Vet Call

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Synchronization of estrus

The final three methods of estrous synchronization I will cover involve a time-tested method of using a progestogen plus luteolytic doses of estrogen and two fairly new methods using injections of prostaglandin $F_{2\alpha}$ (PGF) and gonadotropin-releasing hormone (GnRH).

Strategy 6

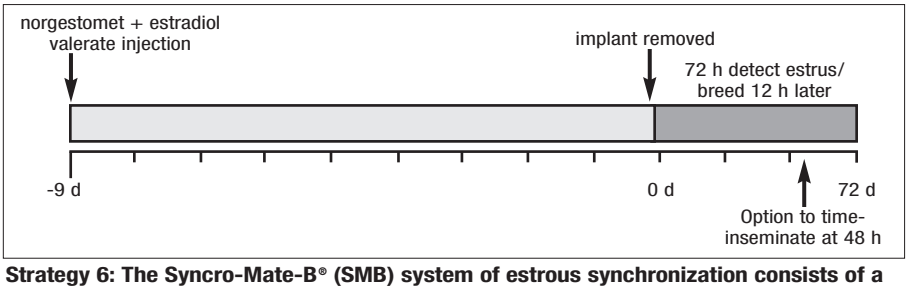
Estrogens are luteolytic when administered to cattle during the early part of the estrous cycle. They can be used with short-term administration of progestogens to synchronize estrus in heifers and cows. In 1975 researchers reported that a nine-day implant containing 6 milligrams (mg) norgestomet (a progestogen) placed under the skin of one ear, plus an injection of 5 mg of estradiol valerate (an estrogen) and 3 mg of norgestomet given at the time of implant insertion successfully synchronize estrus and also induce estrus (heat) in noncycling beef heifers and postpartum cows. This treatment now is commercially available as Syncro-Mate-B® (SMB).

SMB treatment results in a high percentage of heifers and cows showing estrus soon after treatment. The range of females showing estrus after SMB is reported as 77%-100%, with values being greater than 90% in most trials. The fertility of this estrus, however, is variable. First-service conception rates range from 33%-68%.

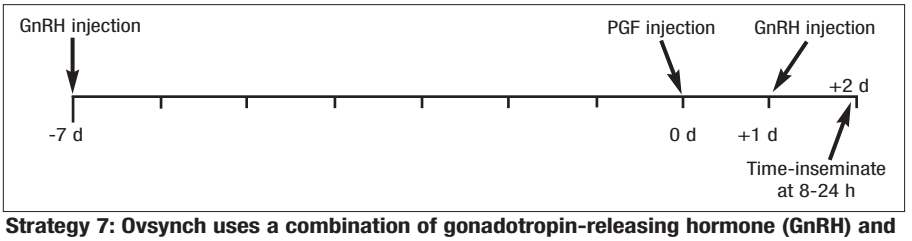
The differences in conception rates across trials may be due in part to level of cyclicity. In one trial a 30% conception rate was reported in noncycling heifers treated with SMB vs. a 48% conception rate in cycling heifers. In some studies, however, conception rate has been quite high after treatment of previously noncycling females with SMB.

Timed insemination 48 hours after removal of the norgestomet implant of the SMB system has been described. Although conception rates following timed insemination are less than that for insemination following detection of estrus, the decrease is not great.

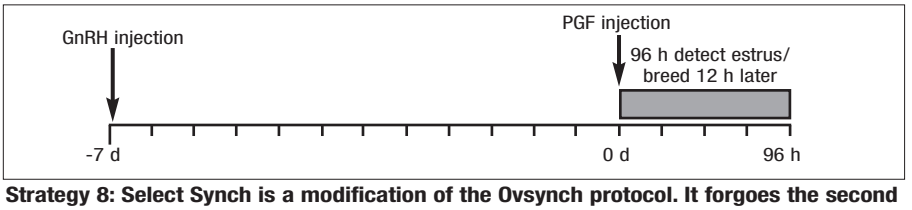
When using SMB to synchronize nursing cows, a 48-hour calf removal starting at the time of implant removal is traditionally added to the protocol with positive effects on pregnancy rates and no adverse health effects on the cows or calves.



Strategy 6: The Syncro-Mate-B® (SMB) system of estrous synchronization consists of a nine-day implant containing 6 mg norgestomet combined with an injection of 3 mg norgestomet and 5 mg estradiol valerate given on the day of implant insertion.



Strategy 7: Ovsynch uses a combination of gonadotropin-releasing hormone (GnRH) and prostaglandin $F_{2\alpha}$ (PGF).



Strategy 8: Select Synch is a modification of the Ovsynch protocol. It forgoes the second GnRH injection and utilizes estrous detection rather than timed insemination.

Strategy 7

A method of synchronization that is in the early stages of development is called Ovsynch. GnRH and PGF or their analogs are utilized to synchronize ovulation and estrus in the Ovsynch protocol. Lutalyse® and Estrumate® are the two PGF products available in the United States. Cystorelin®, Factrel® and Fertagyl® are the available GnRH products. At this time the FDA has not approved a label for the use of GnRH for estrous synchronization, but preliminary work to develop the protocol has been done.

The Ovsynch protocol involves an injection of GnRH followed seven days later by an injection of PGF. Treatment with GnRH results in the release of luteinizing hormone (LH) and follicle-stimulating hormone (FSH) from the anterior pituitary within two to four hours that is similar to the preovulatory surge in cyclic cows and heifers.

Treatment with GnRH prior to PGF assures that one large (>11 mm) follicle is present in all cows at the time of PGF-induced luteolysis, and it tightens the synchrony of induced estrus in a group compared to that induced by PGF treatment alone.

A second injection of GnRH follows the PGF injection by 30-48 hours to induce ovulation of the dominant follicle. Ovsynch is designed for use with timed insemination 8-24 hours after the last GnRH injection.

This synchronization system results in a tight synchrony of estrus for cows, allowing breeding at an appointed time without detection of estrus. However, heifers have not been synchronized as effectively by this system, and this method may not be optimum for young females.

The first injection of GnRH prolongs corpus luteum (CL) lifespan, induces the formation of an accessory CL by either inducing ovulation or luteinization of all

dominant or large growing follicles, and increases progesterone concentrations. As a result, a new follicular wave is initiated in all cows about three days after the injection. Therefore, all the females in the group have growing follicles of about the same stage of development.

In addition, the GnRH-induced increase in progesterone acts to restore ovarian function in postpartum anestrous (not cycling) cows. This positive effect to shorten the postpartum period may be similar to the effect of short-term exposure to progestogen.

The PGF injection lyses the CL and the accessory CL resulting from the GnRH injection, which initiates the process that leads to ovulation. The final GnRH injection serves to increase the synchrony of ovulation within the group of females.

The success of the first injection of GnRH to synchronize follicular growth is good in cows, but less in heifers, particularly young heifers, which probably explains the restricted success of this method in yearlings.

Strategy 8

Ovsynch can be modified by deleting the second GnRH injection, observing the cows for estrus for 96 hours following the PGF injection, then breeding 12 hours after first detection of estrus (this protocol is called Select Synch). The advantage of this modification is that the expense of one injection of GnRH and the labor required for handling the cattle an additional time is removed. The disadvantage of this modification is that ovulation is no longer synchronized, and estrous detection must be utilized prior to insemination.

In order for any synchronization and artificial insemination (AI) management system to be successful, the females must be cycling, in good body condition, free of parasites and reproductive disease, and bred by a skilled technician using quality semen. If any "link" in the chain is weak, the success of a synchronized breeding program is in doubt.

Producers who have experience with synchronization and AI and who work to ensure that all details are managed have successful breeding programs. Working with experienced producers and experts such as veterinarians and breeding-service representatives will help less-experienced producers have the same kind of success.

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