Grazing Considerations for Breeding Season

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Embryonic loss in breeding-age beef cows and heifers may represent the single greatest economic loss for cow/calf producers. Although commonly cited as a major impediment to profitability in the cow/calf sector, the literature would suggest we have made little progress reducing embryo wastage in the past 90 years. In beef cattle, it is generally accepted fertilization rates to a single service are 90-100% regardless of whether natural service or artificial insemination (AI) is utilized. However, a 70% rate of conception and positive pregnancy diagnosis 30 days later is common, and an even lower percentage result in a live birth. A true embryonic loss is defined as those occurring from fertilization until day 42 of pregnancy when differentiation and implantation have occurred. Embryonic losses are further divided into two categories, classified as Early Embryonic Mortality (EEM, fertilization to day 27) and Late Embryonic Mortality (LEM, day 28-42). The majority of embryonic mortality is EEM, with rates ranging 20-44% reported in beef cattle. Late embryonic mortality is thought to occur in <15% of beef cows and heifers. A significant amount of information exists on embryonic mortality in dairy cattle, but very little information exists in beef cattle.

Research suggests the type of pregnancy failures among beef cows and heifers differ. The majority of pregnancy failures in heifers were thought to be a result of failure of fertilization rather than embryonic loss. Studies have shown the embryo or unfertilized egg recovery rate to be lower among heifers than cows, suggesting that perhaps a portion of heifers failed to ovulate after being in heat. Accurate measurement of embryonic mortality is difficult because researchers are unable to evaluate pregnancy until approximately day 27 without harvesting and collecting reproductive tracts at slaughter. No single factor has been proven to cause or prevent EEM. However, the situation is such that if embryo wastage could be prevented in just 5 out of every 100 cows, an additional 2,100 lbs/100 cows could be weaned annually.

The effects of energy and protein weigh heavily on the discussion of embryonic loss in beef cattle. Gross nutritional deficiencies in the diets of breeding age cows and heifers have been shown to have detrimental effects on fertility. There is very little experimental data dealing with nutrition effect on embryonic mortality because methodologies for determining pregnancy prior to day 27 are not very accurate and slaughtering large groups of breeding age females is not practical. However, we know that dietary energy and protein levels play a large role in pregnancy success. It has long been known cows bred when they are gaining weight tend to have higher pregnancy rates than cows bred when they are losing weight. It has been suggested progesterone levels following breeding may be responsible for the decreased fertility/increased embryonic mortality among cows bred during a negative energy balance. Furthermore, cows on the high-end of the milk production curve may experience negative energy balance and increased embryonic mortality even though the base ration they are being fed may appear adequate when balanced for the whole herd. Additionally, the staggering rate at which the U.S. beef industry has selected for more and faster growth may have created physiological conditions in breeding age heifers exceeding the conventional wisdom of proper nutrition. At breeding time, heifers are still growing so fast they cycle but do not ovulate because of improper energy balance.

Excess protein, particularly rumen degradable protein, has been demonstrated by several research scientists to increase embryonic mortality in cows. Studies have suggested fertilization rates and early embryo survival (before day 17) are compromised and altered hormone production and a more acidic uterine pH are the likely causes.

These revelations are of particular interest in Minnesota where spring grass routinely contains double digit percentages of protein concentrations in excess of rations fed over the previous 6 months of the dormant season. Common management practice, particularly in AI herds, is to turn cows and heifers out on grass immediately following breeding, resulting in massive swings in diet component concentrations. Although difficult to observe

in a research setting, it is not difficult to imagine the physiological impact this practice may have on hormone production and acid levels of vital organs.

On an entirely different note, but still worth mentioning, is the subject of handling stress. Handling stress may be something more beef cattle are exposed to during the breeding season than at any other time of the year. Producers who use AI, for example, often transport cattle to pastures after breeding, which may affect pregnancy establishment. Research has shown heifers that were transported for 6 hours either 8-12 or 29-33 days after AI had lower pregnancy rates than heifers transported 1-4 days after AI, suggesting transportation stress resulted in embryonic loss. Because placentation is well under way by day 29 after breeding, elevated prostaglandin as a result of transportation stress seems to be the most logical method by which this stress might affect embryonic survival during days 8-12 and 29-33.

In summary, when planning your grazing system or systems over the spring and summer months, it would be wise to plan around your chosen breeding season. The impacts of abrupt diet changes when turning cows out to grass and handling stress during and following breeding appear to have a tremendous impact on pregnancy success. Several producers in and around Minnesota have been known to hold recently bred females in drylots for 2 weeks to more than a month rather than turn them out to grass in an effort to reduce the impacts of abrupt diet changes and handling stress on pregnancy success. Although mostly observational, this tactic has seemed to increase first-service pregnancies by as much as 15% over the 5-year average. Although not likely to completely alleviate embryonic losses at any level, strict management to reduce complications as a result of these factors may prove fruitful to many cow/calf producers.