Gastrointestinal Parasites of Sheep in Jember District (East Java – Indonesia)

by Nurkholis Nurkholis

PAPER • OPEN ACCESS

Gastrointestinal Parasites of Sheep in Jember District (East Java – Indonesia)

To cite this article: A Awaludin *et al* 2020 *IOP Conf. Ser.: Earth Environ. Sci.* **411** 012025

IOP Conf. Series: Earth and Environmental Science 411 (2020) 012025 doi:10.1088/1755-1315/411/1/012025

Gastrointestinal Parasites of Sheep in Jember District (East Java – Indonesia)

A Awaludin[1*], Nurkholis[1] and S Nusantoro[1]

[1]Livestock Production Study Program, Department of Animal Husbandry, Politeknik Negeri Jember (State Polytechnic of Jember), Jl. Mastrip PO BOX 164, Jember, East Java, Indonesia

*corresponding author: aanawaludin@gmail.com

Abstract. Sheep is a ruminant livestock that has the most population in Indonesia and the highest distribution of maintenance in rural areas. Increasing livestock production, controlling factors and preventing diseases including parasites need attention, especially from the gastrointestinal parasite group. This study aims to identify the diversity of gastrointestinal parasites in sheep in Jember district. This research was conducted by randomly collecting 175 sheep faecal samples from various regions in Jember district. Identification of gastrointestinal parasite diversity by examining worm eggs in sheep faecal samples using sedimentation methods carried out at BBVet Wates (Veterinary Center). Based on the results of sheep feces examination in Jember, 84 samples (48,0%) were examined were infected with one or more gastrointestinal helminth parasites and (52,0%) obtained negative results. Gastrointestinal helminth parasites were found from the Trematode class: *Paramphistomum* sp., Cestode class: *Moniezia* sp., and nematode class consisting of *Ostertagia* sp., *Trichostrongylus* sp., *Cooperia* sp., *Capillaria* sp., *Bunostomum* sp., *Strongyloides* sp. , *Oesophagostomum* sp., *Trichuris* sp., and *Toxocara* sp. with 56 samples were infected with at least one species and 28 samples were infected with two or more species of gastrointestinal helminth parasites which is useful information for future medication.

1. Introduction

Parasitism is an important problem and is still a serious threat to livestock throughout the world. Sheep is one of the livestock that has the potential to suffer various endoparasites whose worm infections are very important. Worm infection is one of the main obstacles for the production of small ruminants such as sheep in the tropics. The nematode class is one of the main causative worm parasites that cause economic losses in sheep production [1].

Jember is one of the districts in the eastern part of the Java island where many people are traditional breeders. Various types of ruminant livestock such as cattle, goats and sheep are cultivated by the community. The incidence of parasitism in ruminants in Jember district is still high, as in cattle identified as *Fasciola* sp., *Trichuris* sp., *Cooperia* sp., *Ostertagia* sp., *Trichostrongylus* sp., *Moniezia* sp., *Bunostomum* sp., *Strongyloides* sp., *Oesophagostomum* sp., *Capillaria* sp., and *Toxocara* sp. in previous studies [2]. Parasitism in the digestive tract of sheep can be caused by helminths from the class of nematodes, trematodes, and cestodes. Various studies have been carried out to identify helminths in the digestive tract of sheep. Helminths identified in sheep consist of 7 species, consisting of 3 species of the trematode class there are *Paramphistomum* spp., *Fasciola gigantica*, and

Schistosoma indicum, and 4 species of nematode class there are *Trichuris* spp., *Bunostomum* sp., *Strongyles*, and *Strongyloides* spp. [3]. Helminths in the digestive tract can potentially be endemic parasites in sheep in an area. The rates of parasitic infections also differ in different age groups, sexes and nutritional conditions. While the sheep rearing system did not show a significant impact on helminthiasis. The prevalence of helminth infections is associated with *Fasciola gigantica*, *Paramphistomum*, *Schistosoma indicum*, *Moniezia* sp., *Strongyle*-type, hookworm, *Strongyloides* sp., and *Trichuris* sp. [4].

Fecal sample examination can be used to help diagnose the disease. In identification of worm eggs, fecal examination is an appropriate method to look at the morphology of worm eggs [5]. The purpose of this study was to identify gastrointestinal parasites in sheep in Jember.

2. Methodology

The study was conducted from June - September 2019. Sheep faecal samples were collected randomly from Jember Regency without distinguishing gender, age, nutritional status, and maintenance management. Identification of worm eggs at BBVet (Veterinary Center) Yogyakarta.

Identification of worm eggs using sedimentation method, as much as 3 grams of stool samples were put into a 100 ml beaker glass with 50 ml of aquades, mixed until homogeneous. Then taken using a pipette and put in centrifuge tubes up to 2/3 tubes. Then, put in a centrifuge tube up to 2/3 tubes and centrifuged (2000 rpm for 5 minutes). Remove supernatant and added with aquades up to 2/3 tubes then centrifuged again with the same process. Sediment is taken and placed on a glass object by adding 1% eosin solution then covered with a glass deck. Observe with a 10 x 10 magnification microscope and identification of the worm eggs morphology found.

3. Results and discussion

The total samples collected was 175 samples taken randomly with no difference in sex, age, nutritional status, and maintenance management. The results of observing worm eggs in sheep faecal samples are presented in Table 1.

Table 1. Results of identification of worm eggs

No.	Number of Samples	Worm eggs	Prevalence (%)
1.	91	Negative	91/175 (52,0)
2.	39	*Trichostrongylus* sp.	39/175 (22,3)
3.	49	*Ostertagia* sp.	49/175 (28,0)
4.	3	*Capillaria* sp.	3/175 (1,7)
5.	2	*Paramphistomum* sp.	2/175 (1,1)
6.	14	*Strongyloides* sp.	14/175 (8,0)
7.	5	*Trichuris* sp.	5/175 (2,9)
8.	2	*Cooperia* sp.	2/175 (1,1)
9.	2	*Moniezia* sp.	2/175 (1,1)
10.	3	*Bunostomum* sp.	3/175 (1,7)
11.	1	*Toxocara* sp.	1/175 (0,6)
12.	1	*Haemonchus* sp.	1/175 (0,6)

One hundred and seven

One hundred and seventy five sheep faecal samples were identified as negative samples of 91/175 worm eggs (52,0%). Prevalence from gastrointestinal parasites in sheep in Jember is dominated by nematode classes consist of *Ostertagia* sp. (28.0%), *Trichostrongylus* sp. (22.3%), *Strongyloides* sp. (8.0%), *Trichuris* sp. (2.9%), *Capillaria* sp. (1.7%), *Bunostomum* sp. (1.7%), *Cooperia* sp. (1.1%), *Toxocara* sp. (0.6%) and *Haemonchus* sp. (0.6%). Meanwhile, for the prevalence of Trematode class consist of *Paramphistomum* sp. (1.1%) and Cestoda class consist of *Moniezia* sp. (1.1%). The

Nematode class is most paralyzed in the intestine with a simpler life cycle because it does not require intermediate hosts so that its spread will be easier, unlike the Cestoda and Trematoda classes which require intermediate hosts in their life cycle so that its spread is not as easy as parasites from the Nematoda class [6]. The spread of different gastrointestinal helminth parasites in each species can also be due to climatic also environmental factors. That can support the development and survival of infective larval stages in most helminths [7]. Management systems in maintenance also contribute to differences in the spread and development of gastrointestinal helminth parasites in livestock [8]. Besides that the presence or absence of river flow also affects the development and spread of gastrointestinal helminth parasites especially the Cestoda class [9].

From 85 sheep faecal samples examined for gastrointestinal helminth parasites, 56 samples infected with at least one species from helminth parasite (Table 2) and 28 samples infected with two or more species from helminth parasites (Table 3).

Table 2. Results of single-infection helminth parasite

No.	Number of Samples	Worm eggs	Prevalence (%)
1.	17	*Trichostrongylus* sp.	17/175 (9,7)
2.	24	*Ostertagia* sp.	24/175 (13,7)
3.	1	*Capillaria* sp.	1/175 (0,6)
4.	1	*Paramphistomum* sp.	1/175 (0,6)
5.	9	*Strongyloides* sp.	9/175 (5,1)
6.	4	*Trichuris* sp.	4/175 (2,3)

Table 3. Results of co-infection helminth parasites

No.	Number of Samples	Worm eggs	Prevalence (%)
1.	1	*Ostertagia* sp., *Trichostrongylus* sp., *Cooperia* sp.	1/175 (0,6)
2.	14	*Ostertagia* sp., *Trichostrongylus* sp.	14/175 (8,0)
3.	2	*Ostertagia* sp., *Strongyloides* sp., *Trichostrongylus* sp.	2/175 (1,1)
4.	1	*Ostertagia* sp., *Cooperia* sp.	1/175 (0,6)
5.	1	*Ostertagia* sp., *Moniezia* sp.	1/175 (0,6)
6.	1	*Ostertagia* sp., *Trichostrongylus* sp., *Bunostomum* sp., *Moniezia* sp.	1/175 (0,6)
7.	2	*Ostertagia* sp., *Trichostrongylus* sp., *Bunostomum* sp.	2/175 (1,1)
8.	1	*Ostertagia* sp., *Trichostrongylus* sp., *Strongyloides* sp.	1/175 (0,6)
9.	1	*Strongyloides* sp., *Toxocara* sp.	1/175 (0,6)
10.	1	*Paramphistomum* sp., *Capillaria* sp.	1/175 (0,6)
11.	1	*Ostertagia* sp., *Capillaria* sp.	1/175 (0,6)
12.	1	*Ostertagia* sp., *Haemonchus* sp., *Strongyloides* sp.	1/175 (0,6)
13.	1	*Trichostrongylus* sp., *Trichuris* sp.	1/175 (0,6)

Prevalence of single infection was identified in *Trichostrongylus* sp. 17/175 (9,7%), *Ostertagia* sp. 24/175 (13,7%), *Capillari*a sp. 1/175 (0,6%), *Paramphistomum* sp. 1/175 (0,6%), *Strongyloides* sp. 9/175 (5,1%), and *Trichuris* sp. 4/175 (2,3%). Prevalence of co-infection is found in *Ostertagia* sp., *Cooperia* sp., and *Trichostrongylus* sp. 1/175 (0,6%), co-infection from *Ostertagia* sp. and *Trichostrongylus* sp. 14/175 (8,0%), co-infection from *Ostertagia* sp., *Strongyloides* sp., and *Trichostrongylus* sp. 2/175 (1,1%), mixed infection from *Ostertagia* sp. and *Cooperia* sp. 1/175 (0,6%), co-infection from *Ostertagia* sp. and *Moniezia* sp. 1/175 (0,6%), co-infection from *Trichostrongylus* sp., *Ostertagia* sp., *Bunostomum* sp., and *Moniezia* sp. 1/175 (0,6%), co-infection from *Trichostrongylus* sp., *Ostertagia* sp., and *Bunostomum* sp. 2/175 (1,1%), co-infection from

Trichostrongylus sp., *Ostertagia* sp., and *Strongyloides* sp. 1/175 (0,6%), co-infection from *Strongyloides* sp. and *Toxocara* sp. 1/175 (0,6%), co-infection from *Paramphistomum* sp. and *Capillaria* sp. 1/175 (0,6%), co-infection from *Ostertagia* sp. and *Capillaria* sp. 1/175 (0,6%), co-infection from *Ostertagia* sp., *Haemonchus* sp., and *Strongyloides* sp. 1/175 (0,6%), and co-infection from *Trichostrongylus* sp. and *Trichuris* sp 1/175 (0,6%). Single infection is more common in samples than co-infection of gastrointestinal helminth parasites, because the conditions of sampling conducted in the dry season, it will affect the spread and development of infective larvae of the gastrointestinal helminth parasites. The development and spread of parasitic helminths and mixed infections will show a higher prevalence during the rainy season, and a lower incidence during the summer [10].

The high level of gastrointestinal helminth parasites infections in sheep is possible because of lack of management and helminth treatment programs, especially on traditional farms. In traditional sheep rearing, enclosure sanitation is not given enough attention so the spread of parasites is out of control.

4. Conclusions

The incidence of a single infection is more numerous than a co-infection, possibly due to the condition of the sampling carried out during the dry season thereby affecting the spread and development of gastrointestinal helminth parasites. Research on infection levels from gastrointestinal helminth parasites needs to be done to obtain useful information to make policies in handling gastrointestinal helminth parasites in Jember district.

5. Acknowledgements

Thank you to the Politeknik Negeri Jember (State Polytechnic of Jember) for providing research funding through the P3M from PNBP funding sources so that this research can be carried out.

6. References

[1] Coop R L and Angus K W 1981 *How helminths affect sheep* (In Practice 3) pp 4 – 11
[2] Awaludin A, Nurkholis and Nusantoro S 2018 Identify the diversity of helminth parasites in cattle in Jember district (East Java – Indonesia) *IOP Conf. Ser.: Earth Environ. Sci.* 207/012032 pp 1 – 5
[3] Sangma A, Begum N, Roy B C, and Gani M O 2012 Prevalence of helminth parasites in sheep (Ovis aries) in Tangail district, Bangladesh *J. Bangladesh Agril. Univ.* 10 (2) pp 235 – 2
[4] Poddar P R, Begum N, Alim M A, Dey A R, Hossain M S, and Labony S S 2017 Prevalence of gastrointestinal helminths of sheep in Sherpur, Bangladesh *J. Adv. Vet. Anim. Res.* 4(3) pp 274 – 280
[5] Soejoto and Soebari 2002 *Parasitologi medik Jilid 3: protozoologi dan helmintologi* (Solo: EGC)
[6] Levine N D 1990 *Buku pelajaran parasitologi veteriner* (Yogyakarta: Gadjah Mada University Press)
[7] Rossanigo C E and Grunder L 1995 Moisture and temperature requirements in feces for the development of free living stages of gastrointestinal nematodes of sheep and cattle and deer *J. Helminthol* 67 pp 357 – 362
[8] Regassa F, Teshale S, Reta D, and Yosef K 2006 Epidemiology of gastrointestinal parasites of ruminants in Western Oromia, Ethiopia *Int. J. Appl. Res. Vet. Med.* 4 pp 51 – 57
[9] Nugraheni Y R, Priyowidodo D, Prastowo J, Rohayati E S, Sahara A, and Awaludin A 2018 Parasit gastrointestinal pada sapi di daerah aliran sungai Progo Yogyakarta *Jurnal Ilmu Peternakan Terapan* 1 (2) pp 46 – 50
[10] Dappawar M K, Khillare B S, Narladkar B W, and Bhangale G N 2018 Prevalence of gastrointestinal parasites in small ruminants in Udgir area of Marathwada *Journal of Entomology and Zoology Studies* 6 (4) pp 672 – 676

Gastrointestinal Parasites of Sheep in Jember District (East Java – Indonesia)

ORIGINALITY REPORT

11%	8%	10%	11%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to Udayana University Student Paper	6%
2	Submitted to School of Business and Management ITB Student Paper	3%
3	tethys-engineering.pnnl.gov Internet Source	3%

Exclude quotes	On	Exclude matches	< 2%
Exclude bibliography	On		