

Signs of Estrus and Improving Detection of Estrus in Cattle

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IRM - 6

Dairy Integrated Reproductive Management

Introduction

Low reproductive efficiency is a difficult management problem in dairy herds. Estrous detection failure is the most serious and widespread problem that affects breeding efficiency in cows. Various management factors contribute to failures to diagnose estrus, but the inability to recognize the signs of estrus is a common cause. Detection of estrus is necessary for a planned insemination program for dairy cows and is the key to the successful use of artificial insemination (AI). Improving detection of estrus leads to greater profits for a dairy producer.

Cows continue to go through estrous cycles throughout the year, with an average estrous cycle length of 21 days. Cycles may vary from 18 to 24 days and be considered normal. Cycle length may be slightly shorter in heifers than mature cows. Length is also shortened to an average of 15 days between the first and second estrus postpartum.

The average duration of standing estrus is 18 hours, and periods from 12 to 24 hours are considered normal. Hot and cold environmental temperatures (Fact Sheet IRM-15) tend to reduce the length of estrous periods for individual cows, and increase the difficulty in detecting estrus.

When in estrus, the cow exhibits behavioral patterns which are distinctly different from the rest of the estrous cycle. Estrus is correlated with the greatest ovarian follicular development and with enhanced release of estrogen (Fact Sheet IRM-2). Estrogen, a female sex hormone from the ovary, acts on the cow to cause the induction of behavioral estrus. In addition, estrogen acts on the reproductive tract to prepare the tract for conception.

All farm personnel should be trained in estrous detection and should note signs of estrus. However, the person most skilled in estrous detection should be identified and given the responsibility of being the primary observer for estrus.

The detection of estrus in cattle is as much an art as a science. To be skilled in this art, a person must understand not only the behavioral and physical signs of estrus, but also the factors influencing detection of estrus. Only then can the necessary steps be taken to improve the estrous detection rate in a particular herd.

Signs of Estrus

The onset of behavioral estrous activity is usually gradual and occurs over several hours. Thus, the intensity of estrus and the typical pattern of behavior in a given cow will vary from the beginning to the end of estrus. Knowledge of these gradual changes in signs of estrus can be used by a producer to indicate if a cow is coming into or going out of estrus. Recording estrous signs on a calendar can often help a producer interpret the signs during the next estrous cycle.

Early Signs

- Increased nervousness and/or restlessness results in greater physical activity in the cow. When free, she tends to move about, trails other cows, twitches and elevates her tail, and remains active when other cows are lying down.
- With approaching estrus, the cow will make repeated attempts to mount other cows but will not stand to be mounted herself. This mounting activity continues through the end of estrus.
- Other behavioral changes immediately preceding estrus include the nudging, licking and sniffing of the genital area of other cows. Sometimes cows coming into estrus will wrinkle their nose and curl their lip, similar to a bull. Many cows bawl or bellow frequently before actual standing estrus.
- In early estrus, the lips of the vulva become swollen and congested with blood.

Signs During Standing Estrus

- Early signs of estrus continue.
- A cow now stands to be mounted by another cow. While some cows begin to walk away due to the weight of the mounting cow, a cow should be considered in standing estrus if she does not avoid the mount initially and does not turn and butt or attack the mounting cow.

The number of mounts and the amount of time between mounts for a cow during standing estrus varies a great deal due to the number of cows in estrus at that time, footing for the cows, environmental temperature, and other factors. Research has shown that an average cow will stand to be mounted approximately 4 times/hour during standing estrus, with each mount lasting about 7 seconds.

- A thin, clear, watery mucus discharge from the vulva is a signal that a cow is in estrus. This mucus is secreted by the cervix and vagina and resembles the white of an egg. The cow's mounting activity causes it to flow from the lips of the vulva and become deposited on the tail and pin bones giving them a wet appearance. Sometimes cows in stanchions or tie-stalls have a pool of this clear mucus in the gutter behind them.

The mucus discharge is most noticeable during mid-estrus, and a decreased mucus flow with a less watery appearance is observed in late estrus. This clear discharge should not be confused with a white or pus-like discharge which may be an indication of vaginal or uterine infections (Fact Sheet IRM-22).

- Feed intake may be reduced during estrus. Also, a drop in milk production may indicate estrus in some cows while other cows are unaffected. Cows exhibiting these changes should be observed carefully for other signs to confirm estrus.

Late Signs

- Cows no longer stand to be ridden, but may mount another cow in standing estrus.
- Hair on the tailhead is rough or rubbed off due to mounting. Mud or manure on the hips or rear flanks is also a sign that mounting may have occurred.
- Hair on the tail or directly below the vulva may be matted because of dried mucus.

Summary

The individual signs of estrus, described above, are often only subtle indications, and all signs should be considered and interpreted together. The dated recording of all apparent estrous activity and use of estrous expectancy charts (Fact Sheet IRM-7) are especially helpful in detecting future estrous periods. Cows which are not observed in estrus by 60 days postpartum should be examined by a veterinarian.

Other Phenomena Related to Estrus

Metestrus Bleeding

A bloody discharge, or metestrus bleeding, is often observed on the vulva, tail and thighs of a cow 2 to 3 days following a normal estrous period.

While metestrus bleeding is not a direct sign of estrus, it indicates that an estrous period occurred earlier. The next estrous period may be expected to occur in 18 to 20 days. This bloody discharge has no relationship to whether a cow has conceived during the previous estrous period.

Split Estrus

Although most cows exhibit an estrous period that is best characterized as continuous with a high intensity at mid-estrus, "split estrus" occasionally occur. With "split estrus", the initial period of standing to be mounted is interrupted by a period of nonreceptivity lasting a few hours and then followed by another period of mounting. Timing of artificial insemination should be based on timing of first mounting activity. A veterinarian should check this cow for cystic follicles.

Silent Estrus

A "silent estrus" occurs when ovarian changes are normal including ovulation, but standing estrus fails to occur. This should not be confused with unobserved estrus due to estrous detection failure. The occurrence of "silent estrus" is most frequent during the first and second postpartum cycles (days 25 to 40 postpartum) and is usually not a problem by the time cows are ready to be inseminated.

Cystic Follicles

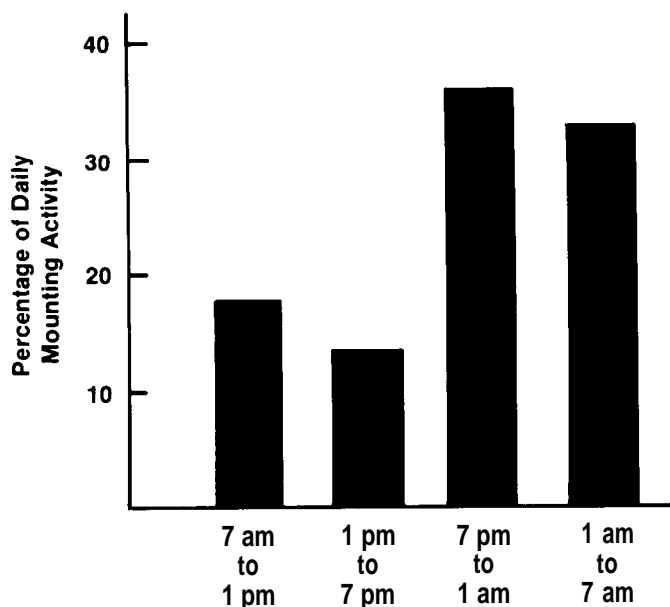
Ovarian follicles are cystic (Fact Sheet IRM-25) when they enlarge beyond ovulatory size and persist beyond a normal lifespan. The incidence of cystic follicles tends to be greatest during the early postpartum period, prior to 45 days. Anestrus often occurs. Nymphomania or frequent estrus is more commonly associated with cysts that occur after 60 days postpartum. Cows diagnosed with the condition should be treated by a veterinarian if the cystic follicles persist for 30 days past the first diagnosis.

Factors Influencing Detection of Estrus

Time of Day

There is an important effect of time of day upon mounting activity of cows in estrus. This effect is different on each farm. The relationship between time of day and mounting activity depends upon the environmental temperature, length of day and timing of milking, feeding and barnyard chores. Researchers in Canada watched cows continuously by use of video-tape equipment. They found that 70% of mounting activity occurred between 7:00 p.m. and 7:00 a.m. (Fig. 1) in their herd. Other researchers have reported that mounting activity of cattle in estrus is concentrated around dusk and dawn.

Each herd has one or two times when mounting activity is concentrated. These periods can be referred to as "hot times" for mounting activity of cows in estrus. The time of day that a "hot time" occurs varies among herds. Also, seasonal changes in day length affect the specific time of day that a "hot time" occurs.



(Adapted from Hurnik et al. 1975)

Fig. 1. Effect of time of day on mounting activity for cows in estrus. A higher percentage of all mounts occurred between 7 p.m. and 7 a.m. compared to the period from 7 a.m. to 7 p.m.

Location of Mounting Activity

The location of mounting activity by cattle in estrus is not spread out across the barnyard/exercise pen evenly. Instead, there are areas where mounting activity is concentrated. These areas can be referred to as "hot spots" for mounting activity. Sometimes the location of "hot spots" is related to footing, such as a dirt exercise lot with good footing. Other "hot spots" may be caused by a bull near the cows in estrus or a common fenceline with other cows or heifers in estrus. Fencelines or lanes out to a pasture or exercise lot may also be "hot spots". Holding pens for a milking parlor rarely, if ever, are "hot spots".

Steps for Improving Estrous Detection

There are six steps to follow for improving the estrous detection rate in a particular herd. These steps take into account the unique aspects of each herd's management and the facilities for housing and exercise of cattle. The goal of these steps is to make the best possible use of the dairy producer's time while watching cattle for estrus. These steps may take 4 to 5 months to accomplish. It's extremely important to follow the steps in order. Step 6 will not be as effective if the other 5 steps are not followed.

1. Draw a map of the barnyard. Include any exercise lot or pasture where the cows can go on a daily basis. Include major landmarks like feedbunks, silos, or trees as reference points. Put the map on the wall next to the records used to record breedings.
2. Place an X on the map at the location where a cow was mounted. Record only one X per cow per estrous cycle. Use the location of the first mount that is observed. Record the time of day (including a.m. or p.m.) next to the X on the map. Conclusions cannot be drawn from just a few mounts. A guideline to use is to record as many X's as one half the total number of cows.
3. Look at the completed map for "hot spots", or areas where X's are grouped or clustered. "Hot spots" sometimes occur where they are not expected. Examine the area of the "hot spot" for unique aspects such as good footing or a location near other animals. Knowledge of these aspects may be utilized in step 5.
4. Look at the map for "hot times". These times may vary with the changes in time of day for sunrise/sunset between seasons. "Hot times" during the winter may not be so during the summer. Thus steps 1, 2, and 3 may need to be repeated for each season. Also, timing of "hot times" is influenced a great deal by the time of day when milking and feeding occur.

5. Adjust the management of the cattle so that full advantage may be taken of "hot times and spots". One example might be a "hot spot" located in the dirt exercise lot with "hot times" just after a.m. and p.m. milkings. Management of the cattle can be changed so cows are prevented from entering the exercise lot while the remaining cows are being milked.

An extension of an electric fence would be adequate. After all cows are milked, the fence is opened to let cows go out into the exercise lot and the cows would be watched for 20 to 30 minutes. Often the first cows to go into the lot will be in estrus.

Another example might be a "hot time" right before a.m. milking. Management can be changed to increase the time for estrous detection immediately before milking. This change can be made with the confidence of knowing that this is the best time to watch for estrus in that particular herd.

6. Make use of appropriate estrous detection aids (Fact Sheet IRM-7). It is important that a veterinarian be consulted before estrous synchronization drugs are used.

Summary

The ability to detect cows in estrus can be improved in most herds. The behavioral signs of estrus should be reviewed by all personnel responsible for detecting estrus. One person should be identified and given the responsibility of being the primary observer for estrus. Once the signs of estrus are understood completely, there are six steps to follow for improving the estrous detection rate. These steps take into account the unique aspects of each herd, and they take advantage of these aspects. Following the steps may take 4 to 6 months, but the rewards, in terms of increased profits, can be great.

References

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- Kiddy, C.A. 1979. Estrous detection in dairy cattle. *Animal Reproduction (B.A.R.C. Symposia in Ag. Res. #3)*. H. Hawk, ed. Allanheld, Osmun & Co. Publishers. Montclair, N.J.

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