

Synchronization of Estrus In Dairy Heifers and Cows



IRM-8

Dairy Integrated Reproductive Management

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Synchronization of estrus can be a useful tool for most dairy producers. Synchronization allows 1) increased use of artificial insemination (AI) with use of sires having genetic capacity for high milk production and ease of calving; 2) planned introduction of first calf heifers to the milking string, preferably at 24 months of age; and 3) needed assistance with problem breeding cows, frequently the higher producing cows in the herd.

Two types of synchronizing agents are available. Prostaglandin $F_{2\alpha}$ (Lutalyse[®], The Upjohn Company, Kalamazoo, MI) or a synthetic prostaglandin (Estrumate[®], Haver Lockhart, Shawnee, KS and Bovilene[®], Diamond Laboratories, Inc., Des Moines, IA) is approved for use in heifers and cows with an active corpus luteum (CL). The other agent is a progestin ear implant (Norgestomet) used in conjunction with an estrogen injection. It is sold as Synchro-Mate-B[®] (CEVA Laboratories, Inc., Overland Park, KS), used without regard for ovarian activity, and approved for use only in heifers.

Most dairy producers use synchronized estrus in heifers to facilitate the use of AI. Results obtained from West Virginia dairy herds that were used in a trial of synchronization of estrus illustrate some of the problems encountered.

Heifers were observed for estrus twice daily for 4 days and palpated rectally on the fifth day to determine reproductive status. Of 909 heifers on 33 farms, 23% were not showing estrous cycles. These heifers were anatomically abnormal (2%), pregnant to unknown pasture matings (9%) or immature (12%), although supposedly of sufficient size and age for breeding. Thus only 77% of the heifers (although up to 100% in some herds) were ready for synchronization, and treatment of the others would have been wasteful.

The post puberal and nonpregnant heifers could be treated with either Synchro-Mate-B[®] or prostaglandin $F_{2\alpha}$. Synchro-Mate-B[®] treatment involves the implant (Norgestomet) between skin and cartilage of the ear and an intramuscular injection (a solution of Norgestomet and estradiol valerate). Estradiol valerate regresses the CL, probably by stimulating the release of

prostaglandin from the uterus. The Norgestomet prevents the heifer from showing estrus and ovulating. After 9 days the ear implant is removed and heifers exhibit signs of estrus in 24-96 hours with peak activity around 36 hours. Generally 80 to 90% of treated heifers respond.

Prostaglandin $F_{2\alpha}$ is a naturally occurring hormone produced by the uterus that regresses the CL. Treatment with prostaglandin $F_{2\alpha}$ only works in heifers (or cows) with a functioning CL. Treatment of animals approaching estrus is inefficient because they would show spontaneous estrus during the synchronization period. Treatment within the four days following estrus is ineffective because the CL will not regress. However, injection of prostaglandin $F_{2\alpha}$ twice, at a 12-day interval, works effectively because all heifers should have a mature CL at the time of the second injection.

Alternatively, heifers can be observed for estrus a minimum of twice daily for four days and bred 12 hours after observed estrus. The remaining heifers are palpated on the fifth day and those with a functional CL (70 to 80% of cycling heifers) are injected with prostaglandin $F_{2\alpha}$. Observations for estrus are continued for 4 more days for a total treatment period of 9 days versus the 16 days (12 days of treatment and 4 days of observation for estrus) of the double injection treatment. Drug costs are reduced by half and approximately 80-90% of cycling heifers are observed in estrus during the synchronization period. Most heifers are in estrus 60-72 hours after injection but may exhibit estrous behavior from 12-96 hours after treatment.

Observation for estrus is important. Although much promotional literature advocates breeding at a fixed time after treatment (48-54 hours after Synchro-Mate-B[®], 80 hours or twice at 72 and 96 hours after prostaglandin treatment), many studies report lower fertility after timed insemination than after insemination 12 hours after observed estrus. In fact, highest fertility is obtained only in heifers showing estrus.

Thus conception to insemination at timed estrus is generally low, only 39% compared to 56% for heifers inseminated 12 hours after estrus in the West Virginia study. Increasing the time spent observing for estrus results in a greater proportion of heifers detected in estrus. Those heifers not conceiving to the first insemination return to estrus 17-24 days later.

Recent surveys in Maryland and West Virginia found that the major basis for culling dairy cows was reproductive failure. It was difficult to classify a single basis for cow removal, but generally if a cow was open and a low producer, had bad feet and legs or had a poor disposition, she left the herd.

To increase or even maintain the level of milk production in the herd required that the other physically sound cows conceived early postpartum. However, in the West Virginia survey of individual cow records, the average interval from calving to first estrus was 71 days and to first service was 78 days, and the interval between services averaged 41 days (approximately two estrous cycles).

Injection of prostaglandin $F_{2\alpha}$ or a related compound has aided detection of estrus in dairy cows. In a study using herds in West Virginia, the majority of cows (63%) at single examination had an active CL. Even though they averaged 112 days post calving and had not been previously observed in estrus, 44% of those treated cows showed synchronized estrus. Only 14% of the cows were classified as possibly not cycling (Fact Sheet IRM-7) and 14% were thought to have a cystic follicle (Fact Sheet IRM-25).

The primary problem is a failure of dairy producers to detect estrus in those cows that should be showing estrus. The underlying reason is insufficient time devoted to estrous detection.

In the West Virginia survey only 37% of producers deliberately observe for estrus and 75% of these observations are made in the milking and feeding area where distractions to cows are greatest and activity is lower. Prostaglandin $F_{2\alpha}$ can be used as a management tool, but deliberate observation for estrus is essential (Fact Sheet IRM-6).

In most studies, the majority of cows show estrus after treatment with prostaglandin. Our observations are that the managers who give reproductive efficiency high priority find a greater number of cows showing synchronized estrus than other managers.

In addition, cows with good uterine tone are more likely to exhibit a synchronized estrus than cows with poor uterine tone. Prostaglandin $F_{2\alpha}$ also improves uterine tone in cows with metritis (Fact Sheet IRM-22).

Facilities necessary for treatment of cows include a suitable stanchion or chute (Fact Sheet IRM-13) for restraining the cow during rectal palpation by the veterinarian. Examination is necessary to determine reproductive status of the ovaries and uterus. In addition, observe cows for estrus a minimum of twice daily, early in the morning and late at night, preferably on a dirt lot or other location that provides sure footing (Fact Sheet IRM-6). Make observations when cows are not being distracted by feeding or other activities. Allot sufficient time and people to do the job right. Finally, don't expect miracles. If the animals are not receiving adequate nutrition, are in unthrifty condition or have health problems, responses will be poor.

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