Bali Cattle Performance in the Dry Tropics of Sumbawa

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ABSTRAK

PANJAITAN, T., GEOFFRY FORDYCE dan DENNIS POPPI. 2003. Penampilan sapi Bali di daerah tropik pulau Sumbawa. *JITV* 8(3): 183-188.

Monitoring penampilan reproduksi dan pertumbuhan sapi Bali telah dilakukan dari bulan Agustus 2001 sampai Agustus 2003 di Kabupaten Sumbawa dan Dompu di Pulau Sumbawa Propinsi Nusa Tenggara Barat. Hasil monitoring menunjukkan bahwa 62% anak lahir diantara bulan Mei sampai Juli. Jarak antar beranak rata-rata 11,9 ±1,9 bulan. Tingkat kematian anak pra sapih 5,3%. Bobot lahir, saat umur 6 dan 18 bulan berturut-turut tercatat: 14,2 ± 2,4 kg, 90 ± 20 kg, 172 ± 40 kg. Pertambahan bobot badan harian pra sapih (6 bulan) dan pasca sapih sampai umur 18 bulan tercatat: 0,41 ± 0,11 dan 0,23 ± 0,11 kg/h. Sapi Bali betina mencapai ukuran dewasa pada umur 2,5-3 tahun dengan bobot rata-rata 237 kg dan tinggi 1147 mm. Bobot dapat diduga dari lingkar dada dengan nilai korelasi = $7e^{0,0023 \text{ lingkar dada (mm)}}$ (R^2=0,9656). Hasil monitoring dengan tingkat reproduksi sangat tinggi dan pertumbuhan sesuai untuk sapi Bali, menunjukkan bahwa sapi Bali dapat beradaptasi dengan baik pada iklim tropis Sumbawa.

Kata kunci: Bali, bobot, sapi, tropis

ABSTRACT

PANJAITAN, T., GEOFFRY FORDYCE and DENNIS POPPI. 2003. Bali cattle performance in the dry tropics of Sumbawa. *JITV* 8(3): 183-188.

Preliminary data on Bali cattle reproduction and growth presented is based on monitoring between August 2001 and August 2003 in the Sumbawa and Dompu Districts of Sumbawa Island, NTB. Sixty two % of calves were born between May and July inclusively. Inter-calving interval averaged 11.9 ±1.9 months; though recognized as an under-estimate, it still indicated of high fertility. Post-natal calf mortality was 5.3%. Birth, 6-, and 18-month weights of 14.2 ± 2.4 kg, 90 ± 20 kg, 172 ± 40 kg, respectively, were recorded. Average daily gains between birth to 6 months and from 6 to 18 months were 0.41 ± 0.11 and 0.23 ± 0.11 kg/d, respectively. Females reached mature size at 2.5-3.0 years at a mean weight of 237 kg and height of 1147 mm. Weight could be accurately predicted from chest girth: Weight (kg) = $7e^{0.0023 \text{ Chest girth (mm)}}$ (R^2=0.9656). At the sites monitored, reproduction was high, and growth was typical for Bali cattle, indicating that these animals are well suited to the dry tropical environment of Sumbawa.

Key words: Bali, weight, cattle, tropic

INTRODUCTION

Bali cattle (*Bos javanicus d'Alton*) was domesticated from Banteng and kept as livestock in Bali Island ("*Balirund*", SLIJPER, 1954; PAYNE and ROLLINSON, 1973). These cattle have been distributed widely under traditional resettlement, colonial and government programs to many places across and beyond Indonesia (DARMADJA, 1980).

Although Bali cattle is relatively new to Sumbawa (76% of NTB area; ANONYMOUS, 2000), it is the most dominant cattle species. The massive population increase from 3,026 in 1969 and to 163,932 in 2001 (ANONYMOUS, 2002), an outstanding ability of Bali cattle to breed normally under harsh conditions (MORAN, 1973; 1978) in Sumbawa. The massive population increased has been assisted by local people preferring buffalo to cattle meat.

Bali cattle is reported as having high fertility and high carcass dressing percentage haven a pregnancy rate of 87% (PASTIKA and DARMADJA, 1976), 86% (DARMADJA, 1980) in Bali, 93% in Sabah, Malaysia (COPLAND, 1974), and 82% in South Sulawesi (WARDOYO,1950 cited by SIREGAR *et al*, 1985). Calving rates of 83% (PASTIKA and DARMADJA, 1976) and 82% (DARMADJA, 1980) have been reported in Bali, however, WIRDAHAYATI (1994) found calving rates of 66% and 64% in Lombok and Sumbawa, respectively. Carcass dressing percentages in mature females, bulls and steers in Bali of 55.8%, 56.6% and 56.5%, respectively, have been reported (SUWINDRA, 1972).

Bali cattle performance is variable and dependent upon environment. Knowing the performance of Bali cattle in Sumbawa will provide a benchmark in dry tropical area and the potential to improvements to achieve optimum productivity.

MATERIALS AND METHODS

The study was conducted in two villages (Boak and Simu) of the Sumbawa District and one village (Sukadamai) of the Dompu district. Average rainfalls for these sites were 1146, 1094, and 1154 mm, respectively, with 99% falling between November and April in this region. Monitoring the performance of approximately 350 Bali cattle commenced in August 2001 to August 2003, under farmer's normal management and trading, thus constantly altering numbers.

Reproductive parameters being monitored included calving date, birth weight (within 12 hours), calf survival, and weaning date. Cattle were denied access to water and feed overnight prior to monthly weighing and measurement of chest girth and height at the peak of the sacrum.

RESULTS AND DISCUSSION

Bali cattle calved throughout the year with 62% calving from May to July inclusive (Table 1; Figure 1). This is consistent with the report of BANKS (1986) and WIRDAHAYATI (1994) who reported peak calving during May to July in West Timor and April to September in Nusa Tenggara. WIRDAHAYATI (1994) reported a similar pattern in Bali.

The quantity and quality of available forage peaks between November and April, reflecting rainfall distribution. Energy demands of cattle peak during late pregnancy and lactation suggesting complete asynchrony with available diets in Sumbawa. Farmers appear to have been very effective in countering dry season diet deficiencies as the benchmarks for reproductive parameters for Sumbawa appear very high

Inter-calving interval (ICI) data is an under-estimated due to the short monitoring period, and lack of data from sub-fertile and infertile cows. The overall mean of 12 months (Table 2) equates to very high pregnancy rates in sexually-mature cows, while poor access to bulls probably contributed to a long ICI at

Table 1. Total number of calves born at the three sites from August 2001-August 2003

Sites	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Sukadamai	12	9	2	5	45	39	41	18	12	11	8	1	203
Simu	1	1		12	7	15	12	2	1				51
Boak	1	2	2	4	9	17	11	6	4	2	3	1	62
Total	14	12	4	21	61	71	64	26	17	13	11	2	316

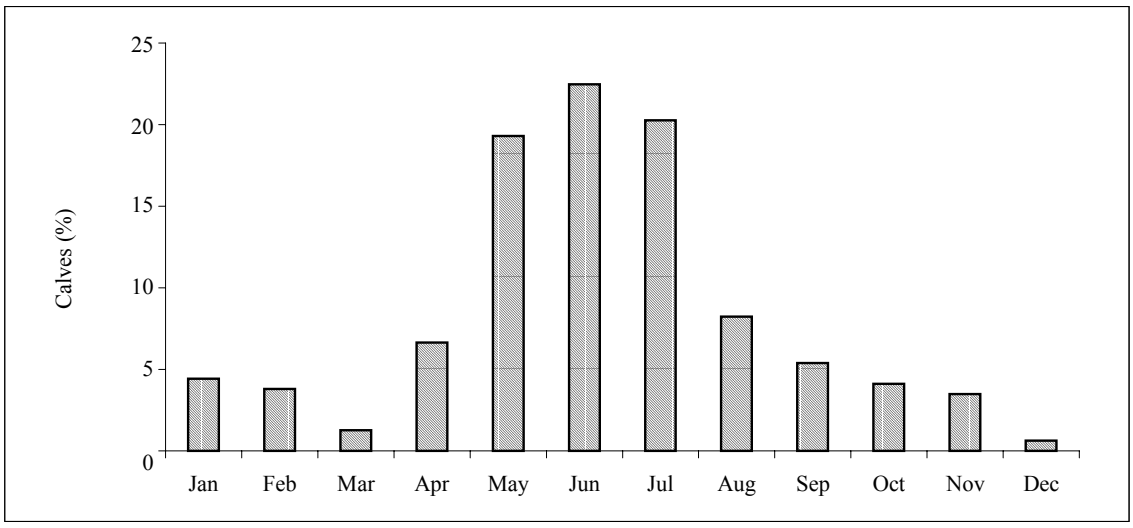

Figure 1. Total distribution of calves born in Sumbawa of a total 316 head from 350 cows

Table 2. Performance parameters (mean, sd, range) for Bali cattle at 3 sites in Sumbawa

Items	Boak	Simu	Sukadamai	All
Inter-calving interval (months)	12.0 ± 1.7 (10.1 - 17.5)	11.1 ± 1.2 (9.7-13.8)	12.0 ± 2.1 (9.6-22.3)	11.9 ± 1.9
Birth weight (kg)	15.2 ± 2.7 (8-21)	14.6 ± 3.8 (11-21)	13.8 ± 2.1 (11-20)	14.2 ± 2.4
Daily gain pre-weaning (kg/d)	0.33 ± 0.10	0.38 ± 0.08	0.48 ± 0.09	0.41 ± 0.11
Adjusted weight at 6 months of age (kg)	76 ± 18 (49-110)	82 ± 15 (55-111)	101 ± 17 (68-140)	90 ± 20
Average daily gain between 6 and 18 months of age (kg/d)	0.20 ± 0.08	0.75 ± 0.13	0.23 ± 0.11	0.23 ± 0.11
Adjusted weight at 18 months of age (kg)	146 ± 23 (105-190)	183 ± 49 (117-280)	185 ± 35 (133-258)	172 ± 40

Sukadamai. Previous observers have reported longer ICIs for Bali cattle ranging from 14 to 18 months (DEVENDRA *et al*., 1973; DARMADJA, 1980; WIRDAHAYATI, 1994), whilst SUMBUNG *et al.* (1978) reported an average ICI of 11.1 months in South Sulawesi.

The average birth weight of 14 kg (Table 2) was relatively high, with a low birth weight of 8 kg in Boak and Sukadamai. Previous reports include 16 kg in West Malaysia (DEVENDRA *et al.*, 1973), Sabah (COPLAND, 1974) and Bali (DARMADJA, 1980), 12 kg in South Sulawesi (SUMBUNG *et al.*, 1978) and Grati, East Java (WIJONO and YUSRAN, 1990), 9.9 kg in Maros, South Sulawesi (PAAT and WINUGROHO, 1990) and 10.5 kg in Timor (WIRDAHAYATI and BAMUALIM, 1990). Lower birth weights are most likely related to nutritional stress on the dam during the late pregnancy e.g. if calving occurs in the mid to late dry season. FORDYCE *et al*. (1993) has shown in *Bos indicus* x *Bos taurus* cattle that birth weights vary by up to 25% in response to changing nutritional conditions in the dry tropics.

Calf mortality was 5.3%, what is higher than reported level of 3.9% in East Borneo (SOLICHIN *et al.,* 1990), but lower than 7.3% (range of 5.2–10.4%) in Bali (DARMADJA 1980). Peri- and post-natal calf loss was reported at 8% for Brahman cross cattle in the dry tropical area of north Queensland in the absence of significant reproductive diseases (HOLROYD, 1987). Previously, WIRDAHAYATI (1994) reported mean calf mortality of 10.8% in West Nusa Tenggara, with losses of 30.7% at one site in Sumbawa. It is suggested that survival of Bali cattle calves is inversely related to birth weight.

Though the effective management of diets during the dry season at the monitored sites may have contributed to the high fertility, the inherent fertility must also be high in Bali cattle to achieve such outcomes. This suggests that where fertility is low, these cattle will readily respond to strategies aimed at improving calf output under Indonesian conditions.

Overall weaning weight (Table 2) was relatively high in comparison to previous reports. Other observations of average weaning weight include 76 kg for males and 73 kg for females at 182 days (DJAGRA *et al.,* 1979), 83 kg (range of 76 to 87 kg) at 205 days (DARMADJA, 1980), 90 ± 30 kg at 6 months in East Nusa Tenggara (SIREGAR *et al.,* 1985), and 86 kg at 205 days (PANE, 1989). Variation in pre-weaning growth rate is related to lactation yields of their dams. WIRDAHAYATI and BAMUALIM (1990) reported an average daily milk yield over six months of 790 ± 420 g/d although it must be recognized that Bali cattle milk is high in total milk solids (approximately 18%; SUKARINI *et al.,* 2001).

The average daily weight gain between 6 and 18 months of age and weight at 18 months (Table 2) are consistent with other reports for Bali cattle, including the results of WIRDAHAYATI (1994) in Sumbawa. Other reports include 167 kg at 20 months in Bali (PANE, 1991), 0.30-0.37 kg/d from birth to one year and 0.18-0.22 kg/d from one to two years of age in Malaysia (DEVENDRA *et al.,* 1973), and 150, 154, 160, and 167 kg for females at 18 months in South Sulawesi, East Nusa Tenggara, West Nusa Tenggara, and Bali, respectively (PANE, 1991) whilst DAHLANUDDIN *et al.* (2003) reported an average daily gain of 0.40 kg/d for weaned heifers fed on native grass supplemented with rice bran + urea and salt. These data suggests that Bali cattle are as adapted to the Sumbawa environment as elsewhere in Indonesia and that there are opportunities to improve post-weaning growth rates.

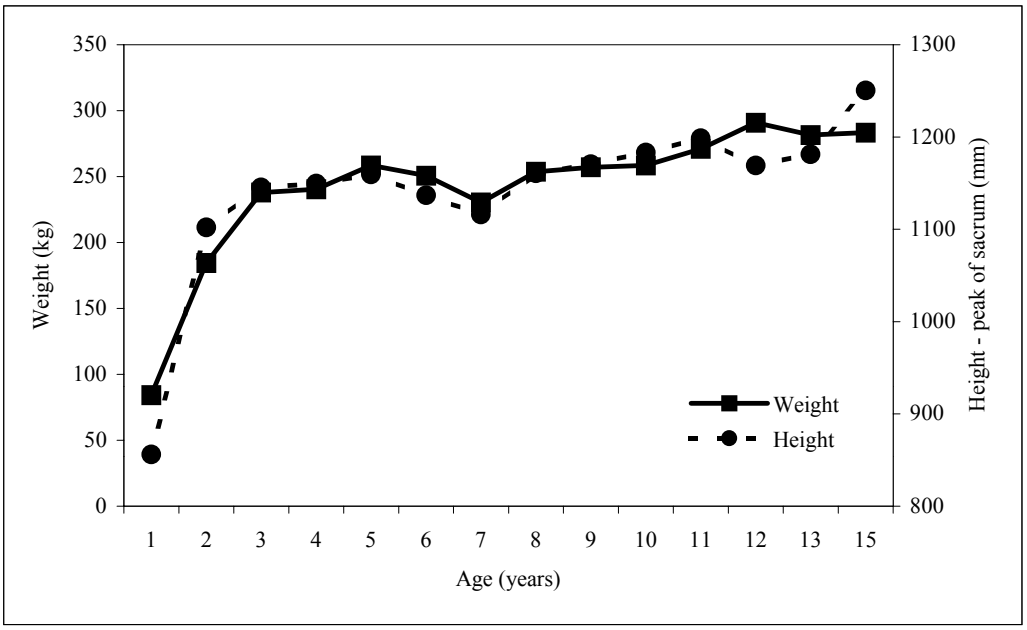

Figure 2. Average growth of female cattle at 3 sites in Sumbawa

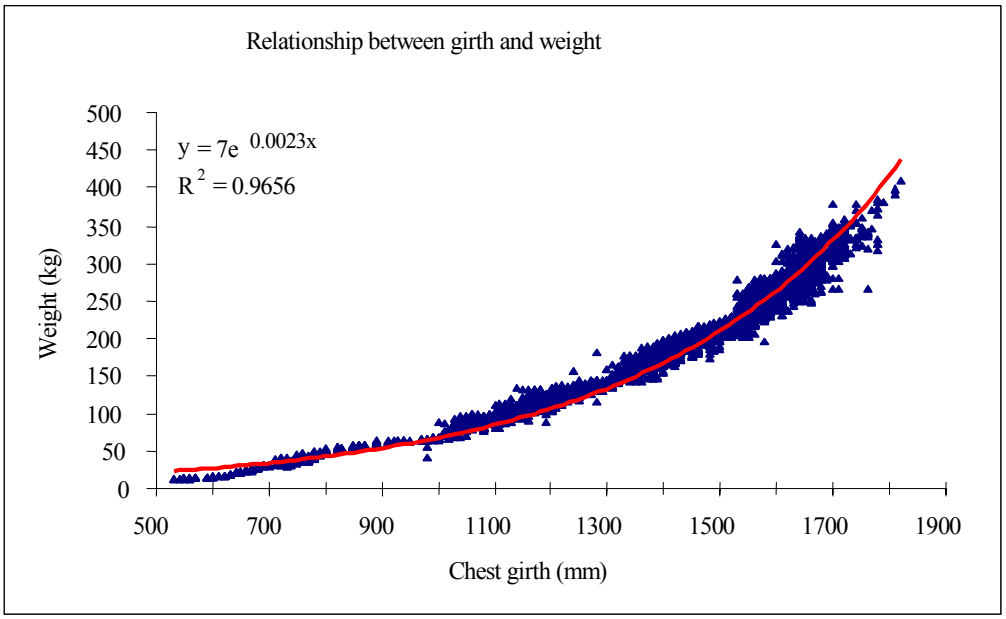

Figure 3. Prediction of weight from chest girth in Bali cattle

Female Bali cattle reached an average mature weight of 237 kg at 3 years (Figure 2). This finding is similar to previous reports: range of mean body weight of 174-248 kg (WIRDAHAYATI, 1994), 224-234 kg in Sulawesi, East and West Nusa Tenggara Provinces (ASTAWA, 1989), and 211, 222 and 242 kg in South Sulawesi, East and West Nusa Tenggara Provinces (TALIB *et al.,* 2002). Our data show that height closely mirrors weight and an average mature height of 1147 mm is reached at 2.5 years. MEIJER (1962; cited by PASTIKA, 1976) reported an average mature height of 1160 mm in Bali cattle. It was found that chest girth is a useful predictor of live weight (Figure 3). ($Y = 7e^{10.0023x}$)

CONCLUSION

Bali cows are very fertile and will readily get into calf despite apparently low feed quality. Availability of a bull rather than nutrition appears to be the major constraint to weaning percentage. Nutrition can be very low in the late dry but this is largely because of a shortage in the quantity than quality of feed. With some simple forward planning, e.g. storage of rice straw or other by-products, to obtain high performance of cows on dry season forage. High mortality appears to occur when feed is short, and a good opportunity to improve post-weaning growth rate with some simple nutritional strategies.

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