Ridin' Herd

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How much is enough?

Calf prices appear to be strong this fall. Because of high input costs, margin of profit for the cow-calf producer will again be narrow. Producers who continue to match genetics (mature weight and level of milk production) with feed resources, environment and management system will be the ones who continue to enhance their profit potential.

Larger commercial cows

If moderation is your goal in terms of cow weight and milk production, it may be an increasing challenge to find the genetics to meet this goal. Breed sire summaries indicate the genetic trends for growth traits, carcass weight and milk production have increased over the years.

It is hard to see how milk production and mature weight of commercial cow herds has not continued to increase over time. In addition, it is hard to see how nutrient needs of the commercial cow herd haven't increased over time as well. McMurray (*Feedstuffs* article, 2008) suggested that average cow weight had increased 322 pounds (lb.) between 1975 and 2005. McMurray indicated that average cow weight (weight for cows at body condition score 5) in 2005 was 1,369 lb. compared to 1,047 lb. in 1975.

Nutrient needs

Maintenance feed intake is proportional to the animal's metabolic body weight. Metabolic body weight is defined as body weight to the ¾ power (body weight^{¾}), which also describes the surface area and is representative of the active tissue mass or metabolic mass of an animal. So as cow weight increases, maintenance feed intake increases because metabolic body weight increases.

Cows partition energy that they consume to body maintenance and growth, then lactation, and finally reproduction. In a low feed environment, cows with a high production potential would have limited energy left over for reproduction because they would shunt energy to maintenance and lactation and finally reproduction.

In contrast, cows with low production potential (described as lower mature weight and daily milk production) in a low feed environment in theory would be able to shunt energy to body maintenance, lactation and reproduction.

A solution to increase energy intake for high-producing cows in a low feed environment on a fixed resource base would be to reduce cow numbers (cow inventory). In a high feed environment, cows with low production potential have enough energy to partition to maintenance, lactation, reproduction, and will likely put on condition. In this low feed environment and a fixed resource base, an option to limit energy intake of cows with low production potential so they don't get over-conditioned would be to increase cow numbers.

If cow mature weight were fixed at 1,200 lb. and milk production varied from 10 lb. per day to 30 lb. per day, annual maintenance energy needs increase. As milk output per day increases from 10 to 20 lb. per day, annual maintenance energy needs increase by 8% (7,815 Mcal per year compared to 8,427 Mcal per year). The increase in annual maintenance energy of a 1,200-lb. mature cow producing 10 lb. of milk daily is 16% less than the same cow producing 30 lb. of milk daily.

If milk output per day were fixed at 10 lb. per day and cow mature weight changes from 1,000 lb. to 1,200 lb. or 1,400 lb., annual maintenance energy needs increase 14% going from a 1,000-lb. cow (6,803 Mcal annually) to a 1,200-lb. cow (7,728 Mcal annually). Likewise, maintenance energy needs increase 27% between a 1,000-lb. cow compared to a 1,400-lb. cow (8,637 Mcal annually).

How many cows to stock?

If a ranch unit has a fixed set of resources, the effect of mature cow weight and daily milk production can be used to determine the number of cows at the same milk output with cows differing in mature weight that could be managed on the unit.

If par were annual maintenance needs in Mcal for cows with a mature weight of 1,200 lb. and daily milk production of 20 lb., we could calculate the number of 1,400-lb. cows producing 20 lb. of milk daily on a fixed resource base. Likewise, using similar information, we could calculate the number of 1,000-lb. cows producing 20 lb. of milk daily that could be managed on the same set of resources.

If 100 head of 1,200-lb. cows producing 20 lb. of milk daily could be managed on a fixed resource base, using the annual maintenance energy needs, about 90 head of 1,400-lb. cows producing 20 lb. of milk daily or 112 head of 1,000-lb. cows could be managed on the same fixed resource base. If cows in each weight group had a weaning rate of 85%, 85 calves, 77 calves and 95 calves would be weaned from cows that weighed 1,200 lb., 1,400 lb. and 1,000 lb. respectively.

This is only part of the profit equation. Profit of an enterprise is a complex set of relationships. Net income or profit is gross income dollars generated minus total annual expenses. Gross income in a cow-calf enterprise is pounds of calf sold times price [dollars per hundredweight (cwt.)]. Pounds of calf sold is a function of weaning weight and the number of cows weaning a calf. Nutrition impacts both of those factors.

Summary

How much is enough? The answer most likely is, "It depends."

Breed differences allow producers to design genetic packages that best fit the feed resources of the operation. In turn, this should increase the profit potential of the enterprise.

The next question is what is the difference in costs as cow mature weight and daily milk production are varied. You have over half the battle whipped if the genetic package of your cow herd fits the resources they are to be managed in, especially feed resources.

If the genetic trends continue in the direction they have been, how do producers maintain the genetic package that they have worked so hard to fit their resources and environment?

The focus of the article isn't to say lightweight mature cows are better than heavy cows and high milk output is less desirable than low milk output. The idea is to help you keep your eye on the target of what genetic package fits your environment and to remind you of the major items that affect of the nutrient needs of your cow herd.

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Editor's Note: *"Ridin' Herd" is a monthly column written by Rick Rasby, professor of animal science at the University of Nebraska. The column focuses on beef nutrition and its effects on performance and profitability.*