

Strategies to Enhance Growth of Weaned Bali (*Bos sondaicus*) Calves of Small-Holders in Donggala District, Central Sulawesi

(Strategi untuk Meningkatkan Pertumbuhan Sapi Bali [*Bos sondaicus*] Muda yang Disapih pada Peternak Kecil di Kabupaten Donggala, Provinsi Sulawesi Tengah)

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ABSTRAK: Penelitian ini bertujuan untuk mengevaluasi sebuah strategi pemberian suplemen pakan untuk meningkatkan pertumbuhan sapi Bali yang disapih pada umur 6-12 bulan di wilayah Kabupaten Donggala, Sulawesi Tengah dan menganalisis kelayakan ekonomi serta sikap petani terhadap strategi penyapihan dini dan pemberian suplemen tersebut. Penelitian dilakukan di dua desa, yakni Desa Lembah Mukti (kontrol) dan Desa Malonas (desa perlakuan). Jumlah anak sapi Bali yang digunakan di masing-masing desa adalah 20 ekor, berumur sekitar 6 bulan dengan berat badan awal $83,1 \pm 2,6$ kg (Lembah Mukti) dan $85,4 \pm 2,6$ kg (Malonas). Ternak di Malonas yang sebelumnya belum disapih, mulai dipisahkan dari induknya minimal 3 minggu sebelum penelitian. Ternak tersebut diberi perlakuan suplemen campuran dedak padi:bungkil kelapa (50:50) setiap pagi oleh peternak sebanyak 1% dari bobot badan (berdasar bahan kering), sebelum ternak tersebut dilepaskan untuk merumput seperti biasa. Bobot badan ternak penelitian di kedua desa ditimbang sekali sebulan selama 6 bulan, dan perbedaan pertambahan bobot badan ternak antara kedua desa ditentukan dengan uji t. Hasil penelitian menunjukkan bahwa ternak yang mendapatkan pakan suplemen mempunyai tingkat pertumbuhan yang lebih tinggi ($P < 0,5$) dibandingkan dengan ternak kontrol yang tidak diberi suplemen (0,424 vs 0,286 kg/h). Tidak ada perbedaan nyata dalam pertumbuhan antara anak sapi Bali jantan dan betina pada umur 6-12 bulan. Pemberian pakan suplemen memberikan tambahan pendapatan kepada peternak sebesar Rp 2.800/ekor/h. Sebanyak 73% dari petani yang diwawancarai berkeinginan untuk menerapkan strategi penyapihan dini dan pemberian suplemen tersebut. Dapat disimpulkan bahwa pertumbuhan anak sapi Bali di wilayah pedesaan dapat ditingkatkan melalui penyapihan dini pada umur 6 bulan yang disertai dengan pemberian suplemen campuran dedak padi:bungkil kelapa.

Key Words: Bali calves, growth, early weaning, rice bran, copra meal, Donggala

Introduction

Bali cattle are the predominant breed of cattle in Donggala district, Central Sulawesi province, Indonesia ($0^{\circ}30'N$ to $2^{\circ}20'S$ and $119^{\circ}45'E$ to $121^{\circ}45'E$). In many part of eastern islands including in Donggala, Bali cattle is become an important part in small holder farming system enterprise (Talib *et al.*, 2003; Jelantik *et al.*, 2008; Panjaitan *et al.*, 2008) due to its characteristics (Chamdi, 2005). Martojo (2003) and Chamdi (2005) indicated that Bali cattle has superiorities in some aspects such as high fertility rate, high production performance, high adaptation capability, good beef performance traits, high innate resistance to ticks and tick-borne diseases, good ability to rapidly recover condition after poor usage, and good work capability.

The dry season occurs in Donggala between the months of April and September and the wet season occurs between October and March, with an average annual rainfall of 1437 mm. In general, each small-holder farm consists of 2.0 Ha of land, with 0.75 Ha planted for rice, producing about 6.25 tonnes of rice each year. In addition to rice, small-holder farmers also produce cocoa, maize, coconut and cassava on their farming land. Typically each small-holder farmer would raise a total of 4-5 Bali cattle, comprised of 1 or 2 breeding cows and 1 animal for fattening, 1 yearling animal and 1 animal aged less than one year of age. There is no data published on the growth of 6 to 12 month old Bali calves in the district. However, Abduh *et al.* (1992) reported that the growth rate of young Bali cattle grazing native grass in South Sulawesi ranged from 100-320 g/head/day. On-station feeding and growth studies, conducted at the University of Tadulako between February and December 2006 (Marsetyo *et al.*, 2007; Marsetyo and Damry, unpublished data) indicated

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that the growth rate of 6 to 12 month old male Bali calves could be increased through the targeted use of small amounts (1% of live weight (LW), on a dry matter basis) of agricultural industry by-products. The maximum live weight gain responses occurred when a mixture of rice bran and copra meal, both of which are available to farmers in Donggala district, was fed at 1% of LW.

The aims of this study were to evaluate a simple supplementation strategy to increase growth rates of weaned Bali cattle aged 6 to 12 months in villages in Donggala district, Central Sulawesi; to assess the economic viability of the introduced feeding strategy; and to assess farmers' attitudes to early weaning and the introduced feeding strategy.

Research Methods

An initial scoping trip to Donggala district identified two suitable villages to participate in the on-farm evaluation. Lembah Mukti village, was identified as the control village, while Malonas village was identified as the intervention village. The two villages were approximately 10 km apart and experienced similar climatic conditions during the study.

Lembah Mukti village (Control). Bali calves (n=9 males; n=11 females), aged approximately 6 months (193.5 ± 4.8 days) and 83.1 ± 2.6 kg live weight were given an individual identification number and were treated for internal and external parasites with 2 ml of Ivomec and 3 ml of vitamin B complex. No other interventions were implemented at this village. The normal feeding management of this class of cattle in Lembah Mukti village consisted of native grass. Calf live weight was recorded once each month over a 6 month period, and average daily gain was determined.

Malonas village (Intervention). Bali calves (n=8 males; n=12 females), aged approximately 6 months (185.5 ± 4.8 days) and 85.4 ± 2.6 kg live weight were given an individual identification number and were treated for internal and external parasites with 2 ml of Ivomec and 3 ml of vitamin B complex. Those animals not previously weaned were removed from their mothers for an initial separation period of at

least three weeks. A bulk load of rice bran and copra meal was supplied to the village each month. The rice bran and copra meal were mixed in equal proportions (50:50) and was then distributed to individual farmers in daily allowances, of 1% of LW (on a dry matter basis), such that each animal was allocated a daily feed allowance package. Farmers were required to feed this supplement, prior to their usual feeding management of their calves. The normal feeding management of this class of cattle in Malonas village consisted of native grass. Calf live weight was recorded once each month over a 6 month period and average daily gain was determined.

The economic evaluation of the rice bran and copra meal supplementation strategy was based on the assumptions that live weight was valued at 25000 rupiah/kg, and that the price of rice bran and copra meal were fixed at 400 and 900 rupiah/kg, respectively. Farmers in the two villages were surveyed at the commencement and conclusion of the six month monitoring period. There were 16 control farmers and 17 intervention farmers from the two villages who responded to the questionnaires.

Statistical Analysis

The student's t-test was used to test differences in daily live weight gain of Bali calves between the control and intervention villages using Minitab version 13.

Results and Discussion

Calves which received supplementation, in the intervention village, grew significantly faster (0.424 kg/day) than calves in the control village (0.286 kg/day) ($P < 0.05$) over the six month monitoring period, and this difference in growth was consistent between months (Figure 1a). There was no significant difference in growth rate between male and female Bali cattle, between six and twelve months of age, in either the control or intervention villages. At the end of the six month monitoring period, intervention village calves were 27.6 kg heavier than their control counterparts (Figure 1b). Economic analysis indicated that the supplementary feeding strategy would result in a modest profit of 2800 rupiah/head/day.

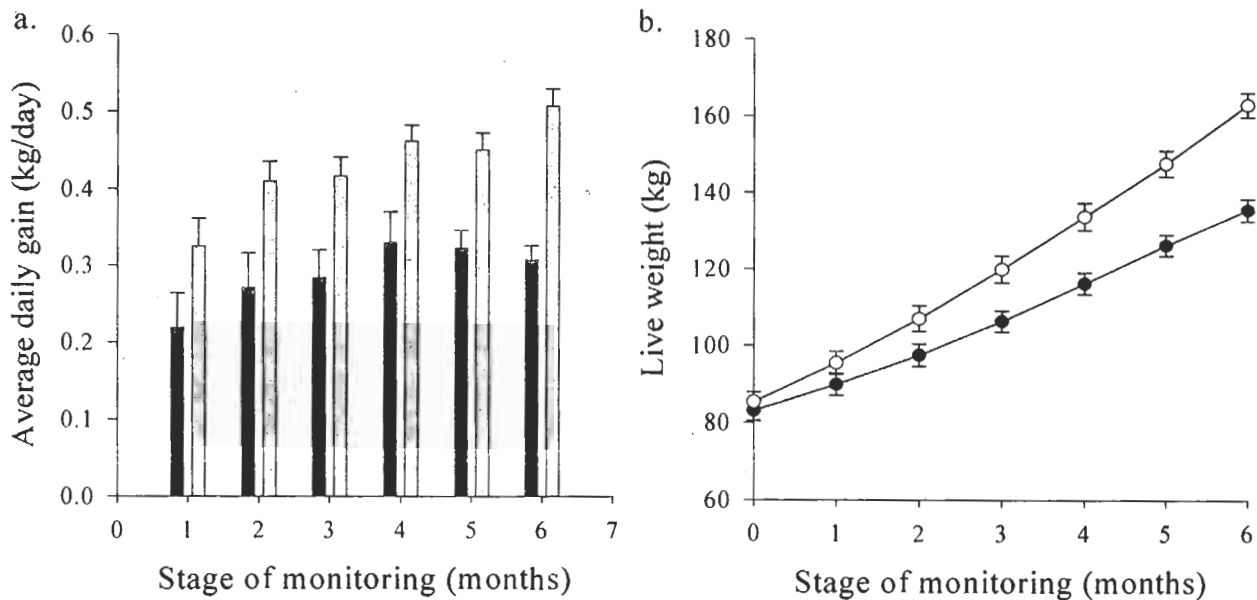


Figure 1. Average daily live weight gain (a.) and live weight response (b.) of Bali calves in Donggala district, Central Sulawesi. Calves were monitored under normal management practices (Control, ■ ; ●), or weaned at six months of age and fed a rice bran and copra meal mixture supplement at 1% of live weight, on a dry matter basis (Treatment, □ ; ○).

An initial interview conducted with farmers prior to the commencement of the study indicated that the majority (79%) did not monitor the change in live weight of their young Bali calves. Approximately 61% of farmers weaned their calves, while the remainder did not practice weaning as a management strategy and allowed the cow to wean its calf naturally. Of those farmers who did practice weaning, 55% weaned calves at 8 months of age or greater, 18% weaned calves at 7 months of age and 27% weaned calves at 6 months of age. Interviews conducted upon completion of the 6 month intervention and monitoring period indicated that 73% of farmers were willing to adopt the intervention treatment in their daily farming system, with the remainder preferring to maintain their current feeding system in which no supplementary feed is provided to their young Bali cattle. There were a number of reasons why farmers decided not to adopt the new feeding strategy. These included that 'they are only animal keepers', 'they can't afford to buy the supplement', 'there is plenty of forage available', 'cattle are not a priority', and 'copra meal is unavailable locally'.

Daily live weight gain of young Bali calves grazing native grass is mostly dictated by the quality and quantity of native grass available to the animals, which is influenced by seasonal conditions, grazing management and soil fertility. Growth rates of Bali

calves obtained from studies carried out at various locations at different times will, therefore, be expected to vary depending on the prevailing environmental conditions. Bahar and Rachman (2003), for example, reported that the growth rate of young Bali cattle, 170 kg in live weight, grazing on native grass in South Sulawesi province ranged from 5 to 100 g/day during the dry season and from 200 to 400 g/day during the wet season. Paat and Winugroho (1990) found that daily live weight gain of Bali cattle, approximately 200 kg in live weight, grazing native grass in South Sulawesi was 40 g/day, while Abduh *et al.* (1992) reported that the live weight gain of 115 kg Bali cattle grazing native grass in Gowa District of South Sulawesi was 321 g/day. In the present study, Bali calves under the control feeding system exhibited a growth rate of 286 g/day. However, the current study is the only one to examine the growth of 6 to 12 month old early weaned Bali calves under a village management system in Central Sulawesi.

It is evident from the current study, and others (Marsetyo, *et al.*, 2007; Mastika, 2003; Oka, 2003; Pengelly and Lisson, 2003; Parwati *et al.*, 1999), that native grass alone will not provide sufficient nutrients required to maximize the growth potential of young growing Bali cattle. Higher growth rates of Bali cattle grazing native grasses can be achieved through the provision of simple supplements, such as

rice bran and copra meal. The current study demonstrated that when Bali calves fed native grasses were supplemented with a mixture of rice bran and copra meal they grew 138 g/day faster than their control counterparts, which were unsupplemented. In the study of Parwati *et al.* (1999), Bali cattle, 270 to 300 kg in live weight, grazing native grass supplemented with 2 kg rice bran/day grew at 410 g/day compared with 302 g/day for animals fed native grass alone. Supplementation of young Bali cattle, 111 kg in live weight, grazing native grass with a rice bran based concentrate (85% rice bran, 13.5% molasses and 1.5% urea) fed at 0.75% of LW, increased live weight gain from 423 to 511 g/day (Paat *et al.*, 1992).

The current study also demonstrated that there was no significant difference in growth rate between male and females Bali calves, either in control or intervention villages. This result is in agreement with results from Dahlanuddin (unpublished) in which the growth rate of male and female Bali cattle, solely fed sesbania (*Sesbania grandiflora*), was similar from 6 to 18 months of age.

Increased growth rates of Bali calves fed native grass by strategic dietary supplementation may help to improve Bali cattle production systems in eastern Indonesia. In this area, most of the cattle are allowed by farmers to free-graze communal fields with minimal, if any, interventions such as feed supplementation. Most farmers involved in the present study were willing to adopt the supplementation intervention, primarily as this strategy will provide them with an additional source of income. Therefore, feed supplementation of growing Bali calves with locally available feed resources is biologically, socially, and economically acceptable under village conditions in Donggala district. The biological impacts of early weaning and strategic supplementation may be two fold; firstly, early weaning removes lactational stress from the cow, enhancing the likelihood of an early subsequent re-conception; secondly, farmers are provided with greater flexibility in how they manage the weaned calf, for example farmers could immediately trade the calf or decide to grow it out using the targeted supplementation strategy evaluated in the present study, based on their financial situation.

Conclusions

In conclusion, growth rates of young Bali calves fed native grass can be increased by supplementation

with rice bran and copra meal, in a village management system. This strategy of weaning and targeted supplementary feeding has the potential to improve Bali cattle production in eastern Indonesia by removing nutrient demands on the cow, in preparation for subsequent lactation and conception, and giving small-holder farmers more flexibility in growing and marketing the early weaned calf.

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