

Serological survey of lentivirus infection in goats and sheep slaughtered in the State of Paraíba, semiarid of Northeastern Brazil

Estudo sorológico da infecção por lentivírus em caprinos e ovinos abatidos no Estado da Paraíba, semiárido do Nordeste Brasileiro

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Abstract

The objective of this study was to determine the frequency of antibodies against small ruminant lentivirus (SRLV) in goats and sheep slaughtered in the state of Paraíba, in the Northeast semiarid region of Brazil. Blood was collected from 500 goats and 500 sheep in slaughterhouses in the municipalities of Alhandra, Guarabira, Esperança, Picuí, Monteiro, Sumé, Patos, Piancó, Catolé do Rocha, and Sousa. The agar gel immunodiffusion (AGID) test was used for the diagnosis of SRLV infection. Of the 1,000 animals analyzed, 28 (2.8%) were seropositive, with a frequency of 3% (15/500) in goats and 2.6% (13/500) in sheep. It was also observed that no significant difference was present in seropositivity among the different municipalities. The low frequency of seropositive animals can be explained by the fact that most of the sampled animals came from extensive breeding herds consisting of meat production native breeds and crossbred animals.

Key words: Small ruminant lentivirus. Serology. Slaughter. Northeast Brazil.

Resumo

O objetivo do presente estudo foi determinar a frequência de anticorpos contra lentivírus de pequenos ruminantes (LVPR) em caprinos e ovinos abatidos no Estado da Paraíba, região semiárida do Nordeste brasileiro. Foi coletado sangue de 500 caprinos e 500 ovinos nos abatedouros dos municípios de Alhandra, Guarabira, Esperança, Picuí, Monteiro, Sumé, Patos, Piancó, Catolé do Rocha e Sousa. Para o diagnóstico da infecção por LVPR, foi utilizado o teste de imunodifusão em gel de ágar (IDGA). Dos 1.000 animais analisados, 28 (2,8%) foram soropositivos, com frequência de 3% (15/500) nos caprinos e 2,6% (13/500) nos ovinos. Observou-se, ainda, que não houve diferença significativa entre os diferentes municípios com relação à soropositividade. A baixa frequência de animais soropositivos pode ser explicada pela maioria de animais amostrados serem procedentes de rebanhos com criação extensiva, compostos por animais de raças nativas com aptidão de corte e mestiços.

Palavras-chave: Lentivírus de pequenos ruminantes. Sorologia. Abate. Nordeste brasileiro.

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The exploitation of goat and sheep farming as an economic activity has become increasingly relevant, establishing itself as an economically viable alternative for rural producers in several regions of the country, especially in the Northeast region (HORA et al., 2013). Brazil has approximately 8,646,463 goats and 16,789,492 sheep, of which about 90% (7,841,373) and 55% (9,325,885) are in the Northeastern region, respectively (IBGE, 2012). However, sanitary deficiencies that cause reproductive losses associated with the replacement of animals of these species need to be addressed. Among the health problems that affect the goat and sheep farming production chain, small ruminant lentivirus (SRLV) infections are relevant, since they are widely disseminated. Additionally, SRLV leads to considerable economic losses by causing increased reproductive problems, decrease in milk production and a shorter lactation period, as well as decreased weight gain from birth to weaning, especially in dairy farms. Furthermore, herd devaluation, control measure costs, and commercial barriers to animal breeding products also contribute to economic losses. (CARVALHO, 2011).

The SRLVs, Caprine Arthritis Encephalitis virus (CAEV) and Maedi-Visna virus (MVV), which affect goats and sheep respectively, belong to the family Retroviridae, subfamily *Lentivirinae*, and genus *Lentivirus* (SHAH et al., 2004). These agents are characterized by a long incubation period, varying from months to years, frequent chronic evolution, with progressive worsening of the lesions, weight loss, and weakness until death (LEROUX et al., 2010). The main route of infection is the digestive system, through the ingestion of colostrum or milk from infected mothers. However, transmission of SRLVs may also occur through other routes where there is direct contact among animals or indirectly through materials contaminated with infected blood or milk. (GREGORY et al., 2011).

The slaughterhouse serves an important role in the study of infectious diseases because it represents a strategic environment for the active

surveillance of diseases for identification purpose and for discovering their origin and foci. (COSTA et al., 2016). It is possible to detect these foci on-site in the slaughterhouse, knowing the slaughtered animals' point of origin through the animal transit guide and traceability, promoting the activation and integration of the specialized sectors in order to solve the problems. Thus, the objective of this study was to determine the frequency of antibodies against SRLV in goats and sheep slaughtered in public slaughterhouses in the state of Paraíba, Northeast semiarid region of Brazil.

The study was conducted in cooperation with the Municipal Inspection Services, in slaughterhouses across 10 municipalities in the state of Paraíba, Northeast Brazil (Figure 1). The study population consisted of woolless hair sheep and adult goats, of both sexes, destined to slaughter. The number of animals to be sampled was calculated considering the following parameters: (a) expected prevalence of 50% (used to maximize the sample); (b) absolute error of 5%; and (c) confidence level of 95%, according to the formula for simple random samples (THRUSFIELD, 1995). According to these parameters, the minimum sample size n was 384 goats and 384 sheep; however, 500 goats and 500 sheep were selected instead.

The sampling period was from April to December 2012. In the slaughter line, 1,000 blood samples were collected (500 of each animal species): 315 males and 185 females of the caprine species, and 359 males and 141 females of the ovine species. Blood samples were collected shortly before bleeding the animals, using appropriately identified 8-ml sterile vacuum tubes, which were then taken to the laboratory for subsequent centrifugation, desorption, and storage at $-20\text{ }^{\circ}\text{C}$ until serological tests were performed.

The agar gel micro-immunodiffusion (micro-AGID) test was used for the serological diagnosis, following the manufacturer's orientation (Biovotech, Recife, PE, Brazil), using the p28 protein of the

CAEV as an antigen. The chi-square test was used to verify the association between seropositivity and the municipality of origin of the animals, with a significance level of 5% (ZAR, 1999), using BioEstat 5.03 software.

Of the 1,000 animals analyzed, 28 (2.8%) were seropositive, with a frequency of 3% (15/500) in goats and 2.6% (13/500) in sheep. It was also observed that there was no significant difference between the municipalities of origin (Table 1) in relation to seropositivity.

Figure 1. Geographic representation of the municipalities/slaughterhouses sampled in the state of Paraíba.

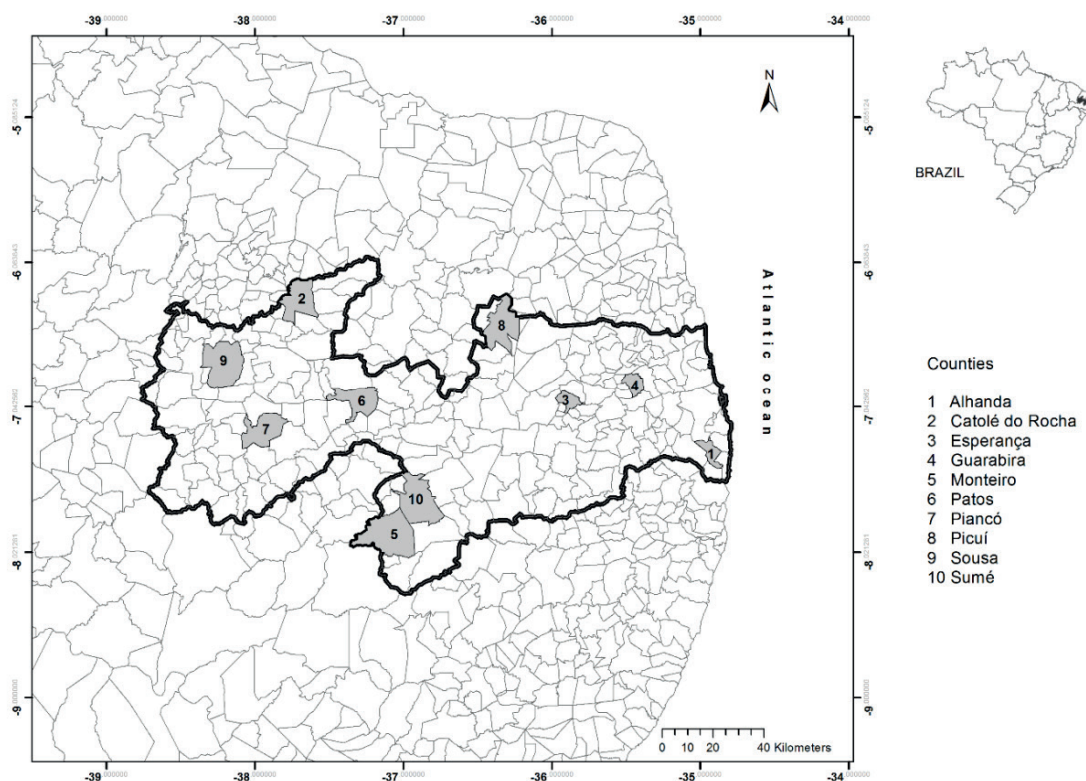


Table 1. Seropositivity for small ruminant lentivirus according to the municipality of origin in goats and sheep slaughtered in the state of Paraíba, Northeast Brazil, from April to December 2012.

Municipality	Goats		Sheep	
	Number of animals	Number of positives (%)	Number of animals	Number of positives (%)
Alhandra	50	0 (0)	50	1 (2)
Catolé do Rocha	50	1 (2)	50	0 (0)
Esperança	50	1 (2)	50	0 (0)
Guarabira	50	0 (0)	50	1 (2)
Monteiro	50	4 (8)	50	2 (4)
Patos	50	2 (4)	50	2 (4)
Piancó	50	1 (2)	50	1 (2)
Picuí	50	2 (4)	50	3 (6)
Sousa	50	1 (2)	50	1 (2)
Sumé	50	3 (6)	50	3 (6)
Total (%)	500 (100)	15 (3)	500 (100)	13 (2.6)

Several studies carried out in the Brazilian Northeast reported seropositivities similar to those found in this study. Castro et al. (2002) performed an epidemiological study in goats from slaughterhouses in the states of Paraíba and Pernambuco and found seropositivity of 3.3% (9/270). Oliveira et al. (2006) analyzed 627 goats and 325 sheep from two slaughterhouses in the municipalities of São Lourenço da Mata and Paulista, Pernambuco and observed seropositivity of 3.8% (24/627) for goats and 5.2% (17/325) for sheep. In the state of Ceará, Araújo et al. (2004), observed seropositivity of 4.9% (11/223) in sheep from slaughterhouses in the metropolitan region of Fortaleza.

The highest frequencies of seropositivity for SRLV has been found in the more technologically-oriented properties, utilizing intensive herd management techniques and performing genetic improvement using exotic breeds (PINHEIRO et al., 2004). The low seropositivity found in this study, therefore, can be explained by the fact that most of the sampled animals came from herds consisting of meat production native breeds and crossbred animals without a defined breed pattern. These herds are generally formed by local animals, with no introduction of animals from other farms, and, according to Saraiva Neto et al. (1995), herds of this type present lower seroprevalence when compared to herds formed by dairy breeds of European origin.

The low seropositivity found in this study is of paramount importance because it aids in the decision making process regarding the best sanitary practices to implement in goat and sheep farming. Due to the lack of vaccination prophylaxis and treatment strategies against SRLV, it is important to conduct periodic serological tests for sanitary monitoring of the herd and subsequent identification of seropositive animals with the objective of promoting virus control and eradication programs in herds.

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