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Short communication

Brucellosis in working equines of cattle farms from Minas Gerais State, Brazil

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ABSTRACT

The present survey aimed at estimating the seroprevalence of brucellosis in working equines of cattle farms from Minas Gerais State, Brazil, and investigating risk factors associated with the infection. Serum samples from 6439 animals, including 5292 horses, 1037 mules and 110 donkeys, were collected from 1936 herds, between September 2003 and March 2004, in 848 municipalities from the state of Minas Gerais, Brazil. The prevalence of antibodies against smooth *Brucella* spp. found in equines from Minas Gerais State was 1.37% (95% CI: 0.97—1.78), resulting in a prevalence of herds with infected animals of 4.28% (95% CI: 4.21—4.36). There were differences between regions but these were not of major epidemiological relevance nor were most of them statistically significant, given the considerable overlap of confidence intervals. Nevertheless, the point estimates suggest that the three northeastern regions have slightly higher prevalence than the rest of the state, both at the herd and animal levels. No association of *Brucella* spp. seropositivity with sex, age or host was observed. In conclusion, the present study showed a low but widespread prevalence of antibodies against smooth *Brucella* in equines kept in cattle farms in Minas Gerais, a state where bovine brucellosis is also widespread albeit with low prevalence.

1. Introduction

The world equine population is estimated at 111 million animals according to the Food and Agriculture Organization of the United Nations (FAO, 2013). Brazil has the fourth largest equine population in the world, with 5.4 million horses, 1.2 million mules and 1 million donkeys (IBGE, 2008; FAO, 2013). Minas Gerais State is ranked first on the country, with 19% of the equine national herd (IBGE, 2008).

Brucellosis is a bacterial zoonosis caused by microorganisms of the genus *Brucella*, which affects different domestic and wild animal species, besides man (Corbel and Cosivi, 2006; OIE, 2009). In equines, it is usually caused by *Brucella abortus* and, more rarely, by *Brucella suis* (Cook and Kingston, 1988; Lucero et al., 2008; Cvetnic et al., 2012). It is known as "poll-evil" or "fistulous withers" due its main clinical manifestation, the inflammation in supraspinous bursa and associated tissue, with possible abscess formation and fistulation (Denny, 1972).

The transmission of brucellosis in equines is still not completely elucidated. Some studies associated horses with high titers of anti-*Brucella* antibodies and symptoms of disease with test-positive cattle (McNutt and Murray, 1924; Fitch and Dodge, 1939). Furthermore, one report suggests that a mare with recurrent brucellosis abscesses transmitted the disease to two cows and a dog (Wisniewski, 1984). However, several studies failed to demonstrate the spread of infection to other horses or cows, despite the observation of an infectious discharge in the postpartum or post-abortion period in mares (Robertson et al., 1973; MacMillan and Cockrem, 1986). It is hypothesized that equids become infected through contact with infected cattle, and that the transmission from horses

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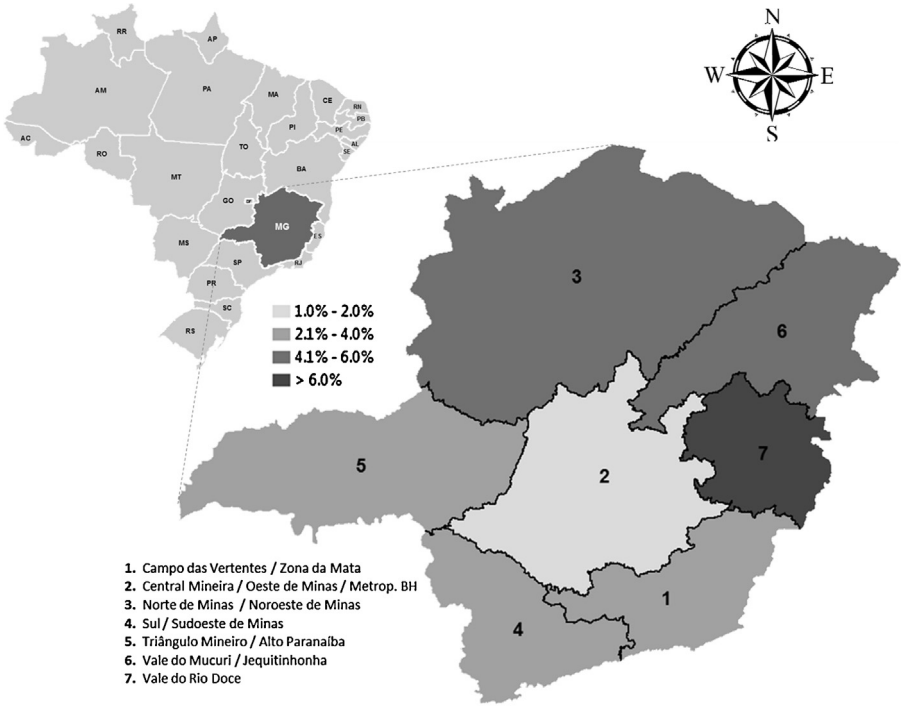

Fig. 1. Herd prevalence of brucellosis in working equines of cattle farms from Minas Gerais, Brazil, 2003–2004. The gray scale color represents the level of herd prevalence per stratum.

to cattle, or between equids, although possible is very unlikely to occur (MacMillan and Cockrem, 1986).

Economic losses arising from the disease in equines are due to the severity of lesions, usually with slow evolution, which temporarily disables or incapacitates the infected animals for work, or in view of the costs of any treatment or hospitalization (Langenegger and Szechy, 1961). Moreover, the health importance of equine brucellosis is also associated with the potential source of infection to other animals, or even to man, and the risk of introduction or maintenance of disease in free areas or herds (Corbel, 2006).

Horses, mules and donkeys, have an outstanding economic and social importance in Minas Gerais, given the key role played in livestock farming. In Brazil, the literature records a small number of studies on brucellosis in equines (Langenegger and Szechy, 1961; Oliveira et al., 1973; Godoy and Barg, 1976; Viana et al., 1981; Langoni and Silva, 1997; Araújo et al., 2009; Alameida et al., 2010; Dorneles et al., 2013). Especially for donkeys and mules, knowledge on the infection by *Brucella* spp. is very scarce and usually arise from an unrepresentative number of animals (Langoni and Silva, 1997; Aguiar et al., 2008; Dorneles et al., 2013). The seroprevalence observed in horses, donkeys and mules surveys ranges from 0.0% to 73.1%, from 0.0% to 7.4% and from 0.0% to 0.95%, respectively (Langenegger and Szechy, 1961; Oliveira et al., 1973; Godoy and Barg, 1976; Viana et al., 1981; Langoni and Silva, 1997; Aguiar et al., 2008; Araújo et al., 2009; Alameida et al., 2010; Dorneles et al., 2013), but these values are hardly comparable due to different experimental designs, serological assays, cut-off points used, and size and representativeness of the sampling.

Considering the scarcity of information on brucellosis in equines and the continuous efforts of Brazilian government to control and eradicate the disease in cattle and buffaloes, the present study aimed at estimating the seroprevalence of brucellosis of working equines in cattle farms, in the state of Minas Gerais, as well as gain insights into risk factors that might be associated to test-positive animals.

2. Material and methods

2.1. Study area and sampling

A cross-sectional random survey was carried out from September 2003 to March 2004 in the State of Minas Gerais, located in southeastern Brazil, including working equines, such as horses, donkeys and mules, from cattle farms (Fig. 1). The sampling was primarily designed for a survey of equine infectious anemia (EIA) in

Table 1
Animal and herd-level seroprevalence of brucellosis in working equines, per stratum, in Minas Gerais State, Brazil.

Stratum	Animal prevalence			Herd prevalence		
	Sampled animals	Prevalence (%)	95% CI[1]	Sampled herds	Prevalence(%)	95% CI[1]
Campos das Vertentes/Zona da Mata	695	1.25	[0.47 –2.03]	289	3.46	[1.67–6.27]
Central Mineira/Oeste de Minas/Metropolitana de Belo Horizonte	906	0.42	[0.00 –0.80]	293	1.71	[0.56– 3.94]
Norte/Noroeste de Minas	1,049	2.04	[0.85 –3.22]	307	4.56	[2.51– 7.53]
Sul/Sudoeste de Minas	780	1.20	[0.43 –1.97]	276	3.62	[1.75–6.56]
Triângulo Mineiro/Alto Paranaíba	699	0.90	[0.22 –1.59]	232	3.02	[1.22– 6.12]
Vale do Mucuri/Vale do Jequitinhonha	1,406	1.39	[0.21 –2.57]	287	4.88	[2.69– 8.05]
Vale do Rio Doce	904	2.00	[1.14 –2.86]	252	7.90	[4.92– 12.00]
Minas Gerais	6,439	1.37	[0.97 –1.80]	1936	4.28	[4.21– 4.36]