



Relationship between body condition score and production of multiparous beef cows

B.J. Renquist, J.W. Oltjen ^{*}, R.D. Sainz, C.C. Calvert

University of California, Department of Animal Science, One Shields Avenue, Davis, CA 95616, United States

Received 29 June 2005; received in revised form 13 February 2006; accepted 10 April 2006

Abstract

Pregnancy rate, calving interval, weaning weight, birth weight and quarterly body condition score (BCS) were collected on fall calving multiparous English crossbred cattle (ages 3 to 10) from 1994 to 2001 to evaluate the critical time of cow condition measurements that predict production. The study was initiated with 260 cows. Replacement animals entered the study at first calving (2 years of age), with 45, 54, 27, 68, 54, and 45 animals added in years two through seven, respectively. Body condition score was measured in association with calving, breeding, weaning, and midway between weaning and calving (August). Regression of the logit of the probability of pregnancy (Y) showed that pregnancy outcome was quadratically related to BCS at breeding ($P < 0.0001$, $Y = -4.81X^2 - 0.52X - 4.339$) and linearly related to BCS at calving ($P = 0.009$, $Y = 0.32X + 4.17$), but was not associated with either the pre- or postpartum change in condition ($P > 0.05$). Calving interval varied cubically with BCS at calving and quadratically with BCS at breeding ($P < 0.0001$ and $P = 0.002$, respectively). The largest decreases in calving interval were associated with increases in body condition score at calving from 3.5 to 4.5 and from 7 to 8. Calf weight at 205 days was related to both the BCS at breeding and the change in BCS from breeding to weaning ($P = 0.01$ and $P = 0.004$). Calf weight at 205 days was also associated with BCS at weaning ($P = 0.0003$). Cows with either low or high BCS at weaning tended to wean lighter calves than cows with moderate condition (4.5 and 5.5). Moreover, BCS at weaning (≈ 6 months prior to calving) was related to birth weight ($P = 0.01$). Dams with a BCS at weaning of 7 birthed heavier calves than dams with low (3 to 4) or high (8.5) BCS. The relationship of BCS at breeding with pregnancy rate, calving interval, and weaning weight suggests that maintenance of adequate BCS immediately before, during, and after the breeding season may be most critical to sustaining adequate reproductive performance and calf gains in animals subject to the seasonal forage production associated with a Mediterranean climate.

© 2006 Elsevier B.V. All rights reserved.

Keywords: BCS; Beef cattle; Birth weight; Calving interval; Pregnancy rate; Weaning weight

1. Introduction

Reproduction and calf growth are two contributing factors affecting profitability of the cow–calf opera-

^{*} Corresponding author. Tel.: +1 530 752 1256; fax: +1 530 752 0175.

E-mail address: jwoltjen@ucdavis.edu (J.W. Oltjen).

tion. Body condition score (BCS) has been shown to be a good indicator of body energy reserves (Wagner et al., 1988; Bishop et al., 1994). Furthermore, BCS and quarterly changes in BCS (Δ BCS) have been associated with pregnancy rate, calving interval and weaning weight.

Many investigators have found a relationship between BCS at calving and pregnancy rate (Richards et al., 1986; Selk et al., 1988), while others have shown that postpartum Δ BCS can interact with BCS at calving to affect pregnancy rate (Houghton et al., 1990). In addition, both Morrison et al. (1999) and Whitman et al. (1975) have shown that pregnancy rate is related to both pre- and postpartum Δ BCS.

Calving interval can affect pregnancy rate substantially in a restricted length breeding season. Richards et al. (1986) showed that both the interval to first oestrous after calving and interval to pregnancy are associated with BCS at calving. Rutter and Randel (1984) suggest that maintaining BCS during the postpartum period is also important to ensuring cyclicity early in the breeding season. Nevertheless, BCS during the breeding season is not related to days to conception (Selk et al., 1988).

Body condition score not only affects reproductive performance, but can also affect milk production and calf growth, as BCS at calving and weaning have both been associated with weaning weight (Wikse et al., 1995; Cicciooli et al., 2003).

Most studies have compared BCS measures immediately before, during, or after the production measure. This study evaluated the effects of BCS and Δ BCS throughout the production year on cow and calf performance to determine critical periods of condition to affect pregnancy rate, calving interval, birth weight, and weaning weight.

2. Materials and methods

2.1. Animal care

This study was conducted for 7 years (1994–2001) on rangeland at the University of California Sierra Foothill Research and Extension Center located approximately 20 miles east of Marysville, CA. Annual grass species constitute the largest fraction of forage available to the animals in this Mediterra-

nean climate. The most common grass species are soft chess (*Bromus hordeaceus*), ripgut brome (*Bromus diandrus*), red brome (*Bromus madritensis rubens*), annual fescue (*Festuca* spp.), wild oats (*Avena fatua* and *Avena barbata*), and medusahead (*Taeniatherum caput-medusae*). The major forbs are filaree (*Erodium* spp.), annual clovers (*Trifolium hirtum* and *Trifolium subterraneum*), and geranium (*Geranium molle*). All experimental and management procedures were approved by the Animal Use and Care Administrative Advisory Committee of the University of California, Davis.

During the first 5 years of this study, cows were grouped into six treatments that were dissolved for the final 2 years of data collection. For description of the nutritional treatments, see Renquist et al. (2005).

The study was initiated with 260 English cross-breed multiparous cows (119, 67, 15, 18, 12, 12, 9, and 8 cows aged 3 to 10 years, respectively). Cowherd management was consistent with typical production practices in California. Animals were culled when they either failed to become pregnant, reached 10 years of age, or were transferred to another study. Replacement animals entered the study at first calving (2 years of age), with 45, 54, 27, 68, 54, and 45 animals added in years two through seven, respectively.

Data collection began at weaning in 1994. Subsequently, all animals were monitored quarterly for body weight and BCS. Quarterly measurements coincided approximately with the production calendar to include times immediately prior to calving (late October to early November), during the breeding season (late January to early February), at weaning (mid-May to mid-June), and between weaning and calving (August). Body condition score (1: severely emaciated, to 9: extremely fat; Richards et al., 1986) was appraised both visually and by palpation by two observers. The two observations were averaged, rounded to the nearest 0.5, and recorded at the chute. The same observers were used throughout the entire study to avoid possible bias.

Birth weight of the calf was taken within 48 h of parturition, at which time the calf was tagged and the navel dipped in iodine. Weaning weight was measured in mid-May to mid-June and was adjusted to 205 days (205 days weight = birth weight + 205((weaning weight – birth weight)/age in days)) and by sex

Download English Version:

<https://daneshyari.com/en/article/2448835>

Download Persian Version:

<https://daneshyari.com/article/2448835>

[Daneshyari.com](https://daneshyari.com)