Effects of Post-Al Nutrition on Growth Performance and Fertility of Yearling Beef Heifers

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Introduction

Approximately 80 percent of the cowherds in the West and Midwest are spring calving, which means that producers are often breeding replacement heifers early in the grazing season. Many of these heifers are developed under a controlled nutritional environment to reach 60–65 percent of their mature weight, artificially inseminated (Al) to maximize productivity, and then typically moved to pasture without supplementation following Al. It is known that transporting females after Al can compromise conception rates. Maternal recognition of pregnancy takes place around days 15–17 post-insemination, and transporting animals near this time compromises conception rates. However, moving heifers within the first five days post-insemination does not appear to cause this reduction in pregnancy success to Al. Nonetheless, research suggests that conception rates are compromised when heifers are moved from a controlled nutritional environment to a pasture without supplementation. These observed low Al conception rates may be due to early embryonic losses—those losses that occur from fertilization until day 28 of pregnancy when differentiation and implantation has occurred. In herds where post-Al movement happens within the first several days after insemination but coincides with early spring forage growth—a time in which forage is typically high in water content and low in nutrient profile—producers have still experienced a reduction in Al conception rates. Our hypothesis is that when heifers are fed under a controlled nutritional environment, synchronized and Al’d, and moved within several days to early spring pasture, conception rates are compromised due to a sudden drop in energy intake during the first 21 days post-insemination.

Objectives

The objectives were to determine the effects of change in nutritional status during the first 21 days post-breeding on body weight, body condition score (BCS), AI conception rates, and, ultimately, reproductive efficiency of yearling beef heifers.

Materials and Methods

Heifers at the Laramie Research and Extension Center (LREC) and Purdue University were assigned to one of three treatments: 1) formulated to meet the growth requirements for heifers to gain at a rate identical to that prior (1.5 lbs/day) to
initiation of trial (GAIN); 2) diet formulated to meet nutrient requirements for a maintenance diet (MAINTAIN); and 3) diet formulated to provide 80 percent of the energy requirement for maintenance (LOSE). Estrous synchronization was accomplished using the industry standard 7-day Co-Synch+CIDR® and the MGA®/PGF2α protocols at both locations. All heifers were bred on a timed scheme. Immediately following AI, heifers were returned to dry lots and placed on dietary treatment for the 21-day experimental period. AI pregnancy rates were determined at 35 days after timed-AI via ultrasonography.

Results and Discussion

As expected, heifers on the GAIN treatment had a greater average daily gain (ADG) and increase in BCS compared to heifers on other treatments. First-service conception rate was significantly increased for heifers on the GAIN (76 percent) treatment compared with heifers on either the MAINTAIN (56 percent) or LOSE (60 percent) treatment. Additionally, conception to the second service followed the same trend with the GAIN (58 percent) group having greater second service conception rates compared with MAINTAIN (24 percent) or LOSE (35 percent). These results suggest that the level of nutritional decline post-AI may not be as critical as the reduction itself. Heifers that were maintained with the same level of nutrition post-breeding had significantly greater conception rates for the first two heat cycles.

As exposed by reductions in ADG, and consequently body weight and BCS, heifers in the MAINTAIN and LOSE diet were under nutritional stress, which was reflected on AI and overall conception rates. Results observed in this study are supported by other research evaluating post-AI nutritional management. In every case, heifers moved from feedlot to pasture with no supplementation resulted in lower pregnancy rates than those kept in the feedlot or moved to a pasture and supplemented. On the other hand, pasture-developed heifers that returned to pasture (with or without supplementation) and heifers moved to a feedlot resulted in similar pregnancy rates.

These data suggest that the post-breeding plane of nutrition is critically important and should be considered for heifers fed a high plane of nutrition prior to breeding.

Acknowledgments

We recognize the hard work of Travis Smith, LREC Beef Unit manager.

Contact Information

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Key words: heifer, dietary energy, post-breeding