Mastitis

Prevalent in most beef herds, mastitis can dry up weaning weights and a cow's ability to express her genetic potential to milk.

by ***Janet Mayer***

PHOTOS BY SHAUNA ROSE HERMEL

No. 89 was an outstanding cow who always calved unassisted, had no complications and weaned calves weighing 629-700 pounds (lb.). After she calved for the sixth time, she developed mastitis (inflammation of the mammary gland). Even though she was treated for the condition, a quarter of her udder became unproductive and atrophied. The bull calf she weaned that year weighed just 560 lb.

Five calves later, No. 89 again developed mastitis. This time she was on pasture, and the condition went undetected until her calf was observed to be in poor condition. The pair was brought in, and her mastitis was discovered and treated. In spite of supplemental feeding, the bull calf did not thrive and later died.

As all cattlemen are well aware, the lactational performance of the dam means profitability through adequate weaning weights and percentage of calves weaned. Therefore, mastitis can be an influencing factor in the final equation and, in the long run, also can be an important factor in preventing cows from achieving their true genetic potential for milk production.

The true-life scenario of No. 89 is not all that unusual, says David Wolfgang, field studies director for the department of veterinary science at Pennsylvania State University (Penn State). "Detection of mastitis in beef herds is often difficult, and very few cases are actually known unless the animal has a lot of swelling or she has a toxic condition that shows in her overall condition.

"Typically most breeders find out a cow has had mastitis after the fact when they discover that a quarter of her udder is atrophied. Unlike dairy cows that are seen and handled when they are milked every day, this happens to beef cows mainly because the herd is out on pasture and also because their udders are not always that visible, especially in first-calf heifers."

Most herds affected

Wolfgang says just about every beef herd has cases of mastitis, with most cases typically involving just one quarter of an udder. Luckily, genetics provides adequate milk for the calf by allowing the other three quarters to kick into extra production; however, there is still a reduction in milk that will affect weaning weights, resulting in substantial loss of money, especially if the disease has affected multiple cows. To prevent this, breeders need to take preventive measures against the disease.

HERD HEALTH

"Management really drives the incidence of mastitis," Wolfgang explains. "For those breeders who manage with their cows in confinement in an area with a lot of flies, there can be as high as 25% of cows with the disease. This often happens when heifers are kept in a confined area for observation, and dirt, packed manure and filth in general get on the teats, making the animal more vulnerable. Conversely, where animals are widely dispersed on clean pasture without a lot of flies, it can be as low as 5%. Clean grass truly is preferable to the cleanest barn.

"For mature cows, the longer they lactate, the greater the chance for mastitis. This happens because the udder becomes more pendulous, presenting the window of opportunity for injuries and the entry of bacteria into the teats. Once a teat end gets nicked, you are in trouble."

Size and shape of the teats can determine the risk of mastitis and can be a critical factor in the disease, Wolfgang points out. In general, the larger the diameter of the teat, the faster the milk flow and the greater the risk of pathogens. The smaller the diameter, the greater the resistance to pathogens.

Although teats and teat ends vary greatly in shape and size, pointed teat ends have the highest resistance to mastitis, but this shape is relatively rare. The common round teat ends have some resistance to the disease; and flat teat ends, the least common, have the least resistance.

The chronic ring, an elevated ring of tissue surrounding the teat orifice, often seen on unmilked dairy heifers and on beef cattle, appears to be a characteristic of high milk producers and may prove in future studies to be part of the teat end's defense mechanism against mastitis.

Control options

Past studies show that environmental factors play a key role in spreading the disease. In dairy herds, the organisms usually are spread through the milking sequence, but in beef herds, the calf sometimes can be the vector.

In a study conducted at Penn State, it was determined that — although organisms might be spread readily from one quarter to

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another in the same cow — spreading from cow to cow seemed unlikely. Cross-suckling is believed to occur only rarely, but "hit and run" incidents, or brief periods of nursing, may be tolerated by some cows, and this brief contact with the mouth of a calf carrying the organisms may be all that is necessary to contaminate a teat end and to begin a teat duct colonization.

Bacteria can enter the udder during all stages of lactation, with the predominant time appearing to be when the animal is in production, especially during the first month of lactation and in the early dry period. An increased rate of mastitis also can occur due to weather change, heat, humidity, rain or mud.

Wolfgang blames fly infestation for being a large contributing factor to the spread of bacteria. "Flies are a big issue in the control of the disease, and as animals congregate together in tighter areas, flies can be a carrier of environmental bugs, moving the bacteria from the skin surface into the tissue. The flies bite the skin at the teat ends and get the bacteria into the gland where it starts to grow."

He says many breeders, both dairy and beef, think that pour-ons help with the fly problem, but he has found that when it is hot and sunny the flies tend to go under the animal to the udder area where there is less hair and softer skin. If heifers come into a lockup, he recommends taking a 12-cubic-centimeter (cc) syringe with some type of repellent and squirting it between their legs.

Other efforts to control mastitis have been examined in studies on different characteristics of the disease. In a report in *Large Animal Practice,* it was pointed out that some studies done on beef cattle

showed the prevalence of mastitis in mature beef cows ranging from 7% to 54%, or between 2.6% and 29.2% of the quarters.

Pounds lost

Determining that approximately 60% of the variance in weaning weight is attributable to the direct influence of the dam's milk yield, it is not surprising that the disease can affect the weaning weight of calves by 7%-12.5%.

Researchers at Louisiana State University determined that, as observed in older beef cattle, mastitis is also prevalent in first-calf beef heifers and led to up to a 23-lb. reduction in weaning weights in that study.

Two Oklahoma State University studies on antibiotic treatment and the effects of mastitis on calf weight gain show varying results. In the first, range beef cows were treated with oxytetracycline at weaning, at

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►Calves can be a vector for mastitis infection, spreading the organism from one quarter to another in the same cow. While cross-suckling isn't common, brief contact with the mouth of a calf carrying the organisms may be all that is necessary to contaminate a teat end and to begin a teat duct colonization.

subsequent calvings or at both events. The treatments did not alter the somatic cell count or increase the growth rate of calves.

A second study attempted to determine the effects of intramammary dry-cow treatment on udder health and subsequent calf growth, since increased somatic cell counts are correlated with reduced calf gain. The treatment did not alter adjusted weaning weights of calves, but it was found to reduce intramammary infection and somatic cell count at the subsequent calving.

In the second of two studies at Penn State, data analysis indicated that dry-cow therapy effectively eliminated many infections present at weaning, but it had no significant effect on prevention of new infections. The result was surprising because one of the important effects of dry treatment in dairy cows is prevention of new infections. The difference was attributed to the fact that the average length of the dry period in dairy cows is about 60 days, substantially shorter than the average 160-day dry period for beef cows.

This particular study concluded that calves of infected dams had weaning weights about 21 lb. less than those with mastitis-free dams.

►Fly infestation is a large contributing factor to the spread of bacteria, including those causing mastitis. The flies bite the skin at the teat ends, introducing bacteria into the gland where it starts to grow.

What is mastitis?

More commonly associated with dairy cattle, mastitis in general terms is any inflammatory condition that affects the mammary gland and significantly reduces the production of milk.

There are two types of mastitis. The noninfectious type accounts for about 1% of cases. It usually results from a physical injury, causing the gland to be more vulnerable to teat and udder lesions.

The remaining 99% of cases are infectious types caused by microbial pathogens, the most common being streptococcus, staphylococcus and coliforms.

Resistance to bacterial invasion is determined for the most part by the structure and function of the teat canal where the microorganisms enter the udder. Once inside, the environment of the mammary gland is most favorable for growth and multiplication.

Further confusing issues and making diagnosis more difficult, the signs of mastitis vary according to factors in the host and the invading pathogen.

Peracute mastitis usually is characterized by gross swelling, heat, redness, pain and disturbed function, characterized by a decrease in milk production. Systemic signs of fever, depression, shivering, loss of appetite and rapid weight loss accompany cases of peracute mastitis. In some cases, bacteremia, septicemia and death may occur.

Acute mastitis also is characterized by all gross signs of inflammation and some signs of systemic disturbance, such as fever and mild depression.

In *subacute* mastitis, the symptoms are less pronounced, and there are no systemic signs.

The existence of inflammation in the absence of gross signs is referred to as *subclinical* mastitis.

Prevention best

Wolfgang advises beef producers not to try to medicate their way out of a mastitis problem. He recommends cleaning the cattle's environment and making sure that cows get proper nutrition as an important aspect of prevention.

"Prior to calving, many cows are kept on a marginal diet — like cornstalks. This will take her reserves to supply the calf, depleting her immune system. Then a month or two prior to calving, many producers will start feeding the dam grain. All that does is pile a bunch of fat into the calf and does nothing for the cow.

"Now she calves, sometimes has a bigger-than-normal calf and crashes," Wolfgang continues. "Her immune system is bad, and she is now a perfect candidate for mastitis. A better balanced diet is very important, and a small amount of grain and some protein should be fed throughout the entire dry period to maintain proper condition."

For herds with major mastitis problems, treatment for mature cows at weaning to clean up any existing infections is recommended, with two treatments being of benefit since there are several months between weaning and calving. This especially holds true if the mastitis problems are occurring at or near calving.

If the problem is showing up in heifers, they should be treated approximately a month before calving. Wolfgang cautions that this might prove to be difficult in a pasture-bred herd where calving dates are often hard to calculate.

When treating beef cattle, Wolfgang advises producers not only to make sure the treatment area is secure, as treatment of beef animals can be dangerous, but also to make sure the area is superclean, as more bacteria problems actually can be induced than are cured.

"I find that the registered breeder pays closer attention to mastitis than a grade breeder," he says. "But maybe more breeders should push the pencil harder than they do. If that tenth-of-a-pound gain lost to the disease on [a] daily basis was more of an issue, they might pay closer attention."