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

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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 Trichurus spp., Bunostomum sp., Strongyles, and Strongyloides spp. [3]. Helminths in the digestive tract can potentially be endemc 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 helmint 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%), *Capillaria* 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.

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6. References
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