



# Nutritional Effects on Reproduction

by **Troy Smith**

**I**t could be argued that many beef producers think much more about production than reproduction. Perhaps they address reproduction by concentrating on their breeding programs. They might spend hours poring over sire summaries and bull sale catalogs, scrutinizing performance EPDs.

That's not a bad thing. It's generally agreed that producer use of increasingly accurate predictors for growth and carcass traits has helped many operations become more productive. However, not all of them become more profitable.

## **Reproduction affects profitability**

Actually, it can be a bad thing if the quest for increased production is pursued at the expense of reproduction. According to University of Wyoming Extension Beef Specialist Scott Lake, reproduction is the single most important factor affecting profit — five times more economically important than either growth or carcass merit.

“And the most important factor affecting reproduction is nutrition,” adds Lake.

That doesn't discount efforts to improve production traits, but Lake encourages producers to pay no less attention to maternal traits. Among them is longevity, which is a very good thing.

According to Lake, analysis shows that cows make optimal economic return to a commercial cow-calf enterprise while they are between 8 and 11 years of age. However, research suggests fewer than 30% of cows remain in the breeding herd until they reach age 10. Two- and 3-year-olds are most apt to fall out, because they failed to rebreed. But quite a few cows are culled in what should be their prime years, ages 4 to 6, for the same reason. As with the younger females, inadequate nutrition may be at the root of their reproductive failure.

According to Lake, detailed herd records often reveal how calving dates for still young but open cows grew progressively later in previous years. Each year, they calved a little bit later than the year before. In a herd managed

for a defined breeding season, such a cow eventually has too little time to return to estrus before bulls are pulled from the breeding pasture. Lake says this scenario draws attention to nutrition's role in maintaining a short postpartum interval. It's the reason why having females in adequate body condition, at calving time, should be a reproductive management priority.

“Collectively, research has demonstrated that if a cow is managed to calve in a BCS (body condition score) of 5 to 6, she will have a shorter post-partum interval and increased rebreeding rate, which will likely lead to increased stayability in the herd,” says Lake.

In order to have a calf every 365 days, a cow has roughly 82 days after giving birth to rebreed. That interval really means, says Lake, she must start cycling again by day 60. Typically, cows and heifers with a BCS of 5 or 6 will return to estrus in 50 to 60 days. Subsequent conception rates of 85-90% could then be expected.

It's worth noting that a dam's nutritional status during gestation affects her calf, due to the fetal programming effect. Lake says calf weaning weights may be up to 40 lb. heavier when dams carry the recommended amount of condition, as compared to dams in poorer shape. Milk production is a factor too, admits Lake, but cow nutrition definitely impacts a calf's performance potential.

## **Energy is critical**

Lake says it is difficult to say one nutrient is more important than another. It is safe to say, however, that energy is critical to reproduction. Energy restriction during late gestation delays return to estrus and reduces subsequent pregnancy rates. Lake warns that the effects of



energy deficiency cannot be overcome by increasing energy intake after calving. It's too hard to catch up because of the increased nutrient demand associated with lactation. If energy intake is adequate during the last trimester of gestation, some boost in performance may be realized by increasing energy intake (flushing) females between calving and breeding.

### Consider protein

Quantifying dietary protein's effects on reproduction is more difficult. Most cattle producers know protein is needed by the rumen microbes that break down cellulosic feedstuffs. The microbes need the protein present in the animal's diet to do their job. If a cow's diet is deficient in protein, utilization of digestible fiber for energy is reduced. Supplemental protein can increase the digestibility of low- to medium-quality forages, making more energy available to the animal.

"Therein lays the confounding effect of protein supplementation. Is the resulting increase in animal performance due to the supplemental protein or the increased availability of energy?" grins Lake.

Either way, research has shown that when pregnant and lactating cows consuming protein deficient forages are supplemented with rumen degradable protein, postpartum interval is reduced and overall pregnancy rate increases.

Lake says much remains to be learned about protein supplementation. It is clear that young animals derive the most benefit because they are still growing and have higher nutrient requirements than mature animals. Additionally, young animals often are more sensitive to changes in diet.

### Avoid dramatic diet changes

Lake thinks many producers don't consider how changes in diet can impact reproduction in replacement heifers. Significant changes in diet often occur for heifers immediately following artificial insemination (AI).

Many heifers targeted for AI, after estrus synchronization, are developed in a drylot situation and fed rations that are fairly high in energy. Lake says the merits of that kind of system are debatable, but it's a management practice that many producers routinely apply. Typically, right after heifers are bred, they are loaded up and hauled to pasture.

"That can present a dramatic change in nutrition. Even really good pasture provides very different nutrition than a high-energy ration.

Often, you're making a sudden change from a diet promoting weight gain to a maintenance diet," Lake explains.

"A drop in conception rate of about 20% can result when heifers go to a maintenance diet — the same (reduction) as if heifers were losing weight — compared to heifers managed for continued gain," he adds, citing University of Wyoming data and similar results from

Purdue University research.

Producers beware. Don't assume that you are home free just because your replacement heifers responded well to estrus synchronization and you got them bred.

Numerous studies have shown that stress or changes in nutrition occurring soon after breeding may put pregnancy at risk. Even when breeding results in fertilization, the embryo is sensitive to environmental insult for some 40 days thereafter. Lake warns that reproductive performance also may be reduced among heifers turned out on pasture with bulls for natural service if the forage offers a lower plane of nutrition. It can reduce the number of heifers that conceive on the first heat cycle and on the second cycle, too.

"We have to slow down and think," advises Lake. "Producers spend a lot of time and money to develop replacement females, especially when they are bred AI. You can't just kick 'em out to grass, if it means nutrition is compromised, and think there are no consequences." **HW**

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