



MINISTRY OF AGRICULTURE, FOOD AND RURAL AFFAIRS

Reproductive Success

Reducing mastitis incidence in your herd also helps cure ailments linked to poor breeding performance.

During a recent investigation into a dairy herd's poor reproductive performance, Dairy-Comp305 records showed six of seven cows on their first tests had high somatic cell counts (SCCs), suggesting mastitis infections since calving. Two had very high SCCs, indicating severe clinical infections. Another five of nine cows not yet bred after calving also had at least one mastitis episode since calving.

In this herd, solving one frustrating problem - mastitis - could also improve reproductive performance. Strong evidence has linked the two Issues.

Ontario research done in 2001 found conception rate was lower for cows that had clinical mastitis within 30 days of a breeding. Using reproduction records from 57 herds over two years, researchers determined the conception rate for first services was 47 per cent for cows with no mastitis, but dropped to 31 per cent for cows with mastitis. Overall, the conception rate in the two groups got closer by the end of multiple breedings at 46 per cent for cows with no mastitis and 38 per cent for those with infections.

Some cows apparently recovered and eventually got pregnant on later services. However, the poor first service conception rate was costly, and the impact on reproduction varied among the different herds.

Over the last 10 years, several researchers have continued examining the association between mastitis and reproduction. Their work shows the two problems don't just happen to occur at the same time in early lactation. Mastitis directly impacts reproductive performance.

Further studies have looked at how mastitis affects reproductive performance, problems it causes and why the negative effect occurs. So far, we have learned mastitis in early lactation or during the breeding period causes or contributes to:

- abnormal inter-estrus intervals;
- increased services per conception;
- abortion;
- early embryonic death;
- poor embryo fertility.

Abnormal intervals

One early study reported on cows with E. coli mastitis between estrus and artificial insemination (AI), or between repeated AIs. These animals had greater frequency of abnormally long or short intervals between heats compared to uninfected herdmates. The researchers hypothesized endotoxins from the E. coli mastitis directly impacted the systemic circulation of hormones that ultimately affected reproductive functions.

Services per conception

To see if timing of mastitis infections during early lactation affected reproductive performance, one study looked at cases occurring before first breeding, between first breeding and pregnancy diagnosis, and after pregnancy diagnosis.

For cows that had mastitis before their first AI, the time to the first AI was longer, at 94 days. Cows that had no mastitis before their first service were bred at 71 days. For those that got mastitis between first AI and pregnancy diagnosis, services per conception were higher compared with those that had mastitis before breeding started or after they were confirmed pregnant. The ultimate mastitis effect was increased days open.

Abortion

Another U.S. study also looked at the timing of mastitis during lactation for its effect on reproduction. Researchers found lower conception rates for cows with mastitis before and during the breeding period. When the cows did get pregnant, the abortion rate between 42 and 180 days after AI was higher for cows that had mastitis at any time during the breeding interval.

Cows that had mastitis also experienced a longer interval from calving to conception than those that didn't.

Embryonic death

Two studies using ultrasound for pregnancy diagnosis confirmed pregnancies are lost at a greater rate in cows experiencing **clinical or subclinical mastitis**. In one study, cows were examined at both 31 and 45 days after AI for pregnancy. **Those that had mastitis between AI and pregnancy diagnosis were 2.8 times more likely to lose the pregnancy between the 31 and 45-day checks than those that had no mastitis.**

In the second study, **cows with subclinical mastitis, indicated by high SCCs, had a 2.4 times greater pregnancy loss by 45 days after AI than those with lower SCCs. Somewhat surprisingly, subclinical and clinical mastitis had almost the same impact on pregnancy loss.**

Fertility

Researchers have shown a cow's immune response to clinical and subclinical mastitis can cause production and circulation of substances that can impair her reproductive system.

For example, as part of the immune response, certain substances elevate natural prostaglandin levels circulating in the cow's body. Most producers understand higher prostaglandin levels inhibit establishment of a healthy corpus luteum and the support of pregnancy after breeding. Embryonic death can result.

Other hormones, such as luteinising hormone (LH), are critical to the successful progression of the reproductive cycle. **A mastitis infection activates immune response and production of cortisol, a stress hormone. This lowers LH levels, compromising follicle development and ovulation also hurting breeding success.**

Cows sick with clinical mastitis often have elevated body temperatures. Resulting heat stress slows development of oocytes, cells from which ova develop. This reduces fertilization rate and lowers the quality of resulting embryos. These changes hurt breeding success, too.

Mastitis can cause fresh cows to go off feed, lose body condition and experience negative energy balance. Prolonged periods of negative energy balance delay resumption of ovarian cycling after calving, which also reduces the chances of successful breeding.

Corrective steps

While initial studies of mastitis and reproduction found a more pronounced negative impact from gram negative infections, such as *E. coli*, **further studies have found the type of bacteria causing mastitis matters less than was previously thought.** However, more work is needed to assess the importance of the different bacterial causes.

Meanwhile, **later research has also clearly shown a new case of subclinical mastitis can potentially be just as devastating to reproductive performance as one that results in a sick cow.**

Regardless of infection type, you and your vet should assess mastitis for its role when trying to solve the riddle of your herd's poor reproductive performance. **Assessing mastitis problems should be a major component of any reproductive performance investigation.**

Few herds with a high mastitis incidence during the breeding period will improve reproductive performance without reducing the number of infections in early lactation. While high SCCs and mastitis treatments are costly enough, the additional impact on reproductive performance should motivate corrective action.

The importance of good udder health for good reproductive performance should not be underestimated, especially with the arrival of warm, humid weather. Typically it heralds more new mastitis cases among early-lactation cows than at other times of the year.

It would be prudent to look at the best ways to help your cows deal with the increased mastitis risk. Improvements to ventilation, maternity pen management and dry cow feeding can help mastitis while improving breeding success at the same time.

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For more information:

Toll Free: 1-877-424-1300

Local: (519) 826-4047

E-mail: ag.info.omafra@ontario.ca