

Conference Paper

Differences in the Rearing System Toward Bali Cattle Gastrointestinal Helminths Infestation in Prafi District, Manokwari Regency, West Papua Province, Indonesia

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Abstract

Helminthic disease is a disease that attacks cattle at various ages. The cattle-rearing influence the development of parasitic disease agents. The objective of this study was carried out to determine the extent to which level of parasites infestation towards different cattle rearing system through examination of cattle feces. Coprological techniques, simple flotation, and simple sedimentation were used to detect gastrointestinal helminths in Bali cattle. A total of 369 rectal fecal samples were collected from Bali cattle on semi-intensively reared, and non-intensively reared in Prafi District, Manokwari Regency, West Papua Province, Indonesia. Fecal samples were used for qualitative and quantitative coprological examination. Eggs worms were identified based on morphology. Meanwhile, the relationship between rearing system to the prevalence of helminthic diseases was analyzed by Chi-square test. Descriptive analyses results showed that the overall prevalence was 57.45 % of gastrointestinal (GI) helminths and the prevalent helminthes eggs identified were Strongyle (22.22 %), Strongyloides (0.81 %), Fasciola (34.96 %), Paramphistomum (10.03 %), Toxocara (5.96 %), Trichuris (2.44 %), and Moniezia (0.81 %). The result showed that there was no association ($P < 0.05$) between rearing system and the prevalence of gastrointestinal helminth infestation.

Keywords: Bali cattle, Gastrointestinal helminths, Manokwari Regency, Prevalence, Rearing system

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1. Introduction

The growing demand for the meat and milk in the developing world, changing the function of livestock and changing consumers perspectives are the major driving forces in the global [1]. Indonesia has the consumption of meat will reach 10.10 kg per capita · yr⁻¹, thus the development of animal husbandry having the potential to be improved [2]. Bali cattle is a national asset needs to be preserved, so we needed to maintain existence [3]. The advantage of Bali cattle than other cattle is has a very high adaptation to the worse

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environment, be able to use feed with poor quality, have fertility and conception rate very high, the high percentage of carcass and having the meat of good quality with low levels of fat, but they have fragile to infection disease such as parasitic digestive tract because a source of feed and environment not really clean [4, 5].

Although the development of cattle production potentially is increased due to the way a less well rearing system as the cattle under a system of semi-intensive, and simple/non-intensive rearing system. The cleanliness of the shed was still less attention, manure has accumulated on the floor and muddy, as well as on the feeding trunk. This condition has a big opportunity for parasitic infections, especially gastrointestinal helminths. Year-round utilization of communal grazing in a field palm oil shared livestock kept by smallholder are a major source of infection. Although parasitic helminths did not cause to death directly, it has a big economic loss. The losses included weight loss, decreased quality of meat, skin, and viscera that may affect livestock productivity, decreasing milk production, and anger of transmission to humans [6].

Suweta stated that helminthic diseases are widely spread throughout the world, including in Indonesia, the cases in animals are primarily associated with the condition of the field, although the intensity of the infestations is also affected by various factors inside the body of the host [7]. In general, the tropical and humid conditions in Indonesia, optimally support the development and spreading of the parasites, so that the prevalence of the infestations are usually high except in the very dry areas.

According to previous study reports, the prevalence of helminth parasites in cattle of many areas in Indonesia is found to be high. For instance, [8] reported 9.31 % in Bali cattle breeding central Sobangan sub-district, Mengwi district, Badung regency, Bali province. In Payangan district, Gianyar regency in 2003 reported that prevalence of nematode gastrointestinal 22.84 %. A study conducted in Central Java province indicated that overall prevalence parasitic gastrointestinal infections of calves were 65.5 % [9].

The present study is therefore initiated with the following specific objectives: to investigate the different types of gastrointestinal helminths affecting cattle; and to investigate the prevalence, to asses some risk factors associated with the prevalence of cattle gastrointestinal helminths. Knowing the type of helminth that infected to immediate treatment with appropriate antiparasitic drugs to be more effective. The purpose of this study was to determine differences in gastrointestinal helminth infestation caused by differences in cattle.

2. Materials and Methods

The study was conducted in Prafi district, Manokwari regency, West Papua province, Indonesia during a period of February to March 2016. From this zone, four study areas were selected, namely, Udapi Hilir, Desay, Aimasi, and Prafi Mulya village.

Proportional random sampling in each rural of Prafi district was used to select each study animal. The sample size was determined based on the expected prevalence of 36 % and absolute desired precision of 5 % at a confidence level of 95 % according to the methods provided by Thrusfield [10]. A total of 369 heads of cattle were examined during the study period.

Fecal samples were directly collected per rectum, used gloves for each animal. Each sample was put in plastic containers with lids and labeled with animal identification, and 10 mL of 3 % formalin was added into the sample container. Then, the samples were kept in a refrigerator at 4 °C for later examinations.

The collected fecal sample was processed and examined using qualitative techniques (floatation and sedimentation) [11]. Nematode eggs were identified by floatation technique in saturated NaCl solution and Trematodes were examined by sedimentation methods. *Fasciola* species and *Paramphistomum* species eggs were distinguished by their morphological and color differences.

Data was entered into Ms. Excel sheet 2007, and descriptive statistics was used to determine the prevalence. The prevalence of each parasite infection was calculated as the number of animals' diagnosed positive for a given parasite divided by the total number of animals examined at a particular time [10]. While Chi-square (χ^2) was carried out to determine the association of the explanatory variable rearing system of Bali cattle with the prevalence of gastrointestinal helminth. Confidence level was held at 95 % and $P < 0.05$ was set for significance. All statistical analysis was performed using Statistical Package for Social Sciences (SPSS) software package version 16.0.

3. Results and Discussion

The results showed that overall prevalence of gastrointestinal helminth infections in Bali cattle was recorded as 57.45 % at Prafi district, Manokwari regency (Table 1). This number is considered largely caused by cattle rearing on semi-intensively or non-intensively/traditional so that livestock hygiene becomes more secure and stable, and ultimately have a positive influence on the health of cattle. Besides, it is also influenced by farmers' high attention and awareness to clean the shed.

TABLE 1: The prevalence of gastrointestinal helminth of Bali cattle in a different area in Prafi district.

Name of Village	Number examined	Number infected	Percentage Infection (%)
Udapi Hilir	95	57	60.00
Desay	108	62	56.41
Aimasi	98	54	55.16
Prafi Mulya	68	39	57.35
Total	369	212	57.45

The prevalence or distribution of gastrointestinal helminths was also different from one village area to another. The prevalence of most gastrointestinal helminths was higher in Udapi Hilir than the prevalence recorded in Prafi Mulya, Desay and Aimasi village (Table 4). The difference can be due to management or grazing system, regular deworming practice and sample size difference collected from each area. This finding is similar to the earlier finding of Purwaningsih who recorded 55.86 % calves infected with various helminths [9]. Meanwhile, the prevalence of gastrointestinal helminth infection found in this study is much higher than the findings of Pramasudha et al. who recorded 9.31 % in Sobangan sub-district, Mengwi district, Badung regency and 22.84 % in Payangan district, Gianyar regency Bali province [8]. The prevalence of gastrointestinal helminth infection found in this study is much lower than the earlier findings of Handayani et al. in Sukoharjo District, Pringsewu regency, Lampung province who recorded 83.97 % [12]. This finding is in coordination with the reports by Rafiullah et al., that the prevalence of these parasites in Khyber Pakhtunkhwa ruminants is usually high especially those kept under traditional methods of husbandry [13].

Fourteen different helminths species including 11 nematodes, two trematodes, and one species of cestode were found in Bali cattle population of the studied area (Table 2).

TABLE 2: The prevalence of different gastrointestinal helminths within the different village area.

Name of Village	Number of examined	Percentage of Classes of Gastrointestinal Helminth Infection (%)		
		Nematode	Trematode	Cestode
Udapi Hilir	95	29 (30.53)	37 (38.95)	1 (1.05)
Desay	108	29 (26.85)	47 (43.52)	2 (1.85)
Aimasi	98	24 (24.49)	36 (36.73)	0 (0.00)
Prafi Mulya	68	17 (25.00)	26 (38.24)	0 (0.00)
Total	369	99 (26.83)	146 (39.57)	3 (0.81)

The initial examination at the site of gastrointestinal helminth that attack Bali cattle in the four village consists of 3 classes, i.e.: the classes of nematode (11 species),

namely *Oesophagostomum* sp., *Trichostrongylus* sp., *Bunostomum* sp., *Nematodirus* sp., *Ostertagia* sp., *Strongyloides* sp., *Cooperia* sp., *Strongyle* sp., *Toxocara* sp., *Capilaria* sp., and *Trichuris* sp., trematode classes (two species), namely *Fasciola* sp., and *Paramphistomum* sp. and cestode classes (one species) namely *Moniezia* sp.

The current study revealed that the prevalence of trematode infestation was recorded as the highest (39.57 %), followed by the nematode (26.83 %), and cestode (0.81 %). When the data was analyzed, it reflects that *Fasciola* sp. (34.96 %) was the most prevalent among the trematodes while the lowest prevalent was *Paramphistomum* sp. with 10.03 %. On the other hand, the prevalence of *Fasciola* sp. and *Paramphistomum* sp. infection found in this study is much higher than the findings of Purwaningsih et al. who recorded 15.27 % and 18.52 % of sacrificial cattle infected in some mosque in Manokwari regency [14].

The more prevalence of *Fasciola* sp. and *Paramphistomum* sp. is because rainfall is abundant in the month of the taken sample and there is an abundance of intermediate hosts of *Fasciola* sp. and *Paramphistomum* sp. because of the traditional rearing system of the cattle. Bali cattle were grazing in the palm oil garden with a tube of water and typology predominantly paddy field tends. While the temperature and humidity also become optimum for larval development of these parasites in this season and are favourable for the migration and development of infective stage in snails.

When the documented data was analyzed for nematodes it shows that the most prevalent in Bali cattle among nematodes was *Strongyle* sp. (22.22 %), *Trichostrongylus* sp. (13.28 %), *Toxocara* sp. (5.96 %), *Strongyloides* sp. (5.15 %), *Oesophagostomum* sp. (2.44 %), *Trichuris* sp. (2.44 %), *Bunostomum* sp. (1.3 %), *Nematodirus* sp. (0.81 %), *Cooperia* sp. (0.81 %), *Capilaria* sp. (0.81 %) and *Ostertagia* sp. (0.54 %). The prevalence of this parasite was less in the rainy season as compared to the in the dry season then the prevalence of trematodes. On the other hand, Nurtjahyani and Agustin reported showed 46.15 % that prevalence of nematodes in the beef cattle. The prevalence of cestodes (*Moniezia* sp. 0.81 %) was relatively lower than that of other parasites [15].

In this study, *Fasciola* sp. and *Strongyle* sp. were the most prevalent gastrointestinal helminth encountered. Most of the Bali cattle (47.70 %) was infected by the single parasite, respectively, 10.30 % was infected by 2 and more types of parasites. A mixed infestation by nematodes and trematodes in Bali cattle was 9.21 % and the mixed infestation by nematodes, trematodes, and cestodes it was 0.27 %.

The variations in the finding of gastrointestinal helminths prevalence with the earlier reports might be due to the difference in the sample size, selection of samples, breed, period and place of study, management factors, climatic conditions, and the availability of

intermediate hosts. Feeding management may play an important role in gastrointestinal helminth infection. Manus et al. estimated that the prevalence of internal parasite disease could reach 90 % in an area with irrigated rice field in several regions of Indonesia [16]. Poor management also reported causing high liver fluke infection (76.5 %) in cattle under traditional system [17, 18]. They reported that the highest prevalence was found in adult animals (58.5 % to 70.7 %) and 36.5 % in the young animal.

TABLE 3: The prevalence of gastrointestinal helminths of Bali cattle in the different rearing system.

Parameter observed	Number of cattle examined	Total	Prevalence (%)	χ^2	P-value
Semi-intensively	147	86	58.50	0.110	0.748
Traditional	222	126	56.76		
Total	369	212	57.45		

The present study revealed that the rearing system (semi-intensively and traditional system) of the studied animal did not show significant association with the prevalence of the gastrointestinal helminthes (Table 3). This is more probably due to an equal opportunity for infection when they are exposed to the parasites in the communal grazing pasture in palm oil garden in traditional rearing system. This is because of almost all small-scale farmers practiced a habit of keeping their animals for pasture grazing in groups for a long period of time compared to the rest. This creates a suitable environment for helminth free animals in order to acquire a high level of infective larvae from the infected pasture. In the semi-intensively rearing, Bali cattle were kept in their shed full time in group penned in some part in the village of Prafi district where cattle been tethered at day time fed under a cut-and-carry system with forage sourced from rice banks, creek banks, and irrigation channel bank. These sites consider a favourable area for liver fluke to breed and thus the high possibility of cattle raised in this area infected by liver fluke.

The absence of an association between rearing system of Bali cattle and prevalence of gastrointestinal helminth agrees with that of cattle are usually reared under semi-intensive conditions, whereby animals and they're young are brought out to graze in the morning near the homesteads, particularly during the cropping season [19]. As a consequence, the time spent indoors, in an environment which may already have been contaminated by a variety of parasites, may have subjected the cattle to greater exposure to infection.

4. Conclusions

By fecal sample examination, an overall 57.45 % gastrointestinal helminth infection was detected in Bali cattle at Prafi district, Manokwari reGENCY, West Papua province. The overall prevalence and the prevalence of the different types of gastrointestinal helminth of cattle recorded in the current study are high enough to limit and constraint cattle production of the district. Knowledge of the prevalence of gastrointestinal helminth infections in cattle would help in the development of potential control strategies. Hence, to reduce the negative impacts of helminthosis on cattle production of the area and minimize pasture contamination and infection of susceptible hosts, cattle should be treated with effective broad-spectrum anthelmintics at the beginning of rainy season.

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