# Breeding *Bos Javanicus* d'Alton cattle in eastern Indonesia: Cattle growth[1]

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**ABSTRACT:** Growth of Bali cattle (*Bos javanicus* d'Alton) was monitored at Kelebuh (seasonal mating and weaning practised) and Tandek villages on Lombok. Body condition score (1-9) variation was low, averaging 6, though 5 over the dry season at Kelebuh. Calf birth weight averaged 16 kg for females and 17.5 kg for males. Suckling calf growth averaged 0.4 kg/day. Post-weaning heifer growth to 2 years averaged 0.2 kg/day, though was 0.25-0.3 kg/day at 18-24 months at Kelebuh. Average cow mature size of 270 kg was reached at 3.5 years at Kelebuh. Girth, but not hip height, was an accurate and precise predictor of weight.

**Key words:** Bali cattle, growth, weight, girth

## INTRODUCTION

Various Indonesian agencies have identified low sale weights of *Bos javanicus* d'Alton (Bali cattle) as a major issue related to poverty of small farmers and the development of a cattle industry in the eastern islands of Indonesia. There was a perception that the genetic merit of cattle is declining due to better quality bulls being sent for slaughter in Java (Talib *et al*. 2003); the anecdotal evidence is that bulls around 350 kg were regularly sold whereas by year 2000, bulls weighing as little as 250 kg were being sold to meet required trade numbers. It is more likely that this outcome was a consequence of poorer animal nutrition. Farmers concentrated on the expansion of cropping during the 1990s. They were forced to sell at younger ages and lower weights to meet trade and cash flow problems experienced with various crops and the general economy. This is supported by the decline in cattle numbers on most of the eastern islands during this period; eg, the population of Bali cattle in Nusa Tenggara Barat province declined by 8.8% between 1998 and 2001 (Talib *et al*. 2003).

Holmes (1987) (quoted by McCool 1992) identified the major constraint to development of a productive and efficient beef sector in eastern Indonesia as poor nutrition. Native *Bos javanicus* d'Alton and crosses with *Bos taurus* cattle predominate in the region. Bali cattle have a small mature size and appear tolerant of diseases, parasites, nutrition, and environmental conditions (Copland, 1996). Management of cattle diets is labour intensive as feed is usually not abundant, and cut-and-carry systems are used in many regions.

In 2001-2004 we evaluated a management system to match animal reproduction with supply of feed from pasture growth, crop residues and other feeds available to farmers for breeding cattle in the region as described by Poppi *et al*. (2010). This paper is the third in a series of fourth, and details animal growth in two villages.

## MATERIALS AND METHODS

Details of sites, cattle management, and overall monitoring are described by Poppi *et al*. (2010). In brief, cattle production was monitored at Kelebuh and Tandek villages (primarily cut-and-carry feeding) in the wet tropics of Lombok. Average annual rainfall is approximately 1500 mm, with 0-10% of annual rainfall usually in the six months from May to October. Irrigation water was most consistently available at Tandek.

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There were about 30 breeding-age female cattle kept in Tandek and about 40 in Kelebuh. Maiden mating was at 2 years of age. Tandek villagers retained prevailing management while Kelebuh villagers adopted alternative Bali cattle management that included use of a selected bull for natural mating which was restricted to 7 months each year, weaning when calves reached 5-6 months of age, and composting of cattle waste. A detailed monitoring system linked to unique individual animal identification was implemented, with data recorded by a village-based technical officer into books and computer files with the same format.

Each month, all cattle were weighed (no feed or water curfew), their hip heights and girth measured, and body condition assessed on a 9-point scale (Teleni *et al*. 1993). Summary statistics were produced for each of these parameters within village.

## RESULTS AND DISCUSSION

The variation in body condition of cattle is low and averages close to 6 over the wet season, dropping to approximately 5 by the end of the dry season at Kelebuh only.

Average calf birth weight was 16 kg for females and 17.5 kg for males. Pre-weaning calf growth averaged 0.4 kg/day both at Tandek and Kelebuh. Post-weaning heifer growth was steady at 0.2 kg/day up to 18 months of age at both sites, by which time they weighed an average of 150 kg. This growth rate was sustained at Tandek, but increased to 0.3 kg/day between 1.5 to 2.5 years of age at Kelebuh. An average mature size of 270 kg for cows is reached at 3.5 years of age (Table 1).

**Table 1.** Weights and heights (± sd) of village Bali cattle on Lombok island

| | Kelebuh | | Tandek | |
|---|---|---|---|---|
| | Female | Bull | Female | Bull |
| Weights, kg | | | | |
| Birth | 16.1 ± 1.8 | 17.1 ± 1.9 | 16.1 ± 2.5 | 17.1 ± 1.5 |
| Weaning | 79.1 ± 15.6 | 82.2 ± 15.5 | 79.4 ± 7.5 | 98.4 ± 7.2 |
| 1.0 years | 124.5 ± 17.1 | 129.9 ± 13.0 | 129.2 ± 10.1 | 144.4 ± 10.0 |
| 1.5 years | 142.2 ± 19.1 | 179.8 ± 42.7 | 160.0 ± 12.7 | 173.5 ± 4.9 |
| 2.0 years | 185.3 ± 18.2 | 240.8 ± 45.0 | 217.2± 23.6 | 238.2 ± 47.9 |
| Mature, post-calving | 270.7 ± 24.5 | - | 277.1 ± 29.0 | 295.8± 29.0 |
| Growth rates,kg/day | | | | |
| Pre-weaning | 0.39 ± 0.1 | 0.41 ± 0.1 | 0.36 ± 0.0 | 0.43 ± 0.0 |
| Wean-1.0 years | 0.25 ± 0.1 | 0.26 ± 0.1 | 0.27 ± 0.1 | 0.29 ± 0.0 |
| Wean-1.5 years | 0.14 ± 0.1 | 0.21 ± 0.1 | 0.25 ± 0.1 | 0.24 ± 0.1 |
| 1.5-2.0 years | 0.28 ± 0.1 | 0.34 ± 0.0 | 0.25 ± 0.1 | 0.26 ± 0.1 |
| Hip heights, cm | | | | |
| Birth | 67.9 ± 5.4 | 67.5 ± 5.8 | 69.8 ± 2.9 | 67.0 ± 2.9 |
| Weaning | 94.3 ± 7.1 | 94.2 ± 4.4 | 95.8 ± 10.1 | 101.3 ± 8.2 |
| 1.5 years | 111.1 ± 1.3 | 115.0 ± 2.4 | 107.6 ± 2.7 | 110.0 ± 1.7 |
| 2.5 years | 114.4 ± 2.7 | 118.0 ± 1.0 | 115.7 ± 4.8 | 117.5 ± 3.5 |
| Mature | 115.1 ± 2.2 | 121.8 ± 2.2 | 115.0 ± 3.4 | 120.8 ± 2.5 |

Average growth rate of yearling bulls increased from 0.25 at the start of the project to 0.3 kg/day once better management was implemented at Kelebuh. Bulls reached the 300 kg target weight for slaughter at 2.5-3.5 years of age, with the earlier times achieved at Kelebuh. There is substantial sexual dimorphism in Bali cattle with bulls known to reach at least 750 kg at maturity, though this is rarely seen within the smallholder community.

Liveweight had a stronger correlation with chest girth length (Figure 1) than with hip height.

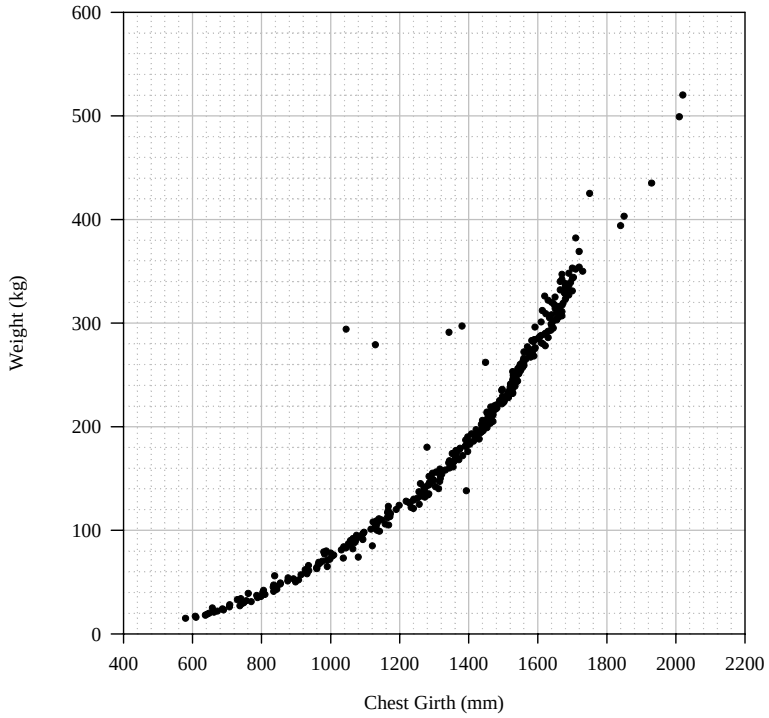


**Figure 1.** Relationship between chest girths (mm) and live weights (kg) in Bali cattle at Kelebuh and Tandek Villages in Lombok island.

Low annual liveweight gain by young cattle on Lombok is typically characterised by gain during the rainy season and often weight loss during dry seasons. Tandek and Kelebuh have similar rainfall totals (~1500 mm annually) which is concentrated in the November-April period. Despite this, young cattle sustained growth through the year. Cattle growth appeared slightly higher at Kelebuh, which may reflect improved management adopted within this village.

Better calving and weaning times contributed to improved growth rates achieved by cattle at Kelebuh. It resulted in bulls reaching a slaughter weight of 300 kg and cows reaching mature size approximately 6 months earlier than previously achieved. Mating, thus calving, was timed to match energy expenditure by breeding cattle with feed availability; ie, late pregnancy and lactation occurred when feed availability and quality was adequate. Weaning conserved cow body condition and allowed available good-quality diets to be fed to weaned calves.

There was no evidence of any genetic regression in Bali cattle. In contrast, random mating, which is a feature of regional breeding, was likely to result in stable genetic merit. The only potential genetic regression witnessed appeared to be cross breeding which resulted in cattle that were generally of substantially higher mature size, thus usually having feed requirements which can easily exceed the ability of villagers to cut and carry. This results in reduced diversion of available digestible energy to production, thus poorer-conditioned animals, especially breeding cows.

Chest girth length is closely related to weight in Bali cattle. Teleni *et al*. (1993) reported that in the absence of weighing balance under smallholder farmer condition, liveweight can be estimated by measuring chest girth length. Farmer in both sites found weight prediction from girth a valuable tool in valuing cattle.

## CONCLUSIONS

Better calving and weaning times contributed to improved growth rates of which bull sale weight and cow mature size reached with the earlier time.

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