



Synchronizing Estrus in Beef Cows

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Estrus synchronization of beef cows and heifers is a program in which a hormone or chemical agent causes groups of sexually mature cycling females to come into heat (estrus) and ovulate at approximately the same time. The estrous cycle is the complete cycle which a sexually mature non-pregnant cow or heifer goes through about every 21 days. "Estrus" is that part of the estrous cycle during which heat or willingness to breed is exhibited. Cattle not reproductively cycling should not be included in an estrus synchronizing program.

Estrus synchronization with prostaglandins has the potential to improve and increase artificial insemination (AI) programs with cattle. The Upjohn Company has developed a prostaglandin product called "Lutalyse," which is the first such product to be approved by the FDA (Food and Drug Administration) for use in cattle in the United States. When properly used, Lutalyse has the potential to synchronize or group estrus in normal-cycling beef cows and heifers. It is also approved for non-lactating dairy heifers.

The active drug in Lutalyse is prostaglandin F_2 alpha, sometimes designated as $PGF_{2\alpha}$. Its generic name is *dinoprost tromethamine*.

Lutalyse is available only through licensed veterinarians, but it is approved for ranchers to use. It is essential that veterinarians, ranchers, and AI company personnel are provided the facts about controlled breeding techniques so that they use the program under proper management situations.

Lutalyse regulates the female reproductive cycle by causing "luteolysis." This is a term meaning destruction or forced regression of the luteal tissue or corpus luteum. The corpus luteum is sometimes referred to as the "CL," and is commonly known as the yellow body on the ovary. The corpus luteum is a group of cells that persists on the ovary around the empty egg sac after an egg is released during ovulation. It develops at the point where the egg was released.

About 5 days after ovulation, the corpus luteum begins producing progesterone. Progesterone is a hormone that prevents the immediate development of another egg on the ovary, and thus prevents the cow from coming into heat. Normally, in a healthy, sexually mature, non-pregnant female, the corpus luteum naturally regresses about 17 to 18 days after she ovulates. Ovulation occurs just after she is in heat.

An injection of Lutalyse causes the corpus luteum to regress earlier than normal. This eliminates the source of progesterone. Usually, in 2 to 5 days after receiving Lutalyse, the female comes into heat and is ready for breeding.

In order for the prostaglandin to destroy the corpus luteum and speed up the estrous cycle a corpus luteum must be present. This means the cow must be cycling, and must be within certain

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days of the cycle. Ordinarily, prostaglandins will not affect the cycle of cows with an immature corpus luteum, that is, between day 1 and day 5 of the estrous cycle. Prostaglandin will not affect cows after the corpus luteum has already started to regress, about day 17 or 18 of the cycle, as these cows are within about 3 days of coming into heat.

For these reasons, a single injection of prostaglandin given the same day to all cycling cows will have no effect on 30 to 35 percent of the cows. The labeled use of the product, in accordance with the FDA approved program, requires two 25-miligram injections of Lutalyse, given 11 days apart. The cattle are bred AI at the predetermined time of 80 hours or at estrus after the second injection.

Programs for Using Lutalyse

There are four main programs being used. Two of them require two injections of Lutalyse, and two require just one injection. Figures in these programs are the number of days from beginning of the program.

Program 1. Two Injections of Lutalyse.

Operation	Days from beginning of program
First injection of Lutalyse, all cows	0
Breed after detection of standing heat	2 to 5
Second injection of Lutalyse, to cows not bred	11
Breed after detection of standing heat, or breed all cows 80 hours after second injection	13 to 15

After one injection, 60 to 70 percent of the animals should be in heat between Days 2 and 5. These animals should be bred after being detected in standing heat. The animals *not* detected in heat after the first injection should receive a second injection on Day 11, and be bred after estrus detection on Days 13 to 15. Any females not showing estrus could be inseminated 80 hours after the second injection.

Program 2. Two Injections of Lutalyse.

Operation	Days from beginning of program
First injection of Lutalyse, all cows	0
Second injection of Lutalyse, all cows	11
Breed after detection of standing heat, or breed all cows after 80 hours after second injection	13 to 15

Two injections should synchronize estrus in most cycling cows within 2 to 5 days after the second injection. Twice daily or oftener heat detection on Days 13 to 15, followed by insemination of females in heat is recom-

mended. Timed inseminations at 80 hours after the second injection without heat detection will generally result in a slightly lower pregnancy rate.

Program 3. One Injection of Lutalyse.

Operation	Days from beginning of program
Check heat and breed all cows when standing heat is detected	0 to 5
Inject Lutalyse, all cows not bred	5
Breed after detection of standing heat (Or breed all cows 80 hours after injection)	5 to 10

Heat detection and insemination of animals in heat on Days 1 to 5. On Day 5 inject all cows not bred. Most cows not already bred will respond and be in heat on Days 7 to 10. This program will use less Lutalyse, but requires more days of observation for heat detection than Program 1 or 2. This program is preferred by many operators. Its advantage is that the rancher has an estimate (from 5 days of heat checks and breeding) of the proportion of the heifers or cows that are cycling before investing in Lutalyse.

Program 4. One Injection of Lutalyse. (We do not recommend this system.)

Operation	Days from beginning of program
Inject Lutalyse, all cows	0
Check heat and breed after detection of standing heat	1 to 5
(Or breed all cows 80 hours after injection)	

This is a shortcut method which will minimize cost and detection effort, but will result in fewer cows bred and conceiving. Probably fewer than 30 percent pregnancies will occur.

Management Needed

The type of management that is already successful in an AI program is the type of management needed for a successful estrus synchronizing program. Reasons sometimes given for poor results in AI programs include difficulty in heat detection, extensive labor requirements, lack of skilled AI labor, poor conception rates, delayed calf crops, and inability to adapt to the necessary production system.

An estrus synchronizing program will not enhance overall pregnancy rates, increase conception, or benefit reproductive performance in non-cycling or sub-fertile cattle, particularly when poor management is responsible for the condition of the cattle.

For the program to be successful there must be: (1) normally cycling cattle, (2) healthy animals, free from disease and on a good nutrition

program, (3) a willingness by producers to learn how to use Lutalyse, (4) availability of a qualified artificial inseminator, (5) high-quality semen, (6) a physical facility that can provide a small crowding corral, a holding alley, and a breeding chute to handle large numbers of cattle efficiently in a short time period.

Individual identification of each animal makes it possible to record breeding dates, sire used, and records of performance. It is a must for a successful synchronization program.

Health and Nutrition

The health and nutritional status of the cows and heifers in an AI program contribute to successful breeding. Good nutrition before and after calving will help cows return to estrus after calving and will also increase rate of pregnancy.

Heifers of the British breeds (such as Hereford and Angus) should be fed so they are well grown and weigh 650 to 700 pounds by breeding time, about 14 to 15 months of age. Heifers of the larger, continental breeds (such as Simmental and Charolais) should weigh 750 to 850 at that time. Use of prostaglandins is not effective in heifers that have not yet begun to cycle.

Most breeders using an AI program want to get as many cows as possible pregnant in the early part of the breeding season. Nutrition is the main factor involved in getting cows and heifers cycling before the start of the breeding season. Remember that use of prostaglandins is not effective in the postpartum cow that hasn't begun to cycle.

Maintaining herd health at a high level is essential in obtaining a high rate of conception. Vaccinate heifer calves for Brucellosis at the proper age. Veterinarians can advise on control of vibriosis, leptospirosis, trichomoniasis, IBR, and other diseases. (*Vibrio* and trichomoniasis can be controlled by use of AI.)

Continuous, year-round health programs should control lice, grubs, pink eye, and related problems.

Handling Facilities

Good handling facilities will help move and work cattle with a minimum of effort. If possible locate these facilities reasonably close to the heat-detection pastures.

Build the pens and breeding chute high enough and strong enough to control the cattle. A breeding chute covered with a roof or building to protect semen, supplies, and records from the elements is most desirable. A breeding chute dark at the front end helps to calm the cattle during breeding.

Heat-detection pastures should have enough grass and water to support the cattle during the time of detection and breeding. Supplemental feeding may be necessary to ensure estrous activity if cattle are not in good condition or if sufficient pasture is not available. The size of holding pastures will be determined by the size of the herd, but pastures should not be so large that heat detection becomes even more of a problem.

Some ranchers prefer a different set of breeding facilities than those ordinarily used for vaccinating, branding, dehorning, and similar chores.

Will It Pay to Synchronize Estrus?

Cost in 1980 was about \$10 per cow for the two injections of Lutalyse. Add to this the cost of semen, the inseminator, and labor required to make the program run successfully. In some of these programs cattle are going through the chute three or four times. Figure out what your cost will be.

Chemical synchronization of estrus often achieves success in 40 to 50 percent of the cows bred. We have seen better results, and many not that good. Running cleanup bulls with the herd can help to get the conception rates up to 90 percent or better during the breeding season.

Producers not using AI may find some advantage in using Lutalyse, but bulls would probably need to be hand-mated so that more cows could be bred during a short time.

In this program of synchronizing estrus, it is evident that good management makes the difference in success or failure. It can be successful. **ONE WORD OF WARNING:** Women of child bearing age, asthmatics, and persons with bronchial or other respiratory problems should exercise *extreme caution* when handling prostaglandins. In the early stages women may be unaware of their pregnancies and prostaglandin, readily absorbed through the skin, can cause abortion. Likewise, the absorbed product can cause bronchospasms. Avoid direct contact with the skin and wash spillage *immediately* with soap and water.