Jurnal Kedokteran Hewan December 2024, 18(4):134-137
P-ISSN : 1978-225X; E-ISSN : 2502-5600 DOI: https://doi.org/10.21157/j.ked.hewan.v18i4.32681

PREVALENCE AND RISK FACTOR OF HAEMONCHUS CONTORTUS IN LAKOR GOAT IN LAKOR DISTRICT SOUTHWEST MALUKU

I Putu Juli Sukariada[1]*, Sherli Melani Ludji[1], Steffanie M. C. Noach[2], and Putu Mira Puspitayani[3]
[1]Animal Husbandry Study Program, Faculty of Vocational Military Logistics, Indonesia Defense University, Kakuluk Mesak, East Nusa Tenggara, Indonesia
[2]Animal Husbandry Study Program, Faculty of Agriculture, Science and Health, Universitas Timor, Kefamenanu, Nusa Tenggara Timur, Indonesia
[3]Disaster Management Study Program, Faculty of National Security, Indonesia Defense University, Jakarta Pusat, Indonesia
*Corresponding author: jsukariada@gmail.com

ABSTRACT

The aimed of this research is to determine the prevalence of *Haemonchus. contortus* and the associated risk factors. In this study, 739 fecal samples from Lakor goats were randomly collected from five villages in Lakor District, Southwest Maluku. All samples were taken from goats showing clinical symptoms such as emaciation, diarrhea, dull fur, and inactive. Fecal samples were examined using the native method. Data presentation was analysed using the Chi-Square (X2) and Spearman's test statistical analysis methods. The prevalence of *H. contortus* in Lakor goats in the Lakor sub-District was 81.60% with the highest prevalence was found in Yamluli Village and Lolotuara Village. The correlation coefficient was 0.838** - 0.931** (P<0.01). These data indicated that there is a close relationship between the incidence of *H. contortus* worm infection in lakor goats and the risk factors in the form of gender, age of the goat and body score condition (BCS) as indicated by the high correlation values.

Key words: *Haemonchus contortus*, Lakor goat, prevalence, risk factor

ABSTRAK

*Penelitian ini bertujuan mengetahui prevalensi Haemonchus contortus dan faktor risiko yang terkait. Dalam penelitian ini, 739 sampel feses dari kambing lakor dikumpulkan secara acak dari lima desa di Kecamatan Lakor, Maluku Barat Daya. Semua sampel diambil dari kambing yang menunjukkan gejala klinis seperti kekurusan, diare, bulu kusam, dan tidak aktif. Sampel feses diperiksa dengan menggunakan metode asli. Penyajian data dianalisis dengan menggunakan metode analisis statistik Chi-Square (X^2) dan uji Spearman. Prevalensi H. contortus pada kambing Lakor di Kecamatan Lakor sebesar 81,60% dengan prevalensi tertinggi ditemukan di Desa Yamluli dan Desa Lolotuara. Koefisien korelasi sebesar. 0,838** - 0,931** (P<0,01). Data ini menunjukkan bahwa terdapat hubungan yang erat antara kejadian infeksi cacing H. contortus pada kambing lakor dengan faktor risiko berupa jenis kelamin, umur kambing dan kondisi body score (BCS) yang ditunjukkan dengan nilai korelasi yang tinggi.*

Kata kunci: Haemonchus contortus, kambing lakor, prevalensi, faktor risiko

INTRODUCTION

Southwest Maluku Regency is one of the districts in Maluku Province, Indonesia. This district has potential with its abundant natural resources, one of which is quite large livestock (Bintang *et al.* 2020). The livestock that is superior and also a germplasm that needs to be developed and preserved in this district is the Lakor goat. As germplasm, Lakor goats have an important role in maintaining biodiversity. Besides that, its potential as superior livestock is very useful for improving the economy of local communities. The advantage of Lakor goats is their ability to adapt to extreme environmental conditions, such as dry grasslands (Lestari *et al.* 2020).

Characteristic of Lakor goats have thick and long black, brown or grayish hair, with a rough hair texture. It has long, thick, and winding horns curved backwards. The body size is large and tall, with a height of around 80-90 cm and a weight of up to 60-80 kg in adult male goats, while in adult female goats the height is around 70-80 cm and the weight is around 40-60 kg (Djulardi *et al*, 2020). Developing the superior potential of Lakor goats requires good livestock management, cage and feed management, to avoid diseases that often attack livestock, especially diseases that attack goats. One of the strategic diseases that is often reported to occur in goats is infection by the worm *Haemonchus contortus (H. contortus)*.

H. contortus is a worm that has a predilection for the digestive tract of goats. These worms cause anemia, diarrhea, emaciation and even death in livestock. *H. contortus* infects livestock through an environment contaminated by worm eggs or infective larvae (L2-L3) which stick to the grass and enter the livestock's digestive tract when grazing. This transmission will occur more quickly if maintenance is still carried out traditionally, because disease transmission is closely related to environmental conditions, hosts and agents (Arifin *et al.* 2019).

Parasitism in livestock significantly impacts reproductive capabilities and meat quality. Infected organs in livestock cannot be utilized due to parasitic contamination, leading to approximately a 5% reduction in carcass weight, with annual economic losses reaching up to 8 million USD (Khaniki *et al.* 2013). Clinical symptoms such as anorexia, emaciation, and mortality have severe and potentially fatal outcomes.

The rapid and extensive transmission of pathogenic agents, alongside economic losses due to livestock morbidity and mortality, poses a serious threat to the local economy, particularly among farmers. Consequently, the risk of an extraordinary outbreak in goats due to helminthic agents is substantial. Therefore, it is essential to determine the prevalence and identify risk factors associated with the spread and transmission of these helminths in Lakor goats in Lakor District, Southwest Maluku Regency.

MATERIALS AND METHODS

Sampling

In this study, 739 Lakor goat feces samples were collected from local farms in five villages, Lakor District. An average of 10 g faeces were placed in a tube containing 10% formalin solution prior to be examined at Veterinary Clinic of Universitas Pertahanan Republik Indonesia, Werwaru Village, Moa Lakor District, Southwest Maluku, Maluku Province.

H. contortus Examination using Native Test

The goat faeces were examined using native method. The feces were placed on a glass object, dripped with 1-2 drops of distilled water, then stirred until homogeneous. The large feces elements were discarded, covered with a cover glass, then examined under a light microscope with 40 x magnification.

Data Analysis

The prevalence of *H. contortus* was analyzed using Chi Square Test (X^2) and Spearman's test using IBM SPSS Statistics 22.0 software and then presented descriptively.

RESULTS AND DISCUSSION

The examination of 739 fecal samples of Lakor goats from Pulau Lakor District, Southwest Maluku using the native method showed that 603 fecal samples (81.60%) were positive for the presence of *H. contortus* eggs and larvae (Figures 1a, Figure 1b).

Were worm eggs found during fecal examination using a light microscope. The morphology observed in the eggs (Figure 1a) was characteristic of *H. contortus* eggs which are oval-shaped, thin-walled, and have a clear area inside the egg. After hatching, the *H. contortus* worm larvae develop from stage L1 to L3 (infective stage, Figure 1b)) in the environment and in the grass. Infection in goats occurs orally when they eat grass that has been contaminated with L3 larvae (Zarlenga *et al.* 2016).

The incidence of disease in goats caused by *H. contortus* worms in Lakor District are presented in Table 1. Figure 2 shows the distribution area of goats infected with *H. contortus* worms in Lakor District. The red area showed a very high infection rate, the orange color showed high infection and the yellow color was an alert area. Overall, infections have

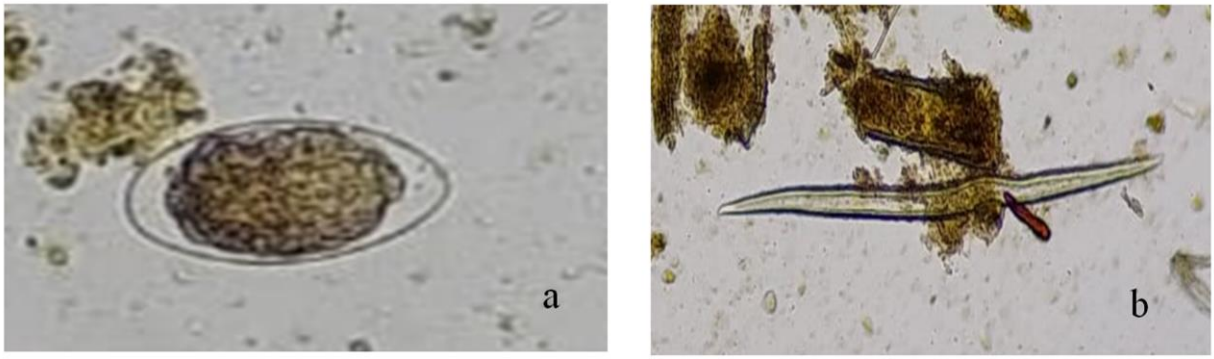

Figure 1. The presence of *H. contortus* in fecal samples of goat farm in Lakor. a= Eggs; b= Larvae

Table 1. Prevalence of *H. contortus* in Lakor goat in Lakor District

Location	Sample			Prevalence (%)
	Total	Postive	Negative	
Desa Sera	200	117	83	58.50
Desa Yamluli	57	57	0	100.00
Desa Lolotuara	35	35	0	100.00
Desa Kety	365	336	29	92.05
Desa Letoda	82	58	24	70.73
Lakor district	739	603	136	81.60

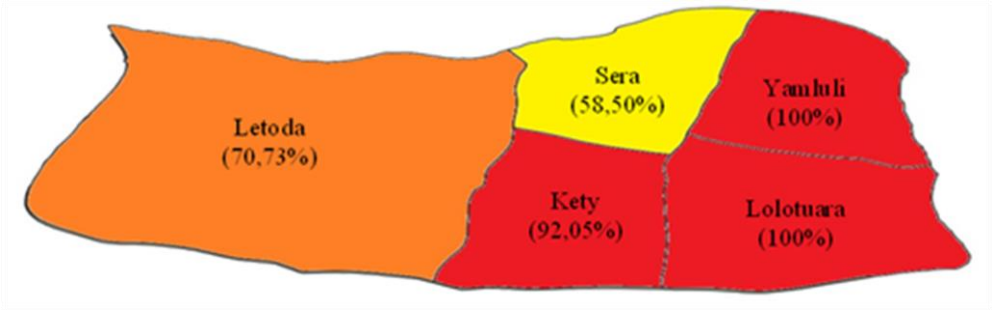

Figure 2. The distribution area of *Haemonchus contortus* prevalence in Lakor goat in Lakor district

occurred in all villages in Lakor District with a prevalence of 81.60%.

In research conducted in Lakor Island, the infection rate exceeded 80%. This occurred because the life cycle of this worm does not require an intermediate host but only requires a definitive host as its final host as also stated by Anderson (2000). The spread of infection rates was also caused by influential risk factors, including gender, age, body score condition (BCS) and maintenance patterns, which are presented in Table 2.

In Table 2, the chi-square analysis values for each risk factor that have the potential to affect the spread of worm infections in Lakor goats are presented. It can be concluded that there was no significant difference between the risk factor categories of gender, body score condition and maintenance patterns for *H. contortus* worm infection (P>0.05). The influence factor was the age of the goat (P<0.05). Therefore, it needs the further test to determine the level of correlation of risk factors with the incidence of *H. contortus* disease in Lakor goats using the Spearman's test (Table 3).

The results of statistical analysis using the Spearman's method presented in Table 3 showed that the correlation coefficient figure from this study was 0.838** - 0.931** with P<0.01. Referring to the correlation values of the three research variables, it showed that there was a close relationship between the incidence of *H. contortus* worm infection in Lakor goats and risk factors in the form of gender, age of the goat and BCS as indicated by the high correlation values. The possibility of an increase in cases can still occur and has the potential to develop into an outbreak.

The potential for *H. contortus* to cause an outbreak in an area was very high. This was influenced by the life cycle of this worm which does not require an intermediate host in its life cycle, and could directly develop and infect other hosts. An extensive rearing pattern accelerates the transmission process, based on the life cycle of the *H. contortus* worm which starts with the female worm laying eggs outside the body of the host and hatching into larvae in the environment. Stage 1 (L1) larvae then develop into stage 2 larvae (L2) and stage 3 larvae (L3) which are the infective stage. Infective larvae attach to grass and are ingested by goats, then the larvae will mature in the goat's abomasum (Whittier *et al.* 2009).

In the abomasum, larvae develop into adult worms that consume the blood and essential nutrients needed by the goat for growth and development, leading infected goats to manifest clinical symptoms such as anorexia, anemia, emaciation, diarrhea, and, in severe cases, death. Anorexia manifests precisely when the infected animal's nutritional demands are high, yet feed intake decreases (Hite and Cressler 2019). This anorexia is induced by the parasite as a form of "programmed" host behavior observed across various infected species (Rao *et al.* 2017).

Animals with anorexia experience stunted growth because the nutrients required for growth are insufficient, with available resources being diverted to the parasitic agent (Clough *et al*. 2016). In chronic cases, parasitic infections can lead to fluid accumulation under the skin due to hypoproteinemia (submandibular edema), a hallmark (pathognomonic) sign of haemonchosis, commonly termed "Bottle Jaw" (Miller and Horhov 2006).

Young goats are particularly vulnerable to haemonchosis, with a higher mortality risk due to their

Table 2. Risk Factors of *Haemonchus contortus* transmission in Lakor District

Risk factors	Total sample	Total positive	Prevalence	df	Sig (P > 0.05)
Gender :					
– Male	325	290	89.23%	1	0.000
– Female	414	313	75.60%		
Age :					
– < 3 years	378	315	83.33%	1	0.213
– > 3 years	361	288	79.78%		
Body score condition:					
– Very thin (BCS =1)	369	314	85.09%	2	0.000
– Skinny (BCS =2)	222	222	100%		
– Normal (BCS =3)	148	67	45.27%		
Maintenance Pattern:					
– Extensive	739	603	100%	0	0.000

Table 3. Spearman's test results to determine the correlation between case incidence ratesand *Haemonchus contortus* risk factors

Correlations			Gender	Age	*Body score condition*
Spearman's rho	Gender	Correlation Coefficient	1.000	0.866 **	0.838 **
		Sig. (2-tailed)	.	0.000	0.000
		N	739	739	739
	Age	Correlation Coefficient	0.866 **	1.000	0.931 **
		Sig. (2-tailed)	0.000	.	0.000
		N	739	739	739
	Body Score Condition	Correlation Coefficient	0.838 **	0.931 **	1.000
		Sig. (2-tailed)	0.000	0.000	.
		N	739	739	739

**= Correlation is significant at the 0.01 level

comparatively lower immunity than older animals (Arifin *et al*. 2019). This susceptibility arises because young animals have not been exposed to parasitic infections before, meaning their B-cells and T-cells lack the immune memory to mount an antibody response and confer immunity against parasitic agents (Namutosi *et al*. 2020). Therefore, young animals have notably higher mortality rates than mature goats.

Prevention and control are very necessary, especially in terms of rearing patterns. The results showed that risk factors based on rearing patterns have a very high prevalence rate, this is because goats can freely move from one pasture to another without intermediaries. It is highly recommended to change the rearing pattern with semi-intensive and intensive systems, as well as administering worm medicine regularly and periodically.

CONCLUSION

The prevalence of *H. contortus* in Lakor goats in Lakor District, Southwest Maluku Regency is 81.60%. The highest prevalence was found in Yamluli Village and Lolotuara Village. The risk factors analysis indicates that there is a close relationship between the incidence of *H. contortus* worm infection in Lakor goats and the risk factors in the form of gender, age of the goat and BCS as indicated by the high correlation values.

ACKNOWLEDGEMENT

The author would like to thank to Universitas Pertahanan Republik Indonesia, the Agriculture and Food Service of Southwest Maluku Regency, the Lakor District Government, breeders in Lakor District and all parties who have assisted in this research.

REFERENCES

Anderson RC. 2000. *Nematode* Parasites of Vertebrates: Their Development and Transmission. Cabi. *www.cabi.org*.

Arifin K, Kusnoto, Yudhana A, Sunarso A, Purnama MTE, Praja RN. 2019. Prevalensi haemonchiasis pada kambing peranakan Etawah di Kecamatan Kalipuro, Banyuwangi. *Jurnal Medik Veteriner*, 2(2):108-111.

Bintang IA, Rumetna L, Susilawati T. 2020. Lakor goat breeding development in South West Maluku Regency. *Journal of Agricultural Extension*, 24(2):137-145.

Clough D, Prykhodko O, Råberg L. 2016. Effects of protein malnutrition on tolerance to helminth infection. *Biology Letters*, 12:20160189. Doi:10.1098/rsbl.2016.0189.

Djulardi A, Lestari WA, Sari SP. 2020. Karakteristik morfologi kambing lakor di Desa Elpaputih Kecamatan Tanimbar Utara Kabupaten Kepulauan Tanimbar. *Jurnal Peternakan Indonesia*, 22(1):22-30.

Hite JL, Cressler CC. 2019. Parasite-mediated anorexia and nutrition modulate virulence evolution. *Integrative and Comparative Biology*, 59(5):1264-1274. https://doi.org/10.1093/icb/icz100.

Khaniki JGR, Kia EB, Raei M. 2013. Liver condemnation and economic losses due to parasitic infections in slaughtered animals in Iran. *Journal of Parasitic Diseases*, 37(2):240-244. https://doi.org/10.1007/s12639-012-0172-6.

Lestari WA, Rumra SA. 2020. Potensi kambing lakor sebagai ternak unggulan di Kabupaten Kepulauan Tanimbar. *Jurnal Ilmiah Peternakan Terpadu*, 8(3):95-102.

Miller JE, Horohov DW. 2006. Immunological aspects of nematode parasite control in sheep. *Journal of Animal Scieice*, 84(13):124-132.

Namutosi WN, Higenyi J, Kizito E, Omodo M. 2020. Prevalence and risk factors of gastrointestinal parasite infection in goats in Sironko district, Eastern Uganda. *International Journal of Veterinary Sciences and Animal Husbandry*, 5(3):27-35.

Rao S, Schieber AMP, O'Connor CP, Leblanc M, Michel D, Ayres JS. 2017. Pathogen-mediated inhibition of anorexia promotes host survival and transmission. *Cell*, 168(503):12-16.

WhittierWD, Zajac A, Umberger SH. 2009. Control of Internal Parasites in Sheep. Agricultural and Food Science. *https://api.semanticsholar.org*.

Zarlenga D, Hoberg EP, Tou W. 2016. *The Identification of Haemonchus Spesies and Diagnosis of Haemonchosis*. Chapter Five. U.S. Department of Agriculture: Agricultural Research Service, Lincoln, Nebraska. University of Nebraska-Lincoln.