Trichostrongyles Species and other Gastrointestinal Nematodes Identified in Sheep from Timis County

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Abstract. This study has as objective to identify Trichostrongyles species and other gastrointestinal nematodes in sheep in Timis County. We performed necropsy on 15 sheep, from which gastrointestinal masses were harvested and processed. Using the method of successor washings adult worms were harvested, while their identification was obtained using identification keys described by Soulsby (1965), Euzeby (1963) and Dunn (1978). The following gastrointestinal nematodes species were identified: Teladorsagia circumcinta, Ostertagia trifurcata, Haemonchus contortus, Trichostrongylus colubriformis, Nematodirus filicollis, N. spathiger, Cooperia curticei and Bunostomum trigonocephalum.

Keywords: gastrointestinal nematodes, sheep

INTRODUCTION

Trichostrongilidosis are cosmopolitan diseases with seasonal clinical course, acute and chronic or subclinical, affecting domestic and wild ruminants, leporidae and equidae (Barger et al., 1978, cited by Dulceanu, 1981). The ruminants trichostrongilidosis are nematodes parasites of the digestive tract, which develops directly without intermediate host.

They are very frequent in many parts of the world, where sheep are bred in the grazing system, at least part of the year.

The disease develops in temperate climates and affects young cattle until the age of 3, and the sheep of all ages, especially during weaning lambs.

Intensity and extensivity of the parasites are dependent on many ecological factors and, lately, the quality of veterinary care. Parasitism situations are not identical from one year to another or from one farm to another. It is mandatory to determine the species bionomie in each of the situations (Barger et al., 1978, cited by Dulceanu 1981, Dărăbuș et al., 1998, Dulceau, 1981). Several studies described the parasitic nematode species of the digestive tract in sheep (Garcia et al., 1993; Rehbein et al., 1996; Fakae et al., 1990).

The purpose of this research was to identify trichostrongyles species and other nematodes from abomas and intestine in sheep.
MATERIALS AND METHODS

The research was conducted between September 2008 - July 2011. In order to determine the gender/species of gastrointestinal nematodes, we performed necropsy and investigated 15 sheep with different ages and races. Sheep studied were slaughtered as needed and due to intercurrent disease, with acute development.

Sheep were part of different private herds in the west of the country.

The study was conducted at the laboratory of Parasitology and Parasitic Diseases of the Faculty of Veterinary Medicine Timisoara.

On the gastrointestinal mass, several ligatures were applied in order to know the exact location of these parasitic species of nematodes as follows: one at the opening of abomasum communication with omasum, two in the stomach pylorus region, two at the end of the small intestine and one at the end of the large intestine.

The abomasum, small intestine and large intestine were placed in separate dishes. Abomasum was opened in length, with scissors in laboratory trays under a thin layer of water. Identification of adult nematodes was performed using the method washings success.

According to the procedure described for abomasum, and small intestine and the large intestine was observed the same protocol work. To identify species of nematodes after harvest, they were fixed in hot 70% alcohol and then clarified, if necessary, with lactofenol, which is an excellent means of clarification and preservation of nematodes.

Species identification was based on determination keys. Identification of adult nematodes was performed on the model described by Soulsby, E. J. L., (1965), Euzeby, J., (1963), Dunn, A.M., (1978) and data in the literature. The images were made using Motic microscope with 14-megapixel Fujifilm removable camera.

RESULTS AND DISCUSSION

Morphological study of gastrointestinal nematode specimens was performed on subjects collected from the intestine of sheep slaughtered in different particular herds.

After harvesting nematodes resulted both complete subject and whole segments of the body due stalk with scissors to bowel.

Species identification results revealed the presence in the intestine, stomach sheep that representatives of seven genera of nematodes, namely: Teladorsagia, Ostertagia, Nematodirus, Haemonchus, Trichostrongylus, Cooperia and Bunostomum.

Based on the identification keys, gastrointestinal nematodes species were highlighted: Teladorsagia circumcincta, Ostertagia trifurcata, Nematodirus filicollis, N. spathiger, Haemonchus contortus, Trichostrongylus colubriformis, Cooperia curticei and Bunostomum trigonocephalum. Gastrointestinal nematode species identified in sheep flocks in the west of the country, corresponded largely with the same identified by other authors in other countries (Kiafouka et al., 1999, Lindqvist et al., 2001, Cabaret et al., 2002).

Nematodirus filicollis was identified in the first six meters of the small intestine. Of 15 bodies examined, 12 were positive to N. filicollis infestation, showing a prevalence of 80% (Tab.1).

From 15 bodies examined, 12 were positive to N. filicollis infestation, showing a prevalence of 80% (Tab.1). These species was identified in the duoden of seven sheep bodies.
with a 58.33% percent, and with a prevalence of 75% it was identified in the jejun and ileon of nine bodies (Tab.2). These nematode were harvested the intestinal mucosa, and bottom trays after repeated washings. They appeared whitish, easier emphasizing adult females, which had thickened posterior extremity, compared to posterior extremity, which was much thinner (Fig. 1).

Other authors such as, Soulsby (1965), Dunn (1978) and Dulceanu (1981), shows this species as a parasite that has a cosmopolitan distribution, that parasitize in the small intestine in sheep, cattle, goats, antelope and deer. The male has a length between 8-15mm and 150mm wide, and the female reaches 12-20mm and 250mm wide.

The mouth is surrounded by six papillae. It does not have cervical papillae. Speacules measure 700-950mm length, and are meeting on the most part of their length. The female tail is truncated and ends with a short spin (Fig. 2) (Milla et al., 1974, cited by Dulceanu 1981).

Comparing the morphological aspects described by Soulsby (1965) with our morphological aspects and images, Nematodirus spathiger species was identified (Fig. 3 și 4). The species was identified in the last portion of intestine. From 15 cadavers examined, only one housed this species, showing a prevalence of 6.66% (Tab.1). This species was found in the jejunum and ileum of sheep to a single corpse.

The other bodies were identified Haemonchus contortus species, where morphological characters put face to face with the characters described by some authors (Jensen et al., 1974, Perrotin et al., 1977, cited by Dulceanu, 1981), were similar (Fig. 5 și 6). This species was identified only in abomasum. From 15 cadavers examined, only 4 were positive of H. contortus.
infestation, showing a prevalence of 26.66% (Tab.1). This species was identified in four abomasum of sheep.

Fig. 5 *Haemonchus contortus*-posterior extremity of the male

Fig. 6 *Haemonchus contortus*-cervical papillae

*Trichotrongylus colubriformis* was found in a large number in jejunum and ileum in sheep, identifying it on determination keys (Fig. 7 & 8). From 15 cadavers examined all were positive with *T. colubriformis* infestation, showing a prevalence of 100% (Tab.1). This species was identified in the duodenum of 13 sheep carcasses with a prevalence of 86.66%, in the jejunum and ileum in 15 cadavers with a prevalence of 100% and a prevalence of 33.33% was identified in colon (Tab 2). In terms of morphological, was easily identified by characteristic appearance of spicules.

Fig. 7 *Trichostrongylus colubriformis*-posterior extremity, characteristic form of the speacules and gubernacumum presence

Fig. 8 *Trichostrongylus colubriformis*-posterior extremity and presence of the anus female

*Teladorsagia circumcincta* was identified only in sheep abomas (Fig. 9). Nematodes were very small hard to see with the naked eye. Of the stereoscopic magnifying glass and optical microscope they had a reddish brown color. From 15 cadavers examined, all were positive with *Tel. circumcincta* infestation, showing a prevalence of 100% (Tab.1).

Fig. 9 *Teladorsagia circumcincta*-posterior extremity of the male

Fig. 10 *Teladorsagia circumcincta*-vulvar region of the female
*Ostertagia trifurcata* was identified only abomas, indicating that this species was found in a very small number compared to *Tel. circumcincta* species. From 15 cadavers examined, only two were positive with *O. trifurcata* infestation, showing a prevalence of 13.33% (Tab.1). This species was found in two sheep abomasum with a prevalence of 100% (Tab. 2).

Morphological appearance of the speacules corresponded with the data described by Dunn (1978) and Euzeby (1963) describing this species as a fairly long nematode measuring between 7-12mm and speacules being small, with a length of 180-220 µm, with the longest branch seems split longitudinally, while other branches are short and sharp net  .

![Fig. 11 Ostertagia trifurcata-posterior extremity of the male](image)

![Fig. 12 Ostertagia trifurcata-characteristic form of the speacules](image)

In the small intestine was identified *Cooperia curticei*, which had a characteristic spiral shape, pink-white (Fig. 13 și 14). From 15 cadavers examined, only 5 were positive with *C. curticei* infestation, showing a prevalence of 33.33% (Tab.1). This species was found in jejunum and ileum of five corpses of sheep with a prevalence of 100% (Tab. 2). This species was found in a very few, meeting only adult female. Morphological characteristics corresponded with those described by Dunn (1978) and Euzeby (1978) describing the species as worms counterclockwise arc shape in the form of a comma.

On the cephalic extremity, cuticle has ring grooves.

![Fig. 13 Cooperia curticei-vulvar region](image)

![Fig. 14 Cooperia curticei- anterior extremity of the female](image)

*Bunostomum trigonocephalum* was identified only in the last portion of the intestine. In this case was identified were both male and female. From 15 cadavers examined, only four were positive with *B. trigonocephalum* infestation, showing a prevalence of 26.66% (Tab.1).

This species was found in the jejunum and ileum of 4 sheep carcasses (Fig.15 și 16).
Soulsby (1965) described this species as part of the family *Ancylostomidae*, nematode parasite in the small intestine in sheep and goats worldwide. Found in record numbers to deer in Scotland. The male has a length between 12-17mm and width is 0.5mm.

*Fig. 15* *Bunostomum trigonocephalum*-posterior extremity of the male  
*Fig. 16* *Bunostomum trigonocephalum*-anterior extremity of the female

### Prevalence of gastrointestinal strongyles infection in sheep

<table>
<thead>
<tr>
<th>GASTROINTESTINAL NEMATODES SPECIES</th>
<th>NO. OF ANIMALS EXAMINED</th>
<th>NO. OF INFECTED ANIMALS</th>
<th>PREVALENCE (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Trichostrongylus colubriformis</em></td>
<td>15</td>
<td>15</td>
<td>100</td>
</tr>
<tr>
<td><em>Teladorsagia circumcincta</em></td>
<td>15</td>
<td>15</td>
<td>100</td>
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<tr>
<td><em>Bunostomum trigonocephalum</em></td>
<td>15</td>
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<td>26,66</td>
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<tr>
<td><em>Nematodirus filicolis</em></td>
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<td>12</td>
<td>80</td>
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<tr>
<td><em>Nematodirus spathiger</em></td>
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<td>6,66</td>
</tr>
<tr>
<td><em>Cooperia curticei</em></td>
<td>15</td>
<td>5</td>
<td>33,33</td>
</tr>
<tr>
<td><em>Haemonchus contortus</em></td>
<td>15</td>
<td>4</td>
<td>26,66</td>
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<tr>
<td><em>Ostertagia trifurcata</em></td>
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<td>2</td>
<td>13,33</td>
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</table>
The nematodes species prevalence in the gastrointestinal tract of sheep

<table>
<thead>
<tr>
<th>GASTROINTESTINAL SPECIES</th>
<th>NO. OF ANIMALS EXAMINED</th>
<th>PREVALENCE %</th>
<th>ABOMASUM NR. (%)</th>
<th>DUODENUM NR. (%)</th>
<th>JEJUNUM, ILEUM NR. (%)</th>
<th>COLONUM NR. (%)</th>
<th>CAECUM NR. (%)</th>
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<tr>
<td><em>Trichostrongylus colubriformis</em></td>
<td>15</td>
<td>100</td>
<td>0 (0)</td>
<td>13 (86,66)</td>
<td>15 (100)</td>
<td>5 (33,33)</td>
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<td>15</td>
<td>100</td>
<td>15 (100)</td>
<td>0 (0)</td>
<td>0 (0)</td>
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<td>0 (0)</td>
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<tr>
<td><em>Bunostomum trigonocephalum</em></td>
<td>4</td>
<td>26,66</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>4 (100)</td>
<td>0 (0)</td>
<td>(0)</td>
</tr>
<tr>
<td><em>Nematodirus filicollis</em></td>
<td>12</td>
<td>80</td>
<td>0 (0)</td>
<td>7 (58,33)</td>
<td>9 (75)</td>
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<td>0 (0)</td>
<td>1 (100)</td>
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<tr>
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<td>0 (0)</td>
<td>5 (100)</td>
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<td>0 (0)</td>
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<tr>
<td><em>Haemonchus contortus</em></td>
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<td>4(100)</td>
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<td>0 (0)</td>
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</table>

**CONCLUSIONS**

- After the morphological study of gastrointestinal nematode species in sheep maintained in the traditional system, in western Romania, the following genera types have been identified: *Teladorsagia, Haemonchus, Trichostrongylus, Nematodirus, Cooperia* and *Bunostomum*.
- From the *Trichostrongylidae* family the following species were identified: *Teladorsagia circumcincta, Ostertagia trifurcata, Haemonchus contortus, Trichostrongylus colubriformis, Nematodirus filicollis, N. spathiger, Cooperia curticei* and *Bunostomum trigonocephalum*.
- From *Ancylostomidae* family *B. trigonocephalum* species was found.
- The prevalence of gastrointestinal parasitism on species of gastrointestinal nematodes in the western country was: *Teladorsagia circumcincta* (100%), *Trichostrongylus colubriformis* (100%), *Nematodirus filicollis* (80%), *Cooperia curticei* (33,33%), *Haemonchus contortus* (26,66%), *Bunostomum trigonocephalum* (26,66%), *Ostertagia trifurcata* (13,33%) and *Nematodirus spathiger* (6,66%).
BIBLIOGRAPHY