

Heat Detection Strategies for Dairy Cattle

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Why detect heats?

When the time comes to examine a herd's dairy reproductive management program, producers often want to discuss low conception rates. In most cases, however, inadequate heat detection is the much greater reproductive problem.

Heat detection is the first step to getting an animal bred. According to DHIA records, producers in Georgia are only seeing a third of their heats. Missed heats are one of several factors that contribute to long calving intervals. By increasing the number of heats observed, it is possible to shorten the interval between calves.

According to data from the Dairy Records Management Systems (DRMS) in Raleigh, North Carolina, as production increases, days open decrease while days to first service and culling rates are similar. At the same time, both breedings per conception and heat detection efficiency increase when milk production increases. This indicates that producers can have greater milk yield along with good reproductive performance.

Effective heat detection encourages a producer to take advantage of the superior genetics available through artificial insemination (AI). Daughters of AI bulls generally produce 1,200 pounds more milk per lactation than non-AI daughters.

What signs do you look for?

More than 90 percent of cows should show heat by 50 days postpartum. Cows should cycle every 21 days by that time.

The most reliable sign a cow is in heat is standing to be mounted by a herd mate. Each stand lasts only 4 to 6 seconds. Cows average about 1½ mounts per hour and are in heat 6-8 hours.

Therefore, cows are only in heat a little more than a third of a day and only spend a total of 3 to 5 minutes actually standing to be mounted. It is easy to understand why cows must be observed for heat several times daily.

Also, producers should monitor secondary signs of heat. These include:

- * mounting other cows
- * clear mucous discharge
- * chin resting and rubbing
- * swollen red vulva, frequent urination
- * muddy flanks and ruffled tailhead
- * bawling, restlessness, sniffing behavior
- * decreased milk production and off feed

These indicators may signal that a cow is in heat, coming into heat or going out of heat. However, base the decision to inseminate on standing heat, not on secondary signs of heat.

When should you observe heats?

A good manager knows that heat detection must be done daily and accurately. Someone must be accountable to get the job done correctly. Studies reveal that initial standing behavior or onset of heat occurs evenly distributed throughout the day.

The fraction of heats observed increases when the number of minutes cows are observed and the number of times cows are observed each day increases.

Times Observed	Percent of Cows Observed in Heat		
	No. Minutes Observed		
5	10	20	
1	26	52	63
2	36	72	86
3	39	79	95
4	49	82	98

Source: OLDS (1980)

Early morning, noon and late evening observations for 20 minutes each are necessary to observe more than 90 percent of the heats in a herd. During hot weather, watch animals earlier and later each day. During cool weather, the middle of the day is generally the best time to watch.

Cows tend to be more active on dirt or pasture and should be watched for heat activity while off concrete surfaces. Also, carefully watch cows the first 30 minutes they are turned out to pasture or an exercise lot. Activity is low during feeding and milking times.

When should an animal in heat be bred?

Highest conception occurs if animals are bred 4 to 14 hours after onset of heat. With good heat detection, time of breeding should follow the AM-PM rule. An animal in heat in the AM should be inseminated that PM. An animal in heat in the PM should be bred the next AM.

Although the traditional AM-PM rule has proven reliable in most cases, studies in Virginia and Tennessee have shown no difference in conception when breeding cows on a once-a-day schedule in the morning compared to the AM-PM rule. Animals in heat in the AM are bred that morning. Animals in heat in the PM (after 12 noon) are bred the next morning (or AM). Breeding animals once per day would be more efficient for many Georgia producers, especially when artificially breeding heifers. However, producers must continue to monitor heat activity a minimum of twice each day (AM and PM). Producers can consider once-a-day breeding as an option to the AM-PM rule.

Do herdmates play a role in heat detection?

Herdmates play an important role in a heat detection program. Pregnant cows, or those in the early half or luteal phase of their cycle, do not make good heat detectors. Cows in heat, or cows coming into or going out of heat, make excellent detectors. As the number of cows in heat increases, the number of mounts per heat period also increases.

Cows in Heat	Mounts/Heat Period
1	12
2	36
3	53

Source: Hurnick (1975)

It is important that herds maintain enough cycling animals to have a minimum of a cow in heat every day. This would require a minimum of 21 cycling cows in the breeding herd at all times. Cows tend to congregate in certain areas when they are in heat. Monitor these areas carefully.

Can hormones help improve heat detection?

One popular method of improving heat detection and getting animals bred sooner is through estrus synchronization. Several products are available to synchronize heat in dairy cows and heifers.

Weekly controlled breeding programs are a useful way to use estrus synchronization procedures under current dairy reproductive management systems. Prostaglandins require a functional corpus luteum (CL) on the ovary for the animal to respond. If the animal is between days 6 to 16 of her cycle, she will come into heat 36 to 72 hours after injection of the hormone.

One popular program (Pfizer Animal Health) recommends a 30-day postpartum examination as part of a monthly herd health program. All healthy cows 50 days postpartum are candidates. The producer selects a day of the week, usually Monday. On Monday morning, the dairy producer gives any cow that is 50 days postpartum an injection of prostaglandin and checks for heat the remainder of the week. This list can be readily generated by computer on the PCDART program. Any cows observed in heat during the week are inseminated. Most cows will come into heat by Friday. Any cow not seen in heat is re-injected the following Monday morning and the same procedure is followed. Any cow not observed in heat and inseminated after three weeks of injections is recommended for a reproductive examination.

The benefits of this program are that cows come into heat a predetermined time, thus aiding in heat detection efficiency. Cows come in heat in groups, increasing estrus activity, and improving heat detection efficiency.

Some new breeding programs decrease the need for heat detection. All animals are bred at a designated time based on hormone treatments at a set time after calving.

Through the use of ultrasonography, techniques studying follicular development have resulted in a method for the synchronization of ovulation (Ovsynch). Two injections of gonadotropin releasing hormone (GnRH), 7 days before and 2 days after prostaglandin (PGF2a), will effectively synchronize ovulation in over 90 percent of lactating cows treated. The second GnRH should be given at 56 hours. Time of ovulation occurs 24 to 32 hours after the second injection of GnRH.

Ovulation synchronization provides us the opportunity to breed all animals treated at a designated time. Animals should be bred 16 to 24 hours after the second GnRH injection. Note that animals between day 5 to 12 of their cycle respond best to Ovsynch. Heifers do not respond as well to this treatment. Administering two prostaglandin injections 14 days apart and 12 to 14 days prior to Ovsynch will improve results.

What else can you do?

Good 21-day records are an essential part of a heat detection program. Use a breeding calendar on your farm. Cows must be identified clearly. Eartags, neckchains or brands are necessary for correct identification.

Self-catching head gates continue to become more popular on dairy operations. Animals can be easily caught for treatments, to mark tailheads, breeding or palpation.

Report accurate information, including heat and breeding information, on DHIA. Identify reproductive culls to improve accuracy of calculated summary values.

The breeding herd can be identified by placing a plastic flag on a neckchain or ring of tape above the switch. This tells everyone which animals to watch closely for activity.

Milk progesterone tests can be useful to monitor cyclic activity of problem breeders. Milk progesterone should be low at insemination. Milk progesterone should be high 21 days after breeding if the cow is pregnant or at midcycle.

Several other aids are available to producers. The most popular is the pressure-sensitive heat mount detectors. They are activated after 4 to 5 seconds of continuous pressure. This causes a fluid to be released into the chamber and a color change in the detector.

Tailheads can be marked several times a week with chalk or crayons, or bi-monthly with paint. Ten- to twelve-inch long and 2- to 3-inch wide marks can be made on the tailheads with crayons or paint. Producers monitor painted tailheads for rubbing activity. Adverse weather conditions can affect the overall results obtained.

Detector animals with chinball markers can be used. Hormones can be used to treat steers and freemartin heifers. Also, bulls can be vasectomized. There are many advantages and disadvantages to these programs. Steers tend to get fat, bulls are dangerous, animals respond differently to hormonal treatment, and chinball markers must be maintained regularly. However, this may be one good use for a freemartin heifer. As with any hormonal treatment, observe proper withdrawal times prior to slaughter.

The HeatWatch* estrus detection system (CowChips, LLC, Manalapan, NJ) was the first detection device with 24-hour surveillance potential for standing activity. Components of the HeatWatch system are (1) a miniaturized pressure-sensitive radio transmitter, powered by a lithium 3-volt battery and secured in a water resistant pouch attached to a nylon mesh patch; (2) a signal receiver; (3) a buffer that stores activity data until it is downloaded to software that enables routinely generated management lists. Activation of the sensor sends a radio telemetric signal containing code for transmitter identification, date, time and duration of standing event. Studies have shown that producers can recover costs in a couple of years.

It is important that any alternate you select remains an aid and does not become a crutch in your management program. Breed animals based on standing heat or using a timed breeding program such as ovulation synchronization.

What strategies should a producer have?

1. To observe 70 percent of all heats.
2. To breed healthy cows, starting at 45-50 days postpartum.
3. To maintain a conception rate of more than 40 percent for all services and greater than 50 percent for first service.

Take home message -

If each day open costs around \$2.00, then each heat missed costs \$42.00. This can be costly in a herd of dairy cows. Watching for heats is the first step to getting animals bred. The most reliable sign is standing to be mounted by another cow. Having several animals in heat together will increase activity.

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