

Fueling Females

Cows need different nutritional levels at different stages of gestation.

by **Heather Smith Thomas**

The protein requirement for pregnant cows increases during later stages of gestation, and it is highest for young cows. If young cows are kept separate from the main herd, they can be supplemented with protein, if necessary, without having to supplement the whole herd, or could receive a higher level of protein. Mature cows can be brought through winter and early spring a lot easier than the younger cows because they are not trying to grow.

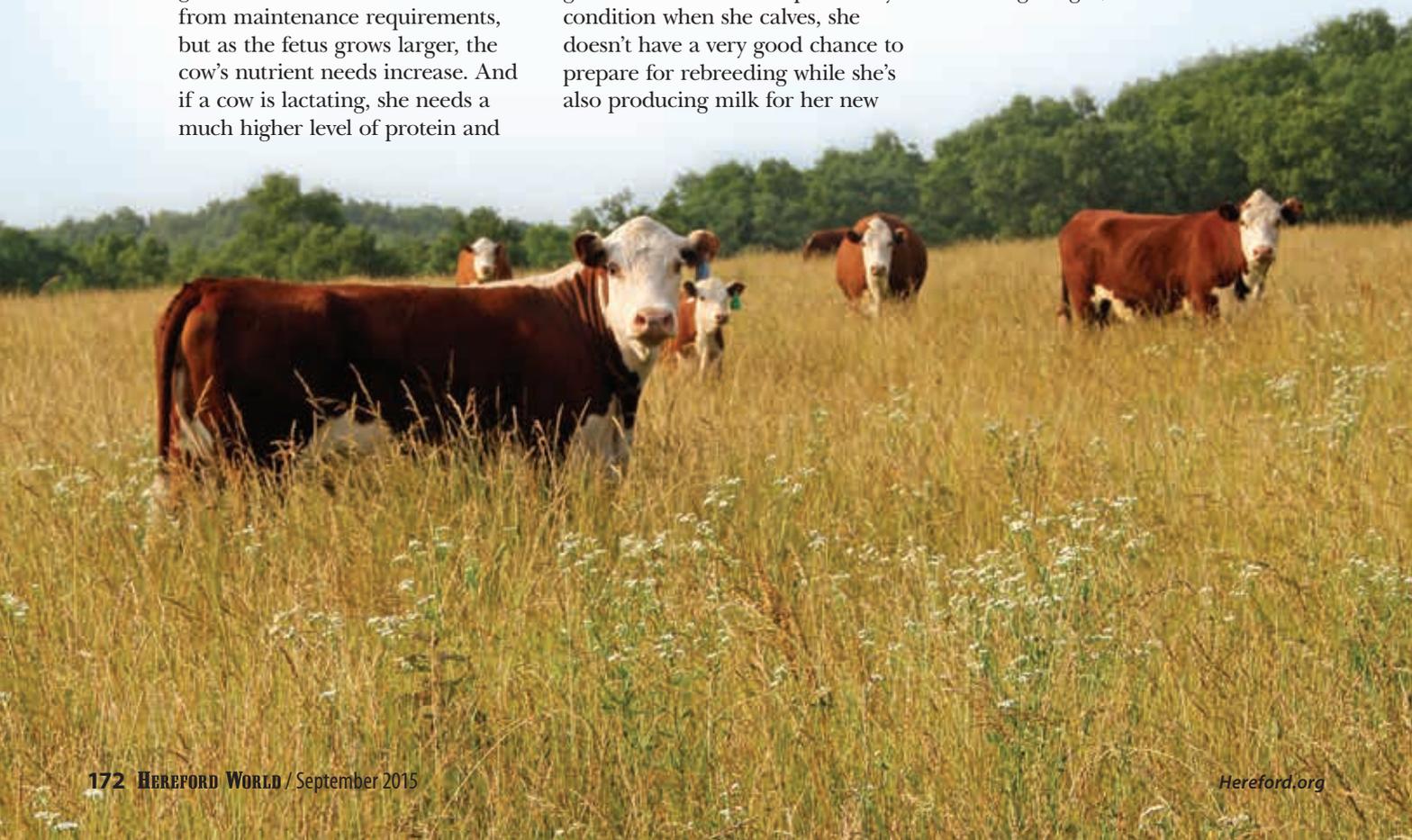
Nutrient requirements in early gestation are not much different from maintenance requirements, but as the fetus grows larger, the cow's nutrient needs increase. And if a cow is lactating, she needs a much higher level of protein and

energy than when she is pregnant. According to Shannon Williams, Lemhi County Extension agent, Salmon, Idaho, producers need to remember that during the 60 days following calving, they are asking the cow to produce milk, repair her uterus and breed back again. "This requires the maximum amount of energy and nutrients," Williams says.

These demands on the cow are the reason why it is very important to make sure cows have adequate levels of protein and other nutrients during late gestation. If a cow is in poor body condition when she calves, she doesn't have a very good chance to prepare for rebreeding while she's also producing milk for her new

calf. The cow may continue to lose weight, even if nutrient levels are increased, and fail to cycle on time. This period is a crucial phase in her production cycle, and if she is a young cow, her need for energy and protein is even greater than that of an older cow.

"Because of these factors, producers should feed 2- and 3-year-olds different from the way they feed the main herd during pregnancy," Williams says. "You also need to pay attention to body condition score, especially in these young cows. If an older cow is losing weight, she should also



be pulled out of the herd and fed differently. Some producers put their old, thin cows with the young cows — whatever works for their operation.”

Williams says that a mature 1,100 lb. cow needs 7.8% of her diet to be crude protein during the last trimester of pregnancy. A 900 lb. 2-year-old heifer approaching her first calving in her last trimester would need 9% crude protein in her diet.

“Another thing that is different between the heifer and the mature cow is the net energy for maintenance,” she adds. “The percent TDN (total digestible nutrients) for a 900 lb. heifer is 65.4%, as compared with 53.2% for an 1,100 lb. cow during her last trimester. This is a major difference.”

Supplementing during gestation

Ken Olson, South Dakota State University (SDSU) Extension beef specialist, says protein supplementation is important, especially when talking about spring-calving herds. “Those cows will possibly need some supplement during the winter if they are utilizing low quality forage sources,” he says. “They may be grazing winter range or utilizing crop residues, or baled straw residues. These feedstuffs are deficient in nutrients.”

Olson says, in this situation, he and the people with whom he works usually think of the first limiting nutrient as protein, simply because the ruminant needs protein for digestion of forage. “If the cow doesn’t have enough protein to create a proper environment for the rumen microbes, she can’t digest the fiber in that low-quality forage to extract the energy value that is tied up in it. We are actually meeting the requirement of the gut bugs first, so they can digest the feed and meet the requirements of the cow,” Olson says.

“We feed the rumen bugs, and that grows more rumen bugs,” he



Cows on range pasture can be fed cake or pellets in portable troughs to minimize waste.

explains. “After they digest the fiber and pass on into the small intestine, the rumen bugs also become supplemental protein for the cow. It’s a very efficient system.”

This process is the reason why the first thing considered in supplementing pregnant cows in the colder months is protein, because of that chain reaction. “This meets the cow’s needs and helps her maintain body condition during the time she’s pregnant

and after calving,” Olson says.

“We need her to be in good body condition in the spring so she has the nutritional status to lactate and also start cycling again, and get pregnant at the beginning of the next breeding season.”

Olson explains that it’s important to keep the cow healthy through the winter and to get her pregnant again in the next breeding season. “We also know we are having an effect on the fetus during her pregnancy, and this is a hot topic in research right now,” Olson says. “One of the things we’ve traditionally known about this, is that if we are providing supplemental protein to the cow we are setting her up to provide better colostrum, more milk and better quality milk. So we help the calf get off to a good start right after it’s born.”

He adds that feeding the cow well will reduce calving difficulty. “The cow is healthier and stronger, and can push better during labor. She can get the calf out quicker which means less stress on the calf not having to endure the pressure of an extended time in the birth canal, and this helps get the calf

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up and going quicker. If the cow is strong, we have fewer weak calves at birth.” Olson says.

“These are all things we’ve known for a long time,” he explains. “The new things we are learning about are part of the topic we call fetal programming. We are finding out that how we feed the cow when she is pregnant affects the development and genetic potential of that fetus, changing how it performs after it is born — and apparently for the rest of its life. We know that in calves that go to the feedlot, it changes their feedlot performance. We can improve

their immune system, and also change their carcass composition.”

There is a lot yet to be learned about fetal programming. “There is a limited amount of data so far, but it tells us we do change it,” Olson says. “The patterns on how we change it, and how to actually manage this for the best possible outcome, still need more study.”

Understanding nutrient restriction

Olson says researchers are just touching the tip of the iceberg to understanding the levels of nutrient restriction, but it seems to matter. “At some levels we get one outcome, and at other levels

of restriction we see different outcomes,” he explains.

“When in which stage of gestation this occurs, whether early-, mid- or late-gestation, appears to have tremendous importance. At different points in the development of that fetus, different things are being developed like the heart and lungs, immune system and various body tissues. Mid-gestation seems to be very important for muscle fiber development, for instance. Different times appear to be important for fat cell development,” Olson says. Thus, how the cow is fed may change things like yield and marbling in the ultimate carcass from her calf.

“This is all affected by how that fetus is developing,” Olson says. “So now people realize we need to have a reasonable plane of nutrition all the way through pregnancy. But there is data from my colleague Amanda Blair, here at SDSU that suggests that a mild mid-gestation energy restriction can actually increase the marbling score of that future calf. So perhaps we are increasing marbling while decreasing muscle fiber generation and maybe just changing the proportion of fat cells to muscle cells.”

In doing so, Olson says a more marbled carcass and improved quality grade is created. “So having the cow a little bit short on energy in mid-gestation may not be a bad thing,” he says. “This is based on just one experiment, so a lot more work needs to be done to make sure this was not just a one-time outcome. We need to better understand how to manage cow nutrition to make this happen in a predictable fashion. That first experiment demonstrated this, so we are currently writing grant proposals to find money to do additional work to continue to pursue these ideas.”

Ruminants have a tremendous ability to manage under less than perfect feed conditions, being



Pregnant cows on winter pasture utilize tubs of protein supplement.

able to lose weight during winter in early to mid-gestation and regain weight with green grass in the spring, and give birth to healthy calves.

“Large ruminants like beef cattle are built to utilize low-quality forages and deal with nutrient shortages,” Olson says. “But just because they can do it and survive doesn’t mean that’s the most productive way to raise beef animals.” Cattlemen generally seek the optimum type of management to tweak their herds’ abilities to their best benefit.

A lot to be learned

“We just need to understand the best ways to do that,” Olson says.

“There is a lot of research going on right now, all over the country, addressing this topic. Studies are looking at what fetal programming does to the feeder calf, and also in terms of replacement heifers. We know from the work that Dr. Rick Funston has done at the University of Nebraska, that nutrient restriction of the dam in the winter can have negative effects on the fetus in terms of when that heifer reaches puberty and how fertile she is, etc. We are trying to learn the effects of restriction – in terms of how great was the restriction and when did it happen. Dr. Funston’s research in that area is continuing.”

There is a lot to be learned, and it may change the way beef cows are fed in the winter. Many ranchers need to be able to utilize as much low-quality forage as possible – such as leaving cows out on winter range and grazing as long as possible without having to feed hay. So the best ways to supplement cows so they can continue to graze low quality forages and not compromise their unborn calves need to be determined.

“We may learn to be more strategic in when we supplement and how much,” Olson explains. “In the past our recommendations were some sort of minimal



Cows may be able to graze through winter if they have adequate protein.

supplementation, or if cows came in from range or pasture in the fall in really good body condition we felt we could under-supplement them, knowing that they can utilize their own excess body reserves. Now we are realizing that this may work in terms of getting the cow through the winter and having her still be fertile for the next breeding season, but we don’t know what that means for the fetus. So now we need to reconsider and figure out some sort of strategic supplementation that still minimizes the cost of doing it and overcomes any negative issues in fetal programming.”

Olson says this is still a work in progress. “Just when we think we have it all figured out, we come up with a new wrinkle like this, and it gives us a lot more to think about,” he says.

He adds that it is important to determine goals for the cows. “A producer now has options and has to decide which one is the most appropriate to meet those goals,” he says. These goals may differ,

depending on whether the cattle are in lush grass pastures on an Eastern or Midwestern farm or running on thousands of acres of public rangeland in Nevada during winter.

“If cattle are on desert range in Nevada, the rancher may have limited ability to do much about some of these things,” Olson explains. “But if you are five miles down the road from an ethanol plant and have easy access to distillers grains, your goals and options become quite a bit different.”

And, sometimes cattlemen can be innovative. “The folks who are thinking outside the box, looking for ways to do something to tweak their own system to make it better, are the ones who can make it work,” he says.

Learning more about the protein needs of the cow and how they fit into the whole picture of the way her calf will develop and how it will perform in the future can help producers as they make their future management plans. **HW**