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Gastrointestinal nematode larvae in dairy cattle bred on *Panicum maximum cv. Mombasa, Cynodon, Brachiaria mutica* and *Brachiaria decumbens* pastures

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1 ABSTRACT

Presence of gastrointestinal nematode larvae from dairy cows bred on *Panicum maximum cv. Mombasa, Cynodon spp, Brachiaria mutica* and *B. decumbens* pastures were evaluated. This study was conducted in a milk production system located in Santa Leopoldina, mountainous region of the state of Espirito Santo. The grass samples were collected from ten points, on a previously outlined "W" path, in the morning between 7:30 and 8:30, noting the presence of dew on all samples taken. The samples were cut close to the ground and separated in half, constituting an upper and lower sample of each collection point, and then placed in plastic bags, identified, and transported at room temperature. The infective larvae (L_3) were identified. In this study, over the forage samples (*Panicum maximum, Cynodon* spp*, Brachiara mutica, Brachiaria decumbens*) collection period, it was observed that every month there was L3 recovery in the forage, however higher L_3 recovery of 78.5 (September) was noted in *P. maximum*; *Cynodon* spp 19.7 (October); *Brachiara mutica* 13.3 (September) and *Brachiaria decumbens* with an average of 14.8 L_3 recovery (September). The results showed that the forage diversity used in the dairy cattle feed, directly contribute to the presence and recurrence of helminth infections in the animals.

2 INTRODUCTION

Literature reports that farm animals in different types of pastures do not have the same levels of infection by gastrointestinal nematode parasites (Niezen *et al.* 1998b), thus, there is relevance in research that can elucidate in a quantitative and qualitative manner, the number of infective larvae present in pastures, since such studies are very scarce. In this sense, in Brazil it's cultural to use a few types of grasses that are used in ruminant breeding, among them the *Panicum maximum (Mombasa)*, *Brachiaria decumbens (Decumbens)*, *Brachiara mutica (Angolan grass)* and *Cynodon* spp, as well as the *Digitaria* and *Paspalum* genus (Santos *et al.* 2005; Nieto *et al.* 2003). The degree of contamination in a pasture depends on climatic factors, animal stocking rate, and intensity of animal infection (Catto 1982). With this, attention should be given mainly to the knowledge of the life cycle belonging to the parasitic gastrointestinal nematodes in the environment, and which perhaps is one of the "barriers" in the health of the animals and, therefore, in the type of pasture, and all of this converging to a better

animal production performance. According to the Brazilian Institute of Geography and Statistics (IBGE 2010), the pasture area in Brazil is of approximately 200 million hectares with a national cattle herd of approximately 212.3 million head, keeping the country in first place in the world rankings. However, a "obstacle" in cattle breeding is still the problem with "worms", since the animals acquired gastrointestinal nematode infections primarily by the ingestion of infective larvae (L_3) present in pastures, in which occurs all year round regarding Brazil (Silva *et al.* 2008, Amarante 2004). Most of the Brazilian beef cattle herd is raised in pastures, often at high stocking rates. This contributes to the onset of diseases such as helminth infections (Dias *et al.* 2007, Moreira *et al.* 2006). In this sense, infection by gastrointestinal nematode parasites is among the main factors that affect the general performance of ruminants bred on pasture, and should be constantly monitored (Siqueira 1993, Silva *et al.* 2008). Cunha (1997) mentions that despite gastrointestinal parasitism being one of the most serious limitations in domestic ruminant production, there is a severe shortage of information regarding the ecology and behavior of free form gastrointestinal nematode parasites and its epidemiology, which could help to better livestock management. In this sense, due to the scarce scientific literature on the subject, the aim of this study was to compare the degree of gastrointestinal nematode larvae (L_3) from dairy cattle bred on pastures of *Panicum maximum cv. Mombasa, Cynodon, Brachiaria mutica* and *Brachiaria decumbens,* considering pasture contamination through fecal matter which acts as a sort of incubator (Silva and Lima 2009).

2 METHODOLOGY

2.1 Study location: The study was conducted on a farm in Santa Leopoldina, state of Espirito Santo, latitude "20º 06 '02" longitude "40º 31' 47", during August 2014 to December 2014. In four paddocks of approximately 0.5 ha composed of the following pastures each: *Panicum maximum*, *Brachiaria decumbens*, *Brachiara mutica* and *Cynodon* spp; monthly grass samples were collected in zigzag, in plastic bags, in a distance of 20 cm from the stool according to Raynaud and Gruner (1982), from various points, until completing uniformly all area collected at equidistant points. Following, according to the technique described by Lima (1989), 500 g of each pasture sample from where the cattle parasitic nematode larvae were recovered were weighed. The data obtained from recovery of L3 from the pastures were subjected to analysis of variance (ANOVA) using a randomized design in level 1 and 5% probability.

3 RESULTS AND DISCUSSION

In the present study, over the grass samples collection period it was observed that in all pastures (*Panicum maximum, Cynodon* spp, *Brachiaria mutica, Brachiaria decumbens*) L_3 belonging to gastrointestinal nematode parasites were recovered. In August, a difference was not recorded ($p>0.01$) between the number of L_3 recovered from the grasses *Panicum maximum, Cynodon* spp and *Brachiaria mutica*, when compared to the *B. decumbens* in the same period. In September, there was a difference ($p> 0.01$) in the recovery of L_3 on *Panicum maximum* pastures in relation to the other grasses. In the month of October, the difference ($p> 0.01$) in the recovery of L_3 was seen only in the *Cynodon* spp pastures. In November, there was a difference ($p> 0.01$) in the L_3 recovery from the *P. maximum* samples when compared to the other grasses. In December no differences were observed in the number of L_3 recovered from the four pastures studied (Table 1).

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Table 1 - Infective larvae from gastrointestinal nematode parasites recovered from *Panicum maximum, Cynodon* spp*, Brachiara mutica,* and *Brachiaria decumbens* pastures during the months of the experiment

Month	*Panicum maximum*	*Cynodon* spp	*Brachiara mutica*	*Brachiaria decumbens*
August	27.3^{A}±61	17.3^{A}±34	11.6^{A}±26	5.0^{BA}±12
September	78.5^{A}±63	2.1^{B}±4	13.3^{B}±5	14.8^{B}±25
October	3.7^{A}±5	19.7^{B}±36	1.1^{A}±2	0.4^{A}±1
November	3.5^{A}±4	0.1^{B}±0	0.3^{B}±0.4	0.1^{B}±0
December	0.4^{A}±0.6	0.8^{A}±1.1	0.3^{A}±0.6	0.6^{A}±0.7

Means in the rows followed by the same capital letter do not differ p>0.01 (Tukey test)

In the present study, it was observed that the highest recovery rates of strongyles L_3 in dairy cattle pastures took place in August and September, which is in accordance with literature (Dias *et al* 2007, Braga *et al* 2009). In the present study, possibly the set of variables in the months studied may have influenced the greater recovery of L3. However, as the authors did not measure plant cover, the climate probably was an important variable. In the months of August and September an average temperature of 23.8. This fact allowed the larval development and survival of the larvae. However, the major issue addressed in this study was to compare as to how the type of forage could influence the recovery of these L_3. Gomes (2003) suggests that the plant's architecture can influence the amount of larvae present in the pasture. According to this author, species that present higher leaf density have lower sunlight penetration, and shading creates suitable environment for maintenance of the infective forms in an easily accessible location for ingestion by the grazing animals, it should also be noted that literature suggests differences between species and their cultivars. The authors of the present article corroborate this information and mention, for example, that the *P. maximum* cv. Mombasa has high vegetal biomass, Figure 1a-b.

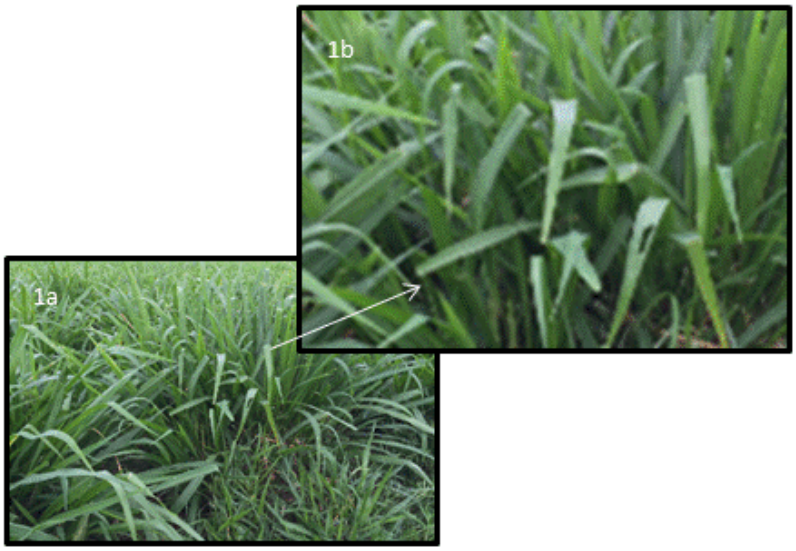

Figure 1a-b: *Panicum maximum* cv. Mombasa

In this sense, in the present study, the highest L_3 recovery average were recorded in the *P. maximum* cv Mombasa (78.5) and the *Cynodon* cv Tifton (19.7). Carrying out some comparisons on this fact it was noted that: Carneiro and Amarante (2008) also observed higher L_3 recoveries in Aruana grass. Already, in relation to *P. maximum* cv Mombasa, the values recorded for L_3 recovery, in this study, were higher than those found by Gazda (2006) who observed lower larvae recovery in *Panicum maximum* cv Aruana (Aruana) pastures. Catto and Bianchin (2007) reported that the highest number of strongyles L_3 in *Cynodon* spp pastures is probably due to its stoloniferous (prostrated) growth, providing leaf collection nearest to the ground and fecal masses where the larvae are concentrated. On the other hand, this discrepancy in relation to the present study may be explained by the typical morphological characteristics of each forage, once erect growing plants, such as some *Panicum maximum* cultivars, have a more open architecture and occupy less ground area, allowing greater sunlight and wind that affect the moisture and thermal stability of the microclimate, as well as reduce the moisture of faeces and create unfavourable conditions for larvae development and survival (Souza 2006). However, one should take into account the types of cultivars from each forage and other factors such as the increase in animal concentration in certain areas, facilitating infection in pastures, especially during the dry season or when it occurs (Lima 2004).

4 CONCLUSION

The results showed that the forage diversity used in the dairy cattle feed, directly contribute to the presence and recurrence of helminth infections in the animals.

5 BIOETHICS AND BIOSECURITY COMMITTEE APPROVAL

This study was submitted to and approved by the Ethics Committee (CEUA-Universidade Vila Velha, Process No. 306).

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