STRATEGIES TO IMPROVE BALI CATTLE IN EASTERN INDONESIA

STRATEGIES TO IMPROVE BALI CATTLE IN EASTERN INDONESIA ACIAR

ACIAR PROCEEDINGS No. 110

ACIAR
The Australian Centre for International Agricultural Research

www.aciar.gov.au

Performance of Bali Cattle Heifers and Calves prior to Weaning in a Feedlot System

L. Oka[1]

Abstract

A study was carried out on the performance of 20 Bali cattle heifers and their first calves kept in a feedlot system and fed either elephant grass only (group A), or a mixture of 40% elephant grass and 60% concentrate with 20.7% Crude Protein (CP) and 77.3% Total Digestible Nutrients (TDN) (group B). Live weights to calving, quantity and quality of milk, calf birth weight and preweaning liveweight gain were significantly enhanced by concentrate supplementation. However, services per conception and gestation length were not significantly different between the two feeding regimes. In the short term, improvements in management — particularly feeding a higher quality ration — are needed to overcome the problems of performance degradation of Bali cattle which have been reported recently.

Introduction

UNTIL now farmers in Bali have kept their cattle in a traditional system, where animals are housed in a simple shed and fed with cut and carry roughages. As the human population in Bali is increasing, more and more green area is now being used for housing or other specific purposes. The development of tourism in Bali is also significantly reducing areas available for production of feed resources for cattle. Therefore, alternative animal management and feed supplementation strategies are needed for Bali cattle, in addition to genetic improvement strategies, in order to improve overall performance of these cattle, which has been reported to be decreasing (Sonjaya and Idris 1996; Lay 1997).

The effects of concentrate supplementation on growth and meat quality of male Bali cattle have been reported by Mastika et al. (1996). In that study there were significant improvements in daily weight gain and meat quality in a concentrate-supplemented group.

This paper reports the effects of concentrate supplementation on performance of Bali heifers and their calves prior to weaning.

[1] Department of Animal Production, Udayana University, Denpasar, Bali, Indonesia

Materials and Methods

Twenty Bali cattle heifers were kept in a feedlot system at the Faculty of Animal Science farm, Udayana University, Bukit Campus, Denpasar, Bali. The animals were divided into two groups of ten with an average live weight of 170.6 kg (group A) and 176.2 kg (group B). Animals in group A were fed elephant grass only (the control diet), while those in group B were fed a ration composed of 40% elephant grass and 60% concentrate supplement. The supplement consisted of a mixture of 36% corn, 19% rice bran, 23% coconut meal, 16.5% soybean meal, 5% fish meal and 0.5% salt, containing 20.7% crude protein and 77.3% TDN. The animals were fed an ad libitum diet twice daily and feed refusals were measured daily to calculate daily feed consumption (FC).

Data collected on performance of heifers included live weight at mating, services per conception, gestation length, total weight gain during pregnancy, liveweight at calving, milk production and composition and FC, while for calves birth weight and preweaning growth rate to 18 weeks of age were determined.

Data for each characteristic were analysed using the Student t-test (Sokal and Rohlf 1969) to compare the two feeding regimes.

Strategies to Improve Bali Cattle in Eastern Indonesia
edited by K. Entwistle and D.R. Lindsay
ACIAR Proceedings No. 110
(printed version published in 2003)

Results and Discussion

Table 1 shows the effects of concentrate supplementation on characteristics of heifers and their calves prior to weaning. Liveweight gain of heifers during pregnancy was significantly improved by concentrate supplementation. The average daily gain during pregnancy for the concentrate supplemented group (B) was 0.424 g, compared with only 0.150 g for the control group (A). Foetal growth and development in supplemented heifers were faster than in those on the control diet, with calf birth weights increased by an average of 5 kg. However, reproductive traits such as services per conception and gestation length were not improved by concentrate supplementation. The use of natural mating with the same bull, and the biological characteristics of Bali cattle, might be the main factors determining these two characteristics. These data indicate that feeding and management play an important role in improving performance of Bali heifers as well as the genetic potential of this breed.

Concentrate supplementation increased live weight of heifers at calving, and improved milk production and milk composition significantly. Schmidt (1971) found that milk yield and its persistency were closely related to energy intake during early lactation. In this study, the higher energy intake was from concentrate supplementation, and higher protein and energy contents of the ration would have increased milk yield and its components. Consequently this increased the growth of calves during suckling, as shown in higher preweaning weight gains and very enhanced live weight of calves at 18 weeks.

Wirdahayati and Bamualim (1990) also reported that feed supplementation increased milk production of Bali cattle by around 28% over a six month lactation. The higher concentration of milk components of Bali heifers in this study, compared to that of other breeds, might be one of the factors which could support enhanced survival of their calves up to weaning, although milk production in Bali cattle is lower than in other cattle breeds.

Conclusions

The use of concentrate supplements improved performance of Bali heifers and their calves prior to weaning, although services per conception and gestation length were not significantly affected. Therefore, in the short term, nutritional manipulation will play an important role in improving performance of Bali cattle. However, in the long term the genetic potential of this breed must be considered, since indicators of genetic degradation have been recently identified in some areas.

Table 1. Performance of Bali heifers and their calves prior to weaning.

Characteristics	Control group A	Control group B
Heifers:		
Initial live weight (kg)	170.58[a] (10.58)	176.20[a] (11.04)
Live weight at mating (kg)	194.50[a] (12.13)	232.00[b] (20.00)
Services per conception	1.80[a] (0.79)	2.00[a] (0.67)
Gestation length (days)	288.11[a] (27.41)	275.56[a] (13.56)
Live weight at calving (kg)	225.70[a] (53.79)	331.90[b] (40.25)
Total FC during pregnancy (kg DM)	1658.20[a] (15.34)	1686.60[b] (14.90)
Milk production (kg/day)	1.10[a] (0.93)	1.60[b] (0.34)
Milk consumption:		
Total solids (%)	16.55[a] (0.53)	17.59[b] (0.76)
Fat (%)	5.45[a] (0.52)	7.43[b] (0.27)
Protein (%)	4.51[a] (0.48)	4.99[b] (0.38)
Lactose (%)	5.36[a] (0.31)	5.42[a] (0.30)
Ca (%)	0.17[a] (0.03)	0.18[a] (0.02)
P (%)	0.13[a] (0.01)	0.13[a] (0.02)
Energy (kcal/g)	1.22[a] (0.11)	1.92[a] (0.03)
Daily FC during suckling (kg DM)	6.23[a] (0.02)	6.61[a] (0.10)
Calves:		
Average birth weight (kg)	12.01[a] (1.97)	17.00[b] (2.18)
Male birth weight (kg)	13.83[a] (1.89)	18.75[b] (0.65)
Female birth weight (kg)	11.17[a] (1.24)	13.00[b] (1.92)
Average preweaning weight gain (kg/day)	0.31[a] (0.22)	0.42[b] (0.14)
Calf weight at 18 weeks (kg)	52.00[a] (4.80)	72.57[b] (9.80)

Values in parenthesis are standard deviations.
Values within a line having different superscripts differ significantly ($P<0.05$).

Strategies to Improve Bali Cattle in Eastern Indonesia
edited by K. Entwistle and D.R. Lindsay
ACIAR Proceedings No. 110
(printed version published in 2003)

Acknowledgments

Financial assistance for this study was provided by the Indonesian Australia Eastern Universities (IAEUP). Thanks are due to Nengah Rita for looking after the animals during the experiment.

References

Lay, W.A. 1997. Potensi pertumbuhan, produksi karkas dan keempukan daging sapi Bali jantan. Seminar IAEUP. "Environmental Pollution and Natural Product & Bali Cattle in Regional Agriculture", 24–25 February 1997, Bali Padma Hotel, Legian, Bali.

Mastika, I.M., Mariani, N.P. and Suryani, N.N. 1996. Observations on feedlotting of Bali cattle. Proceedings of seminar on Bali cattle, a special species for the dry tropics, held by Indonesia Australia Eastern University Project (IAEUP), 21 September 1996, Udayana University Lodge, Bukit-Jimbaran, Bali.

Schmidt, G.H. 1971. Biology of lactation. W.H. Freeman and Company, San Francisco.

Sokal, R.R. and Rohlf, F.J. 1969. Biometry: the principles and practice of statistics in biological research. W.H. Freeman and Company, San Francisco.

Sonjaya, H. and Idris, T. 1996. Kecendrungan perkembangan populasi sapi potong di Sulawesi Selatan. Forum Komunikasi Pimpinan Perguruan Tinggi Peternakan se Indonesia. 9–10 Agustus 1996. Ujung Pandang.

Wirdahayati, R.B. and Bamualim, A. 1990. Penampilan produksi dan struktur populasi ternak sapi Bali di pulau Timor, Nusa Tenggara Timur. Proc. Seminar Nasional Sapi Bali. 20–22 September 1990. Fakultas Peternakan Universitas Udayana, Denpasar, Bali.