PROCEEDINGS OF V. INTERNATIONAL AGRICULTURAL, BIOLOGICAL, LIFE SCIENCE CONFERENCE AGBIOL 2023

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GASTROINTESTINAL HELMINTS OF CATTLE IN SEMI INTENSIVE BREEDING AT BELGRADE AREA

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ABSTRACT

The spread area of Belgrade has extremely favorable conditions for modern agricultural production (climate, agricultural land, watercourses, developed processing industry). This economic branch is of strategic importance for supplying Belgrade with food products, along with the resources that abound in the wider environment (Vojvodina and Šumadija). There are numerous villages here, where households keep cattle in small herds or mini-farm, usually in semi-intensive breeding. During our study performed on 2018 we examined faeces of 190 cattle from 42 herds and 29 cattle by post-mortem examination. Determination of eggs and adult parasites performed on their morphological characteristics. The coprological examination established the presence of gastrointestinal helminth eggs in 39.6% of samples. The majority of cattle were infected with two and fewer number with three or four parasite species. At post-mortem examination of cattle we found *Haemonchus contortus* we occured in 57,53%, *Ostertagia ostertagi* in 55,63%, *Trichonstrongylus axeis* in 49.37%, *Cooperia oncophora* in 32.57%, *Ostertagia trifurcata* in 29.79%, *Oesophagostomum radiatum* 21.22%, *Toxocara vitulorum*17.52%, *Dicocelium dendriticum* 15.26%, *Paramphistomum ichikawai* in 14.21%, *Strongyloides papillosus* 11.51%, *Moniezia benedeni* in 9.47% and *Trichuris discolor* in 6.52%.

Keywords: gastrointestinal helmints, cattle, Belgrade, Serbia

INTRODUCTION

Gastrointestinal helminthiasis is a parasitic infection caused by a group of helminth parasites, which affect the gastrointestinal tract (GIT), associated organs, and whose eggs are excreted to the environment through animals' faeces. GIT helminths are ubiquitous parasitic agents of livestock especially ruminants at and are known to limit cattle production in many areas and countries worlvide. The prevalence variations of specific GIT across different regions suggest the influence of several epidemiological factors on the magnitude of the infection. Of many epidemiological factors, husbandry management in general one of the main conditions for the spread and prevalence of infections. Pasture borne gastrointestinal nematode (GIN) parasites are very common in grazing cattle and thereby represent a significant economic and welfare burden to the global ruminant livestock industry (Spence *et al*.,1996; Stancampiano *et al*., 2007) Mortality of cattle due to parasitic diseases not be alarming at times but their indirect effects on livestock productivity like reduction in productive potential such as decreased growth rate and milking or weight loss are considerably greater (Eckstein *et al*.2015; Forbes *et al*.2004; Spriinger *et al*.2021)

In Serbia, in the past period, cattle breeding was mostly done by agro-industrial companies on large farms with thousands of animals. The cattle breeding in rural communities are within backyard or at small farms with agro-pastoral feeding, and is considered an important economic sector of the food industry

Research on the parasitofauna of cattle in Serbia has not been done sporadicly and that was the reason why we renewed these examination (Babić,1965; Aleksić,1976; Vučković,1976; Toplica, 1987; Marusić, 1988; Stankovic, 2007; Pavlovic *et al*.2022a,b).. In our paper we presented results of examination performed in semı ıntensıve breedıng at Belgrade area

MATERIAL AND METODS

The study of GIT infection performed during 2018 we were carried out in herds of cattle originated from from 6 Belgrade districs Mladenovac, Lazarevac, Obrenovac, Grocka, and Vozdovac (from the village Mladenovac, Vlaska, Mala Krsna, Velika Krsna,Medjuluzje, Senjak, Velika Ivanca, Orašac, Mala Vrbica, Rajkovac, Dubona, Šepšin, Resnik, Ritopek, Vrčin, Vinča, Leštane, Pinosava, Grocka, Velike Granice, Granice, Koracica, Jagnjilo, Markovac, Lazarevac, Arapovac, Junkovac, Leskovac, Sokolovo, Rabrovac, Vrbovno, Zvecka, Krtinska and Stepojevac).

During our study we examined faeces of 190 cattle from 42 herds and 29 cattle by post-mortem examination. During study we collected fecal samples and exaitinatiolls perfonned using standard coprological technique with saturated NaCl solution and seditrentatiotr (Euzebry,1981, Pavlovic and Rogozarski,2017), Determination of eggs and adult parasites performed on their morphological characteristics. Examinations we performed with Carl Zeiss AxioLab A1 microscope with the Axiocam 105 Color microscope camera and Zen Lite software.

RESULTS AND DISCUSION

The coprological examination established the presence of gastrointestinal helminth eggs in 39.47% of samples. The majority of cattle were infected with two and fewer number with three or four parasite species. Our examination showed a high overall prevalence of Nematodes infection (39.47%) than Trematodes (15.26%) and Cestodes (9.74%).

During post-mortem examination we found twelve helminth species. In rumen we occured *Paramphistomum ichikawai,* in abomasus we found *Ostertagia ostertagi*, *O.trifurcata* and *Trichostrongylus axei* (which are also found in the small intestines), in small intestine we found *Moniezia benedeni, Toxocara vitulorum, Strongyloides papillosus, Cooperia oncophora* and *Trichuris discolor, in* large intestine we found *Haemonchus contortus* and *Oesophagostomum radiatum* and in bile ducts and in the gall bladder *Dicocelium dendriticum.*

The prevalence of established parasites was as follows: *Haemonchus contortus* we occured in 57,53%, *Ostertagia ostertagi* in 55,63%, *Trichonstrongylus axeis* in 49.37%, *Cooperia oncophora* in 32.57%, *Ostertagia trifurcata* in 29.79%, *Oesophagostomum radiatum* 21.22%, *Toxocara vitulorum*17.52%, *Dicocelium dendriticum* 15.26%, *Paramphistomum ichikawai* in 14.21%, *Strongyloides papillosus* 11.51%, *Moniezia benedeni* in 9.47% and *Trichuris discolor* in 6.52%.

In the current study, high rate of infection were closely associated with animals in poor body condition. Study showed that in older animals both the prevalence and number of GIT were higher than in younger ones. Family Trichostrongylidae contains most of the important gastro-intestinal nematodes of cattle around the world (Harding and Threlfall, 1989; Nwosu *et al*.,2007; Surbu *et al.*,2020). The life cycle of the trichostrongyles is direct. For most species first-stage larvae develop in, and hatch from, the eggs passed in faeces. These larvae moult twice to the ensheathed third-stage, which are infective and are ingested by the cattle. Under ideal environmental conditions this translation takes approximately one week, but the rate of development is temperature-dependent. The infective larvae continue their development in the mucosa of that part of the gut in which the adults live, then emerge into the lumen and become adults. Most of found helminths are pathogenic to their hosts leading, besides other disorders, to anemia, gastroenteritis and depressed growth rates and mortality (Forbes *et al.*2004; Stancampiano *et al*., 2007; Högberg *et al*.2019; Spriinger *et al*.2021).

The disease is related to the grazing diet and the biological cycle of the parasite, which takes place without transitional hosts. The developmental cycle of the parasite is straightforward. From these reason presence of tapeworm and fluke was only at hilly-mountain region of Belgrade were good condition to development of intermediate hosts of this parasites species. The seasonal dynamics of certain types of parasites, the degree of infection and the occurrence of diseases vary not only in different areas but also in the same area during the year.

At the beginning of the grazing season pastures are essentially parasite-free, except for *Nematodirus*. Any free-living stages of the other trichostrongyles remaining on the pasture at the end of the previous summer have died over the winter or during the early spring, before the cattle are put out to graze (Forbes *et al.*,2004; Hesterberg et al.,2007). Where there is essentially no overwinter survival of the parasites on pasture, it is the eggs in the feces of the cows, and other older animals, that introduce trichostrongyle infection to the pastures in the spring. The rate of development and hatching of these eggs increases with seasonal warming of the environmental temperatures, and when the calves begin to graze significantly the pasture contains plentiful infective larvae. These larvae establish infections in the calves, which are more susceptible to infection than are older animals, sometimes at high levels (Larson *et al*.,2007) The adult parasites in the calves then produce more eggs which, if environmental temperatures are sufficiently warm, develop into a second generation of infective larvae (Chihai 2006; Yevstafieva *et al.*,2020). As temperatures cool in the fall, egg hatching and larval development on the pasture slow then stop. Same was happened with intermediate hosts of tapeworm and fluke (Irie *et al.,* 2013; Ayalew et al.,2016; Pavlovic et al.2022a,b

The parasite-host relationship is complex: physiological state and general condition, method of cultivation and nutrition, time of calving, configuration and macroclimate of the soil. In natural conditions, every animal is infected - constant contamination of the pasture. This is contributed by the increased susceptibility of the already infected herd, the introduction of

susceptible animals into the infected herd and the increase in the intensity of the infection in the already infected herd (Forbes *et al.*,2004; Szyszka, and Kyriazakis,2013).. Immunity develops through continuous infections, and then there is the elimination of the present parasites (self cure mechanism), complete or partial inhibition of the development of newly introduced larvae (spring rise) and complete or partial inhibition of the reproductive abilities of female parasites.

CONCLUSION

The result of our study shows a moderate prevalence of gastrointestinal helminth infection. Temporary breeding on pastures in the presence of cattle of all age categories creates favorite conditions for the development and survival of preparasitic forms and their intermediate hosts outdoors, which enables the infection of calves with gastrointestinal strongyles, flukes and tapeworm. This indicates the need to continue these researches in order to control parasitic infections in cattle.

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