

# Feed To Potential

*In the quest to realize the full genetic potential in today's beef cattle, don't forget that optimum performance is only possible when it is matched with the right nutrition.*



Tim Bodine says high-performance cattle require the right nutrition to fully express their genetic potential.

Story & photos by  
**ED HAAG**

Tim Bodine, president of Performix Nutrition Systems, has witnessed some major changes in cow and calf performance during the last decade. Much of this he attributes to improved genetics. While this is good news for seedstock producers and their commercial customers, it is a blessing that comes with a caveat.

"The animal that is capable of producing more milk or developing more muscle is going to require more protein, more energy and more macro and micronutrients to sustain that high level of production," Bodine says, adding that there is no sense in maintaining high-

performance cattle if you are not going to feed them well enough to allow them to reach their genetic potential.

For this reason Bodine suggests that selecting for high-quality genetics should be done within the constraints of the environment that the cattle will be raised in. "Many nutrient deficiencies are created by mismatching a cow and her environment," he says. "The genetics that work well in a pasture in Missouri may or may not be the optimum genetics for a high-desert ranching operation in the intermountain West."

Bodine adds that like the fuel that goes into a high-performance race car, it takes lots of special, high-octane nutrition to maximize that

special cow's or special calf's performance, and relying entirely on a conventional feed and forage nutritional package can be a mistake when feeding for optimum genetic expression.

This advice is particularly true at critical periods in a cow's or heifer's reproductive life, when inadequate nutrition can negatively express itself during her offspring's entire life.

### Third-trimester nutrition

There is general agreement among ruminant nutritionists that what is consumed or not consumed by a cow in the last trimester of her pregnancy can have a lifelong effect on her calf.

"You obviously want to focus on the cow's intake when she is in late gestation to make sure she receives the optimum level of nutrients for the maximum development of her calf's immune system, as well as to optimize her production of colostrum and milk," Bodine says, adding that it is at this point in time that nutrition plays a key role in helping a high-performance cow to fully express the genetic potential of her and her calf.

He recommends increasing the cow's protein intake, monitoring her energy utilization based on body condition, and feeding more calcium (Ca) and magnesium (Mg). Bodine also suggests feeding cows in their last trimester of pregnancy a more biologically available form of trace minerals and vitamins.

"This nutrition can be made available in a protein supplement or a grain mix," he says, adding that in most situations conventional feedstock such as hay and silage will be deficient.

Bodine points out that in high-performance animals, the nutritional demands are reflective of the increased energy required to fulfill that animal's genetic potential, whether it is in the fetal development of a superior calf or the production of colostrum and milk.

### Calf's immune system vulnerable

Bret Hess, ruminant nutritionist, University of Wyoming, concurs.

"As performance increases, so will the amount of energy required by the animal," he says. "And that must come from the diet."

He notes that the implications of

insufficient nutritional intake during the last phase of pregnancy can assume many forms, ranging from light birth weights that carry through to finishing, to calves having increased disease susceptibility and lower beef quality.

Suppressed or poorly functioning immune systems in calves are one of the most lasting implications of cows receiving inadequate nutrition in the last stages of pregnancy. Once it has been compromised in the newborn calf, there is very little that can be done to mitigate the situation, Bodine says.

Hess points out that this problem can be exacerbated by a negative response in both the cow and the calf.

"In cases of severe nutritional restriction, there is not only poor development of the colostrums in the cow but also a decrease in colostrum transfer across the gut of the newborn calf," Hess says. "This has been shown in some cross-fostering studies where they feed colostrum to calves that were undernourished during that later stage of gestation, and their immune transfer is less than it would be under normal conditions."

He adds that several studies confirm that when cows are nutritionally stressed at the end of their pregnancy, the mortality rate in their calves increases by 5%.

### New research, new considerations

While there is no disputing the role good last-trimester nutrition plays in helping produce a quality calf, recent research begs the question of the part quality nutrition

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Last-trimester nutrition has a lasting effect on newborn calves.

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plays in early and second-trimester fetal development. This issue is particularly relevant to calf producers who rely on maintaining their cow-calf pairs on open range where drought conditions can dramatically reduce available forage for mother cows in early and mid-term gestation.

On rangeland where delivering supplemental feed can be both difficult and expensive, the answer to that question could determine whether or not hauling hay in drought years makes financial sense.

Hess explains that it is in the first trimester when organ development in the fetus occurs. While research on the effect

of poor nutrition on first-trimester beef cows has, to date, been limited in scope and the results inconclusive, similar nutritional studies using sheep have shown that when ewes are nutritionally stressed during the first trimester, their lambs are more likely to be born with abnormal heart development.

As for the effect of nutritional stress on mid-trimester cows, the research evidence is more conclusive, Hess says. Data from an ongoing University of Wyoming and U.S. Department of Agriculture-Agriculture Research Service (USDA-ARS) collaborative study show a direct correlation between the offspring of nutritionally challenged second-trimester beef cows and underperformance in the feedlot.

“The data was collected from a study comparing the performance of steers whose dams were fed on improved pastures during mid-gestation with another group of steers whose dams at mid-gestation were fed on native range in the fall,” Hess says, adding that the calves from both groups were backgrounded to 800 pounds (lb.) and then finished at the same chronological stage so that any physiological differences could be observed. “It was found that calves from the improved-pasture group performed better in the feedyard and had better marbling scores at slaughter.”

Keith Underwood, study participant and meat scientist at the University of South Dakota, recalls that the terminal weight of the improved-pasture steer group was significantly higher.

“At slaughter the weight difference between the two groups was around 44 pounds,” he says, adding that both groups were treated exactly the same in the feedyard.

**Body score as an indicator**

After calving, one of the challenges that ranchers face when working with high-performance cows and their calves is establishing a nutritional regimen that allows that special cow to fully express its genetic potential.

For Bodine, one of the best ways of evaluating the effectiveness of a specific cow's diet is to monitor that animal to make sure that it is maintaining a satisfactory body score.

“In all cows, whether they are high or average performers, the objective after calving is to keep her in the body score range of five to five and a half,” he says. “With high-performing animals you may need to feed more energy in order for them to stay in that range.”

In a situation where limited high-quality forage is available for grazing, Bodine recommends making that available to the high-performance cows along with a mineral and vitamin supplement.

“Feeding the highest-quality forages to the high-performing cows and feeding

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**“Mineral deficiencies can take up to six months or more to be corrected if there are real issues.”**

— *Tim Bodine*

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your lower-quality forage to your lower-producing cows is an excellent way to maximize your economic return," he says.

In situations where high-quality grazing is not available to the high performers, Bodine recommends supplementing a high-energy grain or byproduct along with minerals and vitamins. He adds that this regimen is not without risk.

"When you are feeding those high-producing cows, you have to be aware they will have higher intakes, so they can consume a lot more, and so you have to be careful not to feed them too much grain," Bodine says. "Overfeeding of grain can create digestive disorders or have a negative impact on the digestibility of the forage."

As a general rule of thumb, Bodine recommends feeding 2 to 6 lb. of grain per day or an equivalent amount in a byproduct.

### After breeding

He notes that the next stage for a modification in a high-performance cow's diet is after breeding.

"When her calf is getting out around 120 to 180 days old, that is when you can start replenishing a lot of the trace mineral stores and fat-soluble vitamin stores in that cow by providing her with the appropriate vitamin and mineral supplement," Bodine says. "At the same time that cow's energy requirement has dropped off considerably and that is the time to switch her over to the mid- to lower-quality forages."

He adds that the mineral and vitamin supplementation is regionally specific, so consulting with one's nutritionist and veterinarian makes the most sense.

"Mineral deficiencies can take up to six months or more to be corrected if there are real issues," Bodine says. "You can't just drag a bag of mineral out and fix the problem."

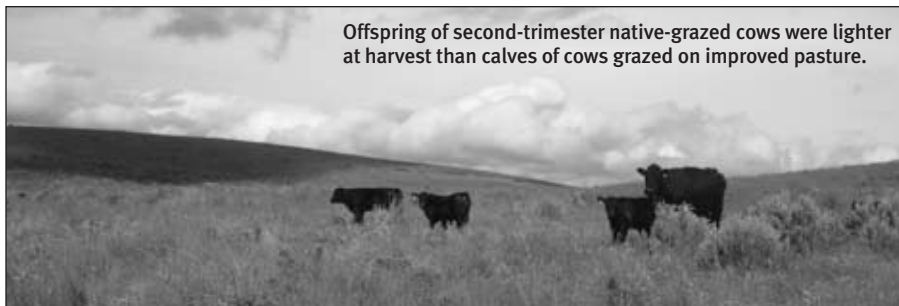
For this reason Bodine recommends establishing a long-term mineral-monitoring program that includes testing for mineral deficiencies in both the forage and in the animals. This would involve taking blood samples from any stillborn fetuses and periodically from the cows themselves at branding or weaning time.

"The veterinarian should be able to help you pull the blood, and both he and your nutritionist should be able to interpret the results and make the appropriate recommendations," Bodine says. "That way you can be certain that you are heading in the right direction with your mineral and vitamin supplementation."

Finally, Bodine sees one of the best ways to make sure weaned calves are receiving enough nutrition to meet their genetic potential is by following their daily weight gain.

"What one should really watch out for in weaned calves is that they are gaining a couple of pounds a day. If they are gaining that much they are receiving adequate energy to develop," Bodine

says. "If they are gaining considerably less, then they are not getting enough energy to fully develop all the fat cells and muscle you would expect in a genetically superior, high-performance animal."



Offspring of second-trimester native-grazed cows were lighter at harvest than calves of cows grazed on improved pasture.