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DIGESTIVE PARASITE FAUNA IN HARE (LEPUS EUROPAEUS) IN WESTERN ROMANIA

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Abstract

During the period November 2013 - February 2014, 24 adult hunted hare (Lepus europaeus) from four hunting sites of Arad County were subjected necropsy. Of them, 13 were males and 11 females. The gastrointestinal mass from each was examined to determine the digestive parasites, macro- and microscopic examination were performed. Each segment of the digestive tube was sectioned, the mucosa and the gastrointestinal content were carefully examined and for the gastrointestinal mass successive washes method was used. The gastrointestinal content and also each segment of digestive tube (previously washed) were microscopically examined by stereomicroscope. The faeces found in the large intestine were examined by flotation method (Willis). Of the 24 samples examined, 21 were positive for gastrointestinal parasites, (prevalence of 87.50%). The most prevalent parasitism was with Eimeria spp., found in 17 samples (80.95 %), other parasites identified were: Cysticercus pisiformis found in two samples (9.52 %), Trichocephalus leporis in 13 samples (61, 90 %) and Trichostrongylus spp. in seven samples (33.33 %). The parasitism with gastrointestinal helminths and larval cestodes in hare represent risk factors for rabbits and domestic carnivores.

Key words*: digestive system, Lepus europeus, necropsy, parasite fauna*

INTRODUCTION

Epidemiological aspects, the lack of references on the parasitoses in hares and also the increased health standards for hunting products, are the motivation for identifying the gastrointestinal parasites found in hares (*Lepus europaeus*) from four hunting sites from Arad County.

The hare (*Lepus Europaeus*) belong to the order Lagomorpha, Family Leporidae (http://wikipedia.org/wiki/Lepus). The living area for hares spreads through entire Europe, from fields until the alpines area. In Romania, the hare is spread from Danube Delta up the mountainous areas; higher densities are recorded at altitudes below 400 meters, in a warm and moderately dry district, avoiding marshy places with stagnant water (http://vanatoare.info/lepus-europaeus/; http://www.info-delta.ro/delta-dunarii).

Young hares live together with female hares even after weaning, this posing an increased risk of contamination with varies parasites to young hares from parasitized females.

Description: Body length varies from 48 to 52 cm, plus the tail (8-9cm), weighing between 4-5 kg. (http://vanatoare.info/lepus-europaeus/). The lifespan is 10-12 years. Hares are herbivorous and feed on grasses, herbs, twigs, leaves, buds, bark and field crops (http://www.info-delta.ro/delta-dunarii).

A study made by Afrenie et al. (2008) indicates the presence of parasitism with: *Eimeria* spp. in the faecal samples collected from European rabbits (*Oryctolagus cuniculus*) from the Zoological Garden Timisoara (Afrenie et. al. 2008).

After the examination of 24 hare gastrointestinal mass probes from a hunting place in Finland, the parasitism with *Trichostrongylus* spp., *Dicrocoelium dendriticum* and *Eimeria* spp., in 88 % were identified (Soveri T.,1987).

MATERIALS AND METHODS

During the period November 2013 - February 2014, 24 hunted hare (*Lepus europaeus*) were necropsied. The animals originated from four hunting sites from Arad County. The hare were killed during the organized hunts made by the

hunters. Out of 24 hare, 13 were males and 11 females, all being adults. The hare were brought from Arad County, from Sofronea (8 samples), Dorobant (4 samples), Simand (6 samples) and Siria (6 samples). All cadavers have been examined at Parasitology and Parasitological diseases Clinic from Veterinary Medicine Faculty Timisoara (Figure 1).

Figure 1. Arad County map (The hunting sites studied) (http://commons.wikimedia.org/wiki/File:Harta_jud_Arad.png).

To determine the digestive parasites from each hare cadaver the gastrointestinal mass was collected and stored at -5° C until examination. Macroscopic examination was performed: the gastrointestinal mass was divided on digestive segments and each segment of the digestive tube was opened with a scissors. Longitudinal sections of the intestines were made for the content and intestinal mucosa carefully being examined. The gastrointestinal mass, divided in digestive segments, was examined then by successive washes method (Figure 2) (Dărăbuş et. al., 2013).

Figure 2. Gastrointestinal mass prepared for examination.

From each segment of the digestive tube (small and large intestine) adult parasites were collected. They were washed with 0.9 % physiological serum to remove impurities and preserved in 70 % ethanol, then by stereomicroscope or microscope were examined for identification (Darabus et. al., 2013). The stomacal and intestinal contents and also each segment of the digestive tract, following a pre-washing procedure were microscopically examined by stereomicroscope. The faeces have been examined using the flotation (Willis) method (Dărăbus et. al., 2013). Faeces were collected from the large intestine of each cadaver and examined by flotation (Willis) method, under a microscope with 10x objective. Identification of the genus *Eimeria* spp. was made in accordance with the identification keys described by Pellerdy, 1974.

RESULTS AND DISCUSSIONS

Macroscopic exam:

Following the analysis of the gastrointestinal mass probes, was identified the presence of *Trichostrongylus* spp. adults, after the content of the small intestine has been emptied.

In the large intestine, was identified the presence of *Trichocephalus leporis* adults (Figure 3.)

On the serosa was identified the presence of *Cysticercus pisiformis*, larva form of *Taenia pisiformis*.

Figure 3. *Trichocephalus leporis* adults.

Microscopic exam:

Following coproparasitological examination using flotation (Willis) method has been identified parasitism with *Eimeria* spp. and *Trichostrongylus* spp. (Figures 4, 5).

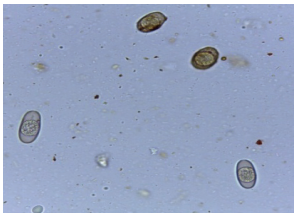

Figure 4. *Eimeria spp*. oocysts, hare faeces.

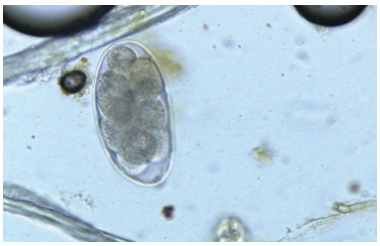

Figure 5. *Trichostrongylus* spp. egg.

Out of 24 probes, 21 were positives with an overall prevalence of 87.52 %.

In regard to the prevalence of identified parasites it has been acknowledged that parasitism with *Eimeria* spp. has been found in 17 samples (80.95 %), with *Cysticercus pisiformis* in two samples (9.52 %), *Trichocephalus leporis* in 13 samples (61.90 %), and *Trichostrongylus* spp. in seven samples (33.33 %) (Figure 6).

Regarding the sex factor was found that, out of the 24 samples examined, 13 were from males (54.61 %) and 11 females (45.83 %).

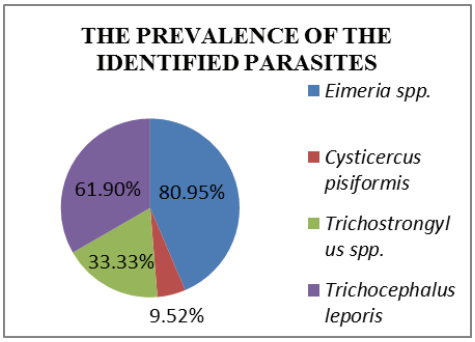

Figure 6. The prevalence of the identified parasites.

The most prevalent parasite found both in male and female was *Eimeria* spp., followed by *Trichocephalus leporis* (Table 1).

Table 1. The parasites prevalence according to the gender of the hare.

Gender	Parasites			
	Eimeria spp. %	*Cysticercus pisiformis* (%)	*Trichostrongylus* spp. (%)	*Trichocephalus leporis* (%)
Male	6/13(46.15%)	2/13 (15.38)	4/13 (30.76)	7/13 (53.84)
Female	11/11 (100)	0/11 (0)	3/11 (27.27)	6/11 (54,45)

Following the results obtained, the high prevalence of parasitism with *Eimeria* spp. in hare females is relevant from the epidemiological perspective: young hares live together with female hares even after weaning, which makes possible an easier and faster contamination with *Eimeria* spp. in young hares.

There is no significant difference in parasitism ratio between females and males for parasitism with *Trichostrongylus* spp., *Cysticercus pisiformis, Trichocephalus leporis.*

In this study the parasitism prevalence was: in Sofronea 75 % (6/8 analysed), in Dorobant 100 % (4/4 analysed), Simand 100 % (6/6 analysed) and in Siria 83.33 % (5/6 analysed).

The prevalence of species parasites was diferent in the hunting sites examined (Table 2).

Table 2. The prevalence of parasites according to the humting sites.

Hunting sites	Parasites			
	Eimeria spp. (%)	*Cysticercus pisiformis* (%)	*Trichostrongylus* spp. (%)	*Trichocephalus leporis* (%)
Sofronea	6/8 (75)	2/8 (25)	2/8 (25)	3/8 (37.5)
Dorobant	4/4 (100)	0/4 (0)	2/4 (50)	3/4 (75)
Simand	6/6 (100)	0/6 (0)	3/6 (50)	2/6 (33.33)
Siria	1/6 (16.66)	0/6 (0)	0/6 (0)	5/6 (83.33)

The fact that the parasitism with *Eimeria spp.* was higher in Sofronea and Dorobant to Siria, can be explained by the fact that Siria is near the hilly area of Arad County, while Dorobant and Sofronea are in a plain area with many lakes.

In the present study, *Eimeria spp.* had a prevalence of 80.95 %,in other similar study performed in Finland, *Eimeria* spp., *Trichostrongylus* spp. and *Dicrocoelium dendriticum* had a prevalence of 88 % (Soveri et.al., 1983).

The parasitism with *Eimeria* spp. in wild hares (*Lepus europaeus)* has been indentified only in those raised in freedom and not in those raised in cages. (Tacconi et.al.1995). The *Eimeria* species identified were: *E. leporis, E. semisculpta, E. robertsoni, E. townsenai, E. hungarica şi E. europeea* (Pellerdy, 1974).

Afrenie et al., 2008, indicate the presence of *Eimeria* spp. parasitism in the faecal samples collected from European rabbits (*Oryctolagus cuniculus*) from the Timisoara Zoological Garden (Afrenie, et.al. 2011).

A study conducted in Spain by Oliveros et al. (2000), showed a prevalence of 62.4 % of *Trichocephalus leporis,* very close to the prevalence found in this study at the same parasite (61.90 %) (Oliveros et.al., 2000).

McCulloch et al. (2004) have identified in one hunted hare lesions and nodules in jejunum caused by *Eimeria leporis* (McCulloch et.al., 2004).

CONCLUSIONS

The prevalence of gastrointestinal parasitoses in hare (*Lepus europaeus*) in Arad County was 87.52 %.

The most frequent parasitism found was with *Eimeria* spp. (80.95 %).

The least common parasitism found was with *Cysticercus pisiformis* (9.52 %).

Depending on the hunting sites the most prevalent gastrointestinal parasitoses in hare (*Lepus europaeus*) was Dorobant and Simand (100 %) and the least comon in Sofronea (75 %).

The parasitism with gastrointestinal helminths and larval cestodes in hare represent risk factors for rabbits and domestic carnivores.

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