



Early lactation is an ideal time to test for mastitis in beef cows. [PHOTO BY SHAUNA ROSE HERMEL]

Story & photos by
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Oklahoma State University (OSU) Regent Professor and researcher Robert Wettemann knew that mastitis existed in beef herds, but he certainly didn't expect to see the levels documented in his study.

"We usually associate mastitis with dairy herds and its transmission

through the milking process," he says. "Because of that, one wouldn't think that there would be that much in beef cows."

In the study, which looked at the effects of intramammary infection and parity on calf weaning weight and milk quality in beef cows, more than 60% of cows in a 164-cow herd had one or more quarters infected.

The study, conducted by

researchers from the University of Maryland Department of Animal and Avian Sciences; the U.S. Department of Agriculture (USDA) Agricultural Research Service (ARS) Disease Resistance Laboratory, Beltsville, Md.; and the OSU Oklahoma Agricultural Experiment Station, Stillwater, Okla., was unique in that it involved both dairy and beef researchers. For Wettemann this was important because it allowed his team to draw on a broader base of knowledge than it would have if its members were exclusively involved in beef research.

Wettemann notes that the higher-than-expected levels of mastitis in the study herd weren't the only significant information gleaned from the project. The researchers also learned that chronic mastitis can lead to a drop in milk production and lower weaning weights in their calves.

In a sister study, calves from cows with three or four infected quarters weighed an average of 56.1 pounds (lb.) less at weaning compared to calves from cows with two or fewer infected quarters.

The effects of these infections are particularly noteworthy in more mature cows, which have a tendency to exhibit irreversible manifestations of prolonged mastitis in the form of blind or nonfunctioning mammary quarters.

Reduced milk production in infected cows is not new. Dairy operators have known for decades that mastitis can have a direct effect on a cow's ability to produce milk. It is estimated that mastitis costs the dairy industry more than \$2 billion in lost production and lost animals. As a result, a high percentage of today's dairies have initiated procedures to control infections in their herds.

Beef producers, on the other hand, have traditionally viewed mastitis as an unavoidable annoyance with little or no real effect on their bottom line. But, that perception is rapidly changing, thanks to a growing body of

knowledge on how mastitis affects beef cattle. In 2003, USDA estimated that mastitis costs the U.S. beef industry \$400 million per year. Much of this is due to lower calf weights at weaning and the early culling of cows that have been irreversibly affected by mastitis.

Guilty parties

One of the most widely circulated arguments supporting the perception that mastitis is not a real problem in beef cattle is the belief that the mastitis-producing bacteria is difficult, if not impossible, to spread in a pasture environment.

Although researchers agree that transmission is far more likely to occur in a poorly managed dairy operation, where the entire herd has the potential of being exposed to cross-contamination two to three times a day, the latest studies show that a significant transference of mastitis-causing bacteria from one animal to another can, and does, occur between lactating beef cows on pasture. For example, in the sister study, the percentage of cows infected with mastitis climbed from 43.4% after calving to 53.7% at weaning.

Max Paape, ARS dairy scientist and participant in the study, speculates that cross-suckling calves are the most likely carriers of the bacteria from one mother cow to the next. "There are calves that suckle from several cows," he says. "If one of them has mastitis, it is likely that some will eventually get it through that calf."

He admits this adds an insidious twist to the infection process. We know that mastitis can cause a reduction in milk production, and with an infected cow not being able to provide her calf with an adequate supply of milk, that calf is more likely to cross-suckle, thereby spreading mastitis to other cows.

Flies are another suspected vector for mastitis. They are known to carry the disease, moving bacteria from the skin surface into the tissue by biting at the teat ends and

Is Mastitis Affecting Your Bottom Line?

Lower weaning weights in beef calves linked to untreated mastitis.

exposing live tissue. This is the entry point of the pathogen, allowing the bacteria into the bag, infecting the specific quarter.

The bottom line

For beef producers, probably the single most documented financial loss due to mastitis is the below-expected weaning weights in calves whose dams are infected with mastitis-producing bacteria.

Although young cows infected with subclinical mastitis in two or fewer quarters usually produce calves with weaning weights equal to noninfected cows, that pattern changes as the infected animal matures. “If the infection is maintained from year to year without treatment, in time the severity is likely to increase enough to result in the loss of a couple of quarters,” Wettemann says, adding that such an occurrence will very definitely have an effect on calf weight gain.

Data from the study shows that beef cows with two or more blind quarters produce calves an average of 35.2 lb. lighter at weaning than the offspring of animals with no blind quarters.

Relevant data

Wettemann notes that the results of these studies are particularly relevant in today’s high-value beef market, where it makes sense to get as many productive years out of a cow as possible.

“Weaning weight of calves is a major criteria for culling cows,” he says. “You would think that it is in a beef producer’s best interest to reduce the occurrence of blind quarters if those quarters are directly responsible for lower weaning weights and increased culling.”

In the past, one of the main arguments given for not treating mastitis in beef cows was that the expense and effort were not worth the return. For Paape and Wettemann, such a supposition is ludicrous. They note that beef producers who do not treat mastitis face a triple threat to their bottom line.

First, both young and old animals that have more than two infected quarters will produce calves with lower weaning weights. Second, untreated animals are likely to become sources of transmission through cross-suckling calves. Third, untreated cows are more likely to develop blind quarters and to be culled at an earlier age than they would if they hadn’t suffered from chronic mastitis.

The question then arises — is there a practical, cost-effective mastitis control program that can be initiated by cow-calf producers today? Based on their research, both Wettemann and Paape

believe that such a program can be successfully implemented.

In a study that looked at the effectiveness of treating mastitis in a cow-calf operation, 90 beef cows were randomly selected out of a larger herd seven to 10 days after calving. Forty-five

were designated the control group, and the other 45 were tested for mastitis.

Out of the 45 animals tested, 15 quarters were diagnosed with mastitis, and the respective animals were treated with a slow-release antibiotic in the fall after weaning. The following spring, the cows

were tested again, and 12 out of the 15 previously infected quarters were determined to be cured.

“That is a very encouraging rate,” Paape says, “especially considering the consequences of not treating at all.”

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Mastitis (from page 19)

The California Mastitis Test developed for the dairy industry is ideal for testing lactating beef cows as well.

[PHOTO BY ED HAAG]

**Recommended control program**

Probably one of the best mastitis tools that beef producers can co-opt from the dairy industry is the California Mastitis Test (CMT), which is also known as the paddle test because of the shape of the test receptor — a handle plus a wider portion with four indentations, one for each quarter's test liquid. Milk from each quarter is drawn and mixed with its own

small batch of CMT chemical. If white blood cells are present — usually an indication of an infection — the mixture thickens.

The CMT is totally portable, costs pennies to run and responds immediately to a wide range of mastitis infections.

Based on his past research, Wettemann recommends running spring CMT tests on lactating mother cows a month after calving at the same time the young animals are being vaccinated and castrated. Once it is determined that a cow has mastitis, she can be treated immediately with an antibiotic, or treatment can wait until her calf is weaned in the fall.

Paape recommends vitamin E and selenium (Se) supplementation, especially for cows that are calving in the spring and have consumed a diet of dried forage during the winter. Most stored forage has considerably less vitamin E than freshly grazed grass. In addition, the vitamin E status tends to decline during pregnancy, reaching a low point at the time of calving.

Vitamin E status is related to the susceptibility to mastitis infection in cattle and plays an important role in reducing tissue damage when mastitis does occur. "Vitamin E is an antioxidant," Paape says. "It helps scavenge toxins produced by the white blood cells to kill the bacteria."

Vitamin E supplementation of beef cows during late gestation and early lactation has also resulted in reductions in calf scours and increases in weaning weights.

Full-spectrum immunization

One of the most promising breakthroughs in recent years has been the development of a trivalent staph vaccine by USDA-ARS scientists. Staph is a leading cause of chronic mastitis in cows. Rather than focusing on developing separate vaccines for each strain of the staph bacteria, USDA-ARS scientists have created a vaccine that responds to multiple strains. Doug Bannerman, a research biologist with USDA-ARS who is currently evaluating the efficacy of this vaccine, says, "In our vaccine there are three different bacterial components that actually stimulate immunological activity against every known *Staph. aureus* strain in the U.S."

While the vaccine is still in the testing stage and approximately two years from release, Bannerman hopes it will serve both milk and beef producers in two capacities: first, as a preventative measure to be used to immunize first-calf heifers, and second, as a treatment enhancer to be used in conjunction with an antibiotic to facilitate a higher cure rate.