Fasciolosis Infection Level of Various Breed Cattle in Batu and Pujon District, East Java, Indonesia

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Abstrack. Fasciolosis is a disease caused by *Fasciola gigantica* (Cobbold, 1855) or *Fasciola hepatica* (Linnaeus, 1758) that infected ruminants and caused liver damaged and loss of productivity. To control Fasciola disease in cattle, it is necessary to consider differences in the prevalence or number of cases in various cattle breed. This research was conducted in two slaughterhouses in Batu and Pujon District, Malang Regency, East Java, Indonesia involving 50 livestock in each slaughterhouse, either beef or dairy cattle. Observation was done for 2 mo by performing liver necropsy, observing the presence of fibrosis and calcification of the bile duct, counting the number of worms and weighing the removed liver tissue. Result of this research the number of fasciolosis in Ongole and Limousin cattle (30.95 % and 35.94 %) was fewer compared to Simmental and Frisian Holstein (58.33 %). Average number of worms head^{-1} in each cattle breed; Limousin, Simmental, Ongole, and FH were (105, 49, 27 and 129) worms. Meanwhile, fibrosis score in each group were 1.48, 1.89, 1.33 and 1.75 respectively. It is suspected that differences in cattle breed had correlation with susceptibility towards infection. It is indicated that Limousin cattle are more tolerant against liver worm infection.

Key words: Breed of cattle/cows, cow/cattle health, fasciola disease, fibrosis disease, manage disease infections

1 Introduction

Fasciolosis is a disease caused by *Fasciola gigantica* (Cobbold, 1855) or *Fasciola hepatica* (Linnaeus, 1758) that infected ruminants and caused liver damaged and loss of productivity. According to [1] the prevalence of these worms is negatively correlated with milk production. The total economic loss in Kenya during the 10 yr period as a result of condemnation of the infected livers was approximately USD 2 600 000. Fasciola infection can be transmitted from livestock to human and cause health problems [2].

Livestock breeds can affect the ability to manage disease infections. Genetic factors in these livestock can cause livestock in a resistance condition, livestock is able to fight infection [3]. Besides, even though the cattle were infected by pathogens, but only slightly affected, the condition of tolerance [4]. To control Fasciola disease in cattle, it is necessary

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to consider differences in the prevalence or number of cases in various cattle breed. It needs to determine the most resistant or tolerant cattle breed. The purpose of this study was to determine the percentage of Fasciolosis cases in beef and dairy cattle that slaughtered at Batu and Pujon District slaughterhouse in Malang Regency, East Java, Indonesia and the impact of Fasciola infection in decreasing liver condition.

2 Materials and methods

This research was conducted in two slaughterhouses in Batu and Pujon District, Malang Regency, East Java, Indonesia involving 50 livestock in each slaughterhouse, either beef or dairy cattle. Observation was done for 2 mo (February 2019 to March 2019). All cattle older than 2 yr. The study was conducted by performing liver necropsy, observing the presence of fibrosis and calcification of the bile duct, counting the number of worms and weighing the weight of the removed liver tissue. The scoring of fibrosis was based on [4]. Data were analyzed descriptively.

3 Results

The results of liver necropsy from the slaughtered beef and dairy cattle in Batu and Pujon slaughterhouse for 2 mo showed that out of 50 cows slaughtered in Batu as many as 29 beef and dairy cattle (58 %) suffered Fasciolosis. While in Pujon, 10 out of 50 beef and dairy cattle (20 %) suffered Fasciolosis (Table 1). The prevalence of fasciolosis in the Pujon slaughterhouse is almost the same as presented by [5] in the Pontianak slaughterhouse that in beef cattle, the prevalence of *F. hepatica* has been found to reach 23.75 %. [5] Reported the prevalence of fasciolosis in Balinese cattles raised in four Prafi District villages, namely Udapi Hilir, Desay, Aimation, and Prafi Mulya Villages were 30.53 %, 30.61 %, 40.74 % and 38.24 % respectively. These results showed that there were no significant differences from the reseached conducted by [6], that Fasciola's infection rate in slaughtered houses in Punjab reached 22.60 %.

Table 1. Percentage of livestock infected by fasciolosis in Batu and Pujon slaughterhouses

No	Livestock type	District	Number of livestock (tail)	Positive fasciola infection (tail)	Percentage (%)
1.	Limousin	Batu	34	19	55.88
2.	Simmental		6	5	83.33
3.	PO*		7	2	28.57
4.	PFH**		3	3	100
Total			50	29	
1.	Limousin	Pujon	25	4	16.00
2.	Simmental		12	4	33.33
3.	PO		3	1	33.33
4.	PFH		6	1	16.67
5.	Brangus		4	0	0
Total			50	10	

* Ongole Cattle Breed
** Friesian Holstein Cattle Breed

The most common livestock slaughtered in the two slaughterhouses were beef cattle i.e. Limousin and Simmental. Fasciolosis were found in beef cattle i.e. Limousin, Simmental, Ongole and dairy cattle Friesian Holstein (FH) but none were found in Brangus cases. It was suspected that the number of Brangus cattle slaughtered during the study period was lesser than others, thus did not reflect the actual condition.

Table 2. Average percentage (%) of fasciolosis cases based on livestock type in Batu and Pujon slaughterhouse

No	Type of livestock	Percentage of fasciolosis cases		Average percentage of fasciolosis cases in both district
		Batu	Pujon	
1.	Limousin	55.88	16.00	35.94
2.	Simmental	83.33	33.33	58.33
3.	Ongole	28.57	33.33	30.95
4.	FH	100	16.67	58.33

The average percentage of Fasciolosis in both slaughterhouses that infected Limousin, Simmental, Ongol and FH were 35.94 %, 58.33 %, 30.95 % and 58.33 % respectively. Fasciolosis infection needs to be controlled since it zoonoses that endangers human life. According to [7], control of *F. hepatica* infection may have an influence on shedding of *E. coli* 0157 in beef cattle aimed at the human food chain.

Previous studies stated that breed factors need pay attention in an effort to find the types of livestock that are most resistant to infections including the *F. gigantica* [8] reported that the level of susceptibility cattle is higher than buffalo. According to [4], Indonesian thin–tailed sheep are more resistant to artificial infections of *F. gigantica* compared to Merino sheep in terms of the smaller number of worms found in the liver and differences in immune response.

Therefore, research that observed cases of Fasciolosis in various types of livestock such as this research needs to be continued in order to obtain information to develop types of livestock that are more resistant to fight against Fasciola infection. In this study it was observed that fewer cases of Fasciola in Ongole and Limousin cattle compared to Simmental and FH.

Table 3. Average number of worms per livestock and fibrosis score on each type of livestock in both slaughterhouse

No	Type of livestock	Average number of worms/head	Average fibrosis score*
1.	Limousin	105	1.48
2.	Simmental	49	1.89
3.	PO	27	1.33
4.	PFH	129	1.75

Note: Mazeri et al. (4)

In Table 3, the average number of worms head^{-1} in each cattle breed; Limousin, Simmental, Ongole and FH were (105, 49, 27, and 129) worms respectively. While the fibrosis score of each breed was reached 1.48, 1.89, 1.33 and 1.75 respectively. According to [4], fibrosis scores are classified in scores from 0 to 3. Where a score of zero indicates no fibrosis; score 1 indicates the presence of local fibrosis; score 2 shows a severe local fibrosis or mild general fibrosis and score 3 indicates the presence of severe local fibrosis accompanied by calcification of the bile duct or severe general fibrosis. Thus on average in all cattle breed in this study had local fibrosis. Liver fibrogenesis and increased activity of

stellate cells are associated with *F. hepatica* infection [9]. Formation of fibrosis occured because the liver cells are damaged due to the presence of juvenile worms that enter the liver tissue. Fibrosis can also be said as an attempt by the body to localize the infection [10].

It is suspected that different breed of cattle has a role in developing immunity against the parasitic infection. In Limousin and FH cattle the number of worms is higher, but the fibrosis score is lower than Simmental (Table 3).

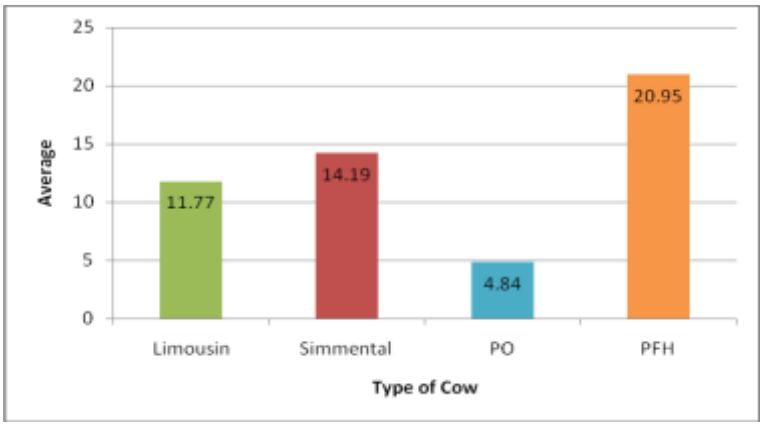

Fig. 1. Average percentage (%) of damaged liver due to fasciolosis in Batu and Pujon slaughterhouse according to cattle breed

Figure. 1 showed that the percentage of liver damaged in Limousin, Simmental, Ongole, and FH were 11.77 %, 14.19 %, 4.84 % and 20.95 % respectively. When comparing Table 2 with Figure 1 it can be concluded that in Limousin, although the number of worms head^{-1} was higher than Simmental, the fibrosis score and the percentage of damaged liver tissue were lower than Simmental. It is possible that Limousin had tolerance to liver worm infection.

The average weight of the damaged liver by fasciolosis from all cattle breed was 10.98 kg on average or 1.42 kg head^{-1}. If in a month 20 cattle suffered Fasciolosis in Batu, East Java, Indonesia the number of liver removed is around 28.40 kg mo^{-1} or 340.80 kg yr^{-1}. The average price of cattle liver kg^{-1} in Batu was IDR 60 000 kg^{-1} so that the estimated economic loss per year reaches IDR 20 448 000.

4 Conclusions

Both beef cattle (Limousin, Simmental, Ongole) and dairy cattle (FH) can be infected by Fasciola sp. The number of Fasciolosis in Ongole and Limousin cattle (30.95 % and 35.94 %) was fewer compared to Simmental and FH (58.33 %). Average number of worms head^{-1} in each cattle breed; Limousin, Simmental, Ongole, and FH were (105, 49, 27 and 129) worms. Meanwhile, fibrosis score in each group were 1.48, 1.89, 1.33 and 1.75 respectively. It is suspected that differences in cattle breed had correlation with susceptibility towards infection. It is indicated that Limousin cattle are more tolerant against liver worm infection.

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