



Prevalence of Gastrointestinal Nematoda in Cattle In Pintu Rime Gayo Highland of Bener Meriah Regency

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Abstract

This study was carried out to assess the prevalence of gastrointestinal nematode in cattle in the Pintu Rime Gayo, a highland sub district of Bener Meriah Regency, Aceh according to age and sex. Stool samples were collected from 150 cattle aged 0-6, 7-12 and >12 months old. Examination was performed by using a centrifuge. Samples tested positive when found gastrointestinal nematode parasite eggs. The data obtained were analyzed with Chi-Square. The results showed that the prevalence of gastrointestinal nematode in cattle aged 0-7 months (32%) was significantly higher ($p < 0.05$) than that in cattle aged 7-12 months (22%) and >12 months (12%). The parasite was markedly more prevalent ($p < 0.05$) in female cattle (23.9%) than that in male cattle (15.2%). In conclusion, susceptibility of cattle in the Pintu Rime Gayo highland to gastrointestinal nematode infection was influenced by both age and sex.

Keywords: gastrointestinal nematode, prevalence, Pintu Rime Gayo

Background

Indonesia has implemented various efforts in agricultural development to nationally fulfill the need for food of its people. Ninety nine percent of Indonesian population, that now reach 215 millions, still consume rice as the main diet (Darmiato, dkk, 2003; Wibowo, 2003),

Domestic animals have become one of important commodity in a country from its significant role in economic development. One of closely related, important factors for animal production is animal health. Breeding animals have poor health status might influence total production of industry, that in turn reduce national income of a country.

Parasitic diseases are among infectious diseases potentially disturbing health status of domestic animals such as cattle, goat, buffalo and sheep, bringing about fluctuated farm animal production (Eberhardt *et. al.*, 2007). Economic losses caused by gastrointestinal nematodes alone are much

higher than that caused by protozoa and insects (Mustika and Riza, 2004). The losses come from emaciation, delayed growth, lower immunity and abnormal metabolism. Additionally, Oluwafemi and Anosa (2000), describe indirect several losses from declined potencies such as anemia and weight loss in young cattle and low body development.

Economic loss from the incidence of worm infestation in cattle is significantly influenced by geographical location, climate and seasons (Anonymous, 2008b). Main factors might result in high incidence of parasitic diseases, in particular gastrointestinal nematodes, are topography, age, sex and inappropriate raising management, causing in the failure in blocking life cycle of the worm.

Brotowidjoyo (1987) suggested that parasite is an animal or a plant lives in the body of other organism and relies on the host organism for food without competition. Parasite is also classified as an organism

lives from other animals efforts without contribution.

The sub-district Pintu Rime Gayo of Bener Meriah Regency of Aceh Province, that spans between 04° 5.11" North latitude and 96° 41.46" East Longitude locates 800-1200 meter above sea level. It has tropical climate, rainfall 1,000-2,500 mm per year, rain between 149-178 days, average temperature 18-28 °C, humidity 30-75.8%, (Anonymous, 2010).

This study was done to explore prevalence of gastrointestinal nematode in highland cattle according to age and sex.

Material and Methods

Fresh feces samples were collected from male and female cattle in the Pintu Rime Gayo Subdistrict, placed in a labeled plastic bag, and brought in cold condition to the Parasitology Laboratory of Veterinary Faculty of Syiah Kuala University for examination. The incidence of nematode parasite in the samples was identified by centrifugation method. Parameter observed were prevalence of gastrointestinal nematode in the highland regions according to age and sex (Arundel and Rickard, 1990). Data obtained was analyzed using Chi-Square.

Results

Prevalence of Gastrointestinal Nematode Parasite according to Age

Results microscopic examinations of fecal samples according to age groups are presented in Table 1.

Table 1. Prevalence of gastrointestinal nematode parasite according to age

Parameter	Age group (month)	Sample	Positive (head)
Highland cattle	0 – 6	50	16 (32%) ^a
	7 – 12	50	11 (22%) ^b
	>12	50	6 (12%) ^c
Total		150	33 22

Note: ^{abc}: different superscripts show significant different ($p < 0.05$)

Data in Table 1 above showed that in the Pintu Rime Gayo Subdistrict the prevalence of gastrointestinal nematode parasite in the cattle aged 0-6, 7-12 and >12

months were 32%, 22%, and 12%, respectively. Based on age, cattle in Pintu Rime Gayo Subdistrict that tend to have high gastrointestinal nematode infestation are those young cattle aged 0-6 months.

Prevalence of gastrointestinal nematode parasites according to sex

Results microscopic examinations of fecal samples according to sex are presented in Table 2.

Table 2. Prevalence of gastrointestinal nematode parasites in the cattle of highland region according to sex

Parameter	Sex	N	Positive
Highland cattle	Male	33	5 (15.2%) ^a
	Female	117	28 (23.9%) ^a

Note: different superscript letters show the data are significant different ($p < 0.05$).

Discussion

As described by Pam *et. al.* (2013) the differences in parasite prevalence between young and adult cattle could be related to limitation of grazing system where young animals tend to have less contact with infectious agents. Lower prevalence observed in this study might be related to natural condition. Young animals, however, could be infected by high numbers of parasites because they were exposed to the infection for a long period of time after birth. Immunity in the young animals is not well developed to resist heavily parasitic infection. The infection can be transmitted by oral-fecal route and parasites could easily reach young animal milk from contaminated mothers.

Levine (1990) as cited by Koesdarto and Setiawan (2007) also describes that species, immunity and age, Young age animals are more susceptible to infestation of gastrointestinal nematode parasites. Age influences concentration of natural (passive) and active immunity in animal body. Additionally, Kadarsih and Siwitri (2004) explain that infestation process of gastrointestinal nematode parasites is strongly influenced by age. Levine (1994) also explains that calf is more susceptible to parasite infection than adult cattle.

In addition, Tizard (1982) suggested that calf is more susceptible to worm infection than adult cattle because they have lower goblet cells in the intestine to slow down the growth of infective nematode larvae. This nematode is also present in the colostrums of newly born calf so that young animals might easily get infected. The parasites are able to penetrate placental barrier and then infect fetus before delivered

Moreover in the study of Urquhart *et. al.* (2003) it is explained that old cattle are more resistant to parasite infestation due to parasite stimulated immunity developed might stimulate the formation of immune response that block the growth of larvae in the tissue, leading to lower morbidity and parasite infestation. Physiological status of definitive host significantly affects worm population in the body. Cattle susceptibility to worm infection increases if they are feed with ration lacks of vitamin A, B and B12, minerals and protein.

In accordance to Setiawan (2008), infection of nematode parasites in calf might be caused by surrounding environment such as parents and owners. Here egg worms excreted in the feces of infected animals contaminated pastures and grass, drinking water and dirty cages floor and calf consume feed dropped on the floor. Added by Djannatun (1987), young animals as long as still have immunity carried from the mothers were protected from infection.

According to Table 2 above in the highland region, the prevalence of gastrointestinal nematode in the male cattle (15.2%) was significantly lower than that in female cattle (23.9%). Results obtained were different from Djannatun(1987) and Suweta (1982) that male cattle have higher susceptibility to nematode infection than female cattle. Dobson (1966) also found that female cattle are more resistant to parasite infections due to higher estrogen level in their body has stimulatory property on reticuloendothelial system (RES) to synthesize antibody against parasite infection. The relatively lower worm infestation in the female cattle than that in male cattle might be related to better physical condition. Female cattle, especially

those in pregnancy and breast feeding stages, are relatively rare to be employed in the farming. This will limit contamination from surround environment.

Additionally, Barger (1999) describes that the numbers of nematode worms per gram feces do not always influence infestation and contamination of sex, but female cattle have higher egg numbers per gram feces than male cattle.

Conclusion

In conclusion, susceptibility of cattle in the Pintu Rime Gayo Subdistrict to gastrointestinal nematode infection was influenced by both age and sex.

Recommendation

It is expected that Animal Husbandry Agencies and related stakeholders in Bener Meriah dan Bireuen Regencies could perform more efforts toward the improvement of management and parasite control of traditional animal farms in their regions.

References

- Anonymous. 2011. *Strongyloides papillosus* Infection. Parasitology laboratory. <http://catatanakhirkoasparasit.blogspot.com/2011/05/infeksi-strongyloides-papillosus.html>2011.
- Anonymous. 2010. Profile of Pintu Rime Gayo Sub-District, Bener Meriah Regency. The Government of Bener Meriah.
- Arundel and Rickard, D.M. 1990. Laboratory Manual for Veterinary Parasitology. *School of Veterinary Science*. The University of Melbourne, Australia .
- Barger, I. 1999. The role of epidemiological knowledge and grazing management for helminthes control in small ruminants. *Int. J. Parasitol.* 29: 41-47.
- Bhattachryya, D.K. and Ahmed, K. 2005. Prevalence of helminthic infection in cattle and buffaloes. *Indian Vet. J.* 82: 900-901.
- Brotowidjoyo, M.D. 1987. Parasite and Parasitism. 1st Ed. Media Sarana Press, Jakarta.

- Darmianto, Suharsono, Beriajaya and Agus. W. 2003. Veterinary Technology to Support Integrated system for Cattle and Palm plantation. *Presented at the Workshop on Palm-Cattle integrated system, at the Bogor Agricultural University, Bogor* September 2003.
- Djannatun, T. (1987). Nematoda in Cattle in regions under surveillance of Farm Cooperation of Southern Bandung, Pengalengan. S1 Script. Veterinary Faculty of Bogor Agricultural University, Bogor.
- Eberhardt, A.G., Mayer, W.E. and Streit A. 2007. The free-living generation of the nematode *Strongyloides papillosus* undergoes sexual reproduction. *Int. J. Parasitol.* 37: 989-1000.
- Kadarsih and Siwitri. 2004. Performance Bali cattle according to regional topography in transmigration areas of Bengkulu. *Jurnal Ilmu-ilmu Pertanian Indonesia.* 6(1).
- Koesdarto and Setiawan. 2007. Parasitic diseases in Breeding of Madura Cattle. Info Vet, Jakarta Selatan.
- Levine, N.D. 1990. Veterinary Parasitology. Gadjah Mada University Press, Yogyakarta.
- Mustika, Ika dan Riza, A.Z. 2004. Opportunity to use Nematophageal fungus to control nematode parasite in plant and animals. *Jurnal Litbang Pertanian*, 23(4): 115.
- Oluwafemi, T.U. and Anosa, V.O. 2000. Haematological studies on domestic animals in Nigeria, Clinicohaematological features of bovine trypanosomiasis, theileriosis, anaplasmosis, eperythrozoonosis and helminthiasis. *Zibblatt Vet. Med.* 27: 789-797.
- Pam, V.A., Ogbu, K.I., Igeh, C.P., Bot, C.J. and Vincent, G. 2013. The occurrence of gastrointestinal and haemo parasites of cattle in Jos of Plateau State, Nigeria. *J. Anim. Sci. Adv.* 3(2): 97-102.
- Sarah, N., Achmad, F., and Taruni, S.P. 2011. Worm infection in thin tailed sheep at the traditional sheep slaughterhouse of Bogor. Presented at Seminar on April 14th, 2011. Department of Biology, Faculty of Mathematics and Natural Sciences, Bogor Agricultural University, Bogor.
- Setiawan, A. 2008. The Effectiveness of the administration of Temulawak (*Curcuma xanthoriza, Roxb*) and Temuireng (*Curcuma aeruginosa, Roxb*) extracts as helminthiasis control against Packed Cell Volume (PCV), Sweating Rate and body weight gain in the post milking Brahman Cross calf. Script. Brawijaya University, Malang.
- Soulsby, E.J.L 1986. *Helminthes, Arthropod and Protozoa of Domesticated Animals.* 7th Ed. The English Language Book Society and Bailliere Tindall, London.
- Suweta, I.G.P. 1982. Economic loss due to liver worm in Bali cattle as implication of interaction in the living environment at the agricultural ecosystem in Bali. *Dissertation.* Padjadjaran University, Bandung.
- Tizard, I. 1982. Introduction to Veterinary Immunology. W.B. Saunders Co., Philadelphia.
- Urquhart, G.M., Armour, J., Duncan, J.L., Dunn, A.M. and Jennings, F.W. 1987. Veterinary Parasitology. Churchill Livingstone Inc., New York.
- Wibowo, T.S. 2003. Protecting and Maintaining the competence of products through certification. Presented in the National Discussion on Certification System in the Bogor Agriculture University on July 15th, 2003.