

THE PREVALENCE OF HELMINTH PARASITES IN HORSES RAISED IN MODERN CONDITIONS

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Abstract

Although in our country the majority of the horse population is still located in the rural areas, where they are used mostly for their traction power, an increase in the horse industry can be observed in and near the major cities where horses are being raised as animals for sport, entertainment and recreation. In such modern holdings, significant efforts are being made to reduce the prevalence of helminth parasite infestation in these valuable animals. However, despite anthelmintic control strategies and prophylactic methods, parasite exposure can't be entirely avoided. The purpose of this study was to determine the prevalence of helminth species in well-conditioned horses raised in modern holdings, with limited exposure to infestation sources. Between August and December of 2014, fecal samples were collected from a number of 154 horses. Out of these samples, 28.57% were positive for parasitic infestation. Among helminthes found, the prevalence of *Parascaris* spp. was 3.89% and the prevalence of Strongylidae was 27.92%, these two being the only genres identified.

Key words: helminths, horses, parasites, *Parascaris equorum*, Strongylidae.

INTRODUCTION

Ever since it's domestication, the horse has been a loyal friend and trusted partner of man in day to day life, playing a vital role in many aspects of human life and evolution (Suteu, 1994). In the developed world, horses have great economic importance to sport and leisure industries. The horses included in the present study are raised in modern holdings, are used mostly for riding, sport, entertainment and a small number of horses are used for patrol services by local authorities. These are expensive, pure-breed of half-breed animals, and their owners try to make sure they are happy and healthy, by constantly improving their living conditions and paying attention to disease prevention methods.

Horses are prone to infestation by a mixture of internal and external parasites. An animal can harbor a great number of parasites without exhibiting any clinical signs. The control of internal parasites is an important part of the horse health program (Hardin, 1997). The most common internal parasites of the horse are nematodes, among which

strongyles (*Strongylus* spp.), ascarids (*Parascaris equorum*), pinworms (*Oxyuris equi*) and bots (*Gasterophilus* spp.) have the highest prevalence. Strongyles are considered to be the most harmful, affecting horses of all ages and causing weight loss, weakness, anemia, diarrhea and even death (Hardin, 1997). Larval stages are responsible for the damage done to the host animal (Khan et al., 2015). Currently, cyathostomins are considered to be the main parasitic pathogen of the horse, while the prevalence of large strongyles has decreased as a result of widespread use of anthelmintic drugs (Love et al., 1999). Ascarid worms have a high prevalence in foals, but can also affect young adult horses, causing irritation of the digestive tract, decreased feed absorption and colic, but also damage to the liver and lung tissue due to migrating larvae. *Parascaris equorum* are highly prolific parasites, producing millions of extremely resistant eggs daily (Mitrea, 2011).

The current study aimed to determine the prevalence of helminth parasites in economically important horses that are in good health, are raised in hygienic conditions and receive veterinary care whenever needed.

MATERIALS AND METHODS

Between August and December of 2014, fecal samples were collected from a number of 154 horses, aged 3 months to 27 years. The horses, raised in 8 different establishments in Bucharest and Ilfov County, were subject to prophylactic deworming two or four times a year, were maintained in individual enclosures or in small groups, and were never allowed to graze on pastures. The horses were clinically examined and the owners and caretakers were questioned regarding the animals' rations, grooming habits, stable and paddock hygiene, general health issues and previous anthelmintic treatments. The fresh fecal samples were collected with gloved hands, were packed containers, labeled with the name, age, sex of the animal and date of collection and transported to the Laboratory of Parasitology of the Faculty of Veterinary Medicine Bucharest. The feces were analyzed immediately or within 48 hours, after being stored at a temperature of 4°C. The presence of parasite eggs was revealed by flotation method, using supersaturated solution of NaCl, then the parasite eggs were identified by genre according to morphological characteristics described in scientific literature (Mitrea, 2011). The positive samples were examined using the McMaster method to determine the degree of infestation (number of eggs per gram - EPG).

RESULTS AND DISCUSSIONS

Out of 154 fecal samples examined, 28.57% were positive for parasitic infestation (Table 1).

Table 1: Overall prevalence of helminth parasite infestation in horses from Bucharest and Ilfov County

Number of samples	154
Positive samples	44 (28.57%)
Negative samples	110 (71.43%)
Samples with mixed species infestation	5 (3.24%)

Among helminths found, the prevalence of *Parascaris equorum* (Figure 1) was 3.89% and the prevalence of *Strongylidae* (Figure 2) was 27.92%. These were the only two genre

of helminths identified by flotation method (Table 2). Of the 154 horses examined, only 5 (3.24%) were infested with both genre of helminths (poly-parasitic infestation). Among the positive samples, 47.72% came from female horses and 52.27% were from males.

Table 2: Prevalence of helminth parasites found in horses from Bucharest and Ilfov County in relation to observed species

Parasite	Positive samples	Negative samples	Positive/total (%)
Strongylidae	43	111	27.92%
Parascaris equorum	6	148	3.89%

The samples cross-examined using the McMaster method showed an infestation of under 500 EPG for *Strongylidae* eggs and under 100 EPG for *Parascaris equorum* eggs. Patient history and clinical examination didn't reveal any clinical manifestation of helminthosis in any of the horses.



Figure 1. *Parascaris equorum* egg identified by flotation method in horse feces (200x)



Figure 2. Strongyle eggs identified by flotation method in horse feces (100x)

The horses included in the study belonged to 8 different stables. In each of these establishments, at least one animal showed helminth parasite infestation. The percentage of infested horses for each stable is presented in Table 3. The lowest prevalence of parasitic infestation was identified in Stable 5, where

the horses were subject to prophylactic deworming every 3 months. In all the other stables, the horses received anthelmintics every 6 months (twice a year). It is difficult to compare results between stables because of the major differences in the number of horses in each stable.

Table 3: Prevalence of helminth parasites found in the stables included in the study

Stable	Number of horses	Number of infested horses	%
Stable 1	23	5	21.74%
Stable 2	7	4	57.14%
Stable 3	26	5	19.23%
Stable 4	25	9	36%
Stable 5	30	2	6.67%
Stable 6	27	8	29.63%
Stable 7	6	5	83.33%
Stable 8	10	6	60%
Total	154	44	28.57%

Overall, the percentage of infested horses found in this study is much lower than the results obtained in similar studies carried out in other regions of Romania. A survey regarding strongyles in horses performed in the north-west areas of the country revealed a strongyle infestation prevalence of 80.71% (Cernea et al., 2003). Another study carried out in two stud farms from the center and northeastern areas of Romania showed a prevalence of 87.97% for parasitic infestation (87.97% strongyles, 13.9% *Parascaris equorum*, 5.06% *Strongyloides westeri* and 1.90% *Eimeria leuckarti*) (Ioniță et al., 2013). In Timiș County (western Romania), 100% of the horses included in a survey were positive for parasitic infestation, with five genre of helminths identified: strongyles, *Parascaris equorum*, *Strongyloides westeri*, *Oxyuris equi* and *Anoplocephala spp.* with a prevalence of 85.57%, 28.84%, 9.61%, 20.19% and 19.23% respectively (Morariu et al., 2012).

Authors involved in similar studies reported a helminth infestation prevalence of 34.5% in Greece (Papazahariadou et al., 2009). Another survey carried out in NW Spain (Francisco et al., 2009) identified a prevalence of 95% for nematode parasites and 1% for cestodes. In Germany, coprological tests revealed a prevalence of 98.4% for *Cyathostominae*, 16.7% for *Parascaris equorum*, 14.3% for tapeworms, 8.7% for

pinworms and 4% for *Strongyloides westeri* (Hinney et al., 2011).

The vast difference between the results demonstrated in this study and the findings of other studies could be explained by variations in the number of horses included in the surveys, different management systems applied in other regions of Romania and in other countries, different climatic conditions in the areas where the fecal samples were collected.

The study demonstrated a 28.57% prevalence of helminth parasite infestation in horses from Bucharest and Ilfov County. However, given the lack of contamination sources, the appropriate hygienic conditions and the periodical veterinary attention received by these horses, we tried to identify the possible causes for the presence of heminth parasites in the 8 establishments. From the investigation of the management systems practiced in the stables included in the study, it was concluded that certain management problems could play a role in the prevalence of parasitism in the horses. For example, no parasitological exams were performed for the horses before or after deworming. A fecal egg count reduction test should always be performed on farms in order to determine the efficacy of anthelmintics administered, and also to evaluate the existence of anthelmintic resistance (Kaplan and Nielsen, 2010).

Also, when anthelmintics were administered, in most cases the body weight of the horses was not measured by weighing, it was estimated subjectively, based on the experience of the veterinarian or caretakers. This leaves room for error when calculating the necessary dose of anthelmintic for each horse. Under-dosing could be a reason why anthelmintic treatments were not effective for some of the horses included in the study. It is also a risk factor for the appearance of anthelmintic resistance, as it facilitates the survival of helminths that can carry the resistance gene, which will be passed on to their offspring (Matthee, 2003).

Another problem encountered was the lack of quarantine for newly introduced horses. Although newly purchased or adopted horses were dewormed upon arrival, they weren't kept separate from the existing herd for a long

enough period to ensure that parasite egg shedding had stopped.

Also, Stable 3 housed sport horses that could easily come in contact with horses from any part of the country during sporting events, increasing the risk of contamination.

CONCLUSIONS

The study revealed that the predominant parasites occurring in horses in Bucharest and Ilfov County are *Strongylidae* and *Parascaris equorum*.

The relatively low percentage of infested animals and the light degree of infestation demonstrate that prophylactic deworming and good living conditions can help maintain a low parasitic burden in horses.

The low infestation rate is also related to the lack of exposure of the animals to infestation sources such as common pastures.

Proper parasitological screening and further improvement of management techniques are recommended in order to ensure that parasite prevalence in horses is kept under control.

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MISCELLANEOUS

