

Research Updates

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Relationship Between Cow Condition and Reproduction

South Dakota State Univ. animal scientists recently conducted an excellent review of the relationship between beef cow body condition and reproductive performance (Walker, J., and G. Perry. 2007. *Proc. Range Beef Cow Symposium, Dec. 11-13, Fort Collins, CO*). They pointed out that body condition score (BCS) at calving has been implicated as the single most important factor affecting postpartum interval to estrus and pregnancy in beef cows. A BCS system was developed as early as 1975 at Colorado State Univ. (Whitman, R.W., 1975), using scores from 1 to 9 (1=emaciated; 9=obese).

Research has shown that for optimum production, mature cows need to maintain an acceptable postpartum interval (PPI) to first estrus of 60 days or less. As shown in the following table, a mature cow BCS of 5 or greater is needed to maintain an acceptable PPI of 60 days or less.

Effect of BCS at Parturition on PPI of Mature Cows

<u>BCS</u>	<u>PPI, days</u>
3	88.5
4	69.7
5	59.4
6	51.7
7	30.6

The authors went on to note that 2-year-old heifers need to be at a BCS of 6 at calving for a high-probability of pregnancy during the coming breeding season.

Effects of Selection for Twin Births in Beef Cattle

Scientists at the U.S. Meat Animal Research Center (US MARC) recently summarized results of a study that involved selection for multiple births in a beef herd (Twiner population). A total of 1,587 single, 2,440 twin, and 147 triplet calves were born in this population over a 10-year period (1994-2004).

The study revealed that production of twin births has the propensity to increase reproductive efficiency in beef cattle by 20 to 30%. However, a portion of the potential gain from

Research Updates

twinning is compromised by reduced calf survival at birth, lighter body weights of twin progeny at birth and weaning, and an increased incidence of dystocia associated with abnormal presentation of twin fetuses within the birth canal. Furthermore, the continued selection for increased frequency of twin ovulations and birth, but triplet births provide little additional production benefits compared with twin births (*Echternkamp et al. 2007. J. Anim. Sci. 85:3239*).

Optimal Timing of Insemination Using the CO-Synch + CIDR Protocol

The objective of this Kansas State Univ. experiment was to determine the optimal timing of insemination when using the estrus synchronization protocol, CO-Synch + CIDR, on lactating beef cows. A total of 605 cows were treated with the CO-Synch + CIDR protocol in which an injection of GnRH was given concurrently with a vaginally placed progesterone-releasing controlled internal drug release (CIDR) insert. Seven days later, the insert was removed and PGF_{2a} was injected. Cows were inseminated at four different times after PGF_{2a} injection: 48, 56, 64, or 72 hours. At insemination, each cow received a GnRH injection to induce ovulation. Pregnancy was diagnosed 32 days following insemination. The following table is a summary of results.

Treatment (hours after PGF_{2a})	No. of cows	Pregnancy rate, %
48	136	42.6 ^a
56	157	62.4 ^b
64	170	54.1 ^{a,b}
72	142	51.4 ^a

^{a,b} Means having different superscripts differ significantly ($P < 0.01$)

As shown above, the optimal time appeared to be 56 hours after PGF_{2a}, although 64 hours was not statistically different from 56 hours. The authors concluded that using a CO-Synch + CIDR protocol may have a broader window of insemination times, from 56 to 64 hours after PGF_{2a} (*Dobbins, C. 2007. Kansas State Univ. Beef Research Highlights*).

Relationships Between Progeny Residual Feed Intake and Dam Productivity Traits

Canadian researchers used total of 222 yearling calves and their dams to examine the relationships between progeny residual feed intake (RFI) and dam productivity traits across ten production cycles. RFI is a useful measure of feed efficiency and is defined as the difference between actual feed intake and expected feed intake. Lower or negative RFI is indicative of improved feed efficiency. Previous research has shown that selection for feed to gain ratio, which is highly related to growth, body size, and body composition, has been ineffective in improving feed efficiency.

Results showed that efficient RFI progeny and their dams consumed less feed, had improved feed to gain ratio, and spent less time in feed activity than inefficient cows and calves. Also, cows that produced efficient calves were fatter, had fewer twins, lower calf death loss, and produced the same weight of calf weaned per cow exposed to breeding compared with cows that produced inefficient progeny. However, cows that produced efficient or low RFI progeny calved 5 to 6 days later than cows that produced inefficient or high RFI progeny, indicating a need to monitor reproductive fitness in low RFI replacement heifers and breeding bulls (*Basarab et al. 2007. Can. J. Anim. Sci. 83:189*) ■