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Another Fixed Time Insemination Option

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Researchers at the Ohio State University and Virginia Tech have developed a new method for synchronizing estrus and ovulation in beef cows. The new protocol is commonly referred to as the “5 Day CO-Synch + CIDR[®]” program. To better understand how and why this protocol works, it will be necessary to explain how it was developed, how it controls the estrous cycle and the products involved.

The 5 Day CO-Synch + CIDR[®] program is actually an abbreviated version of a more commonly used protocol, the 7 Day CO-Synch + CIDR[®] program. As simple as this might sound, moving the timing and length of application for these protocols can have a dramatic effect on their effectiveness. Timing is even more important when dealing with synchronization protocols for fixed time artificial insemination (AI). These protocols focus on synchronizing follicle development and ovulation. Follicles are fluid-filled structures on the cow’s ovary that contain the egg which, when successful, will become fertilized by a sperm cell. Before that can happen, the follicle must release the egg into the reproductive tract by rupturing. This event is referred to as ovulation.

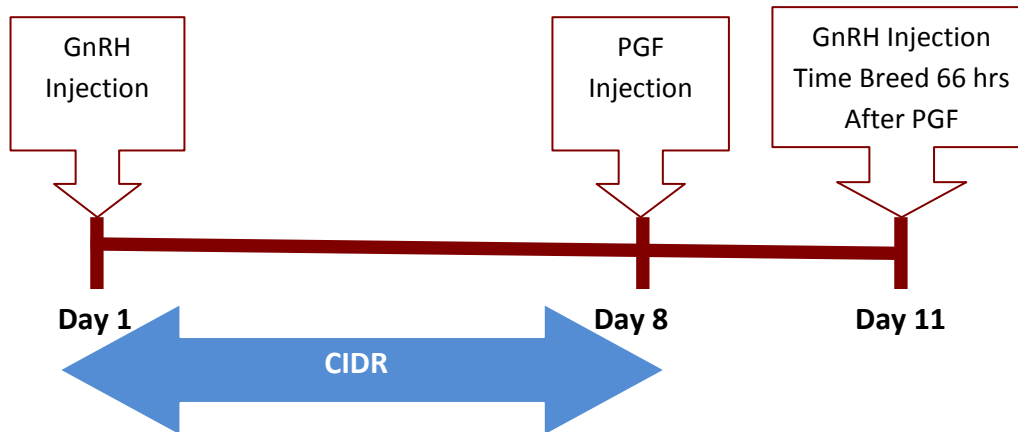
Several hormones have been approved to control the timing of estrus, follicle growth and ovulation. Table 1 lists these hormones, their common abbreviation and several trade names they (or similarly acting compounds) are marketed under. If given at the correct time, Gonadotropin releasing hormone (GnRH) stimulates ovulation, progestins inhibit ovulation, and Prostaglandin F_{2α} (PGF) removes the progestin naturally produced by the cow or heifer.

Table 1. Hormones commonly used in estrous synchronization and trade names they (or similarly acting compounds) are marketed under

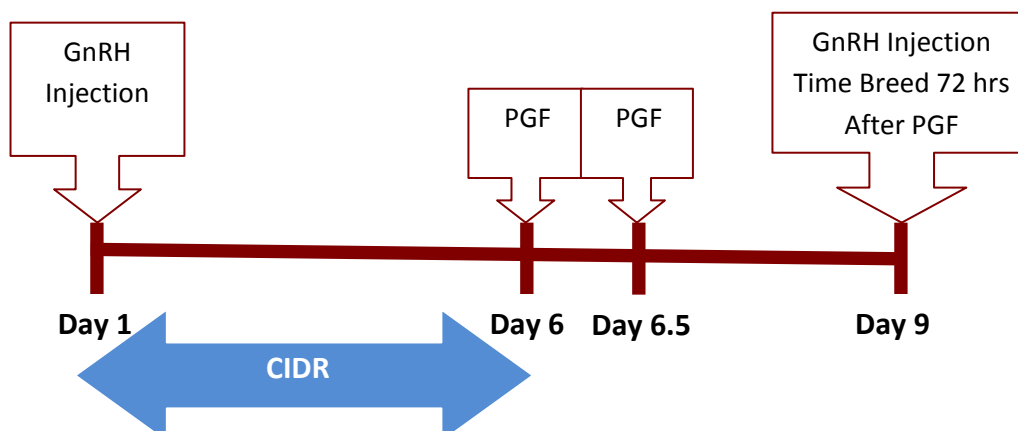
| Hormone (Abbreviation) | Trade Name |
|--|--|
| Gonadotropin Releasing Hormone (GnRH) | Cystorelin [®] , Factrel [®] , Fertagyl [®] , OvaCyst [®] |
| Progestin | EAZI-BREED [™] CIDR [®] ; Intravaginal insert Melengestrol acetate (MGA [®]); Orally-active |
| Prostaglandin F_{2α} (PGF) | Lutalyse [®] , Estrumate [®] , ProstaMate [®] , estroPLAN [™] , In-Synch [™] |

With this background knowledge, it should be easier to understand how this new synchronization protocol works. But first, consider the 7 Day CO-Synch + CIDR[®] program (Figure 1). The CIDR[®] is inserted on day-1 and an injection of GnRH is given

at the same time. This first GnRH injection should ovulate a follicle that is growing and essentially “reset” the ovaries for a new follicle to begin growing. The CIDR[®] is removed exactly one week later (day-8) with an injection of PGF given at removal. Finally, the cows are all bred 54 to 66 hours after CIDR[®] removal with another injection of GnRH given at insemination. This second GnRH injection should stimulate ovulation of the follicle that was recruited after the first GnRH injection. Assuming this works as planned, the egg is released into the reproductive tract where it meets the sperm that was just deposited and fertilization occurs. On average, this protocol will result in a **54% pregnancy rate**.



For the more recently developed 5 Day CO-Synch + CIDR[®] program (Figure 2), the CIDR[®] is inserted on day-1 and removed five days later (day-6) with an injection of PGF at removal. Another injection of PGF is given 12 hours after the first to ensure that the cow’s natural progesterin is removed from the system. On day-9 (72 hours after the first PFG injection), the cows are bred and a second injection of GnRH given at insemination. On average, this protocol will result in a **70% pregnancy rate**.



The most obvious disadvantage of the 5 Day CO-Synch + CIDR[®] program is the requirement for two PGF injections 12 hours apart. Another trip through the chute and

additional expense of a second PGF dose adds to the overall cost of the protocol. Studies have constantly demonstrated that the benefit of this program, over others it has been compared to, is lost if the second PGF dose is not given. Therefore, this program is most effective for ranches that have ample labor and the ability to easily handle cows. If done properly, and the advantages of increased pregnancy rate to timed AI are realized, the added expenses will be covered by improved genetics and added (uniform) calves earlier in the calving season.

The advantage of the 5 Day CO-Synch + CIDR[®] program likely comes from increased estrogen production by the follicle which is stimulated by the earlier removal of progestins (CIDR[®] and naturally produced). This increased exposure to estrogen improves the quality of the egg at fertilization. Moreover, this protocol has been effective for both young and mature cows as well as anestrous (not displaying estrous cycles) and cyclic cows.

For more information about these, or any other estrous synchronization protocols, please feel free to contact your local office of the Mississippi State University Extension Service as well as your Area Livestock Agent or State Extension Beef Cattle Specialists.