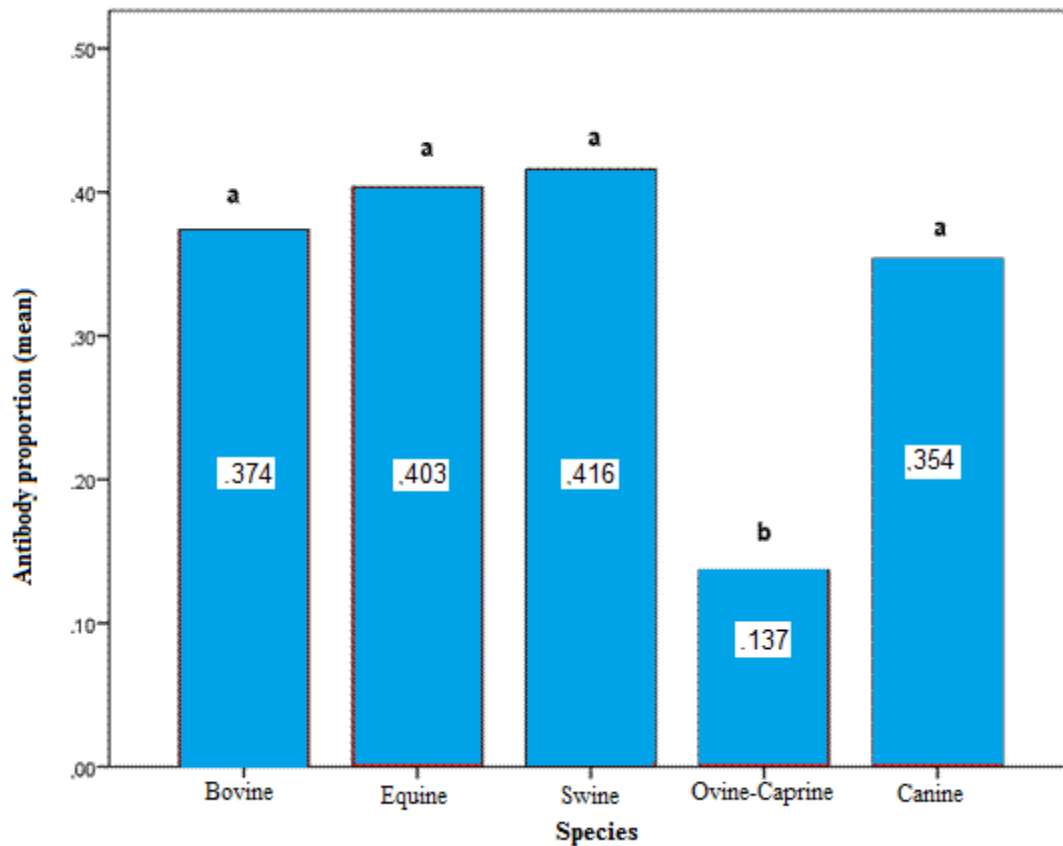
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Different letters in each column differ significantly ($P < 0.01$)

Fig. 1. Behavior of species as leptospira antibodies