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Short communication

Caseous lymphadenitis in sheep flocks of the state of Minas Gerais, Brazil: Prevalence and management surveys

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ABSTRACT

Corynebacterium pseudotuberculosis is the etiologic agent of caseous lymphadenitis, which is a serious, economically important problem for sheep production. We examined the seroprevalence of infection by *C. pseudotuberculosis* and possible risk factors associated with caseous lymphadenitis in sheep herds of the state of Minas Gerais, Brazil. Samples were collected from 642 sheep from 97 farms. Sera of all of the sheep were tested with ELISA for antibodies against *C. pseudotuberculosis*. A questionnaire was applied to gather data on the farm, the sheep herd, the farmer, and individual animal data (breed, sex and age). This is the first sero-epidemiological survey for caseous lymphadenitis in sheep herds in Minas Gerais. We found a high real prevalence, much higher than that suggested from information obtained with the questionnaire, which points to the scarcity of vaccination against caseous lymphadenitis in the sample evaluated. Only a small proportion of the farmers declared that cases of this disease were present in their flocks. The frequency of seropositive sheep varied significantly with breed (χ^2 test, $P = 0.021$). Age group also significantly affected the percentage of seropositivity (χ^2 test, $P = 0.049$), the highest frequency being found in adult animals (more than 12 months old), when compared to the 5–12 months old group (χ^2 test, $P = 0.021$). The prevalence of infection with *C. pseudotuberculosis* in sheep in the state of Minas Gerais was estimated to be 70.9% (95% confidence interval (CI): 64.7–77.0%) and the prevalence of infected flocks being 95.9% (95% CI: 89.8–98.9%). We concluded that *C. pseudotuberculosis* infection is widely disseminated in sheep flocks in Minas Gerais and that caseous lymphadenitis control and eradication programs are necessary in this state.

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1. Introduction

Caseous lymphadenitis is a chronic suppurative disease that mainly affects goats and sheep. Its etiological agent is *Corynebacterium pseudotuberculosis* and can cause debility in animals, presenting itself in cutaneous and visceral forms. The disease is distributed worldwide, with cases being reported in Europe, Australia, North and South America, Africa and the Middle East (Dorella et al., 2006).

Caseous lymphadenitis causes considerable economic losses, which range from condemnation of skins and carcasses, due to abscesses, to expressive losses in reproductive efficiency, as well as in wool, meat and milk production. Subclinical infections are also important, because they allow *C. pseudotuberculosis* to disseminate within and between herds (Paton et al., 1994). Also, caseous lymphadenitis can become a public health problem as it is a zoonosis (Peel et al., 1997; Join-Lambert et al., 2006). Resistance of *C. pseudotuberculosis* to antibiotics and its strenuous perseverance in the environment, associated with the difficulty in detecting infected animals, make caseous lymphadenitis hard to eradicate (Williamson, 2001).

The first case of caseous lymphadenitis in Brazil was reported in 1972 (Garcia et al., 1987) and even though this disease is found in Brazilian sheep herds, few epidemiological studies have been carried out in this country (Silva et al., 1982; Tinôco, 1983; Guimarães and Gouveia, 2006). There are no previous records of serological studies in herds from the state of Minas Gerais. The serological status of the herd is an indication of the presence of the infectious agent and can be used to orient control programs so that they are compatible with the actual infection rate.

Since 2000, commercial sheep husbandry has increased considerably in the state of Minas Gerais with the acquisition of animals from other regions of the country where caseous lymphadenitis is frequent, resulting in a considerable transit of animals into Minas Gerais (IBGE, 2009; ARCO, 2008). Also, the lack of species-specific sanitary legislation and the reduced availability of commercial immunogens in the Brazilian market limit the use of systematic vaccination against the etiological agent of caseous lymphadenitis (Guimarães and Gouveia, 2006).

The aim of this study was to assess the seroprevalence of infection with *C. pseudotuberculosis* in sheep in the state of Minas Gerais and looked for risk factors that could be associated with caseous lymphadenitis.

2. Materials and methods

2.1. Study area and sampling

The state of Minas Gerais is located in southeastern Brazil (Fig. 1). It has an area of 588,383 km^2, a mostly tropical climate, and a mean annual temperature of 21.2 °C. Annual rainfall varies from 1000 to 2000 mm, with well-defined dry and wet seasons. Sampling was organized at two levels: farms and animals. To calculate the number of herds that should be sampled, we used simple sampling with an estimated prevalence of 50%, a confidence interval of 95% and an error of 10% (Noordhuizen et al., 1997). Based on a combined list of sheep farms from the Association of Sheep and Goat Farmers of the State of Minas Gerais (Associação dos Criadores de Caprinos e Ovinos de Minas Gerais: Caprileite/ACCOMIG) and the state government agency for animal health (Instituto Mineiro de Agropecuária: IMA), 97 sheep farms were selected, representing 9 of the 12 mesoregions of Minas Gerais (Fig. 1). Animals were randomly selected and a fixed sampling of eight animals from each property was used (Bennett et al., 1991); for properties with less than eight sheep, all were sampled. The total animal sample was calculated as 776 sheep. Blood was collected by jugular vein puncture and the serum was separated and stored at −20 °C until used for analysis.

2.2. Data animals

A previously tested questionnaire (Pinheiro et al., 2000) was filled out for each herd, demanding data on the farm, the herd, the farmer, and individual animal characteristics (breed, sex and age). The questionnaires were completed and the sera collected in 2002 by IMA veterinarians.

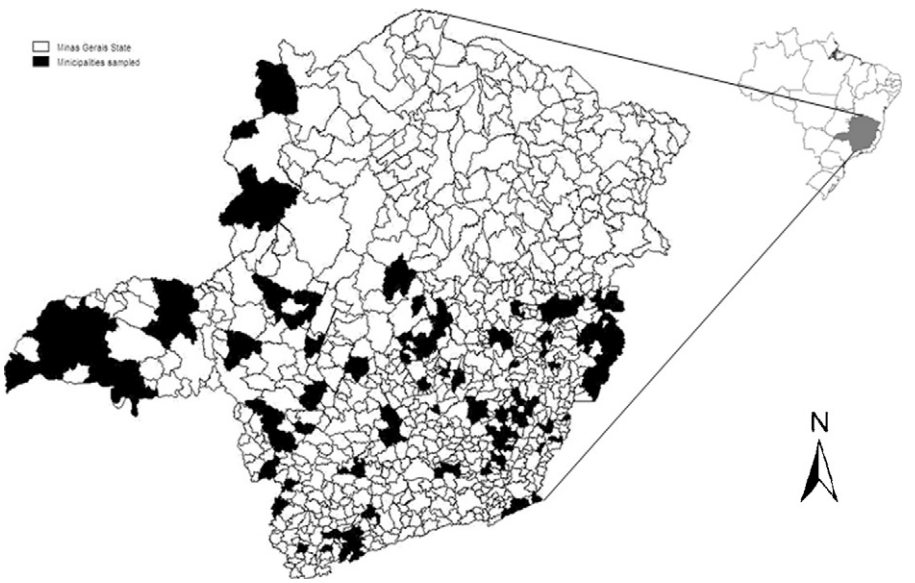

Fig. 1. Municipalities with sampled flocks in Minas Gerais State, Brazil.