Performance and Survival Rates of Beef Calves Under the Dry Tropic Conditions of Nusa Tenggara, Indonesia

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ABSTRACT: Bali cattle (Bos sondaicus) and Ongole cattle (Bos taurus) are the most important cattle breeds in the Nusa Tenggara region of Indonesia. A trial to observe the reproductive performance of Bali and Ongole cows, the mortality and growth rates of their calves under conditions of improved feeding was carried out from 1995-1998 in West Timor, East Nusa Tenggara Province, Indonesia. Parameters observed included calving percentage, birth weight, calf mortality rate and calf daily weight gain (0-3 months old and 3-6 months old). Calving percentages for Bali cows in 1995, 1996, 1997 and 1998 were 82; 64; 44 and 89% respectively, whereas the Bali calf mortality rates in the same period were 52; 37.5; 30 and 48% respectively. Approximately 90% of the calf mortalities occurred before one year of age. The mean birth weights of the Bali calves was 11.9±1.8 kg. The year of birth significantly (P<0.01) affected the calving rates but not the season. Male calf birth weights were slightly higher than those of females but not significantly different (P>0.05). Mean daily weight gains recorded for Bali calves from 0-3 months and 3-6 months of age were 173 and 118g/head/day respectively. Calving percentages in Ongole cows from 1996 to 1999 ranged from 41 to 45% with a calf mortality rate of only 9%. The mean birth weight of the Ongole calves was 19.3±2.6 kg and significantly affected by year and season (P<0.01). The average daily weight gain for Ongole calves from 0-3 months and 3-6 months was 395 and 131g/head/day respectively. Bali cattle had a much higher calving percentage, but faced higher calf mortality during the dry season. On the other hand, although the survival rate of the Ongole calves is high, the calving percentage is relatively low. Therefore feeding improvement for lactating cows in both breeds should be implemented to rectify the the problem of Bali calf survival, and to improve Ongole cows fertility.

Key Words: Ongole Cattle, Bali Cattle, Performance, Survival Rates, Indonesia

INTRODUCTION

The Indonesian province of East Nusa Tenggara (ENT) particularly the area of West Timor, is one of the major beef producing regions of Indonesia. The predominant beef cattle breed found in the region is the Bali cattle breed. This breed was introduced into the island of Timor in the early 1900s and their present population is estimated to be approximately 600,000 head. Approximately 50,000 Ongole cattle are also found in the region (Anonym,1977).

It has been suggested that the difference in the population of these two breeds is due to a lower reproductive rate in Ongole cattle. Some studies have confirmed that Bali cattle have a higher reproductive rate than Ongole cattle (Wirdahayati, 1994; Wirdahayati and Bamualim, 1990), however, the effect of the higher fertility rate appears to be partially offset by a high juvenile mortality rate, particularly in those calves born during the dry season (Banks1986; Wirdahayati, 1994, Wirdahayati, 1998). Studies reported by Wirdahayati and Bamualim (1990) and Wirdahayati (1994) indicated that approximately 41 % of Bali calves are born from the beginning of April to the end of June and another 40% are born from July to September. This calving period occurs during the early to mid dry season when nutritional conditions are the poorest. The affect of poor nutrition and the resultant decrease in cattle body weight and condition, particularly during the post-partum period, may delay the onset of post-partum oestrus, prolong the inter-calving interval, hamper calf survival and reduce the growth rate of weaner cattle.

The objective of this trial was to compare the growth rates and survival rates of Bali and Ongole calves given restricted access to their dams (supplemented and control dams) and to compare after weaning performance of the supplemented and non supplemented calves.

METHODS

The study was conducted at the Lili Research Station, Kupang, West Timor. Calving records on 80 Bali calves were observed from June 1995 until June 1999, and 35 Ongole calves were monitored from 1996 to 1998. The calves were classified as the supplemented group if their dams were allocated to a 3-month feed supplement treatment and as control group if their dams did not receive feed supplement treatment.

Calves were weighed within 24 hours of birth and had continuous access to their dams during the first month postpartum. Thereafter, all calves were separated from their dams and allowed to suckle
twice a day until they were weaned at 3 months of age. The weaners from the supplemented cows were then grouped and received feed supplements and the weaners from the controls were grouped as the control group. During the three month period after weaning, both groups were allowed to graze freely during the day. The fresh normal diet given to the control group of Bali calves was 2 kg native grasses, 1 kg tree legumes and 1 kg putak (palm pith of Corypha gebanga), whereas Ongole calves received 2.5 kg native grasses, 2.5 kg tree legumes and 1.5 kg putak. An extra 1 kg tree legumes added to that of normal diet given to the supplement group of both Bali and Ongole calves. The diets were given to the calves when they were penned.

The parameters observed in this study included the birthweight of calves, the bodyweight of calves at 3 and 6 months of age, and the dam’s milk yield during 0-3 months lactation period which was measured by weigh-suckle-weigh method. The milk yield of the dam and the weight of the calves were measured every two weeks from 0-3 months and from 3-6 months of age. Feed dry matter and crude protein intakes from 3-6 months of age were also measured. Data were analysed using analysis of variance to calculate the mean for each parameter.

RESULTS AND DISCUSSION

Bali cattle calving patterns and birthweights.
Observation was made on 80 Bali calves which were born during four year period, represented an average 69.7% calving rate. Seventy two percent of Bali calves were born during the early to mid dry season (April-September), 17.2% during the late dry season (October-December) and 10.5% during the wet season (January-March). The mean birth weight of Bali calves was 11.9±1.8 kg (n=80). The cow’s mean body weight at calving was 191±21 kg. The mean birth weight of the male calves was slightly higher than the female calves (12.2±2.5 vs 11.4±1.9 kg, P< 0.05). However, the birth weight was not significantly affected by season (P>0.05).

Ongole cattle calving patterns and birthweights.
Observations were made on 35 Ongole calves which were born during three year period, representing an average 44% calving rate. The Ongole cattle calving period tended to be spread evenly throughout the year. The mean birth weight of Ongole calves during the trial was 19.3 ± 2.6 kg. In this trial birth weight was significantly affected by season (P<0.05). The mean birth weight of calves born during the wet season (January-March) was higher than those born during the early dry season in April-June (22.5 ± 1.9 kg vs 19.2 ± 3.2 kg). The difference was more pronounced between the birth weights of calves born during the peak of the dry season (July-September) with a weight of 15.6±2.1 kg and during the late dry season (October-December) with a weight of 16.5±2.9 kg. There was no significant different between female and male birthweights (P>0.05).

Feed intake
Average feed dry matter and crude protein intakes for calves are presented in Table 1.

Table 1. Bali and Ongole calf average milk intake from 0-3 months of age, and weight gains and Dry Matter and Crude Protein intakes for calves from 3-6 months of age (mean±SD)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Bali Calves</th>
<th>Ongole Calves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ave milk intake 0-3 mth (l/h/d)</td>
<td>2.8 ± 0.9</td>
<td>2.2 ± 0.9</td>
</tr>
<tr>
<td>Weight gain 0-3 mth (g/h/d)</td>
<td>192 ± 100</td>
<td>153 ± 85</td>
</tr>
<tr>
<td>Weight at 3 mth (kg/hd)</td>
<td>29.3±5.9</td>
<td>27.3±4.4</td>
</tr>
<tr>
<td>Weight gain 3-6 mth (g/h/d)</td>
<td>146 ± 37</td>
<td>88 ± 49</td>
</tr>
<tr>
<td>Weight at 6 mth (kg/hd)</td>
<td>39.1 ± 5.5</td>
<td>31.8 ± 5.7</td>
</tr>
<tr>
<td>Dry matter intake 3-6 mth (kg/h/d)</td>
<td>1.26±0.24a</td>
<td>1.04±0.27b</td>
</tr>
<tr>
<td>Crude protein intake 3-6 mth (g/h/d)</td>
<td>164±24a</td>
<td>122±20b</td>
</tr>
</tbody>
</table>

Within each breed, means in rows with different superscripts are significantly different (P<0.05).
Calf performance at 0-3 month and 3-6 months

Calf mean daily weight gains for both Bali and Ongole calves aged 0-3 months and given supplementation were significantly greater than the daily weight gains of the control group. Despite this, the difference in calf bodyweights at 3 months of age were not significant different in the Bali calves but they were significantly greater for Ongole calves that were supplemented.

Weight gains from 3-6 months of age for both Bali cattle and Ongole supplemented groups were significantly different from weight gains for control groups as were the body weights at 6 months of age.

The results show that supplemented calves gained weight at an increased rate both pre and post weaning and this had a significant effect on weight differences at 6 months of age.

Calf survival

The mean survival rates of Bali calves during the trial was 57% with no significant difference between the treatments, years or sex. The average calf losses were 52; 37.5; 30; 48; and 48% in 1995, 1996, 1997, 1998 and 1999 respectively. Calving season was found to have a significant effect on calf mortality ( P<0.05).

Calves born during the dry season had a higher mortality rate than those born during the wet season. The highest Bali calf losses (33.3%) were recorded during the late dry season, followed by the mid dry season (29%), and the early to dry season calving (24.4%). The lowest calf mortality rate was recorded during the wet season (13.3%). Most mortalities occurred before one year of age. The highest calf losses (35.6%) were recorded for calves aged less than 3 months old, 28.9 % for calves 3-6 months of age, 26.7% for weaners 6 months to one year of age, and 8.9% for cattle greater than one year old. The Ongole calves survived better than did the Bali calves with a calf mortality of 9.4% recorded during the trial.

CONCLUSION

The results of this study indicated that feeding a supplement to calves with restricted milk intakes during the first three months of life had significant positive effects on calf daily weight gain and that ongoing supplementation after weaning continued to produce significant positive differences within the supplemented group. The low milk yields produced by Bali cows plus the addition of a restricted suckling program as imposed on the calves in this trial has resulted in reduced daily gains during the first 3 months of life.

The results revealed that the time of calving affected the birth weight and survival of the calves. During the trial, Ongole calves survived better than the Bali calves.

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