Scientific Works. Series C. Veterinary Medicine. Vol. LXXI (2), 2025
ISSN 2065-1295; ISSN 2343-9394 (CD-ROM); ISSN 2067-3663 (Online); ISSN-L 2065-1295

STUDY ON THE PREVALENCE OF GASTROINTESTINAL PARASITES IN SHEEP FROM EASTERN TELEORMAN COUNTY, ROMANIA

Alexandru Levi PĂUN[1], Poliana TUDOR[1]

[1]University of Agronomic Sciences and Veterinary Medicine of Bucharest,
59 Mărăști Blvd, District 1, Bucharest, Romania

Corresponding author email: polianatudor@yahoo.com

Abstract

Three flocks, totalling 216 sheep, respectively 3 individual households, totalling 13 sheep, were included in the present study. Fresh faecal samples were randomly collected from 10% of each flock, and in individual households one faecal sample was collected from each animal, resulting in a total of 35 faecal samples. Initially, faecal samples were investigated macroscopically, looking for cestode proglottids. Subsequently, each faecal sample was processed by the usual flotation and sedimentation techniques, followed by microscopic examination for the presence of oocysts and parasite eggs, aiming at their morphological identification. The overall prevalence of gastrointestinal parasites was 45.46% in flocks, and 84.62% in individual households. Microscopic examination revealed the presence of Eimeria oocysts (27.27%) and nematode eggs, represented by Strongyloides spp. (27.27%), digestive strongyles (9.1%) in sheep from flocks, and Eimeria spp. oocysts (69.23%), Strongyloides spp. eggs (53.85%), digestive strongyles eggs (7.69%), and Dicrocoelium spp. eggs (15.38%) in sheep from households. This study reports the presence and prevalence of protozoa and gastrointestinal helminths in sheep flocks in the eastern area of Teleorman County.

Key words*: flocks, gastrointestinal parasites, individual households, sheep.*

INTRODUCTION

In Romania, sheep breeding is one of the oldest and most traditional activities. According to Eurostat data, 10.4 million sheep were registered in Romania in 2024, ranking 4th in Europe after Turkey, Great Britain and Spain (ec.europa.eu/eurostat/databrowser/view/apro_mt_lssheep/default/table?lang=en), representing an important branch of the country's economy. Romania's geographical position and pedo-climatic characteristics provide favourable conditions for animal husbandry and therefore for sheep farming, both in intensive and extensive systems (Chetroiu et al., 2020).

Sheep, like other animals and humans, can become contaminated with various pathogens, resulting in significant economic losses through decreased production of meat, milk, wool (Rizwan et al., 2017). Gastrointestinal parasites play an important role in the occurrence of these losses, either parasitic protozoa, nematodes, cestodes or trematodes (Cai et al., 2023). Previous studies, conducted in different geographical regions of the world, have shown the presence of widely varying prevalence of gastrointestinal parasite infestation in sheep (Pavlović et al., 2017; Lambertz et al., 2018; Akyüz et al., 2019; Bhowmik et al., 2020; Melnychuk et al., 2020; Sîrbu et al., 2020; Abdillah et al., 2021; da Silva et al., 2021; Sheferaw et al., 2021; Sebro et al., 2021; Rajeshwari et al., 2023; Ruhoollah et al., 2023; Mateș et al., 2024).

The aim of this study was to assess the prevalence of gastrointestinal parasites in sheep in some areas of Teleorman County, raised in private farms, both in households (raised in small numbers for own consumption) and in flocks (raised for both own consumption and commercialization).

MATERIALS AND METHODS

Study design

To perform the present study, data were collected in three flocks, called farms A, B and C, and three households, called households 1, 2 and 3. Both types of farms are located in south-eastern Teleorman County. The study was carried out between October and November 2024, at the end of the grazing period and before autumn deworming.

Geographical area of the study

All farms were located in three villages in the south-eastern part of Teleorman County, namely Teleormanu (43°57'39"N 25°27'25"E), Siliștea (43°59'N 25°28'E) and Plosca (44°2'N 25°7E'), where the natural vegetation of the meadows is dominated by festuca, common knotgrass, blue grass, and couch grass.

Animal population included in the study

In the present study, sheep of the Carabaș de Teleorman breed were included, kept by farmers under open grazing system, on concessioned meadows accessible only to the owner's animals. The animals were kept on meadows during the day, and in the evening, they were brought to shelters set up in the owners' backyards (A) or in three-sided sheds near the pastures (B and C). In addition to daily grazing, the sheep also received regular concentrated feed. The 3 flocks, one in each village, were located as follows: flock A (45 sheep) in the village of Teleormanu, flock B (91 sheep) in the village of Siliștea and flock C (80 sheep) in the village of Plosca. In addition, 3 households were selected (one from each locality), where a small number of sheep of the same breed were kept: household 1 (4 sheep) in Teleormanu, household 2 (5 sheep) in Siliștea and household 3 (4 sheep) in Plosca. The anamnesis revealed that these sheep were raised on the communal pasture of each locality, where the animals of all citizens have access to, including other species such as cows, horses or birds (geese).

The identification data of all animals were recorded in a table, recording eartag number, sex, age, and owner location. Age categorization of animals was done in accordance with previous studies (Rajeshwari et al., 2023): lambs (<1 year), juveniles (1-2 years) and adults (>2 years). All animals were clinically examined, body condition score (BCS) and apparent mucosal colour were followed. The assessment of BCS was done in accordance with those previously published (Phythian et al., 2012), with a scale from 1 to 5, where 1 = emaciated, 2 = thin, 3 = average, 4 = fat and 5 = obese. If animals did not strictly fit into one of the categories, they received half-point scores, such as 1.5; 2.5; 3.5, in line with those recommended by Thompson and Meyer (1994).

Coproparasitology techniques

In the case of flocks, simple random sampling method was used to determine the sample size (Rizwan et al., 2017). In each flock, a table of animals was drawn up and a ticket was made for each animal with its identification number written on it. The tickets were then placed in a bowl, from which 10% were randomly selected. A total of 22 animals were selected from which faecal samples were collected, 8 from the juvenile category and 14 from the adult category. In the households, 13 animals were registered and a faecal sample was collected from each animal, 8 samples from juveniles and 5 samples from adults.

Using plastic gloves, faecal samples were collected directly from the animals' rectum and stored in plastic containers. Each tube was labelled with the animal identification data (age, sex, eartag number and holding). The collected samples were kept in the refrigerator at 4°C until the next day, when they were processed according to previously published (Didă et al., 1998).

First, macroscopic examination of each sample was performed to identify cestode proglottids. Secondly, standard flotation and sedimentation techniques were used to detect protozoan oocysts, and eggs and larvae of gastrointestinal helminths, in accordance with literature data (Didă et al., 1998).

RESULTS AND DISCUSSIONS

In the present study, 229 sheep were included, of which 216 belonged to the flocks (206 females and 10 males) and 13 (all females) belonged to the households. Flock A consisted of 45 sheep (42 females and 3 males), aged between 1 and 8 years, with an average of 3.22 years. In flock B there were 91 sheep (88 females and 3 males), aged between 1 and 4 years, with an average of 2.97 years. Flock C consisted of 80 individuals (76 females and 4 males) with an average age of 2.7 years. According to the classification proposed by Rajeshwari et al. (2023), flock A was composed of 46.67% juveniles and 53.33% adult sheep, flock B of 25.57% juveniles and 74.73% adult sheep, and flock C of 41.25% juveniles and 58.75% adult sheep. In the households, the majority were young sheep (61.54%), while

adults had a lower proportion (38.46%). In household 1, 4 sheep were identified with an average age of 2.75 years, in household 2 there were 5 sheep with an average age of 3 years, and in household 3 there were 4 sheep with an average age of 2.75 years.

Following analysis of the recorded data and clinical examination, it was found that all animals were clinically healthy, with a BCS between 2 and 3.5 (Figure 1).

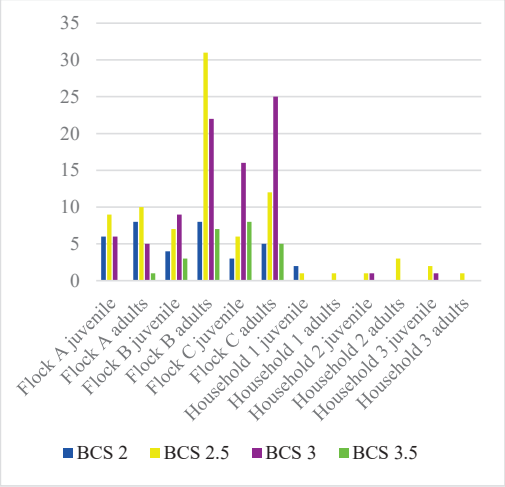

Figure 1. Asessment of BCS in sheep from flocks and households

Results of coproparasitology examination

To assess the prevalence of gastrointestinal parasite infestation, 35 faecal samples were collected, 22 from farms and 13 from households. Following macroscopic examination, no cestode proglottids were detected on the surface of the collected faeces, similar to previous studies (Akyüz et al., 2019). On the other hand, microscopic examination showed an overall prevalence of gastrointestinal parasitic infection of 45.46% in flocks and 84.62% in households. In flocks (A, B and C), the prevalence values were 60%, 44.45% and 37.5%, respectively, while in households (1, 2 and 3) they were 100%, 80% and 70%, respectively.

Based on morphological characters, using identification keys (Didă et al., 1998; Salehi et al., 2022), parasites belonging to the classes Protozoa, Trematoda and Nematoda were observed following microscopic examination (Figure 2).

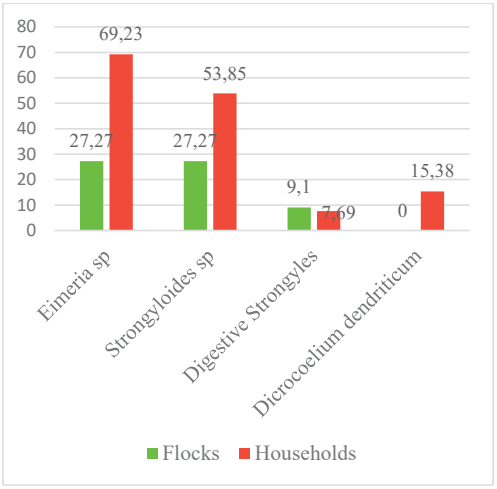

Figure 2. Prevalence of gastrointestinal parasites

In flocks A and C, sheep were parasitized with *Eimeria* spp. and *Strongyloides* sp., and in flock B the presence of digestive strongyle eggs was additionally observed. While in households, *Eimeria* spp. oocysts, *Strongyloides* spp. eggs, digestive strongyles eggs, as well as *Dicrocoelium dendriticum* eggs were identified (Figure 3).

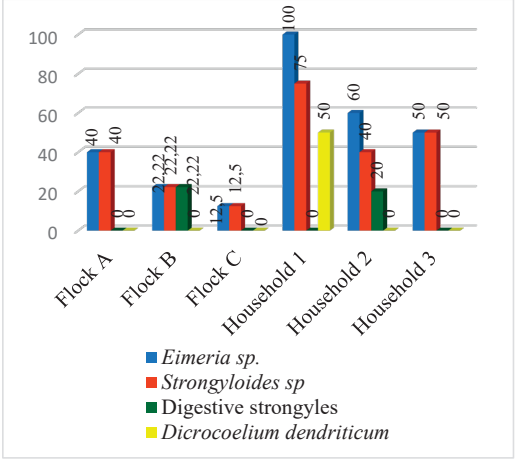

Figure 3. Distribution of parasite types in sheep

Polyparasitism was observed in 40% of positive samples collected from flocks, and in 72.73% of positive samples from households. Regarding the age of the animals, it was found that young animals were infected in a higher proportion than adults, both in flocks (75% vs 28.57%) and in households (100% vs 80%).

Following the microscopic examination, it was found that the prevalence of gastrointestinal parasitism was different in the two types of farms, being lower in flocks (45.46%) and much higher (84.62%) in households.

The degree of infestation can be influenced by a variety of factors, such as environmental conditions, the way grazing is carried out (multiple categories or the presence of multiple animal species on the same pasture), the access of wild animals to pastures that can contaminate the environment, as well as the application of treatments on pastures, or the lack of receptivity of farmers in applying measures to prevent and control parasitic diseases in animals (Rizwan et al., 2017). Climatic conditions and the presence of intermediate hosts are important factors in the development and maintenance of parasites in certain geographical areas and in animal populations (Woldemariam, 2005). Climate change, poor farm management and inappropriate use of pastures present important opportunities for parasite transmission (Castagna et al., 2024). Furthermore, the type and severity of parasitic infection may be influenced by age, immunity, sex of the animal and genetic resistance, as well as the time interval from infestation to examination (Mekonnen, 2021).

The history of each of the farms included in the study showed that the sheep on the flocks grazed on concession pastures, where only the owner's animals had access, while the sheep on the households were raised on the communal pasture, where other species of animals had access, which explains the differences. In addition, a difference in the prevalence of intestinal endoparasites was also found between flocks (60% on flock A, 44.45% on flock B and 37.5% on flock C), which can be attributed to the experience and skill of the owners in managing the livestock. Also, in the case of households, the poor application of prophylactic measures or their lack of application may be the cause of the endoparasite prevalence values recorded.

Protozoa of the genus *Eimeria* recorded the highest prevalence, especially in households (69.23%) compared to the flocks (27.27%). Our results are in agreement with previous studies (Attir and Mammeri, 2021; Abdillah et al., 2021). In a recent study, Sîrbu et al. (2020) identified a prevalence of protozoa of the genus *Eimeria* of 43.7%, and Mateș et al. (2024) identified values between 53.33% and 86.67%. The prevalence values of this parasitosis recorded in our study, as well as in previous studies (Atikum et al., 2021; da Silva et al. 2021), are in direct correlation with the age of the animals, suggesting that young animals are more susceptible to infection with *Eimeria* spp.

Nematodes of the genus *Strongyloides* recorded the second highest prevalence in both types of farms. However, in sheep from households the prevalence value recorded a relatively double percentage (53.85%), compared to that recorded in sheep from flocks (27.27%). The differences may be the consequence of the different numbers of animals in the herds under investigation as well as different management applied to the sheep herds. Previous studies have highlighted different values of the prevalence of this parasitosis (Schoiswohl et al., 2017; Sîrbu et al., 2020; Mateș et al., 2024; Ruhoollah et al., 2023; Abdillah et al., 2021).

Digestive strongyles had a relatively low prevalence, 9.1% in flocks and 7.69% in households, respectively. Our results are in agreement with some previous studies (Atikum et al., 2021), but different from others (Akyüz et al., 2019; Sîrbu et al., 2020; Pavlović et al., 2017).

In household 1 the trematode *Dicrocoelium dendriticum* was diagnosed with a prevalence of 50%. The presence of the infection may be the consequence of grazing in the meadows on the outskirts of Teleormanu village, where conditions were favourable for the development of intermediate hosts (ants of the genus *Formica* and snails of the genera *Helix* and *Zebrina*) necessary for the development of the life cycle of the trematode (Didă, 1996). In contrast to our results, previous studies have reported high levels of this parasitosis (Schoiswohl et al., 2021; Sîrbu et al., 2020; Akyüz et al., 2019; Pavlović et al., 2017), possibly caused by geoclimatic conditions, as well as animal population size, maintenance status and herd management (Bhowmik et al., 2020).

Polyparasitism was more common in animals from households (72.73%) compared to flocks (40%). The mixed infection rate reported in the present study is in agreement with some previous studies (Akyüz et al., 2019). It has been

suggested that gastrointestinal parasitism, and especially polyparasitism, is one of the causes of decreased body resistance and reduced animal productivity, both in intensive and extensive farming systems (Ibrahim et al., 2014; Rizwan et al., 2017). Therefore, controlled application of treatments and compliance with control measures against gastrointestinal parasites is necessary to avoid the occurrence of anthelmintic resistance (Martinez-Valladares et al., 2015). The uncontrolled and frequent application of treatments, together with non-compliance with individual dosages and the use of poor grazing management, with lack of animal rotations on pasture, are the main causes of the appearance of anthelmintic resistance in small ruminants (Sargison et al., 2007; Rufino-Moya et al., 2024).

CONCLUSIONS

The prevalence of gastrointestinal parasitism recorded a higher value in sheep from households (84.62%) compared to those from flocks (45.46%).

In households, protozoa of the genus *Eimeria* (69.23%) were the main cause of endoparasites infection of sheep, followed by *Strongyloides* spp. (53.83%), while in flocks, there was a similar prevalence of *Eimeria* spp. oocysts and *Strongyloides* spp. eggs (27.27%).

Polyparasitism recorded a much higher value in sheep from households (72.73%) compared to those from flocks (40%), and the young sheep recorded a higher prevalence of gastrointestinal endoparasites compared to adult animals, both in households (100%) and flocks (75%).

Regular checks are necessary in sheep flocks to monitor the prevalence of gastrointestinal endoparasites and to assess the parasite load after the administration of antiparasitic drugs in order to determine the health status of the herds.

ACKNOWLEDGEMENTS

This research work was carried out within the USAMVB Project no. 1258/01.11.2024.

REFERENCES

Abdillah, M.F., Lastuti, N.D.R., Utama, S., Suprihati, E. (2021). Identification and prevalence of digestive tract endoparasites of goats in Ujungpangkah, Gresik District. *Journal of Parasite Science*, 5(2): 61-64.

Akyüz, M., Kirman, R., Yaya, S., Gülbeyen, H., Güven, E. (2019). Endoparasites determined by fecal examination in sheep in Erzurum Province. *Turkiye Parasitoloji Dergisi* 43(4): 187-193.

Atikum, P., Osemeke, H., Olaolu, S., Gulek, J., Takyun, A., Yakubu, K.P.R., Weka, R. (2021). Gastrointestinal parasites infection among sheep in Bokkos local government area of Plateau state, Nigeria. *Nigerian Journal of Animal Science*, 23(2): 153-160.

Attir, B., Mammeri, A. (2021). An age-class study of sheep endoparasites in Biskra region (Algeria). *Veterinary Medicine,* 70(1): 39-48.

Bhowmik, M., Hossen, M.A., Al Mamun, M.A., Hasib, F.M.Y., Poddar, S., Hossain, M.A., Alim, M.A. (2020). Prevalence of gastrointestinal parasitic infections in sheep and goats of Sandwip Island, Chattogram, Bangladesh. *Van Veterinary Journal*, 31 (3): 152-157.

Cai, W., Cheng, C., Feng, Q., Ma, Y., Hua, E., Jiang, S., Hou, Z., Liu, D., Yang, A., Cheng, D., Xu, J., To, J. (2023). Prevalence and risk factors associated with gastrointestinal parasites in goats (*Capra hircus*) and sheep (*Ovis aries*) from three provinces of China. *Frontiers in Microbiology* 14: 1287835.

Castagna, F., Bava, R., Gagliardi, M., Russo, S., Poerio, G., Ruga, S., Lupia, C., Cringoli, G., Bosco, A., Rinaldi, L., Palma, E., Britti, D., Musella, V. (2014). Prevalence of helminths in small ruminant farms and evolution of control practices used to counter anthelmintic resistance in Southern Italy. *Pathogens*, 13, 493.

Chetroiu, R., Iurchevici, L., Marin, A., Cofas, E., Cișmileanu, A.E. (2020). *Economic efficiency of livestock sectors - context and assessment*. Bucharest, RO: Ceres Publishing House.

da Silva, A.J.S., da Silva, R.F., de Oliveira, A.V.D., de Souza, L.E.B., de Araújo Souza, M.S., da Costa, D.A. (2021). Prevalence and level of infection by endoparasites in different categories of sheep in the Western Amazon. *Semina: Ciências Agrárias*, 42(4): 2419-2428.

Didă, I., Purcherea, A., Constantinoiu, C., Tudor, P., Duca, I. (1998). *Laboratory methods and techniques for the diagnosis of parasitic diseases.* Notebook of practical works, vol. 1, Bucharest, RO: USAMVB-AMC.

Didă, I. (1996). *Parasitic Zoonosis*. Bucharest, RO: Ceres Publishing House.

Ibrahim, N., Tefera, M., Bekele, M., Alemu, S. (2014). Prevalence of gastrointestinal parasites of small ruminants in and around Jimma Town, Western Ethiopia. *Acta Parasitologica Globalis,* 5: 12-18.

Lambertz, C., Poulopoulou, I., Wuthijaree, K., Gauly, M. (2018). Endoparasitic infections and prevention measures in sheep and goats under mountain farming conditions in Northern Italy. *Small Ruminant Research*, 164: 94-101.

Martínez-Valladares, M., Geurden, T., Bartram, D.J., Martínez-Pérez, J.M., Robles-Pérez, D., Bohórquez, A., Florez, E., Meana, A., Rojo-Vázquez, F. (2015). Resistance of gastrointestinal nematodes to the most commonly used anthelmintics in sheep, cattle and

horses in Spain. *Veterinary Parasitology,* 211: 228-233.

Mateş, B., Florea, T., Rădulescu, A., Puşcaşu, R., Bîrzog, I.E., Cojocaru, D., Morariu, S. (2024). Research on anthelmintic resistance in two flocks of sheep from Alba and Hunedoara counties. *Revista Romana de Medicina Veterinara*, 34(1): 59-64.

Melnychuk, V., Yevstafieva, V., Bakhur, T., Antipov, A., Feshchenko, D. (2020). The prevalence of gastrointestinal nematodes in sheep (Ovis aries) in the central and south eastern region of Ukraine. *Turkish Journal of Veterinary and Animal Science*, 44(5): 4.

Mekonnen, G. (2021). A review on gastrointestinal nematodes in small ruminants. *Advances in Applied Science Research*, 12(7): 32.

Pavlović, I., Becskei, Z., Ivanović, S., Petrović, M., Savić, M., Caro Petrović, V., Bojkovski J. (2017). Biodiversity of helminths of sheep breed in Vojvodian (Northern Serbia). *Bulletin of University of Agricultural Science and Veterinary Medicine Cluj-Napoca: Veteterinary Medicine,* 74(2): 162-166.

Phythian C.J., Hughes D., Michalopoulou E., Cripps P.J., Duncan J.S., 2012. Reliability of body condition scoring of sheep for cross-farm assessments. *Small Ruminant Research*, 104: 156-162.

Rajeshwari, Ganesh, Akshaykumar, Akshata Patil & Pradesh. (2023). Prevalence of endo- and ectoparasites of sheep in and around Krishna district, Andhra Pradesh. *The Pharma Innovation Journal*, 12(8): 745-747.

Rizwan, H.M., Sajid, M.S., Iqbal, Z., Saqib, M. (2017). Point prevalence of gastrointestinal parasites of domestic sheep (*Ovis aries*) in District Sialkot, Punjab, Pakistan. *The Journal of Animal and Plant Sciences*, 27(3): 803-808.

Rufino-Moya, P.J., Leva, R.Z., Reis, L.G., Garcia, I.A., Di Genova, D.R., Gómez, A.S., García, F.G., Martínez-Moreno, F.J. (2024). Prevalence of gastrointestinal parasites in small ruminant forms in Souther Spain. *Animals*, 14, 1668.

Ruhoollah, Khan, W., Al-Jabr, O.A., Khan, T., Khan, A., El-Ghareeb, W.R., Aguilar-Marcelino, L., Hussein, E.O.S., Alhimaidi, A.R., Swelum, A.A. (2023). Prevalence of gastrointestinal parasite in small ruminants of District Dir Upper Khyber Pakhtunkhwa Province of Pakistan. *Brazilian Journal of Biology*, 83: e248978.

Salehi A., Razavi M., Nouri N.V. (2022). Seasonal prevalence of helminthic infections in the gastrointestinal tract of sheep in Mazandaran Province, Northern Iran. *Journal of Parasitology Research*, vol. 2022, ID art. 7392801.

Sargison, N.D., Jackson, F., Bartley, D.J., Wilson, D.J., Stenhouse, L.J., Penny, C.D. (2007). Observations on the emergence of multiple anthelmintic resistance in sheep flocks in the south-east of Scotland. *Veterinary Parasitology,* 145, 65-76.

Schoiswohl, J., Ostrowerhow, K., Hinney, B., Tichy, A., Krametter-Frötscher, R. (2017). Occurrence of endoparasites in the eastern part of Austrian small ruminants and their connection with clinical parameters. *Berliner und Münchener Tierärztliche Wochenschrift*, 130, 170-179.

Schoiswohl, J., Salvenmoser, G., Silbernagl, A.S., Tichy, A., Krametter- Frötscher, R. (2021). Occurrence of endoparasites in sheep flocks in an alpine region in relation to management factors and their impact on clinical parameters. *Wiener Tierärztliche Monatsschrift - Veterinary Medicine Austria*, 108: 289-297.

Sebro, E., Kebamo, M., Abebe, A. (2021). Prevalence of gastrointestinal parasites of sheep and goats in An-Lemo, Hadiya Zone Southern Ethiopia. *Indian Journal od Science and Technology*, 15 (22): 1084-1090.

Sheferaw, D., Mohammed, A., Degefu, A. (2021). Distribution and prevalence of gastrointestinal tract nematodes of sheep at highland and midland areas, Ethiopia. *Journal of Parasitic Diseases*, 45: 995-1001.

Sîrbu, C.B., Imre, K., Dărăbuş, Gh., Suici, T., Mateş, B., Morariu, S. (2020). Prevalence of gastrointestinal parasitic infections in cattle and sheep in two regions of Romania. *Turkish Journal of Veterinary and Animal Sciences,* 44: 581-587.

Thompson J., Meyer, H.I. 1994. *Body condition scoring of sheep.* Oregon State University Extension Service, USA.

Woldemariam, D.I. (2005). *Nematode prevalence, helminth management practices and anthelmintic resistance in small ruminants in the mid Rift Valley of Ethiopia.* [Thesis for the degree Doctor of Veterinary Sciences. Faculty of Veterinary Sciences, University of Pretoria, Pretoria, South Africa, 2-60]. UPSace Repository. https://repository.up.ac.za

https://ec.europa.eu/eurostat/databrowser/view/apro_mt_lssheep/default/table?lang=en