

# Everything You Always Wanted To Know About HEAT DETECTION

## *But Didn't Understand*

by Janet Mayer

**O**ver the past two decades, artificial insemination (AI) has become a valuable breeding and management tool. It provides breeders with an economical, efficient method of making genetic progress by using superior progeny tested sires.

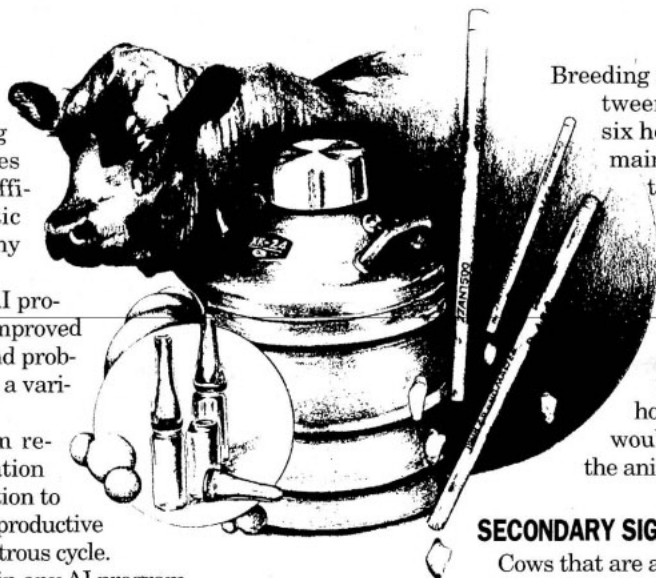
With a little extra effort, an AI program can pay high dividends in improved performance without the costs and problems associated with maintaining a variety of bulls.

However, a good AI program requires extra planning and dedication by the breeder with special attention to management, nutrition and the reproductive cycle — otherwise known as the estrous cycle.

One of the most crucial factors in any AI program is heat detection and proper timing of insemination. Because the bull is being replaced, it now becomes the job of the breeder to recognize and understand a cow's estrus (also called heat) signs.

To do this job efficiently, it is important to first understand the estrous cycle. Simply explained, heat is a short period of time during the estrous cycle when open cows and heifers are psychologically and physically sexually receptive to the male. This period of receptivity occurs every 18 to 24 days. Estrogen (a hormone) is produced when an egg develops inside a cow's ovary — the primary reproductive organ that produces the egg — a few days before standing heat. The release of the estrogen causes changes in the cow's reproductive, nervous and circulatory systems, resulting in her showing signs of heat, which are:

**STANDING HEAT** — Lasting about 15 hours, this primary and most reliable sign of heat is detectable when a cow allows other animals to mount her while she remains standing. Ovulation (the process of releasing eggs which travel down the fallopian tube from the ovarian follicle, a small blisterlike development on the surface of the ovary, to the uterus) is directly related to standing heat and occurs approximately 10 to 12 hours after standing heat.



Breeding should occur during the period between the middle of standing heat and six hours after its end. Sperm cells remain viable in the female reproductive tract for 18 to 24 hours. The fertile life of the egg is approximately 10 to 12 hours, with the most fertile period in the first few hours immediately after ovulation.

For highest fertility, cows should be inseminated in the last two-thirds of heat or within a few hours after they are out of heat which would be approximately 24 hours after the animal comes into standing heat.

### SECONDARY SIGNS

Cows that are about to come in heat, or are already in heat, usually group together. They will mount other cows, bawl and exhibit restlessness and friendliness to other animals in the herd by licking and nuzzling.

The vulva (the fleshy folds of tissue that cover the external end of the vagina) can also exhibit signs of swelling and reddening accompanied by a clear stringy mucus discharge. Roughened hair on the tailhead and mud on the sides, shoulders or hips, are signs of her being ridden by other herd members. A bloody mucus discharge may be observed between the second and fourth days; this simply means the animal has been in standing heat several days before. This is a clear indication to watch for the next heat period in 15 to 20 days.

After ovulation the cow produces progesterone (a hormone). Levels of progesterone in the blood remain high from day six to 18 of the cycle, preparing the uterus (the organ in which the fetus develops during pregnancy) for pregnancy. If pregnancy occurs, progesterone levels will remain high throughout gestation; if it does not, progesterone levels decline and the cow returns into the regular estrous cycle, initiating another heat.



# Establishing a Good Heat Detection Program

Here are some tips from Pennsylvania State University:

**1. Observation has to be the single most important part of heat detection.** Cattle breeders need to spend at least 20 to 30 minutes, twice a day, watching for cows in standing heat. This should become a routine part of the daily work schedule. It should be done in the early morning and late in the evening, with more frequent observation being beneficial.

Do not do this at feeding time because the animals will be distracted. Use your observation time wisely.

Researchers at Cornell University have shown that in any given herd, you can expect 22 percent of the cows to show heat signs between 6 a.m. and noon, with the percentage dropping to 10 percent between noon and 6 p.m. It then increases to 25 percent between 6 p.m. and midnight, with the other 43 percent showing signs of heat between midnight and 6 a.m. It is evident that observation should occur early in the morning and late in the evening to gain optimum results.

**2. Rocky, uneven ground or slippery mud conditions may inhibit mounting activity in the herd.** Try to provide a slightly restricted area with good footing where cows can interact for periods of observation. Larger operations should consider setting aside special pasture areas for heat observation. Cows should be moved into these areas two weeks before the start of breeding to allow the herd to establish a routine.

About 5 percent of a normal cycling beef herd's females should show heat signs on any given day. By removing them from the area as they are inseminated, about half of the herd is gone in approximately 10 days.

**3. Cattle with sore feet and legs will not stand to be mounted; nor will they exhibit normal signs of heat.** Trimming hoofs and caring for infection can minimize this problem.

**4. Proper nutrition is also critical to good reproductive performance.** Inadequate or excessive protein levels, mineral and vitamin imbalances can cause poor heat expression and inferior conception rates. Make sure mature cows rest after calving, as body condition plays a large role in how fast the female will resume cycling.

First calf heifers will usually take longer than older cows because the feed they consume must support their

own growth plus milk production for their calves.

**5. Proper handling facilities, such as a holding pen and chute, are essential to a good breeding program.** If cattle are subjected to improper handling prior to breeding, a good conception rate cannot be expected.

**6. Another factor in establishing a good heat detection system is to identify all the cows in the herd by use of ear tags, ear tattoos or branding.** If loss of ear tags is a problem with your herd, a combination of ear tags and tattoos or brands should be used.

**7. Keep good records by recording when an animal is in heat regardless if the animal is bred or not.** Use a pocket notebook to record the heat period and other pertinent information on the cow. Later, this information can be transferred to the permanent record sheet of each cow. By using this method, future heat periods can be anticipated.

**8. Appoint one person to be responsible for heat detection and train all personnel to recognize the signs of heat and identify the animal that is in heat.** Promptly report this information to the responsible person.

**9. Consider using heat detection aids to help with detection.**

In conjunction with routine visual observation, they can be of great value in determining heat. Some of the more common aids are:

• **Chin-ball marker**

— This device is worn beneath the chin of a detector animal. It acts like a giant marker pen, leaving a mark on the cow's rump and back when she is mounted. This device is used on surgically altered bulls or androgenized cows (cows that have been injected with the synthetic male hormone, testosterone and exhibit male-like behavior).

• **Tail chalking or painting**

— This method is economical, but you must have the skill to interpret what you see. Chalk or paint is applied from the cow's hooks to pins. Animals riding the cow in standing heat will rub off the chalk; however, chalk or paint can also be smeared by licking and chin rubbing.

*Continued on next page*

## Pam Beam, Liberty View Farms, Ohio

Liberty View Farms is a grain operation with a sideline breeding operation of a herd of 100 purebred cows and 40 recipient cows. Beam says their year-round calving program makes heat detection a special challenge during the busy time of the year when planting and harvesting grain is taking place.

She offers the following suggestions for detecting heat:

"We use a gomer bull that is a color distinctly different from the rest of the herd; that way, he is easy to spot from afar. We check for heat three times a day, morning, noon and late in the evening, but it seems we see about 80 percent of them during the morning check. If we are short on help, then I will put the chin ball marker on the bull."

Beam says their major detection problem is catching the heifers in heat. This year they tried using bright green fluorescent paint, with a little chalk added for thickness, behind the hip area onto the tailhead. If the paint was rubbed off or cracked, it was a sign she had been ridden. The paint was reapplied to see if the heifer came back into heat after breeding.

"We do not use a clean-up bull on heifers because of the importance of using a calving ease bull for them, so this method worked very well for us. Surprisingly, the paint will stay on for about two weeks."

The conception rate last year at Liberty View was 85 percent on first service. Beam does the inseminating herself and keeps in practice by doing free breeding of cows on surrounding dairy farms. "I think a big mistake a lot of breeders make with AI is breeding too soon. This isn't a 9-to-5 job. So if you get into AI you had better know this," Beam says. "If a cow needs bred at 10 or 11 o'clock at night, then you do it. The most important things to remember are making sure you watch the cattle for heat signs and keeping good records."

• **Kamar heatmount detector** — This is a plastic device glued to the tailhead of cows that are due to be bred during the next 21 days. The detector is white when first applied, but will turn red from the full weight of an animal mounting the other. A minimum of three seconds of full weight from a mounting animal is necessary to change the color. This device is not recommended if the herd is kept in heavy brush as the device can be torn off or show a false reading.

10. Consider using heat synchronization of the herd. By means of heat synchronization, a group of cycling females can be brought into standing heat and bred over a short period of time. This enables beef producers to group inseminate their herd, resulting in a shorter, earlier calving season that also allows for heavier weaning weights. This method should be considered for breeders who cannot routinely check for heat.

Lutalyse, Estrumate, Bovilene and Syncro-Mate-B® are four products that can be used in the heat synchronization. The first three products are injectable solutions containing prostaglandin. Syncro-Mate-B® consists of an ear implant which contains synthetic progestin called Norgestomet, and an intramuscular injection containing estradiol valerate and Norgestomet. The implants must be removed nine days after implanting.

**For beef breeders who are setting up** an AI program or for breeders with a low conception rate in their herd, Penn State extension specialist Michael O'Conner advises that watching the herd for signs of heat is very important. Breeders have a very small window through which to observe an animal in heat; therefore, adequate time should be given to watching the herd, both morning and evening. The average interval between mountings is seven minutes, with the mounting lasting an average of five to seven seconds.

O'Conner also recommends not trying to do heat detection during feedings. "This has to be absolutely the worst time," he says. "After they have eaten and are kind of loafing around is probably your best bet. In our Penn State herds, we find cows prefer to mount when other activities on the farm are not occurring."

Another time to avoid, O'Conner says, is while you are doing chores. Evening hours seem to be the best, when the cattle are not distracted. "I actually think they get bored in the evening and that is when a lot of mountings occur."

Another detection problem O'Conner notes is the lack of interest in a female in heat by herd-mates that intensifies as the breeding season progresses. The best heat detectors are other cows just going into heat or coming out of heat. Cows in the middle of their estrous cycle, or pregnant cows, don't usually show much interest in a cow in heat.

By using heat synchronization, there is the advantage of all the cattle coming and going into heat over a short period of time.

A different solution was discovered during a study done with Montana beef cattle herds. By introducing a gomer bull into the herd before actually wanting to breed them, the herd was stimulated into heat a whole cycle sooner than other cows that were not exposed to the bull. However, O'Conner cautioned, this does not work with heifers.

"There are a lot of challenges in AI. To establish a good program with a good conception rate, I would have to cite proper nutrition of the herd, good restraint facilities, good footing, use of Syncro-Mate-B® for synchronization, and use of calving-ease bulls on the heifers as the most important things to do," O'Conner says. "If you use a herd bull for clean-up, do at least two services before turning them out with the bull. Getting into an AI program is a commitment, and above all, you must have a system."

AJ