BEEF CATTLE RESEARCH UPDATE

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May 2012

Nutritional Aspects of Developing Replacement Heifers

A recent article reviewed research on the nutritional aspects of developing replacement heifers.[1] The authors of this review noted that research conducted during the late 1960s through the early 1980s indicated that heifers reached puberty at a genetically predetermined size, and only when heifers reach their target body weight (BW) can increased pregnancy rates be obtained. Based on this early research, guidelines were established indicating that replacement heifers should achieve 60 to 65% of their expected mature BW by breeding.[2] This review suggested that traditional intensive heifer development systems may maximize pregnancy rates, but not necessarily optimize profit or sustainability since these systems require significant use of fossil fuels and cereal grains, and increased capital investment in equipment and facilities.

These authors noted that research conducted over the last 10 years in Nebraska[3,4,5,6] and Montana[7,8] has demonstrated that feeding replacement heifers to traditional target weights (60 to 65% of mature BW) increased development costs without improving reproduction or subsequent calf production relative to development systems in which heifers were developed to lighter target weights ranging from 50 to 57% of mature BW. It was pointed out that greatest weight gain should not be the major goal in heifer development programs, instead, producers should strive for a sound, functional, low-cost, and pregnant heifer. The recent research data suggested that heifers can be successfully developed into productive cows using low-quality feedstuffs with the appropriate use of protein supplementation. The authors speculated that one reason reproductive performance has not been drastically impaired by feeding to a lighter target BW may relate to genetic changes in age at puberty. The initial research (late 1960s through early 1980s) corresponded to the industry shift from calving heifers at 3 years of age to calving at 2 years of age. This review concluded that although heifer development systems may vary depending on geographic location, that regardless of the system, minimizing the use expensive feedstuffs will reduce development cost which is a major determinant in lifetime cow profitability.

Effect of Heifer Calving Date on Longevity and Lifetime Productivity

Longevity and lifetime productivity are important factors influencing profitability in a cow-calf operation. A recent study conducted by South Dakota State University and the U.S. Meat Animal Research Center (USMARC) clearly demonstrates the importance of early conception in beef heifers.[9] In this study, longevity data on 2,195 heifers on South Dakota ranches and longevity and weaning weight data on 16,549 individual heifers (data gathered for 20 years) at USMARC was collected. The data was limited to heifers that conceived during their first breeding season. In the analysis, the heifers were grouped based on when they calved in their first calving season (first 21 days, day 1 to 21; second 21 days, days 22 to 42; or greater than 42 days after the start of the calving season).

These researchers reported that heifers that calved with their first calf during the first 21-day period of the calving season remained in the herd longer (greater longevity) as compared with heifers that calved in the second 21-day period, or later ($P < 0.01$). The average longevity for South Dakota heifers that calved in the first or later periods was 5.1 and 3.9 years, respectively. The average longevity for USMARC heifers that calved in the first, second, and later period was 8.2, 7.6, and 7.2 years, respectively. The USMARC data showed that calving period influenced ($P \leq 0.03$) weaning weight of the first, second, third, fourth, and fifth calf, but did not influence the weaning weight of the sixth, seventh, eighth, and ninth calf (Figure 1). Furthermore, calving period influenced the total pounds weaned and average weaning weight ($P < 0.01$), with heifers that calved during the first

period having increased weaning weights, total pound s weaned, and average weaning weights compared with heifers calving in the second or later period. Similarly, heifers calving during the second period had increased weaning weights, total pounds weaned, and average weaning weights compared with heifers calving later.

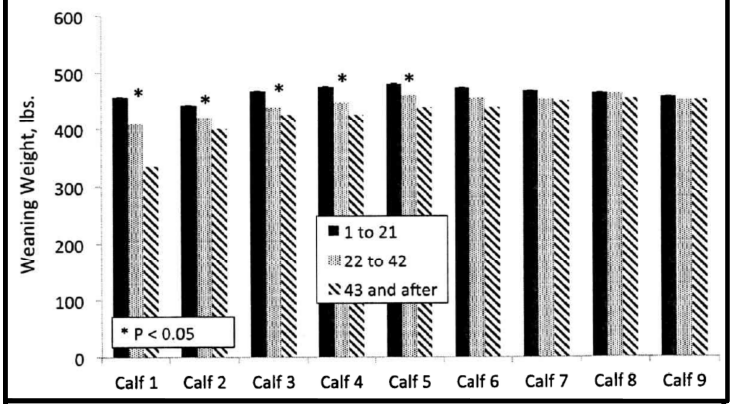

Figure 1. Relationship between day of calving as heifer in the first calving season and weaning weight of subsequent calves.
Source: Kill et al., 2012 as found in Bridges, 2012.[10]

These data clearly illustrate that developing heifers so that they conceive early in the breeding season and subsequently calve early in the calving season is critical for heifer longevity in the herd as well as the performance of her progeny in subsequent generations. This occurs because heifers that conceive earlier in the breeding season will calve earlier in the calving season and have a longer interval to rebreeding. Calves born earlier in the calving season will be older and thus, heavier at weaning.

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