

Topic of General Interest

Technological level and epidemiological aspects of sheep husbandry in Minas Gerais, southeastern Brazil¹

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ABSTRACT- Gouveia A.M.G., Silva M.X., Maia J.M.S., Brandão H.M., Seyffert N., Miyoshi A., Azevedo V. & Guimarães A.S. 2014. **Technological level and epidemiological aspects of sheep husbandry in Minas Gerais, southeastern Brazil.** *Pesquisa Veterinária Brasileira* 34(9):865-868. Núcleo de Sanidade Animal/Qualidade do Leite/Nanotecnologia, Embrapa Gado de Leite, Rua Eugênio do Nascimento 610, Juiz de Fora, MG 36038-330, Brazil. E-mail: alessandro.guimaraes@embrapa.br

Epidemiological and health aspects of sheep husbandry were assessed on 213 sheep flocks in 142 municipalities from the state of Minas Gerais, southeastern Brazil. An updated questionnaire was filled out for each flock, requesting data on the farm, the flock and the farmer by the veterinarians of the State Government Agency for Animal Health (Instituto Mineiro de Agropecuária). Thirteen important variables were selected and scored to determine the technological level of the 117 farms; 0.9% of them was classified as high technological level, 45.3% as medium technological level and 53.0% as low technological level. Lamb production was the main objective of the farms and the main features were low-frequencies of individual identification of animals (16.9%), technical assistance (31.9%), use of quarantine for newly acquired animals (0.9%) the separation of animals by age group (3.7%) and requeste the sanitary certificate at purchasing of animals (11.7%). The main health problems reported were abortion (23.9%), keratoconjunctivitis (17.9%), contagious ecthyma (13.6%), pneumonia (10.3%), diarrhea (9.3%) and caseous lymphadenitis (6.1%). Information of the epidemiological situation and the mainly health measures used in the sheep farms are important to improve the productivity and quality of the lamb.

INDEX TERMS: Sheep husbandry, technological level, epidemiological aspects, Minas Gerais.

RESUMO.- [Nível tecnológico e aspectos epidemiológicos da ovinocultura no estado de Minas Gerais, Sudeste do Brasil.] Os aspectos epidemiológicos e sanitários da ovinocultura foram levantados em 213 rebanhos ovinos em 142 municípios do estado de Minas Gerais, sudeste do Bra-

sil. Um questionário atualizado foi preenchido para cada rebanho, com informações sobre a fazenda, o rebanho e do fazendeiro, por veterinários do Instituto Mineiro de Agropecuária. Treze variáveis importantes foram selecionadas e pontuadas para determinar o nível tecnológico em 117

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fazendas; 0,9% foram classificadas como de alto nível tecnológico, 45,3% como de médio nível tecnológico e 53,0% como de baixo nível tecnológico. A produção de carne de cordeiro foi o principal objetivo das fazendas amostradas e as principais características foram baixa frequência de identificação individual dos animais (16,9%), assistência técnica (31,9%), uso de quarentena para os animais recém-adquiridos (0,9%), separação de animais por faixa etária (3,7%) e solicitação de certificados sanitários na compra de animais (11,7%). Os principais problemas sanitários relatados foram o aborto (23,9%), ceratoconjuntivite (17,9%), ectima contagioso (13,6%), pneumonia (10,3%), diarreia (9,3%) e linfadenite caseosa (6,1%). Informações sobre a situação epidemiológica e das principais medidas sanitárias utilizadas nas propriedades com ovinos são importantes para melhorar produtividade e a qualidade da carne ovina.

TERMOS DE INDEXAÇÃO: Criação de ovinos, nível tecnológico, aspectos epidemiológicos, Minas Gerais.

INTRODUCTION

The growth in the meat sheep flock in Brazil began in the 2000s, and rose from 14,784,958 in 2000 to 17,668,063 in 2011 (IBGE 2012), representing an increase of 19.5%. During this same period, the increase of sheep in Minas Gerais was 89,6%, from 116,796 (2000) to 221,439 (2011) (IBGE 2012) exceeding the national average. This particular growth in lamb production has occurred due the breeding of fleece or semi-fleece sheeps imported mainly from South Africa and Europe, cross-bred with woolless sheep from different regions of Brazil. This increase in sheep production has resulted in considerable transit of sheep into Minas Gerais State, with the acquisition of meat sheep from the Northeast Region and, more recently, dairy sheep breeds coming from South Region (IBGE 2012, ARCO 2009).

Sheep husbandry has an important role in the economy of Minas Gerais, which requires information about zoo-sanitary aspects, aiming to support programs for best conditions of production and sheep industry. There are few studies with epidemiological surveys in Brazil (Silva et al. 1982, Tinôco 1983, Pinheiro et al. 2000, Alencar et al. 2008) or any previously reported studies regarding sheep husbandry in the state of Minas Gerais.

Information of epidemiological and sanitary aspects in sheep flocks is important to improve their productivity. This study aimed to assess the most relevant sheep husbandry practices and determine the technological level of the farms in Minas Gerais, Southeastern Brazil.

MATERIALS AND METHODS

Sampling area

This study was conducted in the twelve mesoregions in Minas Gerais State, Brazil. The State is the largest of the four states of southeastern Brazil with a total area of 588,383.6 km² and 853 municipalities. The altitudes range from 100 to 1500 meters. The predominant climate is tropical with well defined wet and dry seasons. Annual rainfall varies from 1000 to 2000mm and annual temperatures average 21.2°C (SEA 2008).

Sampling, experimental design and questionnaire to farmers

It was not possible to do random sampling because the absence of official registration of sheep breeders in the State, then, non-probabilistic sampling was used, starting from the lists of sheep farmers registered at the IMA, Association of Sheep and Goat Producers of the State of Minas Gerais (Associação de Criadores de Caprinos e Ovinos do Estado de Minas Gerais, ACCOMIG) and the Technical Assistance and Rural Extension Company of Minas Gerais (Empresa de Assistência Técnica e Extensão Rural de Minas Gerais, EMATER). We sampled 213 sheep farms located in 142 municipalities of MG. The data were analyzed using the software Windows Excel 98 and Epi-Info (Dean et al. 1995) to establish the frequency of each variable in the samples collected. Comparison of frequencies was performed using the chi-square test. A questionnaire, prepared by the Sheep and Goat Extension and Research Group, has been previously tested (Magalhães & Gouveia 1985, Pinheiro et al. 2000). Official Veterinarians applied the questionnaire in 2002.

Technological status of farms

The technological level on the properties was determined. The technological level was obtained by dividing the points scored for each farm by the total possible points (26 points). The percentage obtained was used to classify the property according to the following cut-off points: low technological level - properties with a percentage between 0 and 33%, medium technological level - those with a percentage between 34 and 64%, and high technological level - those with a percentage above 65%.

Thirteen variables were selected, and scored (the score values shown in parentheses below) based on criteria used by Silva (2002) and Medeiros et al. (2005). The variables related to "Health care measures" such as disinfection of newborn animals (1), deworming (1), some form of diagnosis of disease (3), and the use of vaccines (2) were considered. "Production" variables were age of weaning (2), controlled breeding (3), and the use of breeding season (2). "Infrastructure" were the use of animal housing (1), technical assistance (2), and manure composting or elevated floors (2). Variables reflecting "nutritional status" were the presence of high-quality pasture (1), the division of pasture (1), and the use of mineral supplements (1).

It was considered an extensive system when the animals were raised exclusively on pasture, eventually brought at night for protection, but without supplementation in any period of the year. The semi-extensive system was that with some supplementation at rainy or drought season and intensive system was that using no grazing, with only housing animals.

RESULTS

Among the 213 sheep farms, 117 were classified and had their technological level determined and those that had two or more variables without reply were excluded from the sample. Two (0.9%) were classified as high technological level, 53 (45.3%) as medium technological level and 62 (53.0%) as low technological level.

The sheep population in 213 properties sampled represented approximately 14% of the State population and the number of sheep in flocks ranged between 2 and 1843, with an average of 80 animals per farm. The average number of sheep per farm in the extensive system was 58 while in the semi-extensive system was 141; this system was adopted in 43.8% (93/213) and extensive in 56.2% (120/213) of the properties.

Few farmers identified the sheep individually (16.9%),

11.7% (25/213) requested the sanitary certificate at purchasing animals, such as brucellosis, tuberculosis, rabies and foot-and-mouth disease. Only 9.0% (19/213) vaccinated the flock, i.e, mainly against clostridiosis 1.0% (2/213), 1.0% (2/213) against leptospirosis, 11.2% (24/213) against rabies and 31.0% (66/213) against foot-and-mouth disease.

Use of quarantine for newly acquired animals was cited in 0.9% (2/213), the separation of animals by age group in 3.7% (8/213), disinfection the navel of newborns in 89.7% (191/213) and the veterinarians were the professionals most cited (58.8%).

Table 1 shows the main pathological disorders reported by owners in 213 sheep flocks in 142 municipalities of Minas Gerais state, Brazil.

Table 1. Major pathological disorders reported by owners in 213 sheep flocks in 142 municipalities of Minas Gerais state, Brazil

Variable	Frequency	
	N	%
Abortion	51	23.9
Infectious bovine keratoconjunctivitis	42	17.9
Contagious ecthyma	29	13.6
Pneumonia	22	10.3
Arthritis	20	9.3
Diarrhea	20	9.3
Mastitis	17	8.4
Pododermatitis	15	7.0
Caseous lymphadenitis	13	6.1
Not informed	43	20.2

DISCUSSION

This is the first research about epidemiological and sanitary aspects in sheep flocks in Minas Gerais. Only 0.9% of them were classified as high technological level, which shows the little use of good sanitary and management measures. Adoption of effective measures of production, usually with higher costs of feed and forage, provides better productivity and increased profitability of the systems and the continuous use of low-tech measures in the farms sampled can render the activity economically unviable.

Extensive and semi-extensive rearing systems were the most frequent in the farms sampled, both used sheep husbandry toward lamb production, with animals raised on pasture at day and some protection at night. No property had adopted the intensive system, which is characteristic of confinement or dairy systems. Alencar et al. (2008), found 72.8% of properties with semi-extensive and only 19.1% with extensive rearing system, in sheep farmers in the state of Pernambuco. It is possible because the climatic differences between the states of Minas Gerais and Pernambuco, with a much longer dry season in this semi-arid weather, with greater necessity for supplementation for a longer period of the year. The average of sheep number in flocks was 80 animals per farm, in the extensive system was 58, while in semi-extensive system it was 141. As no property uses an intensive system, it's possible to infer that the extensive systems tend to use less good-farming-practices, as most farms were classified as having a low and medium technological level.

The presence of regular technical assistance is essential to the success of sheep farming. The education of farm employees in sanitary and other husbandry practices, and the monitoring of parasite and disease prevention and control programs for each farm are necessary. The frequency of technical assistance on farms was very low and made by veterinarians and agronomists. The presence of veterinarians can facilitate the diagnostic and prevention of infectious diseases and they can guide farmers regarding the identification, in purchase of animals and use of quarantine.

Only 16.9% of the sheep farmers sampled identifies their animals individually and kept records of the flocks, thus, important production indices, such as daily weight gain, mortality rate were not registered accurately. In technologically similar conditions, Pinheiro et al. (2000) and Molento & Almeida (2004) found mortality rates of up to 50% in different Brazilian states and these breeders tend not to identify the animals because the commercial objective of raising, since the animals will be slaughtered soon, but it's impossible to control livestock or health data without individual identification.

Quarantine is important to protect the flocks, according Coles & Roush (1992) the introduction of different agents such as helminths and infectious pathogens, and the likelihood of acquiring resistant parasites would increase proportionately to the newly introduced animals. The considerable interstate transit of sheep can increase the exchange of parasites from distant flocks (Guimarães et al. 2009) and the situation may be worsened by the limited use of quarantine.

Beyond the low use of quarantine, few farmers ask for a sanitary certificate when purchasing sheep and most of them do not recognize its importance to the flock health. The acquisition of sheep from Brazilian Northeast region is frequent and the lack of sanitary certificate predisposes the local flocks to risks of introduction of relevant pathogens that were not previously identified in Southeastern. Breeders, who required the health certificates, request them for brucellosis, tuberculosis, rabies and foot and mouth disease. These certificates are traditionally request for cattle transit. *Brucella ovis* infection is characterized mainly by epididymitis in rams, and it is possible that farmers consider erroneously the abortion as a clinical sign of brucellosis. The low demand for certificates can be explained by the little information of the sanitary status in these sheep flocks as well as limited access to diagnostic laboratories. When the diagnostic is done, most of the vaccines are not available; there is only limited availability of national products for diagnostic, treatment and prevention of sheep-specific diseases (Guimarães et al. 2009).

Clostridials, leptospirosis and rabies vaccines were cited by flock managers. Vaccination against rabies and clostridials are common and these diseases can impair the flock production. Vaccination against caseous lymphadenitis was not cited by farmers despite its great economic importance. Guimarães et al. (2009) estimated the prevalence of infection at 75.8% and 95.9% prevalence of infected flocks for caseous lymphadenitis in the state of Minas Gerais, then, the *Corynebacterium pseudotuberculosis* is widespread.

ad in the sheep flocks and it is overlooked by most farmers. Thirty-one percent of breeders had vaccinated against foot and mouth disease, unnecessarily. Cloven hoofed domestic species can contract foot and mouth disease. The susceptibility, in descending order, is the swine, cattle, buffaloes and small ruminants, consequently the pigs are the sentinels of infection and not the small ruminants, then, they are mistakenly vaccinated, in addition to the drawback of nodules in the vaccination site. The Brazilian Program for the Eradication of Foot and Mouth Disease has not recommended the periodically vaccination of sheep, goats and pigs, except in focus and perifocus areas (MAPA 2007).

The main signs of diseases were presented to the farmer in an appropriate vocabulary. It is important that 20.2% could not supply the health data, even when encouraged to respond and the results provide important information about the systems, but the illnesses reported in Table 1 are related to a diagnosis of farmers and associated with the technological level of the properties. The survey was conducted by information provided by the farmer or responsible for the property, and also by direct observation of the flocks. The restricted use of quarantine areas for sick animals, not separating animals by age group and little use of vaccines can be considered mainly responsible for the spread of diseases in the flocks, such as keratoconjunctivitis, caseous lymphadenitis and contagious ecthyma.

The disinfection of the navel of newborns was the only practice used by most farmers. When performed with a correct sanitary product it can protect the lambs from various pathogens. The low level of use of sanitary practices by sheep farmers contributes to the maintenance of the low technological level of the flocks. Moreover, there is limited technical assistance at farms, as well as a lack of access to diagnostic laboratories and commercial specific vaccines in the market.

CONCLUSIONS

The limited use of good-farming-practices and the low technological level in the sheep farms are the major obstacles to the development of sheep husbandry.

Our results indicate an urgent need to implement sheep health programs for the control of those major diseases in Minas Gerais by flock owners and state animal health agents to improve the health and productivity of sheep in the State.

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Conflict of interest statement.- The authors declare that they have no competing interests.

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