

Body Condition Score of Bali Cows: Its Effect on Reproductive Status

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ABSTRACT

The study was aimed at scoring the body condition of Bali cows and its effect on the reproductive status. It was conducted in 14 smallholder farms in Bantaeng, South Sulawesi Province, Indonesia. A total of 64 Bali cows were involved in the study. All cows were subjected to body condition scoring (BCS; scale 1 - 9) and then clinically examined for reproductive status. The results of this study showed that most of cows had lower BCS (68%) and only 32% had BCS 5 or greater. A proportion of cows with parities 1 and 2 were 61%, higher than parities 3 and 4; 28% and parity 5 or greater; 25%. This study also noted that proportions of cows pregnant, cyclic and anestrus were 25%, 9%, and 66%, respectively. Interval from calving (mean $\pm$ SD) to conception of these Bali cows was relatively longer 191.3 ± 115.7 days and it expected calving interval of the cows approximately 476 days. In conclusion, the Bali cows exhibited lower reproductive performance and lower BCS was the contributory factor.

Key Words: Bali Cows, BCS, Reproductive Status, Reproductive Performance

INTRODUCTION

The most popular cattle raised by farmers in South Sulawesi Province, Indonesia are Bali cattle. These cattle originated from Bali Island. Proportions of these cattle are smaller than many breed, such as those in Europe and other west countries. These cattle have been well known their good reproductive performance. Lately, however, the reproductive performance of Bali cattle has decreased. Nutrition is believed to be the contributory factor. Body condition score (BCS) of the cattle is a reflection of the animal's diet. Body condition or changes in body condition, rather than live weight or shifts in weight, are a more reliable guide for evaluating the nutritional status of a cow (Herd and Spratt, 1996). Therefore, measuring BCS of the cows might be used to predict subsequently the cow's fertility.

Fertility, a component of reproductive performance, defines the ability of the female to become pregnant, but it is ultimately reflected in the birth of a calf (Rodriguez-Martinez et al., 2009). Furthermore they stated that fertility is usually monitored by indirect rates of non-return to estrus or by the more accurate conception or pregnancy rates, whereas monitoring is resulting from clinical examinations. This examination must be undertaken comprehensively, including regularly monitoring the cows' BCS as one of the factors affecting fertility. To achieve high conception or pregnancy rates in cows, therefore, it is necessary to have better BCS through sufficient nutrient intake.

The main objective of a cow-calf production system is to yield a high calf crop each year, which is the primary factor that impacts on profit ability (Martins et al., 2012). A high calf crop is dependent on optimal reproduction, which is one of the most important factors affecting the financial viability of a cow-calf enterprise (Martins et al., 2012; Hess *et al.*, 2005). Considering the importance of BCS in relation to the reproductive performance of the cows, the objective of the

present study was to score the body condition of Bali cows and its effect on their reproductive status.

MATERIAL AND METHODS

Bali Cows and Raising Management

This study involved 64 Bali cows. The cows were raised by 14 farmers in smallholder farms in Bantaeng Regency, South Sulawesi Province, Indonesia. The farms were visited for reproductive examination and scoring for body condition as well as parity. Cows were confined in a simple housing of each farmer during night-time and sent out to the field at day-time for grazing.

Scoring Body Condition and Reproductive Examination

Body condition score (BCS) of all cows was recorded (BCS: scale 1 to 9) (Momont and Pruitt, 1998; Mathis *et al.*, 2002). Clinical reproductive examination was conducted. First, the cows were restrained in AI stanchion to prevent the animals from moving. Then palpation per rectum of the genitalia was conducted to assess uterine conditions and ovarian structures (Yusuf *et al.*, 2010). Determination of uterine condition was performed, including contraction, elasticity, tonicity, and symmetry of uterine horns and the presence of any fluid in the uterus (Gautam *et al.*, 2010). The cows were considered pregnant as indicated by uterine development; otherwise were considered not pregnant.

Non-pregnant cows were then assessed for their ovarian functions. The ovaries without any palpable structures of the follicle and/or CL were considered inactive (Yusuf *et al.*, 2010). Presence of the large follicle or dominant follicle and/or corpus luteum (CL) without any development of uterine was considered cyclic.

Statistical Analyses

All data were tabulated and calculated using the Microsoft Excel software for MS Windows. Percentages of BCS and parity were calculated by number of cows at each level of BCS and parity divided by total number of cows multiplied by 100. Similarly, pregnant, cyclic and anestrus cows were calculated by number of cows at each level of pregnant, cyclic and anestrus cows divided by total number of cows multiplied by 100. Intervals from calving to conception were calculated as number of days from calving to conception. Days after calving for anestrus cows were calculated as number of days from calving to the time of examination.

RESULTS AND DISCUSSION

Farm Management

The cattle covered by the study are extensively raised by farmers in the region where the study was undertaken (Fig. 1). It is common that the farmers bring their cattle to the field or grassland for grazing in the morning and returned back to the farm in the late afternoon. This prevailing practice is due to the fact that not all the farmers have special land for planting forage hence it is easier for them to simply keep their cattle in the field for grazing. For the farmers who have available land, they planted such as elephant grass. During the dry season, however, this plantation would not help much, and in order to maintain the cattle, the farmers usually let them grazing in the ricefields.

In Indonesia, more than 90% of beef cattle producers are situated in small farms. Since the cattle in small farms are raised extensively, many factors limit and reduce the productivity of the animals during their lifetime. This situation requires more attention and strategies to increase the productivity of cattle in small farms. An effort to optimize or increase the productivity of cattle, especially among Bali cows in the region, is necessary. Many aspects, such as raising management, nutrition and reproductive management, among others, have to be approached in a holistic manner.

Chenoweth (2012) suggested that in order to achieve high level of productivity in extensive cattle-raising, it is necessary to consider many factors, including optimizing the role of extension, higher education and modern technologies. Taking these factors holistically in small farms would maximize the productivity of the cows and, in turn, contribute not only to national economies, but also to sustainability and profitability of agriculture, as well as to the fabric of local societies (Chenoweth, 2012).



Figure 1. Bali cattle and the farmer

Body Condition Score (BCS) and parity of the Cows

Fig. 2 shows the BCS of the cows used in the present study. About only 32% of the cows had BCS 5 or greater and the other 68% had BCS 4 or lower. This indicated that mainly, cows raised by the farmers suffered from under nutrition, which makes it difficult for the cows to get pregnant. Several studies have shown the positive relationship between BCS and reproduction. Lamb (2012) stated that there are intricate relationships indicating interaction between nutrition and reproduction. From a nutrition standpoint, energy, protein, minerals and vitamins all affect reproduction through various avenues. The hypothalamus, pituitary and/or the ovaries can be affected by nutritional deficiency.

Lower BCS of the cows used in the present study might be caused by under nutrition, which appears to have an effect on the animals' reproductive hormonal mechanism. Flores et al. (2008) concluded that under nutrition of cattle may be communicated to the hypothalamic-pituitary-ovarian axis via metabolic hormones, including IGF-1, thyroid hormones or prolactin. This condition, in turn, affects the reproductive processes in cows.

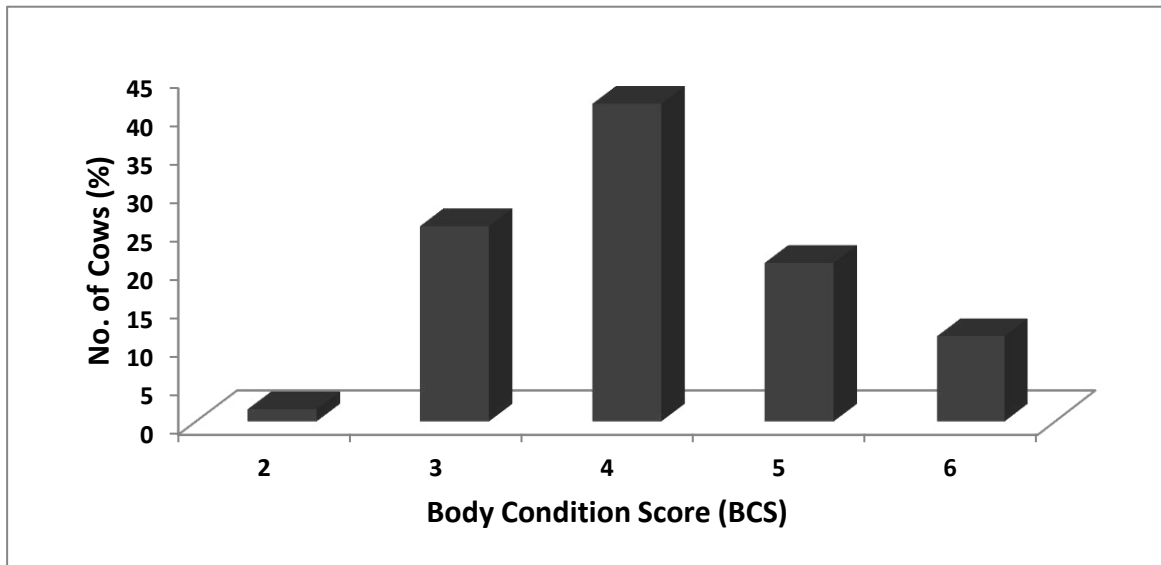


Fig. 2. Body condition score (BCS) of Bali cows that raised in small holder farms

Distribution of Bali cows at different parities is shown in Fig. 3. A proportion of cows with parities 1 and 2 were 61%, higher than parities 3 and 4; 28% and parity 5 or greater; 25%. This means that mostly Bali cows are in the population with lower parities. High percentage of cows with parities 1 and 2 in this study may indicate that Bali cows after first or second calving have difficulty conceiving for the subsequent pregnancy. Therefore, it is vital to maximize and improve the reproductive potential of Bali cows by focusing on reproductive technology management. This allows the potential cows to increase the number of offspring during their lifetime.

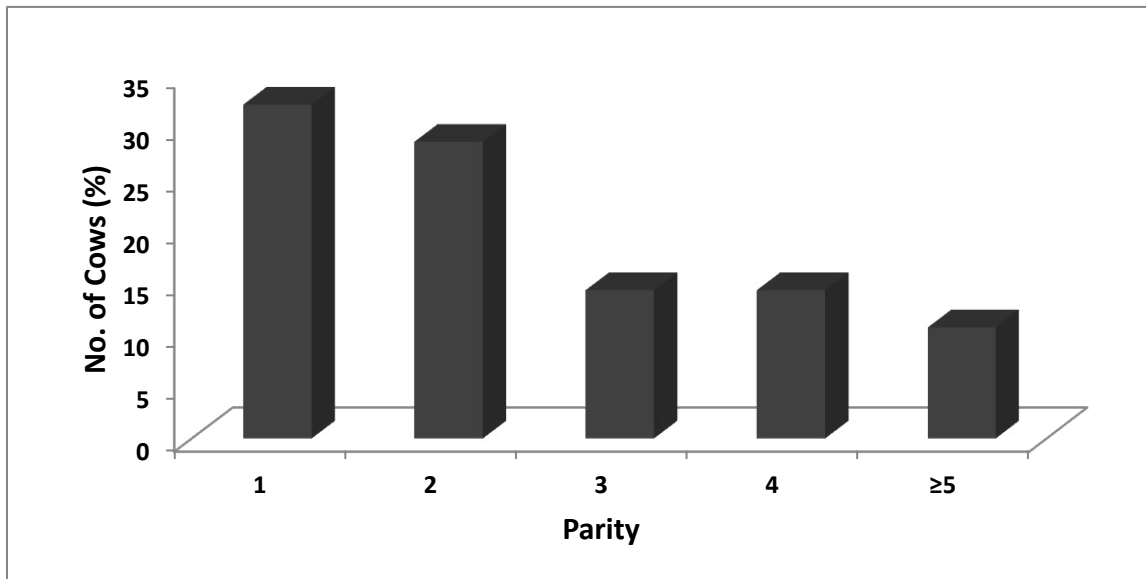


Fig. 3. Parity of Bali cows in small farms.

Reproductive performance of Bali cows

At the time of examination, all cows under the study were subjected to palpation per rectum to examine their reproductive status. In the Bali cow population, we noted that about 25% were pregnant, 9% cyclic, and the other 66% in anestrus (Fig. 4). Lower proportion of pregnant and cyclic cows in this study suggested low reproductive efficiency. Interval from calving (mean $\pm$ SD) to conception of Bali cows was 191.3 ± 115.7 days. It means that expected calving interval was approximately 476 days or greater than 15 months.

Low reproductive performance in Bali cows in the present study had high relationship with the high incidence of anestrus as shown in Fig. 4. Causes of this incidence are not well understood. Lower BCS of these cows is suspected to be contributory (Fig. 6). Therefore, optimal reproductive performance in beef cows is often limited by prolonged postpartum anestrus intervals (Ciccioli et al., 2003) and needs to be shortened to achieve high performances.

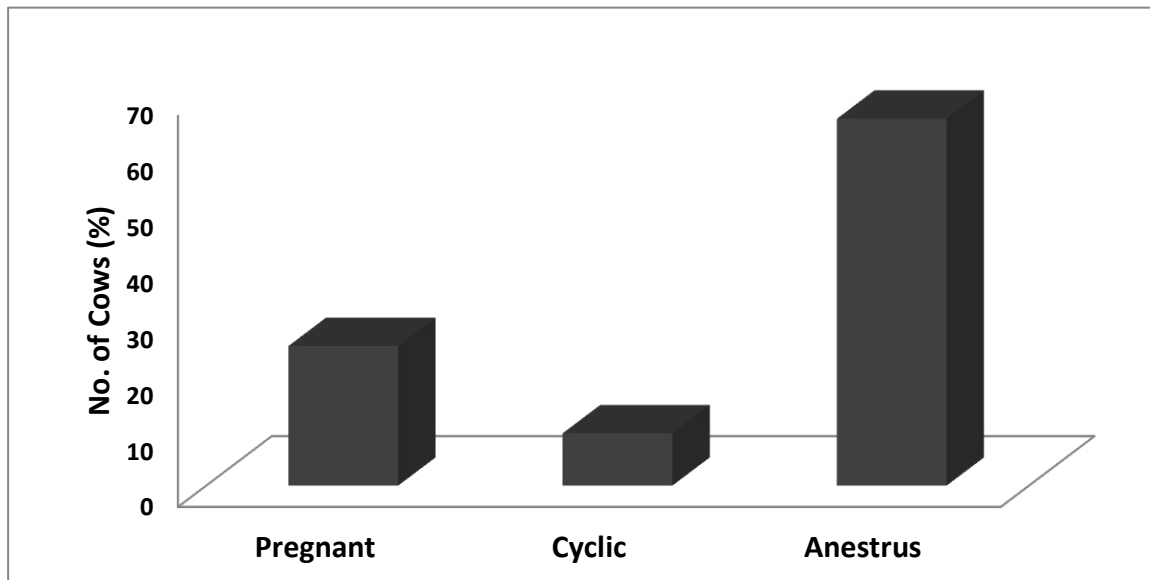


Fig. 4. The Reproductive status of Bali Cows

Anestrus cows

The most critical factors affecting long calving interval in cows is long period of anestrus. Therefore, to achieve optimum time of calving interval, anestrus postpartum should be as short as possible. In this study, we confirmed high variation of anestrus cows after calving (Fig. 5). Up to 85 days after calving, anestrus cows were approximately 57% and the remaining 43% was greater than 85 days postpartum. At best, cows should become pregnant at 85 days postpartum in order to achieve optimum calving interval.

Several factors may affect long anestrus postpartum. One of these factors is BCS. This study confirmed that there was significant ($P=0.0027$) effect of BCS on reproductive status (pregnant, cyclic and anestrus). BCS in anestrus cows was significantly ($P=0.0014$) lower than in pregnant cows (3.9 vs. 4.8) (Fig. 6). This result was in agreement with the study of Drennan and Berry (2006) [13] that showed pregnant cows had higher BCS. Likewise, cyclic cows had higher BCS than anestrus cows (4.5 vs. 3.9; $P=0.1149$). Lower BCS of cows extends period of postpartum anestrus (Lake et al., 2005; Hess et al., 2005) and subsequently prolongs interval from calving to first ovulation as well as conception.

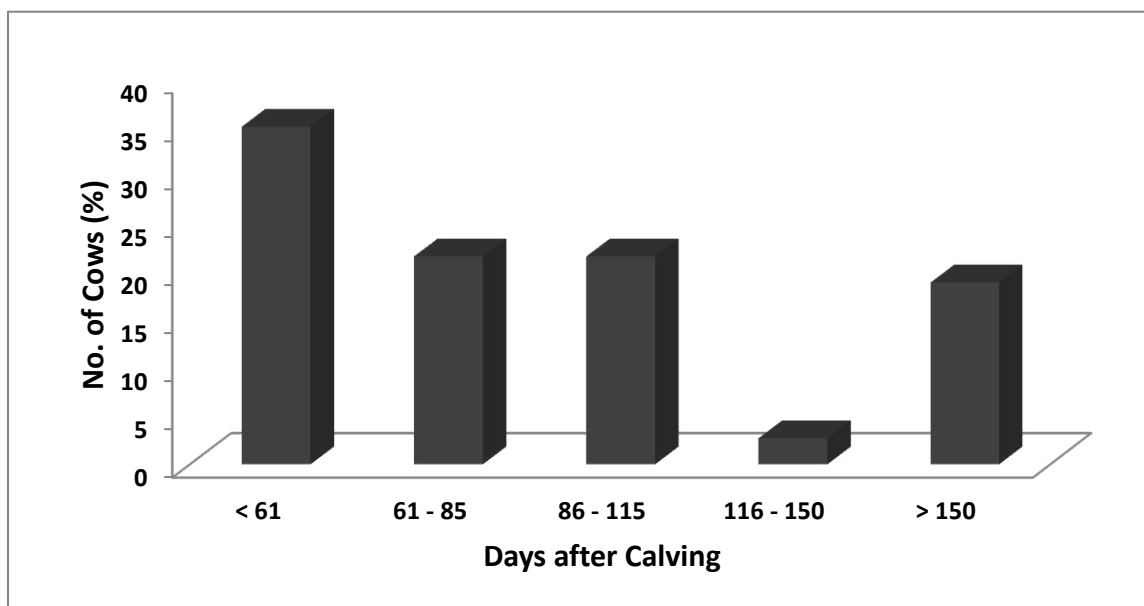


Fig. 5. Days after calving of anestrus cows at the time of examination

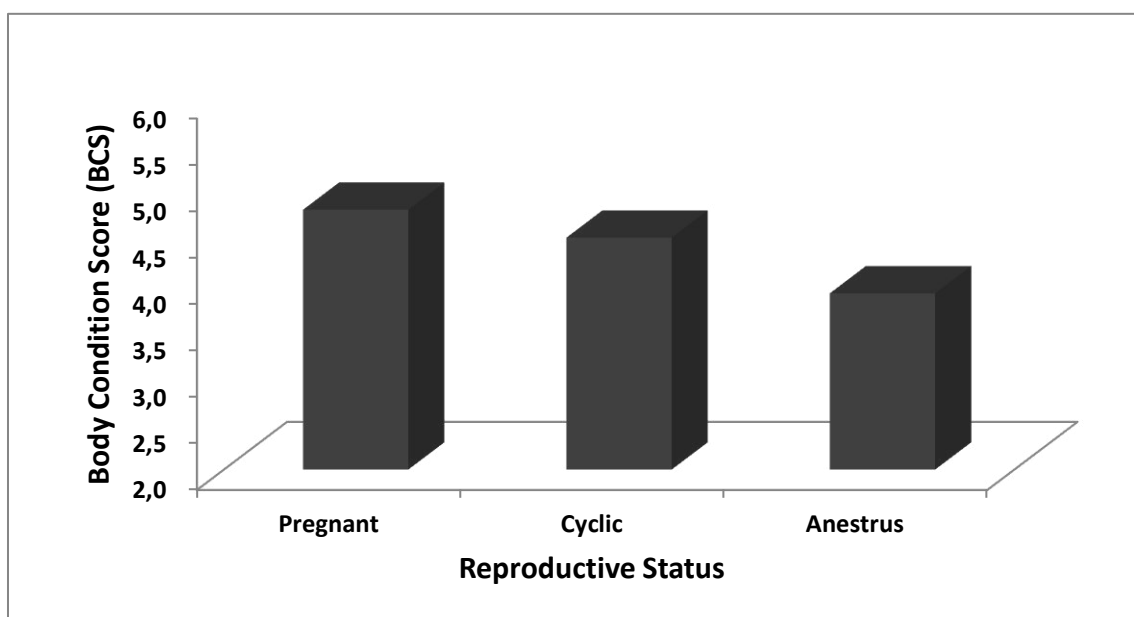


Fig. 6. Body condition score (BCS).

CONCLUSION

In conclusion, reproductive performance of Bali cows has decreased and it appears that lower BCS was the contributory factor.

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