



Revista Brasileira de Parasitologia  
Veterinária

ISSN: 0103-846X

zacariascbpv@fcav.unesp.br

Colégio Brasileiro de Parasitologia  
Veterinária  
Brasil

Radavelli, Willian Mauricio; Pazinato, Rafael; Klauck, Vanderlei; Volpato, Andréia; Balzan, Alexandre; Rossett, Julia; Jassanã Cazarotto, Chrystian; Sâmia Lopes, Leandro; Dias Kessler, Julcemar; Córdova Cucco, Diego; Tonin, Alexandre Alberto; Schafer Da Silva, Aleksandro

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Revista Brasileira de Parasitologia Veterinária, vol. 23, núm. 1, enero-marzo, 2014, pp.  
101-104

Colégio Brasileiro de Parasitologia Veterinária  
Jaboticabal, Brasil

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# Occurrence of gastrointestinal parasites in goats from the Western Santa Catarina, Brazil

Ocorrência de parasitas gastrintestinais em caprinos na região Oeste de Santa Catarina, Brasil

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Received August 18, 2013

Accepted January 21, 2014

## Abstract

This study aims to investigate the occurrence of gastrointestinal parasites in goats from the Western Santa Catarina, Brazil. Twenty four farms were analyzed in 17 different municipalities. Animals (n=217) from different production purposes (milk and meat) and age were randomly chosen. Fecal samples were collected from the rectum stored in plastic bottles and transported to the laboratory in portable coolers at 10 °C. The technique of centrifugal flotation with saturated sugar solution was carried out in order to investigate the presence of eggs, cysts, and oocysts of gastrointestinal parasites. In 88.9% of the investigated animals, it was observed that the presence of nematode eggs which belongs to the Strongylida order, after cultivation and larvae identification were identified as *Haemonchus* spp., *Trichostrongylus* spp., *Teladorsagia* spp., *Cooperia* spp., and *Oesophagostomum* spp. Eggs of *Thysanosoma*, *Trichuris*, *Moniezia*, and *Neoascaris* genus were also observed. Additionally, the presence of oocysts of *Eimeria* spp. and *Cryptosporidium* spp. as well as cysts of *Giardia* spp., and *Entamoeba* spp. were verified. In all the farms evaluated, the animals showed a single or mixed infection, with the highest occurrence of helminths belonging to the *Haemonchus* and *Trichostrongylus* genus, as well as the protozoan *Eimeria*.

**Keywords:** Goats, endoparasites, Strongylida, *Eimeria*, protozoa.

## Resumo

O presente estudo objetivou investigar a ocorrência de parasitas gastrintestinais que infectam caprinos na região Oeste de Santa Catarina, Brasil. Foram analisadas 24 propriedades localizadas em 17 municípios, totalizando 217 caprinos. Os animais de diferentes categorias de produção (leite ou carne) e idade foram escolhidos aleatoriamente. A coleta das fezes foi realizada diretamente da ampola retal dos animais, armazenadas em frascos plásticos e transportadas para o laboratório em caixas térmicas a 10 °C. A técnica de centrifugo-flutuação com solução saturada de açúcar foi utilizada para pesquisar a presença de ovos, cistos e oocistos de parasitos. Em 88,9% dos animais analisados foi verificada a presença de ovos de nematóides da ordem Strongylida e, após cultivo, foram identificadas larvas de *Haemonchus* spp., *Trichostrongylus* spp., *Teladorsagia* spp., *Cooperia* spp. e *Oesophagostomum* spp. Foram identificados também ovos de parasitos dos gêneros *Thysanosoma*, *Trichuris*, *Moniezia* e *Neoascaris*. A presença de oocistos de *Eimeria* spp. e *Cryptosporidium* spp., e cistos de *Giardia* spp., e *Entamoeba* spp. foram observadas. Em todas as propriedades avaliadas, os animais apresentavam infecções simples ou mistas, sendo a maior ocorrência de helmintos do gênero *Haemonchus* e *Trichostrongylus*, assim como pelo protozoário *Eimeria*.

**Palavras-chave:** Caprinos, endoparasitas, Strongylida, *Eimeria*, protozoários.

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Usually goats are bred for meat, milk and hide. In the South and Southeast of Brazil, the goat production is mainly for milk and dairy products. According to IBGE (2010), Santa Catarina herd is of approximately 58 thousand animals, of which nearly 50% are located in the West part of the State.

Health problems in goat may lead to reduction in production, and among these problems gastrointestinal nematodes and the coccidian infections stand out, which may limit production of these small ruminants. The main gastrointestinal nematodes observed in goat are: *Haemonchus contortus*, *Trichostrongylus* spp., *Cooperia* spp., *Oesophagostomum* spp., *Trichuris* spp., and *Strongyloides papillosus* (VIEIRA, 2005), in addition to the coccidian *Eimeria* spp. These parasites are the main cause of significant economic losses, due to high mortality and reduction of growth performance of infected animals (COSTA JÚNIOR et al., 2005). However, these economic losses depend on several factors such as climatic conditions, production system, nutritional and developmental status of the animal, as well as its physiological status (MATTOS; CASTRO, 2002).

Besides eimeriosis and gastrointestinal nematodes, *Giardia* spp. and *Cryptosporidium* spp. can cause health problems in small ruminants. Although these protozoa contribute to production losses, they affect goats and sheep in a lower degree (BASTIANI et al., 2012). Giardiasis has been associated with diarrhea, decreased weight gain, anorexia, and lethargy in young animals (KIROPES et al., 1987; BASTIANI et al., 2012). Due to the major health problems caused by gastrointestinal infections of parasites in small ruminants in several places throughout the world, this study aimed at investigating and identifying the most prevalent gastrointestinal protozoa and helminths in herds of goats from the Western Santa Catarina (SC), Brazil.

In the present study, 217 goats were evaluated between October 2012 and March 2013. This number was reached based on a geographical study that selected 24 farms in municipalities with a greater number of goats in the west of SC, Brazil. Animals of different productive fitness (milk or meat) included in the study were randomly chosen represented mainly by adult (201 goats). For sampling, the animals were restrained manually, while feces were collected directly from the rectum. The samples were stored in plastic bottles and maintained in coolers (10 °C) until laboratorial processing. It was performed by the centrifugal flotation technique with supersaturated sugar solution, allowing the microscopic search of eggs, cysts, and oocysts of parasites through microscopy (10 to 40x). Identification of parasites from the Strongylida order was carried out by larvae culture according to the methodology described by Roberts and O'Sullivan (1950). A pooled sample was used to identify the protozoan oocysts in each farm and samples were incubated at 25 °C and 75% RH, to allow oocyst sporulation and genus identification. A questionnaire was administered to farmers to obtain information with regards to breed, sex, age, diet, water source, productive purpose (meat or milk) and the presence of diarrhea in relation to parasitism. This data was analyzed using Fisher's Exact Test and  $\chi^2$ .

All the 217 goats were parasitized by helminthes and/or protozoa. It was possible to visualize eggs of the Strongylida order, eggs of *Thyasanosoma*, *Trichuris*, *Moniezia*, and *Neoscaris*. Oocysts of *Eimeria* and *Cryptosporidium* as well as cysts of *Entamoeba*

and *Giardia* were also detected (Table 1). In order to confirm the presence of *Cryptosporidium* spp., oocysts were stained using Kinyoun modified method (AMATO NETO et al., 1996). All samples positive for *Cryptosporidium* spp in the centrifugal flotation technique were also positive according to the Kinyoun method.

Moreover, it stands out the occurrence of nematodes of the Strongylida order in 193 (88.94%) of the samples. After the larvae cultivation of the samples in which eggs of the Strongylida order were observed, it was possible to identify *Haemonchus* and *Trichostrongylus* as the most prevalent helminths, present in 81.1% and 77.4% of animals, respectively. *Teladorsagia* was present in 62.6% of the goat, while *Cooperia* and *Oesophagostomum* were the parasites found in the lower rates, representing 15.5% and 4.1%, respectively. In addition, oocysts of *Eimeria* and *Cryptosporidium* were observed in 68.2% and 40.5% of the samples, respectively (Table 1). Also, *Giardia* spp. was found in 22.6% of the samples, along with *Entamoeba* (1.84%) in smaller proportion (Table 1).

Our results showed that gastrointestinal parasites were found in all the farms assessed in this study, differing in type of infection (single or mixed) and genus of parasites. Similar results were reported by Brito et al. (2009) in sheep and goats raised in the micro-region of Alto Mearim and Grajaú (Maranhão State, Northeast of Brazil), when 91.66% and 69.79% tested positive to helminths and coccidia respectively. Martins-Filho and Menezes (2001) and Pimentel Neto et al. (1999) detected the simultaneous presence of helminthes and coccidian in herds of the states of Paraíba and Rio de Janeiro, respectively. Both studies suggested the possibility of damage on these herds due to parasitism, especially in body weight.

*Eimeria* spp. was present in 68.2% of the samples, similar to those results showed by Hassum and Menezes (2005), which observed a parasitism rate of 77.63% in young and adult goats. Brito et al. (2009) reported indexes of 69.79% of goats and sheep with *Eimeria* spp. More striking findings were reported by Freitas et al. (2005) in a study conducted in São José do Rio Preto, São Paulo state, where 100% of the animals examined had one or more species of the genera *Eimeria*. In

**Table 1.** Gastrointestinal helminthes and protozoan of goats (n=217) from the Western Santa Catarina, Brazil.

Parasites	Number of positive samples	Percentage of positive samples (%)
<i>Thyasanosoma</i> spp	23	10.6
<i>Trichuris</i> spp	20	9.2
<i>Neoscaris</i> spp	16	7.4
<i>Moniezia</i> spp	05	2.3
<i>Haemonchus</i> spp	176	81.1
<i>Trichostrongylus</i> spp	168	77.4
<i>Teladorsagia</i> spp	136	62.6
<i>Cooperia</i> spp	33	15.2
<i>Oesophagostomum</i> spp	09	4.1
<i>Eimeria</i> spp	148	68.2
<i>Cryptosporidium</i> spp	88	40.5
<i>Giardia</i> spp	49	22.6
<i>Entamoeba</i> spp	04	1.8

most cases this coccidian causes asymptomatic disease, but may cause losses due to poor feed conversion. Therefore, control programs to this parasite should be enforced.

Studies on goats performed in Paraíba state identified *Oesophagostomum* spp. in 46% of the samples, *Cooperia* spp. in 30%, *Haemonchus* spp. in 10%, *Trichostrongylus* spp. in 12% and *Bunostomum* spp. in 2% of the animals (MARTINS-FILHO; MENEZES, 2001). However, different results were observed by Costa and Vieira (1984), who showed that over 80% of the parasitic load of goats was by *H. contortus*, similar to the findings reported here. Brito et al. (2009) found a ratio to *Haemonchus* spp. (35.41%), *Trichostrongylus* spp. (27.29%), *Cooperia* spp. (23.61%), *Oesophagostomum* spp. (8.93%) and *Strongyloides* spp. (4.75%). It is noteworthy that in the present study the same parasites were identified, with the genus *Trichostrongylus* and *Haemonchus* being more prevalent in herds from the west of Santa Catarina state. Besides, the large number of positive samples for *Eimeria* oocysts and Trichostrongylidae family eggs, the goats tested were also positive for *Cryptosporidium*, *Giardia*, *Entamoeba*, *Thysanosoma*, *Trichuris*, *Neoscaris*, and *Moniezia*.

Furthermore, within the helminthes class, the parasites belonging to the Strongylida order were more prevalent, as already mentioned. However other helminthes were observed in the stool samples of goats, such as *Thysanosoma*, *Trichuris*, *Neoscaris*, and *Moniezia*. The occurrence of *Trichuris* spp. in sheep and goats was already reported in Bahia State (BAVIA et al., 1982). Another study conducted by Martins-Filho and Menezes (2001) with goats in the Paraíba state found that 7.4% of the animals were positive for the genus *Trichuris* and 11.84% for *Moniezia*, consisting in a similar result of this study current.

According to researchers, *Cryptosporidium* spp. can cause outbreaks of diarrhea with mortality, especially in young animals (VIEIRA et al., 1999). Therefore, the disease may lead to severe economic losses, mainly as a result of the delay in the growth and development of these animals, since their damaged intestines have lower rate of nutrient absorption. A study carried out in Ceará State (Northeast of Brazil), showed that 87.5% of the properties analyzed were positive for gastrointestinal parasites, and of these, nearly 100% of the goats were affected by *Cryptosporidium* spp. (VIEIRA et al., 1999).

The presence of *Giardia* in goats is rarely reported, but this flagellate was recently associated with sheep mortality in Southern Brazil (BASTIANI et al., 2012). Since *Giardia* spp. was also found in this study, it is possible to conclude that this protozoan may represent a risk to these specific herds, or for goats in general. Bomfim et al. (2004) have reported one of the first cases of giardiasis in goats in Brazil, where the presence of *Giardia* was observed in 33.3% of the properties surveyed in the state of Rio de Janeiro. In Brazil, reports of *Entamoeba* spp. in goats were unknown. However, these parasites have been described recently in goats in Tanzania (MHOMA et al., 2011).

This study observed that most of the properties (91.6%) raised goats for their own consumption, being probably the main reason for the lack of parasitic treatment with anthelmintics. The occurrence of goat mortality in some herds was reported by owners. Therefore, there is a need to encourage producers to engage in a program of parasite control. No correlation between

breed, sex, age, diet, water source, rearing purpose (meat or milk) nor between presence of diarrhea and parasitism/parasites was observed ( $P>0.05$ ). Based on the results, we can conclude that gastrointestinal parasitic diseases are common and prevalent in goats from the Western Santa Catarina, Brazil.

## Ethical Approval

Experimental protocol was approved by the Animal Welfare Committee of Universidade do Estado de Santa Catarina (UDESC), under number 1.15.13.

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