

Vet Call

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Synchronization of estrus

Last month I wrote about using prostaglandin $F_{2\alpha}$ (PGF) to lyse the corpus luteum (CL) and, in turn, decrease circulating levels of progesterone, controlling the onset of estrus (heat). To review, progesterone is secreted by the CL, a structure on the ovary of cycling cows and heifers. As long as this hormone is present at high enough levels in the blood, it will prevent estrous behavior and ovulation. Once progesterone levels in the circulation drop, final maturation of the ovulatory follicle (egg) and expression of heat will follow.

■ Strategy 4

The most popular method of synchronizing estrus in heifers is to combine injecting PGF with feeding melengestrol acetate (MGA®), a progestogen that mimics natural progesterone. For many years progestogens have been known to suppress estrus in cattle and were the first products used in an

attempt to control the estrous cycle.

The drawback to using progestogen alone is, if it is administered for 14 or more days, conception rates during the estrus that follows its removal are decreased. Although treatment of cattle with progestogens for less than 14 days is reported not to reduce conception rates, a 14-day or less exposure to progestogen alone will not synchronize all heifers in a group. A short-term exposure to progestogen is effective in synchronizing estrus if a luteolytic agent is incorporated in the system.

As discussed last month, PGF causes luteolysis and a return to estrus in cattle when given during the luteal phase (5-17 days after estrus). Research has shown that a higher percentage of cattle treated with PGF during the late luteal phase (days 10-17) exhibited estrus than those treated during the early luteal phase (days 5-9).

It also has been shown that the closest synchrony of estrus occurs when cattle are at a similar stage of the estrous cycle when

PGF is administered. Based on the results of these research trials, Colorado researchers developed a system where females are initially synchronized by feeding MGA for 14 days. A high percentage of the heifers should display estrus within a few days after the last day of MGA feeding.

Because this heat period is less fertile, they are not inseminated at that time. Instead, they are injected with PGF 17-19 days after the last day of feeding MGA. Heifers are observed for estrous behavior for 96 hours after PGF treatment. Any heifer displaying signs of estrus is identified and bred artificially 12 hours after first detection of heat. By waiting 17-19 days before inducing luteolysis with PGF, the researchers overcame the problem of reduced fertility after feeding MGA.

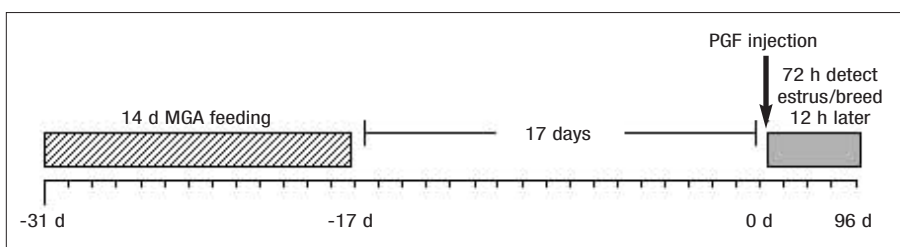
This system also takes advantage of the fact that PGF is more effective when administered late (days 10-17) in the estrous cycle than when given early (days 5-9).

■ Reasons for poor results

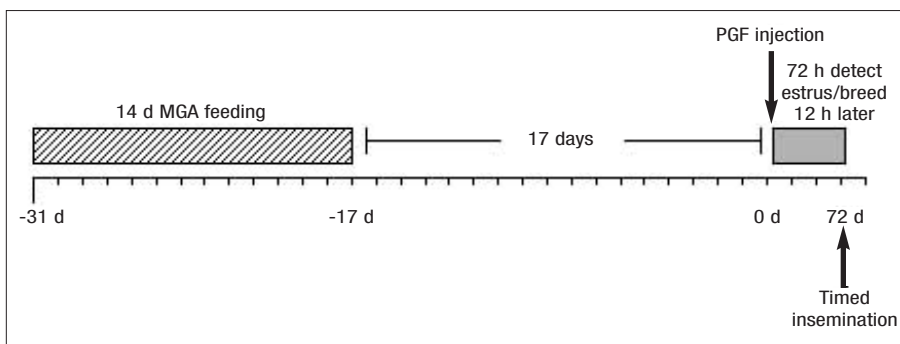
Although this method is extremely popular and effective, poor results occasionally follow its use. In nearly all disappointing cases one of two problems occurs. In some herds, the actual percentage of heifers cycling is much lower than the producer estimates. In order to have satisfactory results, at least 80% (and as close as possible to 100%) of the heifers or cows in a group must be cycling. Although feeding MGA will induce puberty in some heifers, a high percentage should be cycling prior to the start of MGA feeding. (See April 1998 "Vet Call" for a discussion of reproductive tract scores and October 1998 for a discussion of puberty.)

A good test to determine if a group of heifers is ready for synchronization is to detect estrus for a few days. If 100% of the heifers are cycling, they should average 5% being in heat each day (15% of the group detected in heat in three days). If 80% are cycling, 4% should be in heat daily (12% in heat in three days).

A second problem may be encountered when heifers do not eat the allotted MGA



Strategy 4: Melengestrol acetate (MGA®) administered orally in the feed combined with a prostaglandin $F_{2\alpha}$ (PGF) injection 17 days after the last day of MGA feeding.



Strategy 5: Melengestrol acetate (MGA) administered orally in feed combined with a prostaglandin $F_{2\alpha}$ (PGF) injection 17 days after the last day of MGA feeding where estrous detection followed by insemination 12 hours later is combined with timed insemination 72 hours after PGF administration.

every day of the 14-day feeding period. If consumption is erratic, the group will not be synchronized.

To try to avoid this problem, provide 2 feet (ft.) of bunk space per head. I do not recommend feeding MGA on the ground. The MGA should be mixed with 2-5 pounds (lb.) of feed as a carrier. If silage or other high-volume feed is being fed, the MGA should be mixed with 2-5 lb. of grain and fed first. When all the grain is eaten, the silage can be fed.

The entire 0.5 milligram (mg)/head daily dose of MGA should be fed in one feeding, not split into morning and evening feedings. To help ensure adequate daily intake, the heifers should be accustomed to the carrier you'll be mixing with the MGA prior to the introduction of MGA.

If a high percentage of heifers were cycling prior to the start of MGA feeding and daily consumption of MGA was on target, a high percentage of heifers should be in heat two to five days after the last day of MGA feeding. If that is not the case, do not proceed with the PGF injection and artificial insemination (AI). Instead, consult

with a veterinarian or other expert experienced with MGA/PGF and discuss other options.

One impediment to the widespread use of estrous synchronization and AI among producers is the amount of time and expertise required to accurately detect heifers in estrus. Timed insemination, where AI is scheduled for an appointed time after synchronization, is designed to decrease this time commitment and expertise.

Breeding at an appointed time without regard to estrous behavior, following the Colorado system of MGA/PGF estrous synchronization, has been shown to give satisfactory pregnancy rates in cycling heifers. Cycling heifers time-inseminated 72 hours after PGF administration had a conception rate of 50.8% compared to a conception rate of 66.7% for cycling heifers detected in estrus and bred 12 hours later.

■ Strategy 5

A system to maximize the number of heifers pregnant to AI in a three-day period of time uses both detection of estrus and

timed insemination. After synchronizing estrus with the MGA/PGF system, heifers are observed for heat for 72 hours after PGF treatment. Any heifer displaying signs of estrus is identified and bred artificially 12 hours after first detection. At 72 hours after PGF treatment, all heifers not bred are inseminated artificially regardless of success or failure in being detected in estrus.

In a trial testing this method, which used 634 heifers on five farms, the range in AI conception rates for heifers that were time-inseminated without being detected in estrus was 11% to 71%, with an average of 33%. This system capitalizes on the higher conception rate found in heifers that are bred 12 hours after being detected in estrus, as well as capitalizing on the advantage of timed insemination for settling heifers that ovulate in conjunction with the synchronization system but are not detected in estrus.



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