The Prevalence of Gastro-Intestinal Nematode Parasite and Egg-Count in Cattle With Different Skin Colors

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ABSTRACT
This study was aimed to find out burden of nematode infection in aceh cattle with different skin colors. The samples were 105 cattle consisting of adult male and female. Each of skin color consisted of 15 males and 20 females obtained from Aceh Besar District. The samples were examined in the laboratory of Parasitology, Veterinary Medicine faculty, Syiah Kuala University Banda Aceh. The examination of nematode's egg is done by observation on the cattle' feces using centripus test and Mcmaster test. From the results of the study, it was revealed that the prevalence of Nematodiasis based on skin color are: Red 74.3%, Black 82.9%, and white 85.7%. The average number of eggs per gram of feces based on cattle skin color is obtained 23,07 from red, 413,7 black and 610 white. From this result, it can be stated that the lowest rate of infection and the amount of nematode's egg in each gram of cattle's feces on aceh cattle based on skin color is a cattle with the red color. These results are in line with the observations in the field that the red cattle are More demanded among farmers.

Keywords: Aceh Cattle, gastro intestinal nematode, skin color, prevalence, parasite intensity

1. INTRODUCTION

Aceh cattle are indigenous cattle breed native to the Province of Aceh, Indonesia. The cattle is the result of crossbreed between the local cattle (*Bos sondaicus*) and the zebu derivative cattle (*Bos indicus*) from India [1]. The common hair colors of Aceh cattle are brick red, brown, black, white, and a combination of light and dark [2].

The livestock breeding has a high potential of profit. The poor maintenance of cattle (poor sanitation and feed management) can cause various types of diseases including parasitic diseases [3, 4]. From an economic point of view, parasitic diseases have a very high impact on farmers, but this problem is often overlooked. Worm infection in the digestive tract of cattle can cause gastrointestinal disorders that lead to delayed growth [5]. Nematodiasis is a disease caused by infestation of

nematodes (round worms) in the digestive tract of animals [6]. Tolibin [7] explains parasitic infections might lead to significant weight loss due to disturbance of food absorption in the digestive tracts, the suction of blood and fluid by the parasites, and the damage of host digestive organs.

Previous research found the high incidence of nematodiasis in the domestic animals [7]. Agustina *et al.* [8] and Junaedi *et al.* [9] reported the prevalence of *Toxocara vitulor*um in Bali cattle in the East Bali and Manokwari Regency, respectively. Novase *et al.* [7] described the prevalence and intensity of worm eggs in the feces of cattle (*Bos Sp*) slaughtered at the Slaughterhouse of Pontianak, West Kalimantan. The rate of gastrointestinal nematode infestation in cattle in Aceh Tengah [10]. The prevalence of nematodiasis

can be determined based on the measurement of worm egg numbers in the feces of cattle using Whitlock method [3].

Based on field observations, there is a tendency for livestock buyers to choose Aceh cattle with certain hair colors. Red Aceh cattle are more preferred so that their prices tend to be more expensive (Ilyas, personal interview). For this reason, it would be interesting to study the performance of Aceh cattle, for example thier nematode infestation rate, based on hair color.

2. MATERIALS AND METHODS

1.1 Sample Collection and Preparation

Fecal samples were taken immediately after defecation from 105 Aceh cattle (45 male and 60 female) raised by local farmers in the Mesjid Raya District of Aceh Besar. The subjects were selected by the simple random sampling method and then grouped into three hair colors, namely red brick, black, and white. Each group consisted of 15 bulls and 20 heifers. Each sample was put in a transparent plastic bag, stored in a cool container and labeled. The label contained infomation about a sample number, study location, sex, age and hair color.

1.2 Determination of Nematode Infection

2.2.1 Centrifuge Method

Two grams of fecal samples were put into a mortar, added with aquadest and mixed. The mixture was poured into a centrifuge tube up to ¾ of the tube height and spun at 2,000 rpm for 5 minutes.

Supernatant was discarded, the pellet was added with saturated NaCl solution up to ¾ of the tube height and mixed. The mixture was respun at 2,000 rpm for 5 minutes. The centrifuge tube is placed on the tube rack in an upright position. The pellet was dripped with saturated NaCl until the surface of the liquid in the tube looked convex. After a 3-minute incubating step, a glass object was attached to the surface of the solution. The preparate was observed using a microscope [11].

2.2.2 McMaster Method

Two grams of feces were mixed with 28 ml of water in a mortar. One ml of mixture was added with the same volume of saturated. The solution was then put in the *counting chamber* and then calculated [12].

1.3 Data Analysis

The data on the EPG value of Aceh cattle with different colors were analyzed using the ANOVA test followed by the multi range Duncan test. The prevalence and EPG values male and female were analyzed using the chi square and t-student tests, respectively.

2. RESULTS AND DISCUSSION

2.1 The Most Common Hair Color

Field observations showed that the occurrence three hair colors of Aceh cattle in the study area, namely brick red, black and white. Brick red is the most common cattle hair color found five villages in the Mesjid Raya District (Table 1).

Tabel 1. Type of cattle hair colors in seen in the Mesjid Raya District

Village	Total	Cattle hair color		
		Brick red	Black	White
Lamreh	343	167	80	96
Paya kameng	503	274	81	148
Ruyung	203	80	70	53
Brandeh	481	288	102	91
Ladong	285	130	65	90
Total	1815	939	398	478

The data was obtained from 1815 Aceh cattle population consisted of 939 red brick cattle, 478 white cattle and 398 black cattle. It is possible that the brick red Aceh cattle have a better resistance to disease. So that their reproductive rate is higher than the black and white cows. This is related to what local agent said that the price of red brick Aceh cattle is higher than that of black or white one (Ilyas, personal communication).

The results of direct interviews with breeders in Mesjid Raya District indicated that Aceh cattle are one of the easiest livestock to maintain and are very resistant to summer or drought compared to other cattle types. They can be released freely or are grazed in the mountains to look for food alone, no need to be locked up, and if sold the selling price is higher. The cattle are also used as a work force in the agriculture (Zainun; personal communication).

2.2 Nematode Identification

In this study, data on the prevalence of nematodiasis were obtained based on the results of centrifugation and McMaster. The tests coveraged fecal samples collected from 105 of Aceh cattle with different hair colors (35 brick red, 35 black and 35 white) in Mesjid Raya District. The total and hair color-based prevalence of gastrointestinal nematode infestation in are presented in Table 2**.**

Tabel 2. Prevalence of Gastrointestinal Nematodes in each type of skin color

Hair color	Sex	Cattle examined	Positive number	Prevalence (%)	Total Prevalence (%)
Brick red	Male	15	12	80	74,3
	Female	20	14	70	
Black	Male	15	13	86,7	82,9
	Female	20	16	80	
White	Male	15	12	80	85,7
	Female	20	18	90	
Total	Male	45	37	82,2	80,9
	Female	60	48	80	

Based on Table 2, it can be seen that the highest prevalence rate of nematodiasis was found in the white cattle (85.7%), followed by in the black cattle (82.9%), and in the red brick cattle (74.3%). The prevalence rates according to sex and hair color were brick-red male 80%, brick-red female 70%, black male 86.6%, black female 80%, white male, and white female 90%. The prevalence in male (82.2%) was higher than that in female (80%). The differences, however, were not significant ($p>0.05$).

The high infestation of nematode in the Aceh cattle raised in the Mesjid Raya District is closely related to the maintenance system used by local farmers in the region. The cattle are usually left free to graze or feed themselves on grazing land whereas the pen only functions as a place to rest of the cattle at night. It is not uncommon that the grazing areas to be contaminated with worm eggs or larvae.

Muhibullah [13] argued that the maintenance system affects the worm incidence rates. Cattle raised with traditional systems (extensive or herded) are more at risk of developing worms than those raised with a more modern system (intensive or penned).

2.3 The Number of Eggs per Gram of Feces

This study found that the average number of eggs per gram (EPG) of feces is 458.9. The highest and lowest EPG values based on the cattle hair were white 610.00 and brick-red 323.07, respectively. The EPG score of black cattle was 413.70.

The EPG value in Aceh bulls (578.30) was higher than that ini Aceh cows (36.70). The highest and lowest numbers of Aceh bulls infected by nematode worm eggs based on hair color were white bulls 900 and brick red 366.6, respectively. The differences in the EPG according to hair color were significant ($p<0.05$), but not according to sex or a combination of hair color and sex ($p>0.05$).

This study found that brick red cattle had lower prevalence rate (74.3%) and EPG (323.07) compared cattle with black and white color (Table 3). The EPG in the livestock feces is influenced by several factors including the number of adult worms, larvae, host resistance and infection level as well as crude fiber content found in cattle feed. The more crude fiber content in the feed the less numbers of worm eggs in cow and buffalo feces [13].

Tabel 3. The number of gastrointestinal nematode eggs per gram of cow faeces of each skin color.

Hair Color	Sex	The prevalence of nemathodiasis	EPG	The average EPG
Brick Red	Male	12	366,7	323,07
	Female	14	285,7	
Black	Male	13	476,9	413,7
	Female	16	362,5	
White	Male	12	900	620
	Female	18	433,3	
Total	Male	37	578,8	458,9
	Female	48	366,7	

Tabel 4. The body condition score (BCS) based in skin color

BCS	Hair color			Total
	Brick Red	Black	White	
Good	10	5	4	19
Medium	23	27	24	74
Poor	2	3	7	12
Total	35	35	35	105

From Table 4, it can be seen that the body condition of cattle based on skin color with the most good body condition is brick red cows with 10 cows and the least is 4 white cows. For moderate body conditions, the most cows were black with 27 heads, and the least was 23 cows with brick red color. Meanwhile, in poor body condition, there were 7 white cows at most, and the least red brick, only 2 cows

Tabel 5. Skin health and presence of external parasites based on skin color

Skin condition	Hair color			Total
	Brick Red	Black	White	
Good	0	0	2	2
Medium	17	25	24	66
Poor	18	10	9	37
Total	35	35	35	105

From data in the Table 5, it can be seen that only 1,9% (2/105) cattle examined had a good condition of skin health. Other cattle had medium (62,9%) or poor (35,2%) skin health conditions. In tropical climates, ectoparasites occur almost throughout the year. The existence of these ectoparasites is increasingly detrimental if it is not controlled properly [14].

3. CONCLUSION

The prevalence rates of nematodiasis in Aceh cattle varied according to hair colors and sex. Brick red aceh cattle tend to have better resistance to nematodiasis compared to black and white aceh cattle, and the differences are significant. The prevalence of nematodiasis was not influenced by sex.

AUTHORS' CONTRIBUTION

RF, MH, and HV conceptualized the work. LVR, MB and IM were responsible for laboratory work, AA and RR and RF worked on field work. The manuscript was written by MH, WES and HV.

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