Vet Call

by Bob L. Larson, DVM, University of Missouri

Timed insemination of heifers following the MGA/Prostaglandin estrus synchronization system

If at all possible, producers should utilize artificial insemination (AI) when breeding heifers. The primary advantage of AI is that a proven calving ease bull (EPDs with high accuracy) who also has good growth and maternal traits can be used. You should not use mature bulls to breed heifers naturally because the size difference between the individuals can easily lead to injury of the heifer. Because young bulls do not have high accuracy EPDs, you cannot be as certain of successfully selecting a calving ease sire.

Artificial insemination is a valuable tool to extend the use of bulls with superior genetics, but only 5 percent of beef cattle are inseminated artificially each year. In order to increase this percentage and to decrease the labor requirement of AI, the estrous cycle can be synchronized so that a high percentage of treated females will show a fertile estrus (heat) within a short, predetermined period of time. Estrus can be synchronized in cattle through the use of progestogens (MGA), prostaglandins (Estrumate, Lutalyse), progestogen-prostaglandin combinations (MGA/PG), and progestogen-estrogen combinations (SyncroMate-B).

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. However, conception rates were decreased in treated females when melengestrol acetate (MGA) was fed for greater than 14 days. Treatment of cattle with progestogens for less than 14 days does not reduce conception rate, but in order for these short-term progestogen systems to be effective in synchronizing estrus, a luteolytic agent must be incorporated.

Prostaglandin F_{2a} (PG; Estrumate, Lutalyse) causes luteolysis (breakdown of the CL) and a return to estrus in cattle when given during the luteal phase (days 5 to 15; day 0 = day in heat) of the estrous cycle. The fertility of the induced estrus is normal. A system that initially synchronizes heifers by feeding MGA and then uses administration of PGF_{2a} during the late luteal phase of the subsequent cycle should produce a high estrous response that is closely synchronized and fertile.

Colorado researchers developed a system in which MGA is fed for 14 days, followed by an injection of PG 17 days after the last day of MGA feeding. This system should result in most of the heifers displaying heat within a few days after the end of MGA feeding. But this heat period is skipped and an injection of prostaglandin is given late in the luteal phase of the following cycle. By waiting 17 days before inducing luteolysis with PG, researchers overcame the problem of reduced fertility after feeding MGA. This system also takes advantage of the fact that PG is more effective when administered late (day 10 to 15) in the estrous cycle than when given early (days 5 to 9) in the estrous cycle.

One impediment to the widespread use of estrus synchronization and AI among producers is the amount of time and expertise required to accurately detect heifers in heat. One way to decrease the pressure to accurately detect heat is to mass inseminate heifers at a predetermined time. I have found that if most of the heifers are cycling when MGA feeding begins, mass inseminating the group at 60 to 72 hours after the PG injection without any heat detection results in pregnancy rates that are only slightly less than if heat detection is used.

If producers want to increase pregnancy rates to greater than that with traditional heat detection systems, a combination of heat detection and mass insemination can be used. Producers should observe for estrus behavior for 3 days following the PG injection and inseminate 12 hours after the heifers are first detected in heat — and then at 72 hours after the PG injection, mass inseminate all heifers not yet bred. Timed insemination following the MGA/PG estrus synchronization system takes advantage of inseminating those heifers that ovulate at a time consistent with the synchronization system, but who fail to show estrus. The only downfall to this system is that more semen will be used, and therefore semen costs will increase.

A variation on this strategy is to identify all heifers that have not been bred after a 3 to 4 day breeding period and to give that group another PG injection 10 days after the first one. This PG injection should be followed with another 3 to 4 day period of estrus detection and insemination 12 hours after first detected in heat.

Many economic and logistic variables must be considered when designing a heifer breeding program that uses the MGA/PG program for estrus synchronization. In cases when the best economic outcome for a ranch is to have the most heifers bred in a 3-day period of time, heat detection and inseminating 12 hours after detected in estrus — combined with timed insemination at 60 to 72 hours after the PG injection — is superior to insemination following heat detection alone. If semen costs are high and the best economic returns occur if no semen is wasted, the best method following MGA/PG synchronization would be to follow the traditional heat detection and insemination schedule. In cases when labor or other constraints make heat detection impossible, timed insemination at 72 hours after PG injection gives satisfactory results in cycling heifers.