Incidence and control of worm burdens in Bali bulls fed forage tree legumes in West Nusa Tenggara

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Introduction

Bali cattle are the predominant domestic cattle raised in smallholder systems in eastern Indonesia. They are characterised by low growth rates partly due to genetic factors but largely due to insufficient and/or poor quality feed and management. Internal parasites can have severe impacts on animal production and are a common problem in eastern Indonesia due to poor hygiene and management practices. Prevalence, or the ratio of number of worm infestation occurrences, in the cattle population is high in West Nusa Tenggara. Astiti *et al.* (2011) reported prevalence levels of 81% in some area of Sumbawa Island and Astiti and Panjaitan (2011) found prevalence levels of 78% in some areas of Lombok Island where cattle were housed all day under cut-and-carry feeding system. There is currently no information on worm burdens in smallholder fattening enterprises as previous investigations have focused on smallholder breeding cattle.

The objectives of this study were to determine the status of internal parasite infections in Bali bulls being fattened with forage tree legumes under smallholder conditions and to observe the efficacy of current control practices. It was hypothesised that forage tree legumes may provide some control of gastro-intestinal parasites if they contain condensed tannins and if leafy branches for feeding cattle are harvested from >2 m above ground level where they are unlikely to harbor parasites.

Materials and Methods

Three sites were selected in both Lombok and Sumbawa for a survey conducted between March and October 2012. Bulls in Sumbawa were fed leucaena (*Leucaena leucocephala*) at around 70% of diet while bulls in Lombok were fed Sesbania (*Sesbania grandiflora*) at around 30% of diet. Ninety-two bulls approximately 1.9 years of age were monitored. Faecal samples were collected for egg counts and all bulls were subsequently treated with Albendazole (7.5 mg/kg body weight).Worm burdens were monitored monthly following treatment with Albendazole. Faecal samples were collected in the morning following defecation or by direct rectal collection. Approximately 10 g samples were taken and preserved in 2.5% formalin for later worm egg analysis. The prevalence of internal parasites in the cattle population was determined using the method described by Stevenson (2005).

Results and Discussion

The prevalence of internal parasites from Day 0 (prior to treatment with Albendazole) to Day 120 is presented in Table 1. The average prevalence prior to fattening was 66% in Sumbawa and 56% in Lombok. There were no bulls infected with trematode worms in Sumbawa; while 18% of all infected bulls in Lombok were infected by both trematodes and nematodes, and 56% of all infected bulls had severe trematode infestations. The highest prevalence of nematodes and trematodes was 80% in Paloma, Sumbawa and 88% in Jelantik, Lombok, respectively.

In general, the efficacy of albendazole against both fasciola and nematodes in cattle is high. Theodorides *et al.* (1976) reported that cattle drenched with albendazole at

Table 1. Prevalence of worms Burden in Bali bulls before and after treatment with anthelmintics in West NusaTenggara.

Internal parasites	Islands	Hamlets	Prevalence (%)				
			Day 0*	Day 30	Day 60	Day 90	Day 120
Nematodes	Lombok	Jelantik	44	44	0	11	22
		Nyerot	50	17	0	17	0
		Gemel	45	36	45	55	27
	Sumbawa	Jatisari	77	23	0	0	0
		Senayan	41	0	0	0	0
		Paloma	80	0	0	0	0
Trematode	Lombok	Jelantik	88	88	60	25	50
		Nyerot	40	60	60	40	40
		Gemel	40	40	45	70	60
	Sumbawa	Jatisari	0	0	0	0	0
		Senayan	0	0	0	0	0
		Paloma	0	0	0	0	0

*Prior to anthelmintic treatment

doses of 5-10 mg/kg reduced gastro-intestinal nematodes by 99%. In addition, Theodorides and Freeman (1980) reported that cattle drenched with albendazole at doses of 10 mg/kg reduced fluke burden by 93%.

On Sumbawa, this study indicated that faecal nematode egg counts in Bali bulls fed leucaena at 70% of diet decreased to zero within 60 days following treatment and remained low until the last measurement at 120 days. The high efficacy of parasite control in bulls offered 70% leucaena in their diet may be partly due to the anthelmintic effect of tannins in leucaena (Alonso-Dı´az *et al.* 2008). However it is important to note that the initial prevalence of nematodes in animals receiving a high leucaena diet was generally greater than those offered 30% sesbania/70% grass diets in Lombok.

In Lombok, the prevalence of faecal nematode eggs in bulls fed a diet of 30% sesbania and 70% grass decreased to low levels within 60 days following treatment but increased thereafter. The faecal trematode egg count was not significantly affected (Table 1). This indicated that the bulls fed 30% sesbania were never released totally from their worm burden. Reinfection was however more likely to occur in Lombok as most of the grasses came from paddy fields and irrigation channels infected by internal parasites. In addition, the lower proportion of sesbania in the diet meant a lower tannin intake and therefore a reduced anthelmintic effect.

Conclusions

This study demonstrates that feeding system can affect the efficacy of parasite control in Bali bull fattening systems. Legumes with high tannin content (such as leucaena) were more effective in controlling internal parasites. However, further work is warranted as the two feeding systems were confounded by proportion of forage legume in diet and environment (one a flooded paddy field environment and the other a drier upland environment).

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