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Estrus Synchronization Protocols for Natural Service[1]

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Cow-calf operations rely on reproductive efficiency. The industry standard is for each cow to produce a calf every year. Several applied reproductive technologies can help increase the productivity of the beef herd. Applying these reproductive management techniques will allow beef producers to concentrate the conception at the beginning of the breeding season. Consequently, calvings will be concentrated at the beginning of the calving season, and a more homogenous group of calves will be produced (Binelli et al. 2022).

Estrus synchronization protocols are thought to be used exclusively with artificial insemination (AI). However, this is not true, because natural service synchronization programs may also be used. The main difference is that AI uses frozen semen, while bulls are used for mating in natural service. Moreover, in AI, an experienced person is required to conduct the insemination, while in natural mating, trained personnel are needed only to apply the hormones. Thus, natural service synchronization programs apply estrus synchronization protocols and expose the synchronized females to bulls for mating. This practice has benefited beef producers by increasing the number of females in heat in the first seven to 10 days of the breeding season. It is necessary to synchronize estrus to achieve these results because estrus synchronization is key to compacting the breeding and calving seasons and to obtaining heavier calves at weaning. This publication is intended for producers interested in improving the reproductive efficiency and performance of their cows. This publication explains the process of estrus synchronization and the protocols that can be used for natural service synchronization.

What is estrus synchronization?

Estrus synchronization manipulates the estrous cycle using exogenous hormones to control the timing of ovulation. Multiple protocols have been developed that offer different benefits for the producers. Johnson et al. (2013) discuss a few benefits that can be obtained from these protocols, such as:

- The elimination of estrus detection, which allows scheduled breeding activities in a predetermined period. This is known as fixed-timed artificial insemination (FTAI).
- The enabling of more cows to be bred at the beginning of the breeding season.
- A shortened breeding and calving season.
- Creation of a more uniform calf crop.
- Improved genetics in beef herds when used with other reproductive biotechnologies, such as AI or embryo transfer.

The hormones approved in the United States for estrus synchronization protocols are gonadotropin-releasing hormone (GnRH), prostaglandin F2α (PGF), and progesterone (P4) (Bó and Baruselli 2014). There are different types of

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protocols to synchronize estrus depending on the intended use (i.e., AI or natural service synchronization) (Figure 1).

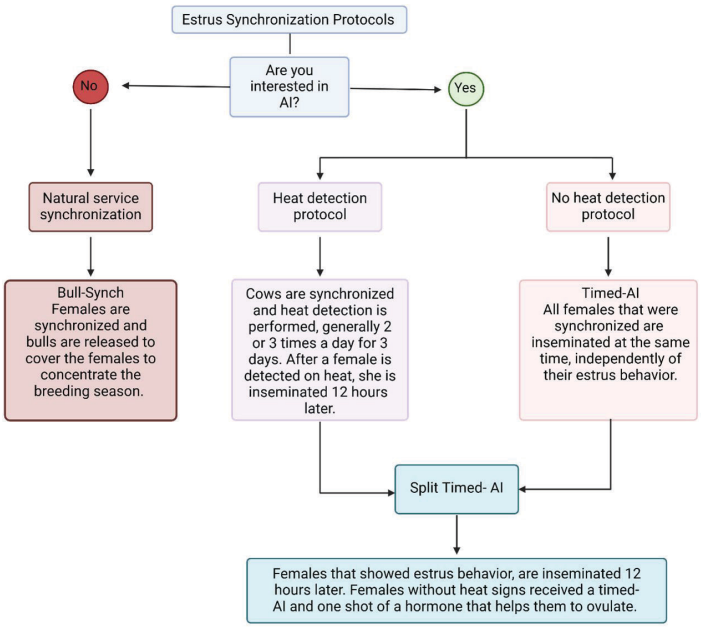

Figure 1. Decision tree to provide guidance in selecting the most appropriate synchronization protocol.
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When deciding which protocol to use to synchronize estrus, it is important to consider whether AI will be conducted. Protocols will differ depending on the goal. We used the 7-day Co synch + CIDR protocol (Figure 5) (Gonella et al. 2022) for natural service synchronization on a ranch in the Florida Panhandle. The calving season was shortened from 122 days to 94 days, and 50% of the calves were born within the first 28 days of the calving season, compared to 65 days when estrus was not synchronized.

Here are common protocols that can be used to synchronize estrus for natural service:

1. **One shot of PGF**: This protocol consists of a single application of PGF. It is highly recommended to introduce bulls 4 to 5 days before the application of the PGF, as animals that present heat 4 or 5 days before the PGF will not respond to the PGF's effect. This protocol is recommended for animals that are cycling, as PGF will not be effective in inducing cyclicity (Figure 2).

- **7-day CIDR:** This protocol consists of inserting a CIDR (intravaginal P4 device) for 7 days; bulls should be released with the animals immediately at CIDR removal. This protocol can be used for both cows and heifers. An additional advantage is that this protocol can help to induce cyclicity in heifers that have not reached puberty and in anestrous cows (Figure 3) (Perry 2005).

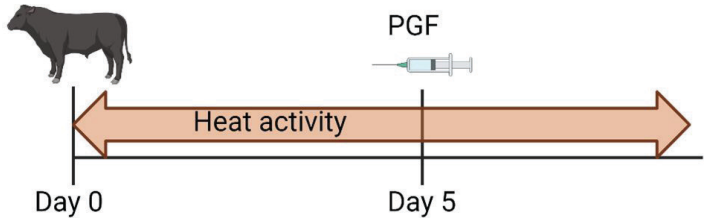

Figure 2. One shot of PGF protocol for natural service synchronization.
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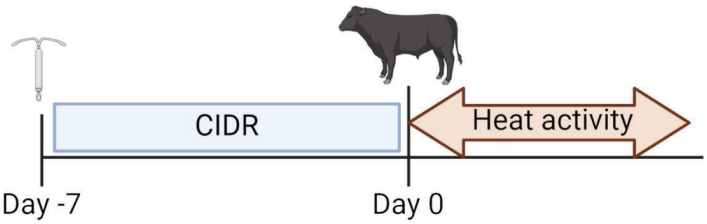

Figure 3. 7-day CIDR protocol for natural service synchronization.
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- **MGA protocol:** This protocol involves supplementing heifers only with melengestrol acetate (MGA) for 14 days. MGA is progestin approved for use only in heifers, not mature cows. MGA should be fed at a rate of 0.50 mg/head/day, and it may be top-dressed to the feed or included in the concentrate formulation as a medicated feed. Heifers should be exposed to bulls 10 days after the last MGA day. This protocol is recommended for producers who feed their heifers daily, as proper bunk management is important to ensure consistent feeding (Figure 4) (Beef Reproduction Task Force 2022).

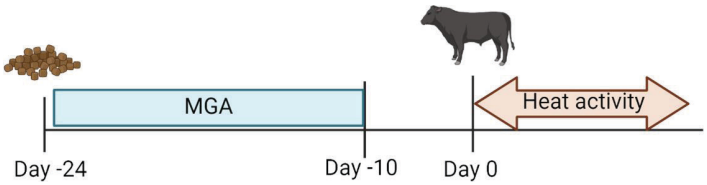

Figure 4. MGA protocol for natural service synchronization (heifers only).
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- **7-day Co synch + CIDR**: This protocol consists of inserting a CIDR and applying one dose of GnRH on day -7. Seven days later (day 0), the CIDR is removed, and one dose of prostaglandin is injected. Bulls are placed with cows or heifers immediately after the injection (Beef Reproduction Task Force 2022).

- Natural service synchronization results will depend on bulls for success. It is highly advised to have a veterinarian evaluate bulls before the breeding season. The most common recommendations on bull-to-cow ratio are 1 mature bull for 25 females and 1 yearling bull for 17 females (Thomas and Hersom 2009).

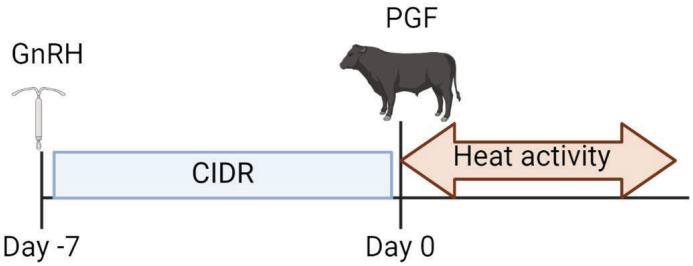

Figure 5. 7-day Co synch + CIDR protocol for natural service synchronization.
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Take-Home Message

- Estrus synchronization protocols are not only used for AI. Their use can also benefit natural breeding programs.
- Using estrus synchronization protocols for natural mating will shorten the breeding season; thus, the calving season will be shortened, too. Additionally, having more animals calving at the beginning of the season will result in heavier calves at weaning.
- When deciding which protocol to use, consider if you are breeding heifers or cows. Not all protocols work with both groups.
- Remember to evaluate bulls before the breeding season and consider the correct bull-to-cow ratio.

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