

# Occurrence of gastrointestinal parasites in goat kids

## Ocorrência de parasitos gastrintestinais em cabritos

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### Abstract

Fecal samples from male and female goat kids, of different breeds and up to one year of age, were analyzed to determine egg and oocyst counts per gram of feces (EPG and OPG, respectively), and fecal culturing was performed to identify nematode genera. Helminth eggs and *Eimeria* spp. oocysts were found in 93.06% (188/202) and 77.22% (156/202) of the fecal samples, respectively. From fecal cultures, the following genera were identified: *Cooperia* in 11.88% (24/202), *Haemonchus* in 51.98% (105/202), *Oesophagostomum* in 9.4% (19/202), *Strongyloides* in 5.94 (12/202) and *Trichostrongylus* in 20.79% (42/202) of the samples. The *Eimeria* species found were *E. alijevi* in 25.24% (51/202), *E. arloingi* in 7.42% (15/202), *E. caprina* in 2.97% (6/202), *E. caprovina* in 10.39% (21/202), *E. christenseni* in 4.45% (9/202), *E. joklchijevi* in 11.38% (23/202), *E. hirci* in 9.4% (19/202) and *E. ninakobhyakimovae* in 28.71% (58/202) samples. Among the gastrointestinal parasites, the genus *Haemonchus* and two *Eimeria* species (*E. ninakobhyakimovae* and *E. alijevi*) were predominant.

**Keywords:** Goats, fecal culture, *Eimeria* spp., *Haemonchus* spp.

### Resumo

Amostras fecais de cabritos machos e fêmeas, de diferentes raças e com até uma ano de idade, foram examinadas para determinação do número de ovos e oocistos por grama de fezes (OPG e OoPG, respectivamente) e coprocultura para identificação genérica dos nematódeos. Ovos de helmintos e oocistos de *Eimeria* spp. foram observados em 93,06% (188/202) e 77,22% (156/202) das amostras, respectivamente. Pelas coproculturas, foram identificados os gêneros *Cooperia* em 11,88% (24/202), *Haemonchus* em 51,98% (105/202), *Oesophagostomum* em 9,4% (19/202), *Strongyloides* em 5,94 (12/202) e *Trichostrongylus* em 20,79% (42/202) das amostras. As espécies de *Eimeria* encontradas foram *E. alijevi* em 25,24% (51/202), *E. arloingi* em 7,42% (15/202), *E. caprina* em 2,97% (6/202), *E. caprovina* em 10,39% (21/202), *E. christenseni* em 4,45% (9/202), *E. joklchijevi* em 11,38% (23/202), *E. hirci* em 9,4% (19/202) e *E. ninakobhyakimovae* em 28,71% (58/202) das amostras. Dentre os parasitos gastrintestinais, houve predominância do gênero *Haemonchus* e de duas espécies de *Eimeria*: *E. ninakobhyakimovae* e *E. alijevi*.

**Palavras-chave:** Caprinos, Coprocultura, *Eimeria* spp., *Haemonchus* spp.

### Introduction

Gastrointestinal parasitic infections in goats are one of the main factors limiting the expansion of this sector in Brazil (COSTA et al., 2009) and worldwide (GITHIGIA et al., 2001), and lead to great economic losses (COELHO, 2009).

The aim of this study was to determine occurrences of gastrointestinal parasites in goat kids from farms in the Brazilian states of São Paulo, Mato Grosso do Sul, Goiás and Minas Gerais.

Fecal samples were collected directly from the rectums of 202 goats, during the mornings, between March 2009 and November 2010. The groups were constituted of male and female animals, of different breeds and up to one year of age. EPG (helminth egg counts per gram of feces) and OPG (oocyst counts per gram of feces) were measured in accordance with the modified technique of Gordon and Whitlock (1939), and samples

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**Table 1.** Mean OPG and EPG values from 202 goats from different Brazilian states between 2009 and 2010.

| Brazilian States            | OPG            |                 | EPG                  |                    |                  |
|-----------------------------|----------------|-----------------|----------------------|--------------------|------------------|
|                             | <i>Eimeria</i> | <i>Moniezia</i> | <i>Strongyloides</i> | <i>Strongylida</i> | <i>Trichuris</i> |
| Goiás (n = 31)              | 1141.03        | 223.50          | 602.44               | 1527.91            | 22.25            |
| Mato Grosso do Sul (n = 52) | 1040.20        | 70.52           | 350.75               | 874.15             | 47.33            |
| Minas Gerais (n = 27)       | 627.45         | 20.70           | 125.83               | 704.20             | 5.35             |
| São Paulo (n = 92)          | 1833.30        | 115.25          | 770.44               | 2288.48            | 33.17            |

OPG = oocysts per gram of feces. EPG = eggs per gram of feces.

**Table 2.** Frequencies and absolute values for species of the genus *Eimeria* from 202 goat kids from different Brazilian states between 2009 and 2010.

| Species                     | Goiás (n = 31) | Mato Grosso do Sul (n = 52) | Minas Gerais (n = 27) | São Paulo (n = 92) | Total           |
|-----------------------------|----------------|-----------------------------|-----------------------|--------------------|-----------------|
| <i>E. alijevei</i>          | 19.6% (10/51)  | 43.13% (22/51)              | 13.72% (7/51)         | 23.52% (12/51)     | 25.24% (51/202) |
| <i>E. arloingi</i>          | 20% (3/15)     | 33.33% (5/15)               | 0.0% (0/15)           | 46.66% (7/15)      | 7.42% (15/202)  |
| <i>E. caprina</i>           | 0.0% (0/6)     | 33.33% (2/6)                | 0.0% (0/6)            | 66.66% (4/6)       | 2.97% (6/202)   |
| <i>E. caprovina</i>         | 19.04% (4/21)  | 19.04% (4/21)               | 33.33% (7/21)         | 28.57% (6/21)      | 10.39% (21/202) |
| <i>E. christenseni</i>      | 0.0% (0/9)     | 22.22% (2/9)                | 22.22% (2/9)          | 55.55% (5/9)       | 4.45% (9/202)   |
| <i>E. jolkchijevi</i>       | 13.04% (3/23)  | 34.78% (8/23)               | 0.0% (0/23)           | 52.17% (12/23)     | 11.38% (23/202) |
| <i>E. hirci</i>             | 15.78% (3/19)  | 31.57% (6/19)               | 10.52% (2/19)         | 42.10% (8/19)      | 9.4% (19/202)   |
| <i>E. ninakohlyakimovae</i> | 13.79% (8/58)  | 31.03% (18/58)              | 8.62% (5/58)          | 46.55% (27/58)     | 28.71% (58/202) |

with EPG values greater than 500 were subjected to fecal culturing using the technique of Roberts and O'Sullivan (1950), followed by identification of third-stage larvae (L3) as described by Ueno and Gonçalves (1998).

Samples positive for *Eimeria* spp. were subjected to oocyst sporulation in Petri dishes using a mixture of aqueous solution of sieved feces and 2.5% potassium dichromate (1:1) at room temperature for up to 10 days (VIEIRA et al., 1997). Subsequently, the oocysts were concentrated in saturated sugar solution (SHEATHER, 1923) and morphometrically classified (LEVINE, 1982) using a 10× widefield micrometer eyepiece (Bioval<sup>1</sup>) with 40 and 100-fold magnification.

Helminth eggs and *Eimeria* spp. oocysts were found in 93.06% (188/202) and 77.22% (156/202) of the fecal samples, respectively. Only 19.8% (40/202) of the animals showed EPG counts of up to 500 (Table 1). EPG counts lower than those obtained in the present study were reported by Hassum (2008) among goats younger than two years of age in the state of Rio Grande do Sul, where the peak egg count was 517 EPG. There was a statistically significant association ( $P < 0.0005$ ) between EPG values and stool consistency, such that animals with high EPG presented abnormal consistency. Animals aged less than 90 days ( $P < 0.03$ ) also showed higher values. Gender and breed did not have any influence on occurrences of parasites ( $P > 0.05$ ).

The genera of Strongylida, with their respective percentage occurrences in fecal cultures, were the following: *Cooperia* (11.80%), *Haemonchus* (57.14%), *Oesophagostomum* (9.31%) and *Trichostrongylus* (21.73%). The *Eimeria* species found were *E. alijevei*, *E. arloingi*, *E. caprina*, *E. caprovina*, *E. christenseni*, *E. jolkchijevi*, *E. hirci* and *E. ninakohlyakimovae* (Table 2).

Among the helminths found in our study, the genus *Haemonchus* was the most prevalent, since it was recorded in 51.98% (105/202) of the animals. This result was equally obtained by Brito et al.

(2009) in Maranhão. Differently, Martins Filho and Menezes (2001) stated that the genus *Oesophagostomum* constituted the most prevalent helminth in goats in Paraíba. The low occurrence of *Trichuris* in our study was similar to that reported by Bavia et al. (1982) among goats in Bahia.

The species *E. ninakohlyakimovae* and *E. alijevei* had higher prevalence and were found in 28.71% (58/202) and 25.24% (51/202) of the goats, respectively. Predominance of *E. ninakohlyakimovae* was reported by Ahid et al. (2009). Differently from our results, Tembue et al. (2009) in Pernambuco found higher occurrences of *E. arloingi* among goats.

Parasitism by helminths of the genus *Haemonchus* (SILVA et al., 2008) and protozoa belonging to the genus *Eimeria*, especially the species *E. ninakohlyakimovae* (FREITAS et al., 2005), may lead to significant economic losses from goat breeding, since these parasites are highly pathogenic and cause intense morbidity and mortality in the herd (BRITO et al., 2009). Therefore, more attention should be paid to prophylaxis against such parasites, because high EPG and OPG values have been found in goats from the different regions analyzed, with high prevalence of the genus *Haemonchus* and the *Eimeria* species *E. ninakohlyakimovae* and *E. alijevei*.

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