

# Factors Affecting CALF SURVIVAL

BY TROY SMITH

**T**his is the season when interrupted sleep becomes routine. A warm bed is traded for a bone-chilling midnight stroll. It's time for another walk through the heifer pen in anticipation of the official onset of calving season. The wind has come up, and there's moisture in the air. The heifer that looked like she might be first is obviously restless and uncomfortable. All by herself in the far corner, she's lying down, then she's up again, waddling around with a kink in her tail. You'd better put her in the calving barn.

The weather is rapidly worsening; but inside, out of the wind and snow, things are progressing slowly. Palpation indicates a normal presentation, but this heifer's calf is a big one. She's taking too long and definitely needs help.

Following considerable straining and sweating by the attending "midwife" and too little help from the new mother, a live calf is delivered. It's alive — but cold and slow to stir. After a few tentative sniffs, its mother seems to lose interest. Additional work is required if this baby is going to survive.

The scenario is all too familiar to cow-calf producers located in northern regions, and some have sought alternatives to the traditional spring calving season when environmental factors can compromise calf survival. Still, a majority of range-raised beef calves will be born during the next few months. For many purebred breeders and some commercial producers, calving is underway already.

Conscientious cattlemen monitor their herds, prepared to intervene when nature's course takes a wrong turn. Their vigils are rewarded when timely action results in a viable calf; however, some of the most important factors affecting calf survival should be managed long before the time of birth and those first minutes or hours of life "on the outside."

## For the long term

Reminding cow-calf producers that calf survival depends on year-round management is veterinarian Gary Rupp, director of the University of Nebraska Great Plains Veterinary Educational Center, located at the U.S. Meat Animal Research Center (MARC) near Clay Center. Rupp

says, in addition to dystocia (calving difficulty), factors affecting calf survival that warrant long-term management schemes include age of dam, disease immunization and nutrition.

MARC studies have indicated mortality at or near the time of birth is four times greater in calves experiencing dystocia. The most common cause of death is injury incurred during difficult or delayed birth. Calves suffering anoxia (insufficient oxygen) during prolonged labor often die just before or soon after delivery, and those that survive often exhibit symptoms typical of weak calf syndrome.

Most producers recognize the calf-puller is used far less when genetic selection is aimed at optimizing birth weight relative to the dam's capacity for delivery. Actual birth weights, expected progeny differences (EPDs) and pelvic measurements are selection tools.

First-calf heifers are more likely to experience dystocia. Consequently, calving heifers separately from and a little earlier than mature cows can make monitoring easier and allow for better management of each group's nutritional needs.

All of that requires forethought and planning. Rupp fears that the area where long-term planning is most often neglected is nutrition. Plenty of producers would benefit from spending more time planning effective health programs, too, but he says the most important step toward vigorous, viable calves is taken when the nutritional needs of cows and heifers are met on a year-round basis.

"A good immunization program should be thought out well ahead of calving and probably should include BVD (bovine viral diarrhoea) and IBR (infectious bovine rhinotracheitis)," says Rupp. "Immunization for viral scours, clostridials and *E. coli* can be beneficial, but a vaccination program is of minimal consequence compared to overall management, and that begins with nutrition of the dam."

He warns producers against becoming too dependent on scour vaccines. Since they are administered to the dam, their efficacy hinges on the transfer of antibodies to her calf through colostrum. Rupp says getting the dam in shape to produce a vigorous calf



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and adequate colostrum should be the producer's primary concern.

### Eating for two

R.A. Bellows of the USDA-ARS Livestock and Ranch Research Laboratory near Miles City, Mont., says studies have repeatedly shown gestation diets deficient in energy or protein have a marked effect on calf viability and the ability of the dam to recover and rebreed. He cites studies where a 10% reduction in calf survival at birth was attributed to the dams' low-energy diet. Furthermore, diets low in energy may alter gamma globulin levels of colostrum or hinder absorption of colostrum antibodies.

"Some studies report that gestation diets low in energy or protein result in lowered levels of colostrum antibodies," says Bellows. "Adequate energy and protein have positive effects on calf heat production, too, and adequate fat in the gestation diet appears to be of importance in terms of calf heat production and cold tolerance and rebreeding of the dam."

According to Bellows, a newborn calf is physiologically programmed to produce heat to maintain body temperature after it moves from the controlled, warm uterine environment to an often hostile external environment. An obvious method of generating heat is through muscle action or movement, including shivering. The other is hormone-triggered production of heat from brown fat located mainly around the kidneys. Accounting for about 50% of heat produced, this is an important heat source in the newborn calf.

"Gestation diets balanced for everything else may or may not be high in fat, but we're encouraging producers to consider supplementation when necessary to achieve a fat content ranging from 3.9 to 5.9%," offers Bellows. "In our studies, feeding 4.9% dietary fat during the last 53 days of gestation improved cold tolerance and increased plasma glucose concentrations in newborn calves. The increased glucose may also be associated with improved thermogenesis (heat production) and potentially improved calf survival."

Bellows warns feeding supplemental fat for shorter periods during late gestation may not be so beneficial. In his study, calves from cows fed supplemental fat during the last 28 days of gestation did not appear to have improved cold tolerance. That suggests there may be a latent time period that must be exceeded before the effects of supplemental fat may be realized.

In addition, there seems to be a carryover effect from feeding fat during gestation, resulting in improved pregnancy rates. However, Bellows says, any positive

response to fat supplementation may depend on the particular fat used. Work remains to be done to evaluate fat sources, how long fat must be fed and what levels are most economical.

"Right now, our work with safflower oil shows it to be a good source," Bellows says. "Vegetable, rather than animal, sources may be better. Soy is OK — certainly the most common and one of the cheapest, but raw soybeans may be one of the poorest sources."

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Rations may be evaluated for protein, energy, fat, vitamins and minerals. Both Bellows and Rupp recommend evaluation of animal response and nutritional reserves of gestating cows and heifers through body condition scores (BCS). The classic scoring system, based upon the degree of fatness, uses a subjective numeric scale from 1 (extremely thin) to 9 (extremely fat).

"I'd say a condition score of 6 is optimum for first-calf heifers," offers Rupp. "Cows can score a 5 and do OK, but the ones below that can hurt you. I'd rather shoot for a 5.5 or even 6 as a herd average."

Rupp repeats his belief that having the dam in shape is the key to enhancing calf survival. Environmental factors may be managed by breeding to avoid calving during periods when weather extremes are most likely. Obviously, when calving during extreme weather, providing shelter makes good sense. Particular consideration should be paid first-calf heifers among whom, according to a national average, 20% will require assistance at calving. Whether assisted or not, if a calf isn't getting immediate mothering attention, Rupp advises producers be proactive.

### What to do now

"The longer it takes for a calf to get colostrum, the more its chances of survival decline. Not just in the short term, but later too because of diminished immunity," explains Rupp. "We now believe that calves

are capable of developing immunity more quickly than previously thought. They start absorbing colostrum immediately and develop some immunity within a couple of hours. So don't wait."

Frank Garry, Colorado State University Veterinary Teaching Hospital, Ft. Collins, agrees. Garry's ideal calving scenario includes an uncomplicated and unassisted delivery of a vigorous calf receiving immediate attention from a keenly interested mother. Anything else may warrant some intervention.

"Ideally, a calf is active from the start and is trying to stand within 15 to 20 minutes. It should be successfully standing within an hour," says Garry. "It should be nursing soon after, hopefully within 90 minutes and certainly within two hours."

If the calf's mother is doing her job, she should stimulate the calf's movement, triggering heat production. If a calf is lethargic, Garry advises checking its temperature before it is an hour old. A normal temperature range is 101-102° F; a temperature lower than 100° indicates hypothermia. The calf needs to be warmed and the body temperature stabilized at 101°.

"You need shelter to break the wind, a roof if it's wet and something between the calf and the cold, wet ground. Often a heat lamp is used to warm the calf, and you can help maintain body temperature with those little foam jackets or some kind of wrap around the calf's shoulders and belly," advises Garry.

Even when hypothermia isn't an immediate danger, Garry thinks a little follow-up effort should accompany every assisted birth. That's particularly true for first-calf heifers. To assure the calf gets adequate colostrum promptly, he suggests milking out the heifer and giving the calf all of the colostrum she produced.

Garry says a heifer's mothering instinct may have to be stimulated by movement of the calf. If it isn't already moving, she may sniff a little, then ignore it. Any time assistance is provided, Garry recommends devoting a few extra minutes to help with bonding and enhance the calf's chance of survival.

"Dry the calf and try to get it up on its sternum. Rub the dickens out of it, and when it starts thrashing about, its mother usually goes crazy after it," Garry adds. "That first hour of birth is when the danger of cold stress is greatest, and 10 minutes spent in simple intervention can be very beneficial in drying the hair coat to improve insulation, in stimulating heat production, and getting that calf up and nursing. Make it standard operating procedure to jump in and assure the likelihood of that calf's viability." 