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Identification of Worm Types that Infest Bali Cattle in Bolo District

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Abstract

Bali cattle are the primary genetic resources of Indonesia. Besides beef cattle are used as breeds, they are also distributed to all regions in Indonesia. One of the requirements for good quality of beef cattle is to be free from parasitic diseases. Bima Regency is one of the areas of Bali cattle population centers in West Nusa Tenggara, but the Bali cattle maintenance system in Bima Regency is generally still extensive, certainly increasing the potential for diseases. The disease can cause economic losses, disrupt the health of livestock and the health of people who consume meat derived from parasitic-infected animals. This study used 50 stool samples of Bali cattle aged 5 to 12 months taken randomly. The sedimentation and flotation method were used to identify nematode worm eggs. The parameters observed were gastrointestinal parasitic morphology, and then the data were analyzed descriptively. It was found two types of parasites that infected Bali cattle in Bolo Sub-district, Ascaris spp, and Trichuris sp. Ascaris spp infected as many as 72% of 50 Bali cattle faecal samples, 72% were infected by Trichuris sp., and mixture of Ascaris spp and Trichuris spp infected 54 % of the sampled cattle. The improvement of cage management and cattle maintenance system are necessary to implement. Those are by taking into high-quality nutrition feeding, regular anthelminthic treatment, and avoiding the feeding of green forage to avoid worm infection and re-infection.
Keywords: *Ascaris spp, Bali Cattle, Nematode Parasites, Stool, Trichuris sp.*

Introduction

West Nusa Tenggara (NTB) is an island province dominated by dry land with a geographical pattern. NTB is seen as suitable for breeding and developing cattle in Indonesia. West Nusa Tenggara has the driest climate in Indonesia, lasting 8-9 months/year, with low rainfall (1000-1500 mm) during the rainy season. Due to the long dry season, there is marginal land that is more suitable for livestock business, especially ruminants. The potential of NTB as a livestock province or as a cattle barn in Indonesia has been recognized nationally. It is supported by data on the availability of pasture fields for cattle, horses, buffaloes, and goats. Cattle farms not only produce meat or milk but also produce manure and as land for opening up employment opportunities (Setiawan 2014). Community interest in raising cattle has increased every year. The key to success in efforts to increase cattle productivity is the health of the animal itself (Kertawirawan et al. 2012). The health of Bali cattle is one of the keys to success in efforts to increase the productivity of large livestock. The emergence of disease in livestock can cause a decrease in the rate of livestock productivity causing economic losses in the livestock sector (Kertawirawan 2010). Among the many animal diseases in Indonesia, parasitic disease, or

helminthiasis, is still lacking the attention of farmers, which results in high economic losses (Nugroho 2012). Helminthic infection in animals can cause health problems in humans and can also cause economic losses for farmers. If infected livestock results in stunted body development so that the carcass or meat produced is of poor quality and for the breeder, the costs to be borne by it are quite high, generally this intestinal parasitic infection attacks poorly maintained young cattle (Ngurah et al. 2013). The mortality rate of livestock due to helminthiasis is not high. It is the reason why people neglected helminthic infections in livestock.

Furthermore, the indirect effects of helminthiasis are the decrease in livestock productivity as well as the impact of zoonotic infections on public health (Owhoeli et al. 2014). Gastrointestinal disease in cattle due to helminthic infection can cause economic losses for Indonesian farmers. The level of intestinal worm infestation has even been reported to reach 80% in cattle less than one year-old (Widjaja et al. 2014).

Generally, beef cattle in Indonesia are maintained in a traditional farm. Traditional farming can cause high prevalence of helminthiasis. Previous studies have been carried out to identify the types of worms that infest local cattle in Indonesia. Sari (2014) reported that the prevalence of gastrointestinal worms in Ongole grade and Limousin cattle in Tikung Sub-district, Lamongan District was 58%. Astiti et al. (2011) helminthiasis prevalence in Bali cattle in the Assisted Village Development Area in Bima District was 81.1%. It shows that cattle in Indonesia are still very susceptible to parasitic infestations. Some of the helminthic infections are zoonotic, which means the diseases can be transmitted to humans. For example, people who eat beef containing worms can be infected. The principles of safe, healthy, whole, and halal of food from livestock origin are needed to maintain the health of veterinary communities (Veterinary Public Health). Arsani et al. (2013) noted that the Veterinary Public Health aims to create a healthy and productive society through the protection and security of animal products that are safe, healthy, whole, halal, and competitive.

Information about the incidence of parasitic infections in dairy cattle in Bolo Sub- district, Bima district, Bima District, is limited or even not yet available, so a more in-depth study is needed. The parasitic disease control program will be useful if it is designed based on accurate information about the incidence of the disease and the associated risk factors research on parasitic worm eggs that infect Bali cattle through a faecal examination using sedimentation and flotation methods. The study was aimed to determine the type of worm egg infection in Balinese cattle in Bolo Sub-district, Bima District.

Materials and Methods

A total of 50 Bali cattle from both sexes aged 5 to 12 months were randomly selected for the study raised by the community in Bolo Sub-district, Bima District was examined for possible worm infections. Observation of f fecal samples of Bali cattle was carried out at the Vocational Laboratory of the University of Mataram Program Outside the Domicile of Bima District. The research was conducted from July to September 2019. A total of 10 to 15 grams of stool sample of individual cattle was collected through rectal palpation and was put in a tube and was labeled. Samples were stored in 10% formalin solution as preservatives to prevent the hatching of eggs during transportation and storage. The sample was entered in the freezer until further identification was carried out. In addition to cattle stool collection, interviews were also conducted to find out the animal identity and other supporting data.

Examination the Stool Samples of Bali cattle

The examination of faecal samples from Bali cattle was carried out using the sedimentation and flotation method. Stool samples were weighed as much as 2 grams using a digital analytical balance. The samples were added with 30 ml saturated NaCl, and the mixture was stirred until homogeneous. Filtering was done to separate the feces' pulp. Then the filtered water is poured into centrifuge tubes up to a volume of 15 ml. Centrifugation was carried out at 1500 rpm for 15 minutes. Centrifuge supernatant was placed on the shelf in an upright position, dripping with saturated NaCl with a dropper until the liquid surface in the centrifuge becomes convex, attach the glass cover on the convex surface carefully and leave it for 2 to 3 minutes then put on top glass objects and examined under a microscope with a magnification of 10x (Soulsby 1982). Eggs and worm larvae were identified based on Atlas of Medical Parasitology (Pusarawati et al. 2014), Atlas of Medical Helminthology (Purnomo et al. 2009) and The Biology of Animal Parasites (Noble et al. 1989).

Results and Discussions

Samples of cow feces are taken directly from cattle herded by breeders in Bolo Sub-district, Bima District. The types of cattle raised by the local community are Bali cattle. The study focused on the incidence of intestinal worms in Bali cattle aged 5 to 12 months. The sample used was 50 samples. Based on the identification of 50 stool groups, samples found one egg class, namely Nematodes. Examination using the sedimentation and flotation method identified two types of worms: *Ascaris* spp, and *Trichuris* sp. Figure 1 and Figure 2.

Figure 1. *Ascaris sp.* eggs

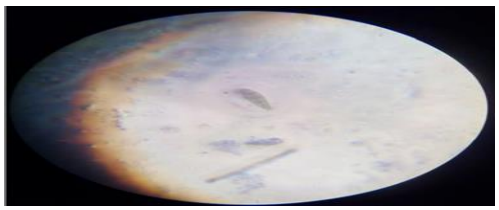

Figure 2. *Trichuris* sp eggs

From Table 1 through sedimentation and flotation tests there were 36 samples (72%) positive of *Ascaris sp.* while 36 samples (72%) were positive for *Trichuris sp.* which is a single infection 54% of the sampled cattle were infected with a mixture of *Ascaris sp.* and *Trichuris sp.*

Table 1. The results of observations and identification of worm eggs found in the feces of Bali cattle herding in Bolo District, Bima Regency

Inspection Method	Result of the test	Jumlah
Sedimentation and flotation	*Ascaris* sp.	72% (32 samples)
Sedimentation and flotation	*Trichuris sp.*	72% (32 samples)
Sedimentation and flotation	Co-infection of *Ascaris* spp and *Trichuris sp.*	54% (27 samples)

Losses due to helminthic infections, according to the Ministry of Agriculture (2010), reached 4 billion rupiah per year. Helminthiasis can cause a decrease in productivity, emaciation, weakness, decreased production power. In severe infections, the disease can cause digestive disorders to inhibit the growth of the animal itself. Other effects include weight loss due to diarrhea and effects on the host because the parasite absorbs food in the digestive tract and the host fluid.

The prevalence of gastrointestinal worms in cattle is most often found at the age of 1 to 5 years (Karim et al. 2016). Gastrointestinal parasites are a source of problems in cattle and buffalo in India with varying prevalence rates (Marskole et al. 2016). Environmental factors that influence the development of larvae three nematodes in the grass are influenced by temperature, humidity, and rainfall (Das et al. 2016).

The intestinal parasitic worm species found are from the Nematode class. It is related to the nematode's life cycle that does not require a reservoir host so that the life cycle of this worm is easier than other classes. Losses caused by gastrointestinal worms generally disrupt the digestive system, causing diarrhea, enteritis (intestinal inflammation), bleeding, gastritis, anemia due to rupture of blood vessels in the intestine, drastic weight loss, and dehydration (Basetto et al. 2011). This condition is possible because the cattle in that location live with food that comes from rice fields that do not allow the development of trematodes.

Intestinal parasitic worms from the Trematoda class require a reservoir host to be able to reach its definitive host (Khozin 2012). The high prevalence of parasitic nematodes in Bali cattle is closely related to two factors, namely the maintenance system and the nutrition of the feed provided. The maintenance of Balinese cattle is carried out by breeders with a system of housing. Generally, cattle maintenance is still managed traditionally. The cages were made from bamboo, and livestock disposal was placed near the cages. Cage construction that is not in accordance with the technical requirements and management of livestock maintenance, in particular, enclosure sanitation, are the factors that affect the prevalence of intestinal worms that can disrupt livestock productivity (Sukmawati and Kaharudin, 2010; Raza et al., 2012) and are more often herded.

The management of housing is one of the supporting factors of production that has not yet received attention in the business of beef cattle farming, especially community farms (Sukmawati and Kaharudin, 2010). The cages must support the management of livestock and health or environmental hygiene. Correct building enclosures will greatly help farmers in the attempt of animal health control. The condition of type C cages with a stable ground cage is relatively challenging to dry, so the floor tends always to be wet and humid. Such conditions provide opportunities for transmission of nematodes in cattle that are not initially infected become infected. Infected cattle will excrete feces containing nematode eggs and then hatch into infective larvae in the grazing area. The infective larvae move between grasses in the grazing area, which can be swallowed at any time by uninfected cattle. Nutritional factors, for example, Bali cattle that are kept, are generally given forage, which is mostly fresh grass and a little legume. Giving concentrate is rare because it is relatively expensive. Such conditions positively affect the resistance of livestock to parasitic infections. Nutrition plays avital role so that livestock can reduce the impact of parasites. Lack of food sources and water sources in several villages in the Bolo Sub-district also caused a lack of nutrients obtained, which caused a decline in the animal's immune system (Mustika 2004). The lack of food sources is caused by the geographical conditions of the dry Bolo Sub-district with low rainfall intensity.

Precautions against parasitic infections such as administering anthelmintics are not commonly practiced among breeders, thereby increasing the possibility of parasitic infections. Alternative control of helminthiasis, namely by providing food that contains adequate nutrition and controlling parasites in the grazing area through a controlled grazing system and administration of routine anthelmintics every six months. Therapy of internal parasites through the provision of anthelmintic drugs will contribute to an increase in cattle weight of at least 0.1 kg per day and, in general, will improve the health status of cattle. The provision of anthelmintic should not only be made on animals that have been confirmed to be positively infected by worms. It is because most of the animals, especially those raised traditionally, suffer from helminthiasis.

However, a stool examination was needed to determine the type of helminths that infected the cattle. Thus, the anthelmintics were given following the diagnosis based on stool examination. Based on the results of the Workshop entitled "Strengthening of Prevention and Control of Taeniasis / Cysticercosis and Soil-Transmitted Helminthiases in Bali, Indonesia" held at the Faculty of Medicine at Udayana University Denpasar Bali on September 22, 2014, some recommendations regarding the prevention of contextually based helminthiasis in Bali, Indonesia "can be noted. The recommendations were prepared jointly by academics, field practitioners, provincial and district/city governments, as well as specialized experts who pursue related fields. May the recommendation be relevant as a reference for helminthiasis control in Bolo District, Bima Regency. Regular control measures are a must, in addition to farmer education, about the correct use of anthelmintics.

Conclusion

The type of gastrointestinal nematode in Bali cattle is *Ascaris* sp. and *Trichuris* sp. As many as 72% of 50 Bali cattle fecal samples were infected with single *Ascaris* sp., and 72% are infected with *Trichuris* sp., and 54% were infected with a mixture of *Ascaris* spp, and *Trichuris* sp. Helminthiasis in livestock is an economic disease that can cause substantial losses to livestock, breeders, society, nation, and country. There is the need for control of helminthiasis cases in Indonesia in general and in Bolo Sub-district in particular to deal with repeated cases of helminthiasis in livestock. The way to control it is straightforward by breaking the life cycle of the worm, which needs to be supported by the awareness and commitment of the stakeholders.

Suggestion

Based on the results of this study, female Bali cattle in Bolo Sub-district were found to have gastrointestinal nematode parasitic infections, which might later influence the quality of Bali cattle breeds in Bolo Sub-district.

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