How Much Is *Too* Much?

Individuals must determine how much milk is enough based on feed quality, quantity and management of young and mature cows.

*by **Ron Torell**, Nevada livestock specialist*

PHOTO BY SHAUNA ROSE HERMEL

►"We know the breed average for the current population of Angus cattle is a +15.0," says John Crouch, director of performance programs for the American Angus Association, in regard to milk EPDs. The optimum level will depend on your feed and management resources.

How much milk and how much frame are enough? If you like Oreo cookies and play center for an NBA basketball team, you can't have enough of either. However, if you are a young range cow carving out a living in the desert lands of Nevada, too much of either may be your demise. Conversely, if you are a mature cow living on the lush irrigated pasture of West Virginia, too little milk and too small a frame may be a waste of resources and represent lost income.

"The largest percentage of cows that drop out of our program are the 3- and 4-year-old cows," says Alan Sharp, a Ruby Valley, Nev. rancher. "The reason they drop out is because of failure to rebreed despite proper heifer development as a yearling and feeding a balanced postpartum ration as a 2-year-old."

Jon Griggs, manager of Maggie Creek Ranch near Elko, Nev., agrees with Sharp. "The added growth requirements of the young cow, combined with the added requirements for excessive milk and large frame size, is too large a void for our feed resources to fill. If, however, we can get our low- to moderate-milk and moderate-framed cow to the 4-year-old stage, fleshed, with a third calf in her, that cow will usually stay on the ranch and produce every year thereafter."

Griggs goes on to say, "crossbreeding can be a factor to consider when setting parameters for expected progeny differences (EPDs) for milk. You pay for heterosis by having a crossbred or composite cow that may need more input than a straightbred, and if she's a heavy milker, even more inputs are required."

"Getting the cow to that third calf is the challenge," agrees Ken Conley, manager of the University of Nevada Gund Research and Demonstration Ranch located north of Austin, Nev. "Over the years we have had to implement several management strategies to keep these young cows in the herd (see "Managing around milk," page 200).

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How accurate are milk EPDs?

Genetic merit for maternal ability in beef cattle is evaluated by the milk expected progeny difference (EPD). Oklahoma State University researchers conducted a study to determine the effectiveness of the milk EPD in predicting calf weaning weight differences and to examine its relationship to other measures of cow and calf performance.

Cows were sired by high- or low-milk-EPD Angus or Hereford bulls. Birth weights, 205-day weights, final cow weights, final cow condition scores and monthly 24-hour milk yields were recorded. Calf birth weights were similar across breeds and milk levels.

Cows from high-milk-EPD bulls produced more milk at all stages of lactation than cows from low-milk-EPD bulls. Weaning weights were 41.9 pounds (lb.) heavier for calves out of high-milk Angus cows than for calves out of low-milk Angus cows and 17.7 lb. heavier for calves out of high-milk Hereford cows than for calves out of low-milk Hereford cows.

Cows sired by high-milk-EPD bulls had lower final body condition scores (BCS) than cows sired by low-milk-EPD bulls. Final cow weights were similar across breeds and milk levels.

As expected, cows from high-milk-EPD bulls produced more milk and weaned heavier calves, but did so at the expense of body condition. By selecting for high milk EPDs, producers will increase weaning weights, but will also decrease cow body condition.

by Oklahoma State University researchers
J.A. Minick, D.S. Buchanan, S.D. Rupert and L. Knori

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— Larry Leonhardt

"We used to marvel at a first-calf heifer that weaned a 500-pound (lb.) calf off our rangelands," he continues. "We cursed the first-calf heifer that weaned a 400-pound calf. Then we wised up and realized that those heifers raising the largest calves were open and thin come pregnancy-check time. The heifers that were pregnant were the heifers that weaned the moderate to smaller calf."

Those pregnant heifers returned the most dollars in the long run because the ranch didn't have to replace them with weaned heifer calves that had to go through the same period of high nutrient demand and acclimation, Conley says. "To compound the situation, we would select replacement heifers that had the heavier weaning weights. I am convinced the cause of these open young cows is too much milk and frame coupled with the added nutrient requirements of being a young cow."

The opposite problem

Robert Whitacre of Winchester, Va., has the opposite problem. The area receives more than 30 inches (in.) of precipitation annually. Native forages include clover, bluegrass, orchard grass and fescue.

Managing around milk

"A moderate-framed Angus cow with a milk expected progeny difference (EPD) of +15 will work for us only after she is 4 years old, bred back early with her third calf, and in good body condition. However, that same cow has difficulty jumping the hurdles of the first and second conceptions to get there," Ken Conley says. "I want my mature cows to produce on my feed's potential on a dry year. However, I do not want to lose heifers getting to that point."

Conley manages the University of Nevada–Reno (UNR) Gund Research and Demonstration Ranch north of Austin, Nev. The ranch is a desert range operation with an annual rainfall of 8-10 inches (in.).

"It is for these reasons that we implemented strategies and a field demonstration that could manage around the 2- and 3-year-old open cow problem. The whole premise behind our demonstration is prevention and setting the young cow up to succeed," says Ron Torell, northeast area livestock Extension specialist and demonstration coordinator. Co-investigators include Conley; Ben Bruce and Bill Kvasnicka, UNR Extension faculty; and Jon Wilker, Gund Ranch cowboss.

"The first thing we did was implement a crossbreeding program to capitalize on heterosis," Conley explains. The ranch purchases Angus bulls with a maximum frame score of 6 and a milk EPD of +15 or below one year, followed the next year by Hereford bulls of similar frame and milk constraints. "This is our best attempt at managing heterosis, because the bulls have to be run in common during breeding."

Their second strategy is to select replacement heifers from the middle of the herd, culling the largest and the smallest heifer calves. Heifers are developed to reach 65% of their mature weight 45 days prior to the breeding season, 70% of their mature weight by breeding time.

"We have to select heifers early and push them hard to reach these goals," Conley says.

Research indicates that gains in excess of 1.5 pounds (lb.)/day during the development period can lower subsequent milk production due to fat deposits in the mammary glands. "We really do not care," Conley says. "We seem to always have excess milk for our feed resources anyway. By reaching target weight 45 days prior to breeding, our heifers are cycling one to two times prior to bull turn-in. This is helping our first conception rate." Research also clearly shows that the second and third heats are more fertile than the first.

The heifers are synchronized with the MGA/Lutalyse® program, and then they are bred by artificial insemination (AI) to calving-ease sires possessing milk, frame and growth EPDs that fit the ranch's criteria. Strong emphasis is placed on the fleshing ability of a bull's daughters and udder quality (see "Udderly Beautiful," page 218).

"We select only high-accuracy-EPD AI bulls," Conley says. "We keep most of the heifers from these AI sires as replacements. We then put in cleanup bulls with the same specifications for a brief 35-day breeding period.

"Any heifer bred after this point is destined to fail with her second or third conception due to reduced postpartum interval, so we eliminate them up front," he continues. "After the 35-day breeding period, we turn the heifers out on the range. We want those heifers to learn how to walk on a cow trail, learn the range and learn how to scrounge for feed. We do not want these heifers to get comfortable lying around an irrigated pasture with a water trough close by."

First-calf heifers are bred to calve 30 days prior to the mature cows, allowing the young cows an additional 30 days postpartum before the next breeding season. To calve at the same time the following year, the young cow needs to cycle and breed 85 days postcalving. First-calf heifers need a minimum of 90 days (usually 120 days) on average to cycle and breed.

The protocol allows the heifers 120 days postpartum to conceive and still calve with the mature cows the following year. "A word of caution," Conley says, "you better have a good calving barn if you move your calving date back. We had to build a facility that would accommodate February 1 calving."

The heifer-development system sets the cow up to succeed the following year, says Kvasnicka, state Extension veterinarian

"Feed is not a problem here, so milk and frame are less concern," says Whitacre, a commercial cattleman and field representative for Accelerated Genetics. "I sell a lot of semen from frame score 7 bulls with Angus milk EPDs of +27 and above. It is not uncommon for us to wean 700-pound calves.

"A smaller-framed, lower-milk cow does not work for us. She gets overfleshed and weans a smaller calf compared to the type of cow we can support," Whitacre continues. "That type of cow winds up in the cull pen fairly rapidly here. There is a limit, however. We try not to exceed a 7.2 frame or much more than +30 on milk for Angus. Extremes have a way of creating problems."

Where's the balance?

So how much milk and how much frame are too much?

"There is not much scientific data available to guide producers as to the correct milk EPD or frame size for various feed resources," says John Crouch, director of performance programs for the American Angus Association. "Research does show that the higher the milk EPD and the larger the frame of the animal, generally the higher the nutrient requirement of that animal."

There are always exceptions, such as the high-milking, small-framed cow or the large-framed, low-milk cow or the crossbred, easy-fleshing cow, that defy all the rules, Crouch says. "We know the breed average for the current population of Angus cattle is a +15.0. Each individual must determine how much milk is enough based on feed quality, quantity and

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with UNR. "Research clearly shows that delivery problems (dystocia) and prolonged births affect breed-back. We have very few dystocia problems due to the development program and the light-birth-weight bulls used. We intervene rapidly if we see a heifer in birthing distress.

"We also implemented a vaccination and management program designed to protect against the reproductive diseases known to the area," Kvasnicka says. "We do not want to put all this time, effort and money into the heifer and have her go out due to a reproductive disease."

Heifers are vaccinated prior to breeding, according to label, for infectious bovine rhinotracheitis (IBR), parainfluenza-3 virus (PI_3), bovine viral diarrhea (BVD), trichomoniasis, vibriosis (vibrio) and leptospirosis (lepto). Cows are given booster vaccinations annually prior to breeding.

"We also feed a calcium-phosphorous trace-mineral mix to aid the immune system in mounting a response to those vaccines, and we deworm annually with a type two dewormer," Kvasnicka says.

"The next thing we did was implement feeding 4 pounds of energy per head per day — in our case ground corn — along with our existing ration of grass, alfalfa and a calcium-phosphorous trace-mineral mix," Torell says. "The energy had more of an impact on breed-back than anything else we did."

To better visualize the importance of pre- and postpartum energy, Torell recommends viewing energy requirements as a checkbook balance. "Once first-calf heifers calve, they just 'melt,'" he explains. "The young cow is drawing energy from her body reserves faster than we can supply them in the form of feed. The cow is still growing herself. She is now lactating, cutting teeth, and is a first-time mother.

"It is for these reasons that we must enter the last trimester of pregnancy at 85% to 90% of her mature weight and in a minimum body condition of 6. This is also the reason we must feed prepartum energy, as well as postpartum energy. We must make deposits to that checking account so there is a balance of fat to draw from when the big draw occurs — postpartum and lactation."

"The other strategy we implemented was summer grazing these first-calf heifers on our best rangelands and weaning the calves off these young cows when our forage quality declined," says Bruce, UNR state Extension specialist. "By calving 30 days prior to the mature cow herd we had a calf that was 180 days of age by late July and capable of ruminating. Stopping the lactation requirement on these young cows by weaning allows the cows to put on condition prior to winter. This practice is making a deposit into that fat-reserve checkbook to draw from the following year."

"A word of caution," Conley says, "you have to have a place to go with the freshly-weaned 180-day-old calf and the labor to get the calf over the weaning stress. If you have good feed to go to, the calves will weigh the same at fall shipping time as if you had left them on the cow. However, the cow will be one full body condition score higher."

After their first calf is weaned and the cows are processed, they are fed through the winter with the thin-cow bunch. This reduces competition for feed and allows the cows to maintain the body condition gained from early weaning, says Jon Wilker, Gund Ranch cowboss. They continue to feed the cows a calcium-phosphorous mineral with a half-alfalfa, half-grass ration. However, they don't provide a supplemental energy source.

After having their second calves, the cows are treated as mature cows.

"We have a good winter feed program for our mature cows," Conley says. "We wean according to forage quality and quantity. We winter-feed in groups based on body condition. We often wean our calves from our mature cows in August at less than 200 days of age. These are all body-condition-preservation moves designed to help in next year's calf crop."

This program may seem extreme to some readers. However, the Nevada group says they believe that in order to stop the bleeding with open 2- and 3-year-old cows, all of these measures are required.

The complete demonstration is in its second year.

— by Ron Torell

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management of young and mature cows. Too much can be devastating under harsh and dry conditions; however, too little can result in lost income that could have been passed on to the calf from the maternal component."

"To compound the situation, there are many variables one must consider when setting a ranch's maximum-milk-EPD criteria. There is no cut-and-dried answer," says Larry Leonhardt of Shoshone Angus, Cowley, Wyo. Leonhardt has studied this question on his registered Angus ranch for the past 20 years.

"The type of cow, supplemental strategy, level of heterosis, weaning strategy [and] maturity level of the cow herd are all factors that can influence how much milk a ranch can handle under various forage and range conditions," he says. "You have to have enough milk and frame to make a calf, however not so much as to make open, young, thin cows in the process."

If producers don't know what their ideal is, Leonhardt recommends starting with a target of average and adjusting from there. He cautions, however, that average may be too much for the 8- to 12-in. precipitation zones and not enough for the higher precipitation zones. And average milk for breeds that require high nutrient levels may be too high as a starting point.

"Average always gives you fewer problems. Yet, as a registered bull seller, average is hard to sell," Leonhardt says. "You can hardly give a below-average-milk-EPD bull away. The

bottom line is, the cow has to match the environment."

Finding a match

Jim Gosey, University of Nebraska beef cattle specialist has tracked research on the effects of cow size and milk production for several years and points to work done at the Roman L. Hruska Meat Animal Research Center (MARC), Clay Center, Neb., by Tom Jenkins and Calvin Farrell.

"Their work demonstrates that higher levels of milk production have a detrimental effect on reproductive levels under sparse feed conditions and less of an effect when feed availability is abundant and of good quality," Gosey says. "Jenkins and Farrell's work also showed that there is an interaction between breed of cattle and feed availability."

At low levels of feed, generally the smaller cows with more moderate milk levels excel due to their greater reproduction and lower cost, he explains. But, at higher feed levels, the large high-milking cows excel due to their greater output of calf weight.

When asked how much milk is enough, Gosey suggested taking a look at the oldest cows and using them as a guide, or taking a look at the heifers that are falling out of your program. If possible, look at the sires of these two classes of cows and determine what milk EPDs they had at the time of purchase.

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Additionally, Gosey suggests ranchers consider whether they sell calves or yearlings. Milk is less important if you are selling yearlings.

Gosey warns against any single-trait selection, including the current fascination with marbling. Some sires that excel in marbling are well above their breed average for milk EPD. Breed differences with regard to milk level and marbling show a definite trend for higher levels of marbling to be associated with higher levels of milk production. For most traits, moderation and balanced trait selection are key.

Which is worse?

Frame size or milk production, which causes a bigger nutrient need for the beef cow? MARC research indicates that breeds that have the ability to produce higher levels of milk also have heavier organ weights. Heavier organ weights equate to greater nutrient needs, not only during the time cows are lactating, but also during the time that they are not lactating.

Rick Rasby, a beef specialist at the University of Nebraska, says the MARC data suggests milk production may be as big a drag on a cow's system as frame size.

"This is not to say that frame size is not important, but both need to be considered," Rasby says. "Again, moderation may be the safest route until you can determine what best fits your environment and feed resource base."

A moderate-framed cow would have a mature weight of 1,100-1,175 lb. at a moderate body condition score (BCS) of 5, Rasby explains. He describes moderate-framed as frame score 4 and 5 on a 9-point scale. Large-framed cows are frame score 6-9 with mature weights of 1,250-1,475 lb. and above. Small-framed cows are frame score 1-3 with mature weights of 955-1,030 lb.

"It is a good idea to stay away from extremes — the extremely large and extremely small-framed animals," Rasby recommends. "Calves destined for the rail would get discounted quite severely for too large or too small a carcass. Evaluate your feed resource. If you have limited feed, stick with the moderate-framed cow. If you have lush feed, you may be able to support a higher nutrient demanding cow or breed of cow."

So how much milk and frame is enough? Again, when it comes to Oreo cookies and basketball, the more the better. However, when cows are concerned, the experts we contacted suggested starting with average milk and frame size and adjusting over time. Make your adjustments based on performance under your feed and range resource conditions.