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Prevalence of Helminthiasis in Cattle Through Fecal Examination in Magetan Regency

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Abstract

This study aims to determine the prevalence of helminthiasis and find various kinds of egg worms in cattle through fecal examination in Magetan Regency. A hundred cattle fecal samples were collected from six animal markets in Magetan Regency. The Faecal examination was performed by native, sediments, and Flotation methods. The results of this study showed that there were 40 samples positively infected by a helminth, which indicated that the prevalence of helminthiasis in cattle was 40%. The kind of helminth were *Oesophagostomum* sp. (14%), *Bunostomum* sp. (8%), *Mecistocirrus* sp. (8%), *Haemonchus* sp. (4%), Toxocara vitulorum (3%), *Trichuris* sp. (2%), *Strongyloides* sp. (2%), and *Fasciola* sp. (11%).

Keywords: Prevalence, Helminth, Cattle, Magetan Regency, Fecal Examination

Introduction

Magetan Regency is one of the regencies located in East Java Province, where it is well known as a local cattle center that excels in development and marketing. The population of beef cattle in Magetan Regency in 2018 was 120,677 heads (Central Bureau of Statistics). As the data show an increase of more than three thousand cattle compared to the previous year as a result of a large number of new breeders in Magetan Regency. It shows that there are opportunities for the community can take advantage of the further advanced beef cattle farming in Magetan Regency. On the other hand, the lack of attention to a proper rearing system and the inexperience of new breeders can lead to diseases caused by parasites such as helminthiasis or worms.

Worm infections can inhibit weight gain, inhibit growth livestock, and predispose to other diseases (Rozi *et al*., 2015). The farmers in Indonesia suffer a loss of up to Rp. 4 billion per year due to gastrointestinal nematode worm infections (Directorate General of Livestock, 2010). Some parasitic diseases are also zoonotic and endanger humans, including Fascioliasis, Balantidiosis, and Taeniasis (Tolistiawaty *et al*., 2016). In Iran, Fascioliasis is sporadic and able to infect nearly 10,000 people (Ali *et al*., 2011).

Research on the prevalence of helminthiasis in beef cattle, among others, Paramitha *et al* (2017), in LPA Benowo Surabaya was 73%. In Bali Province, Arsani *et al* (2015) was 38.22%. Purwaningsih and Bambang (2012) in Central Java an average of 41.3% with the species of worms found, namely Strongyle sp. (24.0%), Toxocara sp. (12,5%), *Trichuris* sp. (6.8%), *Strongyloides* sp. (6.3%), *Fasciola* sp. (2.5%), Capillaria sp. (2.1%), and Moniezia sp. (1.6%).

Environmental aspects such as climate, temperature, humidity, altitude, and rainfall can affect the incidence of parasitic infections (Karim et al., 2015). Intrinsic factors such as animal species, age, sex, and animal condition or immunity also affect the transmission (Jhoni et al., 2015). The beef cattle rearing system in Magetan is carried out intensively. Cattles are kept in cages that are generally made of bamboo. Sanitation in the cage is not maintained. There is no good drainage so that the fecal are disposed of around the cage. This phenomenon causes many flies to swarm around the cattle. In addition, it is not uncommon for cattles to experience diarrhea.

The study was conducted to determine the prevalence and types of worms found in beef cattle through faecal examination in Magetan Regency. The data obtained are expected to be used in disease prevention efforts to develop beef cattle in Magetan Regency and reduce the losses incurred.

Materials and Methods

The study was conducted from October 2020 to March 2021. The sample consisted of 100 beef cattle whose fecal were taken. Samples were randomly selected from six animal markets in Magetan Regency. Fecal are taken immediately after the cattle defecate as much as ± 10 grams and then put in a plastic or urine container, and given a preservative in the form of 10% formalin and a label. Each label contains the number, gender, date, and place of collection. The stool sample is taken to the laboratory for examination. The examination was carried out using the native method, the sedimentation method, and the Fulleborn floating method. These three methods are standard examinations used in the examination of helminthiasis. The sample is declared positive if worm eggs are found on examination using one or more methods.

In the native method, a small amount of fecal is taken and applied to the object glass. Give one or two drops of water and mix well, then cover with a cover glass. Then examine it with a microscope with a magnification of 100x. (Sosiawati et al., 2017).

Sedimentation method, make a suspension of fecal with water 1:10. Then filter and put the filtrate in a glass beaker. The filtrate was centrifuged for 2-5 minutes at 1500 RPM. The supernatant was discarded and repeated until it was clear. Once clear, the supernatant was discarded and left a little. The sediment is stirred and taken sufficiently. Place it on the object glass and cover it with a cover glass. Check with a microscope with a magnification of 100x (Sosiawati et al., 2017).

The working procedure of the floating method is similar to that of sedimentation. After it was clear, the supernatant was discarded and then a saturated sugar solution was added to 1 cm from the mouth of the tube. Then centrifuge in the same way. Place the centrifuge tube on the tube rack and drip the saturated sugar solution until it looks convex. Put the cover glass on it then wait 1-2 minutes. After that, place the cover glass on top of the object glass and observe with a 100x magnification microscope (Sosiawati et al., 2017).

Positive samples were identified and prevalence rates were calculated using the formula Prevalence = (Total of positive samples/Total of samples taken) x 100%.

Results and Discussions

The prevalence rate of helminthiasis in beef cattle through faecal examination in Magetan Regency was 40% as shown in Table 1.

Based on the type of cattle, the infections found in limousine crossbreeds there were 21 cases, 16 cases of Simmental crossbreeds, and three cases of Ongole breed as shown in Table 2.

Table 1. Prevalence of Helminthiasis in Beef Cattle Through Fecal Examination in Magetan Regency (October -November 2020)

Animal Market	Total of sample	Positive sample worm infection		positives sample(%)
		Single	Mixture	
Kawedanan	25	11	3	14 (56)
Maospati	10	1	2	3 (30)
Panekan	15	4	2	6 (40)
Plaosan	20	3	1	4 (20)
Parang	15	4	3	7 (46,7)
Ngariboyo	15	5	1	6 (40)
Total	**100**	**28**	**12**	**40 (40)**

Table 2. Prevalence of Helminthiasis in Beef Cattle in Magetan Regency by Type of Beef Cattle (October-November 2020)

Market	PO	S (+)	PL	S (+)	Psm	S (+)	TS	TS (+)
Kawedanan	3	1	9	5	13	8	25	14
Maospati	0	0	6	3	4	0	10	3
Panekan	3	0	5	4	7	2	15	6
Plaosan	2	0	11	4	7	0	20	4
Parang	3	2	6	3	6	2	15	7
Ngariboyo	4	0	7	2	4	4	15	6
Total	**15**	**3**	**44**	**21**	**41**	**16**	**100**	**40**

Description: PO= Peranakan ongole, S= sample, PL= Peranakan limousine, Psm= Peranakan simental, TS: Total of sample, TS(+)=Total of the sample (+)

The results of the examination found eggs of worms *Oesophagostomum* sp., *Bunostomum* sp., *Haemonchus* sp., *Mecistocirrus* sp., *Strongyloides* sp., *Trichuris* sp., Toxocara Vitulorum, and *Fasciola* sp. Pictures of worm eggs are presented as follows.

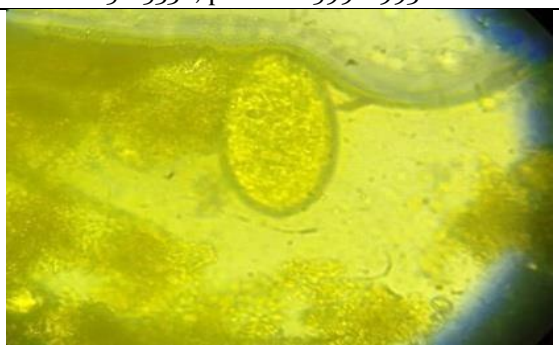

Figure 1. The eggs of *Fasciola* sp. magnification 400x

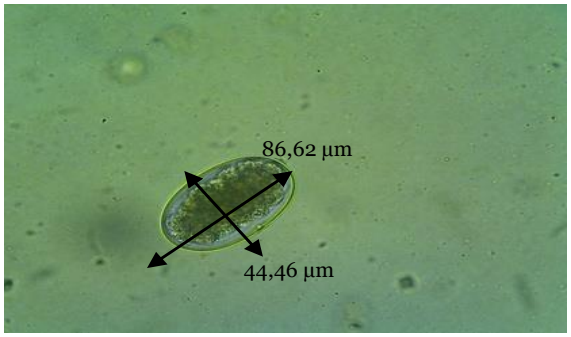

Figure 2. The eggs of *Oesophagostomum* sp. magnification 400x

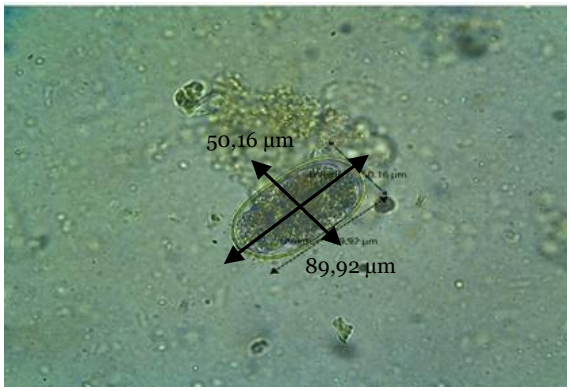

Figure 3. The eggs of *Buniostomum* sp. magnification 400x

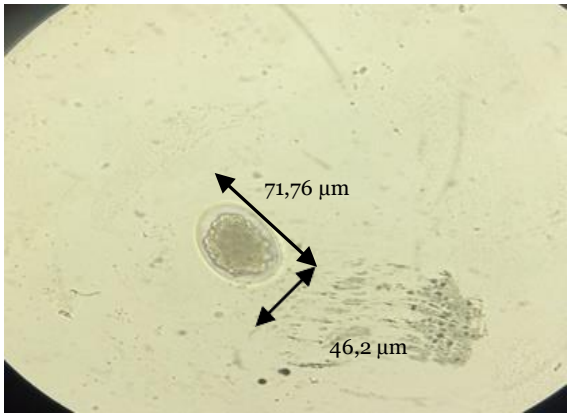

Figure 4. The eggs of *Haemonchus* sp. magnification 400x

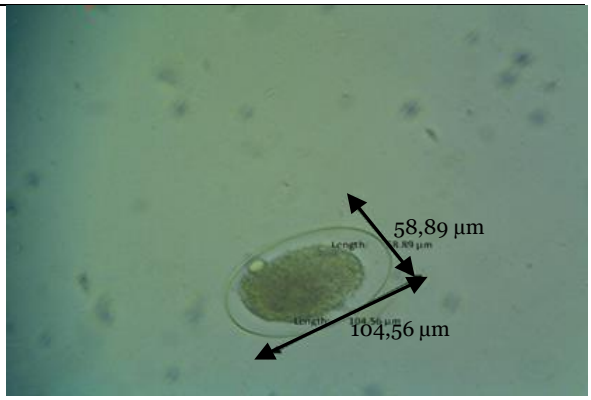

Figure 5. The eggs of *Mecistocirrus* sp. magnification400x

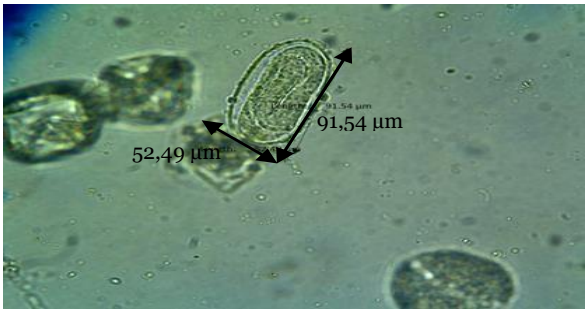

Figure 6. The eggs of *Strongyloides* sp. magnification400x

Figure 7. The eggs of *Trichuris* sp. magnification 400x

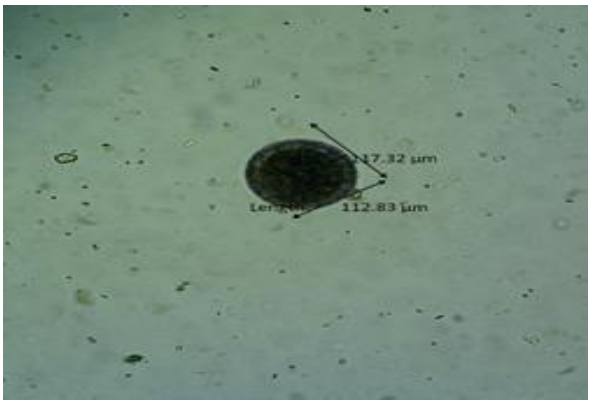

Figure 8. The eggs of *T. vitulorum* magnification 100x

In Magetan, Worm infection of beef cattle occurs in single and mixture patterns. The single most common infection was caused by

Oesophagostomum sp. a total of eight cases and the most common mixed infections were *Oesophagostomum* sp. and *Bunostomum* sp. a total of four cases. Types of worm infection in beef cattle in Magetan Regency can be seen in Table 3.

Discussion

The prevalence of helminthiasis found in beef cattle in Magetan Regency was 40%. This figure is lower than the results of research by Paramitha *et al*. (2017) at LPA Benowo Surabaya 73%. But higher than yield research by Arsani et al (2015) in Bali Province 38.22%. Differences in prevalence are influenced by environmental aspects such as climate, temperature, humidity, altitude, and rainfall (Karim et al., 2015). Livestock traffic can also be an influential factor. Monitoring of livestock traffic that is not optimal can reduce or increase the prevalence rate because cattles come and go alternately from inside or outside the city.

The cattles in this study did not show clinical symptoms like cattle infected with the parasite. The physical condition of infected and uninfected cattle tends to be difficult to distinguish. However, in some of the stools taken, the consistency is softer and some are mixed with a little blood.

There were 21 cases of limousine crossbreeding, 16 cases of Simmental crossbreeding, and three cases of Ongol breed. These results have not been able to prove the influence of race on the incidence of infection because there are external factors that influence it.

The results of the examination found the type of worm eggs that matched the characteristics of *Oesophagostomum* sp. (14%), *Bunostomum* sp. (8%), *Mecistocirrus* sp. (8%), *Haemonchus* sp. (4%), *T. Vitulorum* (3%), *Trichuris* sp. (2%), *Strongyloides* sp. (2%), and *Fasciola* sp (11%).

Eggs of *Fasciola* sp. are elliptical in shape, yellowish in color, and the operculum is not visible. The eggs of *Oesophagostomum* sp. measuring 86.62 x 44.46 m, elliptical for the shape. Eggs of *Bunostomum* sp. measure 89.92 x 50.16 m and looks blunt. According to Taylor et.al (2016), the eggs of F. hepatica are ovoid, have an operculum, yellow to brown, and are 130-150 x 65-90 m, the eggs of *F. gigantica* are 170-190 x 90-100 m. larger than *F. hepatica*. The eggs of *Oesophagostomum* sp. are elliptical, with thin walls, measuring 75-98 x 46-54 m. The eggs of *Bunostomum* sp. measuring 97-106 x 45-55 m, thin-walled, elliptical with blunt ends, and contain four-eight cells.

Table 3. Types of Worms Found in Beef Cattle Through Stool Examination in Magetan Regency (October-November 2020)

Animal Market	Total of sample	Total of Positive sample	Positive sample helminthiasis			
			single	Total	mixture	Total
Kawedanan	25	14	*Trichuris* sp.	1	*Haemonchus* sp. + *Trichuris* sp.	1
			Toxocara vitulorum	1	*Bunostomum* sp. + *Fasciola* sp.	1
			Fasciola sp.	2	*Oesophagostomum* sp. + *Bunostomum* sp.	1
			Bunostomum sp.	1		
			Mecistocirrus sp.	3		
			Oesophagostomum sp.	3		
Maospati	10	3	*Oesophagostomum*sp.	1	*Oesophagostomum* sp. +*Bunostomum* sp.	1
					Oesophagostomum sp. +*Strongyloides* sp.	1
Panekan	15	6	*Fasciola* sp.	1	*Oesophagostomum* sp. + *Fasciola* sp.	1
			Oesophagostomum sp.	3	*Strongyloides* sp. + *Bunostomum* sp.	1
Plaosan	20	4	Toxocara vitulorum	1	*Oesophagostomum* sp. +*Bunostomum* sp.	1
			Mecistocirrus sp.	2		
Parang	15	7	*Fasciola* sp.	3	*Fasciola* sp + Toxocara vitulorum	1
			Mecistocirrus sp.	1	*Fasciola* sp. +*Haemonchus* sp.	1
					Oesophagostomum sp. +*Bunostomum* sp.	1
Ngariboyo	15	6	*Haemonchus* sp.	2	*Oesophagostomum* sp. +*Mecistocirrus* sp.	1
			Fasciola sp.	1		
			Mecistocirrus sp.	1		
			Oesophagostomum sp.	1		
Total	100	40		28		12

The eggs of *Haemonchus* sp. measuring 71.76 x 46.2 m. Eggs of *Mecistocirrus* sp. Measuring 104.56 x 58.89 m. Eggs of *Strongyloides* sp. measuring 91.54 x 52.49 m and inside the eggs, there are worm larvae. Eggs of *Trichuris* sp. shaped like a lemon, and there is a transparent plug at the end. Align with the statement of Kusnoto et.al (2010) eggs of *Haemonchus* sp. measuring 70-85 x 41-48 m. Eggs of *Mecistocirrus* sp. measuring 95-120 x 56-60 m. Eggs of *Strongyloides* sp. thin-walled, measuring 40-60 x 20-25 m, and already contains larvae. Eggs of *Trichuris* sp. brown shaped like a barrel with a transparent plug at the end, and measuring 70-80 x 30-42 m. The eggs of *T. Vitulorum* are subglobular, brownish-colored surrounded by a layer of albumin, and measuring 75-95 x 60-75 m. The *T. Vitulorum* eggs found were larger than the literature, namely 117.32 x 112.83 m.

Mixed or single infections are common in cattle, so it is difficult to know the specific effect (Levine, 1994). Most infections are caused by worms from the class Nematoda and then Trematodes. It is related to the worm's life cycle that does not require a reservoir host, so it is easier to take place (Nofyan et al., 2010).

Oesophagostomum sp. was the most common infection with a total of 14 cases. Two groups of worms often attack cattle in the tropical area, namely Strongyloidea and Ascaridea (Wiliamson and Payne, 1993). In this case, the Strongyloidea group, namely *Bunostomum* sp. and *Oesophagostomum* sp. Worm infection *Oesophagostomum* sp. can loss of weight and if it continues, death can occur (Kusnoto et al., 2017).

The least infection is caused by *Trichuris* sp. and *Strongyloides* sp. with two cases. The reduced source of forage and the height of the grass that is closer to the ground in the dry season can increase the chances of ingestion of *Trichuris* sp. infective by livestock (Winarso et al., 2015). These worms will suck blood to grow (Kusnoto et al., 2017).

In class Trematoda infection with *Fasciola* sp. There are 11 cases out of 100 samples. This figure is lower than data reported by Nofyan et.al (2010) in several animal markets in Indonesia, namely 90%. Worms *Fasciola* sp. requires an intermediate host in its life cycle. Snails are one of the intermediate hosts that are easy to find in clear waters, with good oxygenation, and the water flow is not too fast like a rice field environment (Levine, 1994). The Magetan area has vast rice fields and plantations that can also have the potential to cause and affect the infection.

Conclusion

The prevalence rate of helminthiasis in beef cattle through faecal examination in Magetan Regency was 40% and worm eggs found are *Trichuris* sp., *Oesophagostomum* sp., *Bunostomum* sp., *Mecistocirrus* sp., *Haemonchus* sp., *T. Vitulorum*., *Strongyloides* sp., and *Fasciola* sp.

Suggestions

To conduct counseling to improve maintenance management, administer deworming medicine regularly and continuously, and check and collect disease data every year to determine future prevention steps.

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