

## EFFICACY OF HOMEOPATHIC TREATMENT AGAINST NATURAL INFECTION OF SHEEP BY GASTROINTESTINAL NEMATODES

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**ABSTRACT:**- ROCHA, R.A. DA; PACHECO, R.D.L.; AMARANTE, A.F.T. [Efficacy of homeopathic treatment against natural infection of sheep by gastrointestinal nematodes]. Eficácia do tratamento homeopático contra infecções de nematódeos gastrintestinais em ovinos. *Revista Brasileira de Parasitologia Veterinária*, v. 15, n. 1, p. 23-27, 2006. UNESP-Universidade Estadual Paulista, Departamento de Parasitologia, Instituto de Biociências, Caixa Postal 510, Botucatu, SP, 18618-000, Brazil. E-mail: rrabdallah@hotmail.com

The efficacy of the homeopathic treatment with the Fator Vermes®, administered according to the manufacturer's recommendations, was evaluated against gastrointestinal nematodes infections in sheep. The experiment was divided into two phases: in the first phase (January/06/2004 to April/30/2004), the animals of the treated (n=10) and control (n=10) groups were treated individually with conventional anthelmintics to avoid deaths. In the second phase (April/30/2004 to July/06/2004), the sheep from the group that received the Fator Vermes® were treated as they had been in the previous phase, while the control group animals were treated with conventional anthelmintics at 14 day intervals. In the first phase of the experiment, there was no significant difference ( $P>0.05$ ) between group means regarding egg counts in feces (EPG), weight gain, or packed cell volume (PCV). Meanwhile, in the second phase, the control group sheep had a significantly higher weight gain, higher PCV values, and lower EPG counts. Infective larvae of *Haemonchus* spp., *Trichostrongylus* spp., *Cooperia* spp., and *Oesophagostomum* spp. were identified in the fecal cultures. After six months of daily treatment with the Fator Vermes®, it was not possible to substantiate the product's benefits in both sheep health and productivity or in the prophylaxis of gastrointestinal nematode infections.

**KEYWORDS:** Sheep, *Haemonchus*, homeopathy, treatment, nematode.

### RESUMO

A eficácia do produto homeopático Fator Vermes®, administrado de acordo com as recomendações do fabricante, foi avaliada contra as infecções por nematódeos gastrintestinais em ovelhas. O experimento foi dividido em duas fases: na primeira fase (06/Janeiro/2004 a 30/Abril/2004), os animais do grupo tratado (n=10) e do grupo controle (n=10) foram tratados individualmente com anti-helmínticos convencionais para evitar a ocorrência de mortalidade. Na segunda fase (30/Abril/2004 a 06/Julho/2004), as ovelhas do grupo que recebeu o Fator Vermes® foram tratadas da mesma maneira que na fase anterior, já as ovelhas do grupo controle foram tratadas com anti-helmínticos convencionais a cada 14 dias. Na primeira fase do

experimento não houve diferença significativa entre as contagens de ovos nas fezes (OPG), ganho de peso ou volume globular (VG) dos dois grupos ( $P>0,05$ ). Já na segunda fase do experimento, as ovelhas do grupo controle apresentaram ganho de peso superior, valores mais elevados de VG e contagens OPG inferiores. Larvas infectantes de *Haemonchus* spp., *Trichostrongylus* spp., *Cooperia* spp. e *Oesophagostomum* spp. foram identificadas nas coproculturas. Após seis meses do tratamento diário com Fator Vermes®, não foi possível evidenciar benefícios do mesmo na sanidade dos animais ou na profilaxia das infecções por nematóides gastrintestinais.

**PALAVRAS-CHAVE:** Ovinos, *Haemonchus*, homeopatia, tratamento, nematóides.

### INTRODUCTION

One of the main health problems in sheep industry is parasitic gastro-enteritis. Nematode infections cause economic loss due to animal mortality and expenses with anthelmintic products. In

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addition, another and even more severe problem is parasite resistance to the drugs. Studies carried out with sheep reveal that the situation is very critical in Brazil (AMARANTE et al., 1992; ECHEVARRIA et al., 1996; MELO et al., 2003).

New drugs have not been launched in the market because of the very high costs and risks associated with taking a new active drug down the development track to marketing. For this reason, the pharmaceutical industry has, in general, turned away from this activity. By implication, the international small ruminant industry is too small for these companies to make the necessary investment (WALLER, 1997). Because of this, control alternatives have been searched for aiming to minimizing the problems caused by nematode infections. Among the alternatives is the homeopathic treatment of people and animals that has been more common in recent years (TAYLOR et al., 1989).

The demand for homeopathic veterinary treatment by owners is probably part of a broad upsurge of public interest in 'green' issues and 'natural' treatments. In addition, the absence of residues in the food and lower financial costs are also important considerations for farmers (KAYNE; McGUIRE, 1993). The alternative therapies based on phytotherapy or homeopathy are largely recommended in organic farming but do not have any demonstrated efficacy (CABARET et al., 2002).

This experiment was carried out to evaluate the efficacy of the Fator Vermes® (Arenales Fauna e Flora) homeopathic product in the prophylaxis of gastrointestinal nematode infections in Bergamascia sheep.

## MATERIAL AND METHODS

### Study location and management

The study was carried out at the Universidade Estadual Paulista located in Botucatu, São Paulo State, Brazil, from 06 January 2004 to 06 July 2004. The mean annual rainfall is 1516.2 mm. The rainfall during the study period was 861.2 mm with a minimum of 28.8 mm in June. Average temperatures varied from a mean maximum and mean minimum of 27.8 °C and 18.3 °C in February and 21.0 °C and 12.7 °C in July.

Twenty Bergamascia ewes, 18 months old, were placed in a 0.6 ha paddock with *Cynodon dactylon* and *Brachiaria decumbens* grass from 06 January 2004 to 06 July 2004. The paddock had been previously grazed by sheep and was left without animals for 3 months before the beginning of the experiment.

In the beginning of the study, fecal egg counts (FEC) were determined for each animal. The ewes were randomly allocated according to FEC value in two groups. The treatment group received, daily, a homeopathic product (Fator Vermes® - Arenales Fauna e Flora) and the other group (control) was not treated.

Each ewe received daily 100 g of an 18% crude protein (CP) concentrate (Ração Noel® - Cafenoel). The homeopathic product was mixed in the concentrate to propitiate the ingestion of the 1,6 g of the homeopathic product/day by each animal of the treated group, according to manufacturer recommendation.

The control group received only the concentrate, without the homeopathic product.

The sheep had free access to mineralized salt (Nutrumin®-Nutrumin) and to drink water throughout the experiment and also to Tifton hay (12% CP), starting in May due the reduction in the quality of the pasture.

All animals were treated with conventional anthelmintics at the beginning of the experiment in conformity with recommendation of the manufacturer of the homeopathic product. A combination of levamisole phosphate at the dose of 10 mg/kg (Ripercol®L 150 F, Fort Dodge) and albendazole at dose of 10 mg/kg (Valbazen® 10 Cobalto, Pfizer) was used for treatment. The drugs were administered orally for three consecutive days and caused an overall reduction of 92.8% in FEC 2 weeks after the treatment. This combination of anthelmintics showed efficacy against resistant nematodes, commons in the site of the study (AMARANTE et al., 2004).

To prevent mortality, treatments with the combination of the conventional anthelmintics (albendazole + levamisole) were administered individually to ewes with FEC higher than 4000 eggs per gram (EPG) (TEMBELY et al., 1998; AMARANTE et al., 1999) and/or packed cell volume (PCV) lower than 21% (AMARANTE et al., 1999).

### Phases of the experiment

The experiment was divided in two phases: in the first phase (06/January/2004 to 30/April/2004), the animals of both groups were treated only individually with conventional anthelmintics to avoid mortality. In the second phase (30/April/2004 to 06/july/2004), the ewes of the Fator Vermes® group were treated in the same way, but all ewes of the control group received suppressive treatments with conventional anthelmintics every 14 days.

### Measurements

Faecal samples and blood samples were taken from all animals every 2 weeks from 06 January 2004 to 06 July 2004. Body weight was recorded on the same occasions. FEC were determined using a modified McMaster technique, in which each nematode egg counted represented 100 eggs per gram of feces (EPG). Composite cultures (ROBERTS; O'SULLIVAN, 1950) for the production of infective larvae of gastrointestinal nematodes were performed separately for each group of sheep according to their group. The larvae were identified according to descriptions of Keith (1953).

Blood samples were collected by jugular vein puncture into EDTA vacutainer tubes. PCV was determined by microhematocrit centrifugation method. Blood eosinophils were counted with a Neubauer chamber after staining with Carpentier solution (DAWKINS et al., 1989). Counts are reported as number of cells per microliter of blood. Moreover, the animals were periodically weighed.

### Statistical analysis

The data were analyzed on Minitab® Statistical Software (Minitab Inc., Release 11) by using a one-way analysis

of variance to compare two groups. The data relative to FEC and eosinophils was transformed on  $\log_{10}(x + 1)$ . The figures in the results are expressed as arithmetic means.

**RESULTS**

Before being allocated to the two groups, the animals averaged 2450 EPG. Due to the conventional anthelmintic treatment administered to all the animals, in the beginning of the experiment the EPG averages were near zero (Fig. 1). Nematode egg output peaked at a mean of 2600 EPG in the control group in early March. This increase in the EPG average was produced by four animals, which were treated with the anthelmintic (Fig. 2). There was no statistical difference in the EPG averages throughout phase 1 ( $P > 0.05$ ).

In the first phase of the experiment, of the 10 ewes from the group treated with Fator Vermes®, one required two treatments with conventional anthelmintics, and two needed one treatment (total of three animals treated in the group) (Fig. 2). In the control group, five of the 10 ewes required one treatment.

In the second phase of the experiment, the mean control

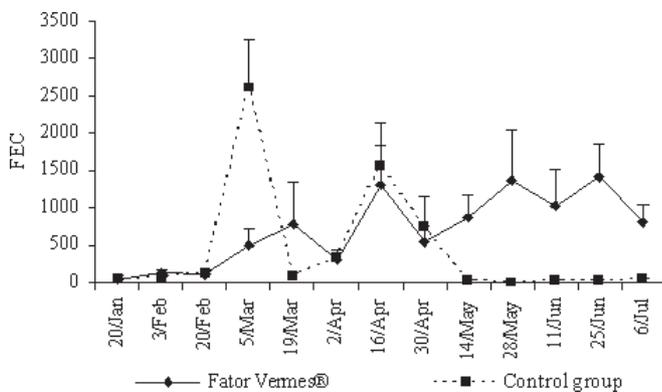


Fig. 1. Mean fecal egg counts (FEC) of the ewes of the group treated with Fator Vermes® and control group. The arrow indicates the beginning of the suppressive anthelmintic treatments of the ewes of the control group. Bars are standard errors.

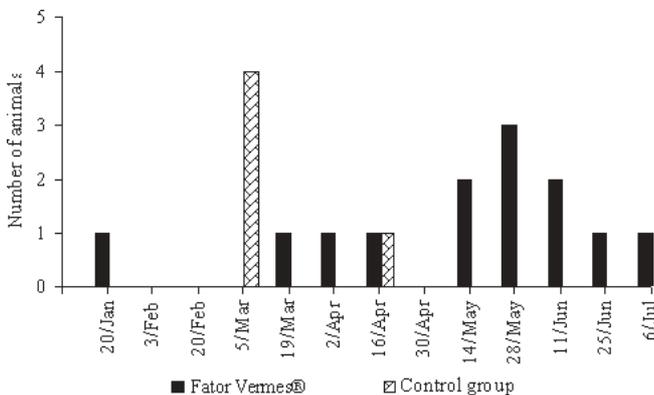


Fig. 2. Number of ewes of the group treated with Fator Vermes® or of the control group that received salvage treatments with conventional anthelmintics. The arrow indicates the beginning of the suppressive anthelmintic treatments of the ewes of the control group.

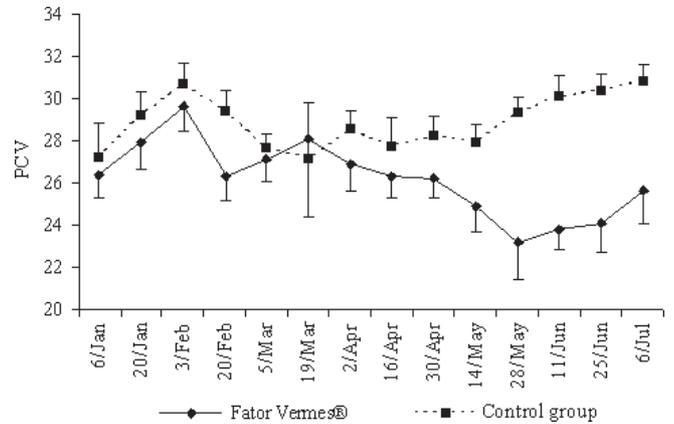


Fig. 3. Mean fecal packed cell volume (PCV) of the ewes of group treated with Fator Vermes® or of the control group, not treated. The arrow indicates the beginning of the suppressive anthelmintic treatments of the ewes of the control group. Bars are standard errors.

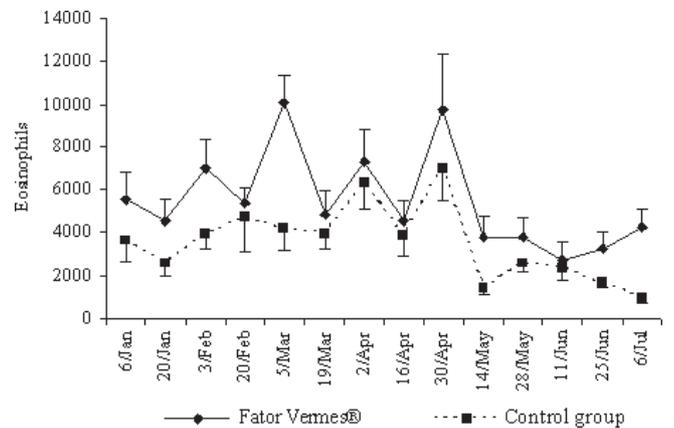


Fig. 4. Mean number of eosinophils per microliter of blood in ewes of the group treated with Fator Vermes® or of the control group, not treated. The arrow indicates the beginning of the suppressive anthelmintic treatments of the ewes of the control group. Bars are standard errors.

group EPG was near zero after the beginning of the suppressive anthelmintic treatments (Fig. 1). In the group treated with the Fator Vermes®, three of the EPG averages were above 1000. The control group had significantly lower EPG averages than the group treated with the homeopathy in all sampling days of phase 2 of the experiment (14/May -  $P < 0.05$ ; 28/May -  $P < 0.01$ ; 11/June -  $P < 0.07$ ; 25/June -  $P < 0.05$ ; and 06/July -  $P < 0.05$ ).

In the second phase of the experiment, of the 10 ewes of the group that received Fator Vermes®, six required anthelmintic treatments (Fig. 2): one needed four treatments, and the remaining animals one treatment. One of the ewes of the group treated with the Fator Vermes® was highly susceptible to nematode infections and it was treated with anthelmintics four times in the second phase of the experiment. In spite of the frequent treatments, this animal became progressively debilitated and died at the end of the trial due to nematode infections. On the other hand, four animals of the group treated with the Fator

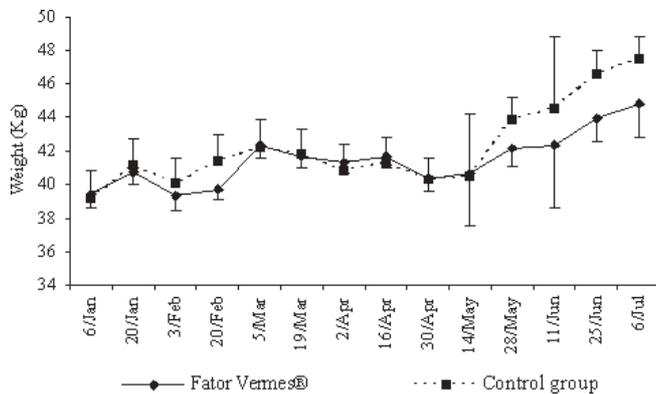


Fig. 5. Mean weight of the ewes of the group treated with Fator Vermes® or of the control group, not treated. The arrow indicates the beginning of the suppressive anthelmintic treatments of the ewes of the control group. Bars are standard errors.

Vermes® did not require anthelmintic treatment at any time throughout the experiment. This was also the case of five control group animals in the first phase of the experiment.

Infective larvae were identified in the treated and control group fecal cultures, respectively, at the following percentages: 58.1 % and 26.8% *Haemonchus* spp. larvae; 34.1% and 63.2% *Trichostrongylus* spp. larvae; 5.7% and 6.2% *Cooperia* spp. larvae; and 2.1% and 3.8% *Oesophagostomum* spp. larvae.

In the group treated with the Fator Vermes®, the lowest PCV average (23%) was recorded on May/28, while in the control group, this happened on Jan/06 and Mar/19 (PCV = 27%) (Fig. 3). Mean PCV of both groups were similar until May/14 ( $P>0.05$ ). Then, all control group PCV averages were significantly higher ( $P<0.05$ ).

The blood eosinophil averages remained relatively high during the experimental period in both groups, falling after April/30 (Fig. 4). On two occasions (March/05 and July/06), the means of the treated group were significantly higher than those of the control group ( $P<0.05$ ).

In phase 1, four and three animals, respectively, from the treated and control groups lost weight (Fig. 5). In this phase, there was no weight gain difference in group means ( $P>0.05$ ). In phase 2, only one animal in the treated group lost weight. In this period, the animals in the group treated with the homeopathy gained an average of 4.2 kg, while control group animals gained 7.0 kg ( $P<0.05$ ).

## DISCUSSION

In the first phase of the experiment, when the animals of the two groups were treated individually with anthelmintics to prevent deaths, it was not possible to detect significant differences between PCV, weight gain, and EPG group means. In other words, there was no evidence that justified using the Fator Vermes®. Likewise, Taylor et al. (1989) found no effect of an oral homeopathic product used to prevent parasitic bronchitis caused by *Dictyocaulus viviparus* in calves. The homeopathic plant *Artemisia cina* also did not reduce the egg output of gastrointestinal nematodes in lambs (CABARET, 1996).

In the second phase of the experiment, once again it was not possible to substantiate any benefit derived from the Fator Vermes®. In this phase, the control group animals, treated at 14-day intervals with anthelmintics (suppressive treatments) had better PCV and weight gain values than the group treated Fator Vermes®. These differences were certainly due to the accentuated parasite load reduction in the control group animals, as observed by the reduced EPG counts in this group. However, it must be emphasized that it is not recommendable to drench flocks in short intervals due to the anthelmintic resistance problem.

It is important to stress that, in the second phase the differences between the groups would have been even bigger if individual conventional anthelmintic treatments had not been administered to the animals of the group treated with homeopathy. The comparative results between groups obtained in this phase also showed that the selective treatments with conventional anthelmintics, based on the EPG counts or on the PCV values, did not suffice to avoid animal productivity reductions.

The average eosinophil counts were higher in the group treated with homeopathy. On two occasions, there were statistically significant differences between group means. Eosinophilia is a well documented feature of helminth infections but the precise nature of the interaction between parasite and eosinophil remains an enigma (WILDBLOOD et al., 2005). Rainbird et al. (1998) showed that eosinophils can adhere to, and immobilize the invasive L3 larval stage of *H. contortus* in *in vitro* cultures in the presence of specific antiparasite antibodies. However, according to Wildblood et al. (2005), ovine nematodes may actively encourage recruitment of eosinophils, since local eosinophil-mediated mucosal damage possibly may provide a permissive local microenvironment for the parasite.

Throughout the experiment, it was possible to identify nine naturally-resistant animals (four in the treated and five in the control group) which were not treated individually with conventional anthelmintics. These results agree with several studies that demonstrated that parasite infection resistance is not uniform in the herds. Animals that are resistant, susceptible, or that show intermediary resistance to helminth infections are usually found (BARGER, 1985; AMARANTE et al., 1998). According to Bishop and Stear (2003), modeling studies predict that selective breeding of sheep for resistance may be used as an effective complementary control strategy for nematode infections with considerable effect in the epidemiology, since it causes reductions in egg output, pasture larval contamination, and, hence, subsequent larval challenge. Therefore, selecting resistant animals seems to be an alternative for a much more promising control for helminth infections than prophylaxis based on treating animals with allopathic or homeopathic drugs.

## CONCLUSION

After six months of daily homeopathic treatment, it was not possible to substantiate the product's benefits in either

sheep health or productivity or even in the prophylaxis of gastrointestinal nematode infections.

**Acknowledgement.** The authors are grateful to Valdir A. Paniguel and Maria Angela B. Gomes for technical assistance.

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Received on October 7, 2005.

Accepted for publication on March 14, 2006.