



Revista Brasileira de Parasitologia  
Veterinária

ISSN: 0103-846X

zacariascbpv@fcav.unesp.br

Colégio Brasileiro de Parasitologia  
Veterinária  
Brasil

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Revista Brasileira de Parasitologia Veterinária, vol. 20, núm. 2, abril-junio, 2011, pp. 178-180

Colégio Brasileiro de Parasitologia Veterinária  
Jaboticabal, Brasil

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# Parasitism rates of *Lipoptena guimaraesi* and a new record of *Lipoptena mazamae* on *Ozotoceros bezoarticus* from the Central Pantanal wetlands in Brazil

Índices parasitológicos de *Lipoptena guimaraesi* e novo registro de *Lipoptena mazamae* sobre *Ozotoceros bezoarticus* no Pantanal central, Brasil

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Received September 3, 2010

Accepted December 22, 2010

## Abstract

From May to October of 2006 we collected 143 louse flies of the genus *Lipoptena* on the body surface of 16 pampas deer *Ozotoceros bezoarticus* captured in four farms from the central area of the Brazilian Pantanal wetlands. We also examined 172 cattle individuals and none of them had louse flies. Most of the parasites identified were *Lipoptena guimaraesi* but one specimen of *L. mazamae* was also found, representing a new host record for this ked fly. The prevalence of *L. guimaraesi* was 93.8%, the mean intensity of infestation was 9.5, and the index of discrepancy was 0.444.

**Keywords:** Diptera, Hippoboscidae, *Lipoptena* spp., *Ozotoceros bezoarticus*.

## Resumo

De Maio a Outubro de 2006, 143 hipoboscídeos do gênero *Lipoptena* foram coletados sobre a superfície corporal de 16 veados-campeiros *Ozotoceros bezoarticus* capturados em quatro fazendas localizadas na área central do Pantanal brasileiro. Também foram examinados 172 bovinos na mesma área, sobre os quais não foram encontrados hipoboscídeos. Muitos dos parasitos foram identificados como *Lipoptena guimaraesi* apesar de um indivíduo de *L. mazamae*, registrado pela primeira vez sobre veado-campeiro. A prevalência de *L. guimaraesi* foi de 93,8%, a intensidade média de infestação foi de 9,5 e o índice de discrepância foi de 0,444.

**Palavras-chave:** Diptera, Hippoboscidae, *Lipoptena* spp., *Ozotoceros bezoarticus*.

The subfamily Lipopteninae (Diptera, Hippoboscidae) comprises three genus of blood feeding ked flies which are mainly ectoparasites of Artiodactyla mammals: *Lipoptena*, *Melophagus*, and *Neolipoptena* (MAA, 1969). These are louselike larviparous insects, dorsoventrally flattened with robust legs, and mouthparts directed forward (LLOYD, 2009). *Lipoptena* and *Neolipoptena* parturition occurs before puparian formation and development is into winged imagines (“volant individuals”) that lose their wings right after reaching the host (BEQUAERT, 1953), while the more specialized *Melophagus* do not have functional wings in any stage of life cycle. Most of the published studies about the distribution

of *Lipoptena* and *Neolipoptena* species on host populations with descriptive parasitism indexes (prevalence and abundance/intensity) are available only for Nearctic Region (SAMUEL; TRAINER, 1972; DAVIS, 1973; EADS; CAMPOS, 1984; FORRESTER et al., 1996). In the New World, where four species of *Lipoptena* are known to occur (PETERSON; MAA, 1970), data is still scarce and focused on *L. cervi*, *L. depressa* and *L. mazamae* that parasite the North American deer *Odocoileus* spp., *Rangifer tarandus*, *Cervus* spp., and *Capreolus capreolus*. Although Lipopteninae are often host specific to Bovidae and Cervidae species (MAA, 1969), incidental infestations of humans have been documented (IVANOV, 1975).

Until recently, deer keds have not been clearly associated to transmission of any infection agent either to its wild host or cattle and humans. However, Dehio et al. (2004), Halos et al. (2004) and Reeves et al. (2006) provided evidence that deer keds (*L. cervi*

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and *L. mazamae*) are natural reservoirs for *Bartonella* spp. and may act as vectors for transmission of this bacterium within ruminant population and potentially to humans.

*Lipoptena guimaraesi* was described by Bequaert (1957) based on specimens collected from the South American pampas deer *Ozotoceros bezoarticus* in the States of Mato Grosso and Goiás, central-western Brazil. The holotype and most of the paratypes are deposited at the Zoology Museum of the Universidade de São Paulo. Recently, there have been new geographic records in the States of Tocantins, Central-Western Brazil (DESIDERIO et al., 1999), and Paraná, southern Brazil (GRACIOLLI; CARVALHO, 2003), and in Uruguay (JACKSON, 1987). However, there is still no information about infestation rates and prevalence.

In this paper we report the infestation and infrapopulation parameters of *L. guimaraesi* on *O. bezoarticus* in the Central Pantanal wetlands in Brazil, and this is also the first record of *L. mazamae* on pampas deer.

From May to October of 2006, we captured 16 pampas deer at four cattle ranches in the Nhecolândia region of Pantanal wetlands, State of Mato Grosso do Sul. The region is characterized by close contact between cattle and wildlife. Pampas deer predominantly live in open habitats and often found feeding together with cattle. We also examined 172 cattle individuals from one of these ranches.

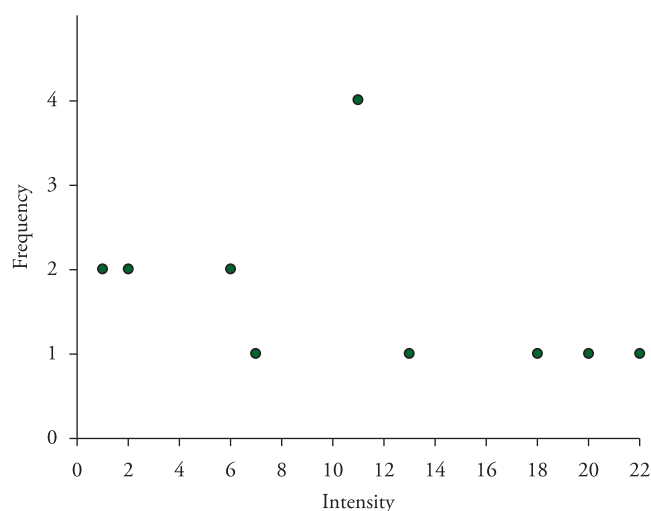
The deer were captured by darting from cars, all-terrain vehicles (ATVs), or on foot using a Distinfect® (Zurich, Switzerland) model 35 dart gun. The animals were chemically restrained as described by Piovezan et al. (2006). All proceedings were authorized by the Brazilian Federal Environment Agency (IBAMA) under licenses 26/2005 and 032/2005 (protocols no. 02014.001890/2005-66 and no. 02014.002008/05-00) and followed the Guidelines for Capture, Handling and Care of Mammals as approved by the American Society of Mammalogists (ANIMAL CARE AND USE COMMITTEE, 1998).

We carefully examined the deer for ectoparasites over 5 minutes during handling procedures. If infestation was high, parasite collection was continued until we could not find more individuals. *Lipoptena* were collected with metal clamps and stored in 70% ethanol, labeled according to host individual. Cattle were brought to the management's corral and held individually in a squeeze gate for full body examination for ectoparasites.

In 70% ethanol vouchers (one couple) were deposited at the Acariology Collection of the Universidade Federal Rural do Rio de Janeiro, Seropédica, and the remaining specimens (deposited number INS100 to INS117) were deposited at the Zoological Reference Collection of the Universidade Federal do Mato Grosso do Sul, Campo Grande.

The infrapopulation was described in terms of prevalence (number of infested hosts)/(number of examined hosts) and mean intensity of infestation (number of ectoparasites)/(number of infested hosts), with their related 95% confidence intervals (BUSH et al., 1997). Aggregation level of deer ked was measured with the index of discrepancy (POULIN, 1993). Quantitative Parasitology 3.0 software (RÓZSA et al., 2000) was used to calculate parasitological and discrepancy indexes.

We collected 66 males and 76 females of *L. guimaraesi* (Figure 1) and one female of *L. mazamae* on 16 *O. bezoarticus*. The keds were always found on the ventral area and legs of hosts, especially near



**Figure 1.** Intensity of infestation of *Lipoptena guimaraesi* on *Ozotoceros bezoarticus* in Nhumirim ranch, Mato Grosso do Sul, Brazil, 2006.

the genitals and anus. The fur of these body parts is white and softer than dorsal pelage. No remarkable skin or fur damage to the infested deer could be observed. The index of discrepancy was 0.444, suggesting a non-aggregate distribution of *L. guimaraesi* on *O. bezoarticus*. The prevalence was 93.8% (69.76 to 99.85%) and the mean intensity of infestation 9.5 (6.27 to 12.93). Among the 142 specimens of *L. guimaraesi*, six (three males and three females) volant individuals were collected in deer captured on September and October, indicating that volant emergency occurs at the late dry season in Pantanal. Fifteen female specimens were pregnant with mature larvae.

No keds were found in the cattle examined. The study sites shelter vigorous populations of pampas deer (TOMÁS et al., 2001), red brocket deer (*Mazama americana*) and gray brocket deer (*Mazama gouazoubira*). The latter two species have been recorded as hosts of *Lipoptena mazamae* in different regions of Central and South America (BEQUAERT, 1957). Hence, the fact that we found just one individual of *L. mazamae* parasitizing pampas deer confirms the occurrence of *L. mazamae* in the Brazilian Pantanal, but suggests that it can only incidentally parasitize pampas deer. Though the high prevalence of *L. guimaraesi* on pampas deer confirms that the parasitism is recurrent, a host specific relation cannot be confirmed since the presence of this parasite was evaluated in brocket deer from Pantanal wetlands or adjacent ecoregions.

Even though deer keds were neither found in cattle nor reported in any domestic dog or human from the research station at Nhumirim ranch, there are still reasons for caution. As blood-sucking parasites that can potentially affect different species, including domestic and wild, its role as vectors of disease agents should be investigated.

The Pantanal region is characterized by the sympatry of wildlife species, cattle and humans, and can pose a high risk to public health and the economy due to disease outbreaks. The role of *Lipoptena* species as vectors of *Bartonella* spp. (REEVES et al., 1996;

HALOS et al., 2004) and anaplasmosis in cattle (DRUMMOND, 1966) is an example of a known risk. Besides, louse flies are still poorly known in Neotropics, thus their relation with disease transmission is certainly underestimated.

Further studies on pampas deer, especially those that require to be captured, should focus on investigating the presence of *Bartonella* strains on both deer keds and their hosts, and further studies on brocket deer species should also investigate parasite infection by *L. mazamae*.

## Acknowledgements

This study was supported by the Conselho Nacional de Desenvolvimento Científico e Tecnológico (Project PELD/CNPq No. 520056/98-1). C. A. Zucco was supported by a grant from the Coordenação de Aperfeiçoamento de Pessoal de Ensino Superior (CAPES). Cesar Zucco greatly helped reviewing the language.

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