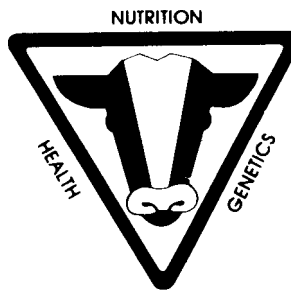


Stress and Reproduction



IRM-15

Dairy Integrated Reproductive Management

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The reproductive efficiency of dairy cows under stress is less than optimal. Some cows don't show standing estrus (heat). Other cows have a reduced chance of becoming pregnant if they are bred while under stress. The exact way stress influences reproduction is not fully understood. Therefore, precise recommendations are not available to help dairy producers prevent the effects of stress.

Two types of stressful conditions which affect reproduction are discussed in this fact sheet. General recommendations to help alleviate heat or management stress are provided for dairy producers.

Heat Stress

The term "heat stress" refers to the stress of hot weather and not the estrous or heat cycle. Researchers in Florida suggest that the body of a dairy cow begins to respond to warm temperatures in the environment at slightly over 70°F. Recent studies indicate that the reproductive performance of cows does not suffer until environmental temperatures are over 90°F.

Additionally, the sun's rays can directly have an adverse effect on fertility. Cows with black markings will absorb more heat from the sun's rays, further elevating body temperature. Blood flow may be diverted from internal circulation to peripheral circulation in an attempt to reduce body temperature. The reduction in blood flow to internal organs including the uterus, oviducts and ovaries may reduce available nutrients and increase biochemical waste products at the tissue level. Certainly some cows do become pregnant in very hot weather, but overall fertility rates are low.

Hot weather lowers reproductive efficiency in two ways. First, cows are harder to detect in estrus and are sometimes classified as anestrus. Second, cows that are bred by artificial insemination have a hard time becoming or staying pregnant. The second problem shows up as a low conception rate or high services per conception.

Anestrus

Cows may not be detected in estrus due to failure of ovarian function and absence of estrus. More commonly, the frequency of mounting in hot weather is reduced and a producer misses seeing the few mounts which do occur. Some dairy producers may have both problems.

The underlying cause of improperly functioning ovaries is thought to be only an indirect effect of high temperatures. Cows eat less feed during hot weather. Subsequently, there are insufficient nutrients available after milk production for the ovaries to "switch on" and start functioning during the first 6 weeks of lactation.

Any producer who thinks this might be the problem should look at the records from the veterinarian's palpation of the cow's ovaries. Cows that calve immediately before or during hot weather are most likely to be affected. Check the records for each cow not observed in estrus. It is important to look at results of the veterinarian's 30 to 75 day postpartum palpation record for each cow. Research shows that over 95% of all cows will have either a corpus luteum (CL or Yellow Body) or a follicle on one of their two ovaries at this stage of lactation. Any herd with fewer than 75% of cows cycling by 60 days after calving should have the energy level of the feed checked.

Scientists in Florida recommend increasing the energy concentration of the cow's feed to account for reduced intake during hot weather. Providing shade over the feeding and watering area is another way to increase feed intake by heat-stressed cows. These two changes have been shown to improve milk production and fertility under Florida conditions.

A different way of solving the problem is suggested by researchers in Israel, where hot weather is a major problem. Israeli dairy producers spray cows with a fine mist of water while the cows are in the holding pen before milking. After the spray, fans blow across the cows and dry them. This cools the cows and improves their appetites so they eat more.

This approach may not be practical for areas of the U.S. with high humidity, or where the holding pen is located in the free-stall or loafing barn. If the bedding in the resting area for cows gets wet, the bedding can serve as an important source of bacteria to cause mastitis.

Another approach to spray-cooling is to provide a fine mist of water over the area where cows stand to eat. Cows are attracted to the spray so they eat while they are next to the feed bunk. Water misters are commercially available from agricultural supply catalogs. This type of sprayer is commonly used in swine production operations.

All dairy producers having problems catching cows in estrus during hot weather should check their palpation records. If cows seem to be going through normal estrous cycles, then a producer must conclude that cows are not mounting often enough to be observed in estrus. Dairy farmers with this problem can make three changes that will improve their chances of catching cows in estrus. All producers should make the first two changes, and any producer who still has problems should consider the third change as a last resort.

The first change in management takes advantage of a cow's natural tendency of timing during the day for showing estrus. Research studies have shown that most of the estrous activity of dairy cattle occurs just after dawn and just before dusk. If a herd is milked during dawn and/or dusk, the cows should be watched for heat for 20 minutes before A.M. and/or after P.M. milking. An effective trick used by some producers is to close off the exercise lot until one hour before dusk.

The observer then opens the gate or electric "hot-wire" and lets the cows out. Oftentimes, the first cows out are in estrus.

Using estrous detection aids is the second change that producers can make to increase estrus detection rate. Fact Sheet IRM-7 describes the proper use of these aids.

The last resort for dairy producers who fail to observe their cows in estrus is to utilize prostaglandins for estrous synchronization, (Fact Sheet IRM-8). Any cow over 120 days since calving and not observed in estrus should be considered as a candidate for "last resort" treatment. As always, with estrous synchronization, pregnant cows and recently bred cows may be aborted. No cow should be treated without the direct supervision of a veterinarian.

Low Conception Rates

High environmental temperatures may have an adverse effect directly upon survival of a cow's egg, a bull's sperm, or the developing embryo while in the cow's reproductive tract. The egg and sperm may not form a healthy embryo, or a developing embryo may die, resulting in an early abortion. This problem may result in conception rates falling below 20% during summer months. Often, fertility will not return to normal until late October or November, even though environmental temperatures became unstressful in late September or early October.

The cause of a low conception rate appears to be an increase in the body temperature of cows because of hot weather. Practical methods for lowering the body temperature of a cow include providing shade or sprays of water as described previously.

Giving cows access to a pond that they may wade in to cool off is not recommended. The cow's teats are exposed to a variety of mastitis-causing organisms in the water.

Management or Behavioral Stress

Certain types of management situations are stressful to cattle. The effects that management stress can have upon reproduction in cattle have not been researched thoroughly. A cow's body responds to stressful situations in many ways. The bodily response most characteristic of stress is increased secretion of hormones called glucocorticoids from the adrenal gland. Many management situations or diseases can increase secretion of glucocorticoids. For example, trucking cattle, competition for free stalls, isolation from all herdmates, overmilking, surgery, and severe mastitis have been shown to increase blood levels of glucocorticoids.

A few research studies have been conducted to look at the effect that stress has upon reproduction in the open or nonbred cow. The effect that stress may have on a pregnant cow has not been well studied. Stress seems to have its biggest influence upon cows just before they come into estrus. The balance of reproductive hormones can be altered by stress at this time. Cows or heifers may have delayed ovulation, and/or they will not come into standing estrus at all.

There are many practical situations where management of cattle may induce unnecessary stress near the time of ovulation. One example is chasing or roping cattle before they are inseminated artificially. Another is use of aggressive dogs to isolate cattle for breeding. Also, when moving animals through a cattle chute for estrous synchronization and/or breeding, handle them as gently as possible.

Isolating a cow in a breeding stall away from the rest of the herd several hours before being bred artificially may be stressful. A second cow might be brought into the vicinity to keep the cow in the breeding chute quiet.

While stress may have important effects upon detection of estrus in some situations, the problem can be avoided. A recent research study closely examined a herd of dairy cows that were moved into a new milking and housing facility. Although adrenal stress hormone levels were elevated and milk production was decreased for a short time after relocation, there were no problems in detecting cows in estrus. The important conclusion of this study was that cows can undergo the stress of transportation, and adjustment to a new milking parlor, a new free-stall barn, new farm workers and new herdmates without a decline in estrous detection rate. Extra stress was avoided in this study by not chasing, beating, or roping the cows, and handling the cows as gently as possible.

In conclusion, the time that management stress may have its biggest effect on reproduction appears to be immediately before a cow comes into standing estrus. Any management procedures that can decrease the amount of stress in cattle at this time should be practiced.

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