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H. Dahlanuddin
University of Mataram, Indonesia

Baiq Tutik Yuliana
Assessment Institute for Agricultural Technology, Indonesia

Tanda Panjaitan
Assessment Institute for Agricultural Technology, Indonesia

Michael J. Halliday
The University of Queensland, Australia

H. Max Shelton
The University of Queensland, Australia

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Growth of Bali bulls on rations containing *Sesbania grandiflora* in central Lombok, Indonesia

H Dahlanuddin^A, Baiq Tutik Yuliana^B, Tanda Panjaitan^B, Michael J Halliday^C and H Max Shelton^C

^A Faculty of Animal Science, University of Mataram, Lombok, Indonesia

^B Assessment Institute for Agricultural Technology, Lombok, Indonesia

^C School of Agriculture and Food Sciences, The University of Queensland, Australia

Contact email: dahlan_travel@yahoo.com

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Introduction

The demand for meat in Indonesia is currently growing by up to 8% per year, with beef cattle fattening identified as a major livestock industry (Purwantara *et al.* 2012). Bali cattle (*Bos javanicus*) account for almost 27% of total beef cattle in Indonesia; they are the predominant breed in the eastern islands and are highly favoured by smallholder farmers for their high fertility, low calf mortality and generally higher price at markets (Purwantara *et al.* 2012). Lombok in west Nusa Tenggara is one of the biggest suppliers of Bali cattle in Indonesia.

A major constraint to improving the overall productivity of Bali cattle is their slow growth rate, due to lack of readily available, inexpensive, high-quality protein sources. Fodder tree legumes, such as sesbania (*Sesbania grandiflora*), offer a fast-growing, low-cost source of protein (Evans and Rotar 1987). Farmers in Lombok have established a unique and productive integrated farming system by planting sesbania trees along the bunds of rice paddies, providing forage and timber without significantly compromising rice yield (Dahlanuddin and Shelton 2005).

As only the central part of Lombok is intensively planted with sesbania, a collaborative project funded by the Australian Centre for International Agricultural Research (ACIAR) is underway aiming to: (1) characterise the existing cattle fattening system; and (2) assess the impact of differing levels of sesbania feeding on the growth rate of Bali bulls from weaning to maturity (about 30 months old).

Materials and Methods

Objective 1- Pre-trial

Three typical cattle fattening groups were selected in central Lombok in the hamlets of Montong Oboq, Bun Prie and Repok Nyerot. Commencing March 2012, animal weights, feed regimes and sale prices were monitored regularly to understand the fattening profiles of the 3 groups.

Objective 2 – Feeding trial

Within each of these groups, a semi-controlled feeding trial was begun in July 2012, using 20 male Bali calves with an

Table 1. Pre-trial profiles of groups fattening Bali cattle at 3 sites in central Lombok (March – July 2012).

Categories	Montong Oboq	Bun Prie	Repok Nyerot
No of farmers	30	19	30
No of cattle /household/period	1	1-2	2-3
No of cattle monitored	8	30	23
Initial live weight (kg)	119 ± 15	195 ± 5	188 ± 13
Sale weight (kg)	268 ± 3	237 ± 6	312 ± 11
Fattening period (months)	12.5 ± 1.3	4.8 ± 0.4	8.3 ± 0.9
Average daily gain (kg/hd/d)	0.44 ± 0.13	0.32 ± 0.03	0.58 ± 0.05
Animal value at start (Rp × 10 ⁴ /kg)	3.3 ± 1.4	3.0 ± 0.1	3.3 ± 0.3
Animal value at sale (Rp × 10 ⁴ /kg)	2.3 ± 0.2	3.0 ± 0.1	3.0 ± 0.1
Margin (Rp/head/month)	49.9 ± 4.3	29.9 ± 3.1	47.1 ± 5.3

average age of 7.6 ± 0.4 months and mean live weight (LW) of 90 ± 5.8 kg. Bulls were randomly allocated to the 3 villages in August 2012. Farmers were requested to feed sesbania to these bulls at rates up to 20% (fresh weight) of total diet in Montong Oboq, 40% in Bun Prie and 60% in Repok Nyerot. A rice bran supplement of 0.5 kg fresh weight/100 kg LW was supplied for farmers at Bun Prie and Repok Nyerot, where higher levels of sesbania were being fed. The actual amounts and proportions of different feeds offered were recorded on 6 consecutive days in March 2013. Live weight was measured monthly.

Results and Discussion

The pre-trial profiles of the 3 groups are presented in Table 1. Farmers in Repok Nyerot achieved the highest daily gains and sale weights, but the monthly profit margin was slightly lower than for those in Montong Oboq. The higher gains were thought to be due to higher levels of sesbania feeding. This aspect was tested in the subsequent feeding trial. Montong Oboq had the longest fattening period (12.5 ± 1.3 months), as they started with the lightest bulls (119 ± 15 kg). In the feeding trial, farmers could not achieve the recommended levels of sesbania feeding (Table 2). Despite

Table 2. Growth rates of Bali bulls fed sesbania foliage at 3 sites in central Lombok (August 2012 – March 2013).

Variables	Montong Oboq	Bun Prie	Repok Nyerot
Land ownership (ha)	0.39 ± 0.15	0.23 ± 0.01	0.53 ± 0.08
No of farmers selected for trial	6	6	8
No of sesbania trees/farmer	199 ± 37	321 ± 79	326 ± 31
No of bulls allocated to village	6	6	8
Starting weight of bulls (kg)	87 ± 3	93 ± 2	89 ± 1
Requested level of sesbania in diet (% fresh)	20	40	60
Actual proportion of sesbania in diet (% fresh)	29 ± 6	49 ± 2	45 ± 4
Amount of rice bran offered (kg DM/hd/d)	0	0.9 ± 0.1	1.2 ± 0.1
Average daily gain (kg/hd/d)	0.35 ± 0.02	0.34 ± 0.02	0.50 ± 0.04

similar proportions of sesbania in the diet, daily gains were higher at Repok Nyerot (0.50 kg/hd/d) than at Bun Prie (0.34 kg/hd/d); gains at Montong Oboq were 0.35 kg/hd/d, where sesbania feeding was least and rice bran was not fed. Differences in growth rates may have been related to variation in feeding practices by individual farmers, *i.e.*, total dry matter offered/day and differing quality of the grass offered.

These data offer a basic understanding of sesbania feeding systems in Indonesia and their productivity. Growth rates were comparable with previously recorded data, namely 0.38 kg/d for bull calves of similar age fed 30% sesbania; however, they were much higher than 0.2 kg/d achieved in traditional fattening systems comprising diets of predominantly local grass species (Dahlanuddin *et al.* 2013).

Conclusion

Although some difficulties occurred with this on-farm research, the study suggests that the inclusion of sesbania in the fattening diet can boost animal growth rates. The trial will continue to monitor the growth path on-farm until the bulls reach maturity.

Acknowledgments

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