



Nutrient re-partitioning to improve reproductive efficiency

Numerous confounding factors—disease, weather, age, breed, bull fertility and nutrition—can all interfere with the beef cow's one reason for existing...to produce a live calf every season.

So nature has equipped the cow with a series of mechanisms to fight back. One such mechanism, "nutrient partitioning," dictates that when a pregnant animal consumes energy and protein, her body will use those critical nutrients only according to preset priorities:

- First...to sustain the life of the fetus
- Second...to provide milk for the newborn
- Third...to build her own body condition.

Therefore, whenever nutrition is inadequate, the cow's body compensates to protect, first, the unborn fetus and then the suckling calf by robbing the cow of condition. And as research has proven, that loss of condition also robs the producer of reproductive efficiency. Lower condition inevitably means poorer breedback.

Changing the priorities

At the heart of that prioritization mechanism is a complex interaction between circulating hormones that the body uses to signal reproduction, lactation and growth. Only when those hormones and metabolites reach

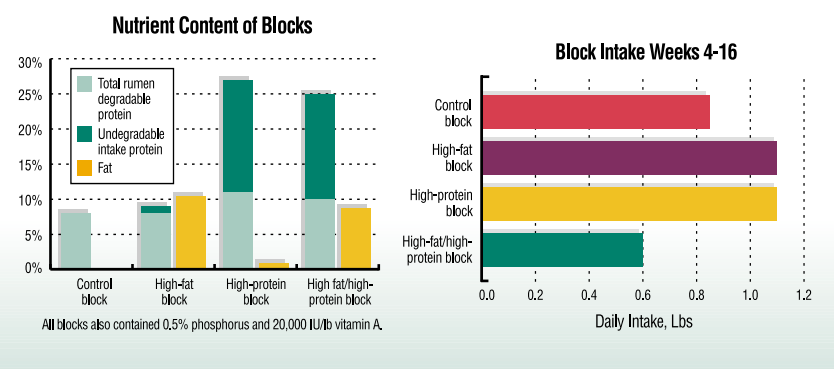
critical concentrations will cows cycle. Cows in good condition produce appropriate concentrations; poor-condition cows don't.

That understanding of the reproductive process led researchers to an obvious question: Could they change the concentration of those hormones in thin cows via the diet, in effect fooling the system into changing that list of priorities and beginning the reproductive process despite poor condition?

Because body condition and dietary energy are closely linked, that research first focused on providing added energy. Two disadvantages resulted. First, supplemental energy reduces forage use. Second, supplemental energy is relatively expensive to provide to the ruminant, designed by nature to extract its own energy by breaking down forage feeds.

Successful nutrient re-partitioning

Now, research is demonstrating that



supplementing the right kind of protein, not energy, can affect this change in the cow's metabolism and, by re-partitioning nutrient use to prevent weight loss, improve reproductive efficiency.

Certain proteins—those found in supplements like feather meal, blood meal and cottonseed meal—escape through the bovine rumen without being broken down into smaller components. When these "undegraded intake proteins" or "bypass proteins" are fed to cows in a negative energy balance—those drawing on body condition to keep up with the demands of lactation—a number of metabolic changes occur:

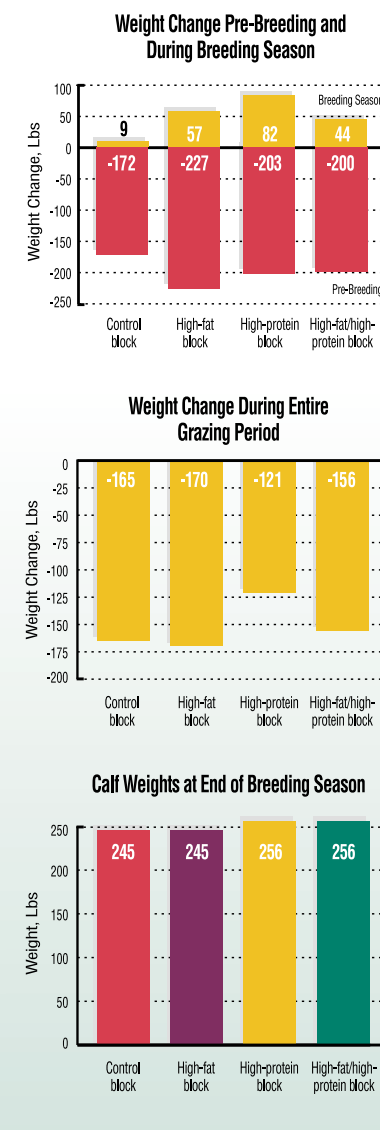
- Insulin levels in the blood rise.
- That increased insulin relative to growth hormone reduces milk production in young, thin beef cows.
- The excess energy from that reduced lactation then goes into improving cow weight gain.

In effect, the researchers had succeeded in re-partitioning nutrients—forcing the cow's system to add condition before increasing lactation.

The results

New Mexico State work on a patented application of the re-partitioning process demonstrates results. The research divided a group of 72 first-calf heifers grazing desert range into four feeding groups. They averaged 916 pounds, with an average body condition score of 4.6. Low-moisture, high bypass-protein blocks fed free-choice resulted in:

- Dramatically more weight gain than any other diet during breeding.
- Dramatically less weight loss over the duration of the entire grazing period.
- And because the calf obtains a large share of its nutrition from grazing, the improvement in reproductive efficiency came even while calf weights at the end of breeding showed no decline.



Coming next in

Nutrition for early weaning. Changing market conditions, changing economics and widespread drought have changed the attraction of early weaning. Nutrition is key to making it work.



GO WITH THE BRAND YOU KNOW®

CRYSTALYX® Natural-27 is an all-natural, 27 percent protein supplement designed to supply the extra rumen-bypass protein proven by research to improve condition of thin first-calf heifers—without sacrificing calf weaning weights. Natural-27 is an ideal supplement during late gestation and the breeding season to supply necessary nutrients for high conception rates. Plus, it is highly fortified with trace minerals to help support disease resistance and reproductive efficiency. Natural-27 complements high quality forages by supplying bypass protein, and complements low quality forages by promoting forage digestion.



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STRATEGY: TARGET THIN HEIFERS

To be cost effective, the re-partitioning concept must be targeted correctly

- Two year-old heifers. Pushed to calve at earlier ages, today's heifers are often still developing even after dropping their first calf. That leaves them

Target for bypass protein:

- 2-year old heifers
- Condition score <5
- In negative energy balance
- Lactating

especially vulnerable to weight loss that first season, and to falling even further behind when they suffer a long post-partum interval.

- Thin. The metabolic imbalances that make the re-partitioning concept work are most acute in heifers that fall below the ideal 5.5-to-6.5 body-condition score.
- Lactating. Researchers believe the energy for weight gain initiated by bypass protein supplementation comes when the hormonal changes divert nutrition away from lactation. Therefore, in order for the effect to work, animals must be lactating.
- In a negative energy balance. Target cows must be losing weight (drawing on body reserves to meet the needs of lactation).
- Consuming adequate rumen-degradable protein. While the bypass proteins cause the necessary metabolic changes to initiate re-partitioning, the target animals must at the same time be eating sufficient levels of proteins that are degradable in the rumen. These rumen-digestible proteins ensure available energy needed to fuel the weight gain.
- Supplemented calving through breeding. The strategy is most effective in early lactation.