Synchronizing Natural Service

How can you synchronize estrus for natural service? Why would you want to?

by **TROY SMITH,**
field editor

"Synchronization of estrus with natural-service breeding systems may offer opportunities to cattlemen in terms of greater season-end pregnancy rates, and females conceiving earlier in the breeding season should result in more calves born earlier in the calving season and greater subsequent weaning weights," says Carl Dahlen, North Dakota State University (NDSU) Extension Beef Specialist.

Even if they never have considered applying it to part or all of their own herds, most cow-calf producers know that estrous synchronization is a process for manipulating the estrous cycle. There are several different protocols that can be applied to prepare a group of bovine females to be bred at about the same time, or at least within a pretty short period of time. Synchronization of estrus is a reproductive management tool that makes artificial insemination (AI) practical.

Synchronization can be used with natural service, too.

It could happen even if it wasn't the original plan. Let's suppose, for instance, that a producer synchronizes a group of females for AI. Now, suppose semen from a high-powered AI sire was ordered, but the shipment didn't arrive on time. Or maybe an ample supply of frozen semen was received early enough, but was destroyed before it could be used because the producer's storage tank ran out of liquid nitrogen.

Let's say the semen supply was secured early and kept safe, but on the first day of breeding season, the technician that is supposed to perform the insemination breaks both arms.

Let's just suppose Murphy's Law kicks in and, for whatever reason, the planned AI cannot take place. A possible alternative is to open the gate and turn bulls with the synchronized females. Our producer may not reap the benefits of the chosen AI sire's genetics, but the same objectives afforded by synchronized estrus can be achieved with natural service.

According to North Dakota State University (NDSU) Extension Beef Specialist Carl Dahlen, that's why some commercial cow-calf producers may want to consider synchronizing females for use with natural service.

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Synchronization of estrus to concentrate both the breeding season and calving season can be particularly useful with replacement heifers and in cow herds with extended calving and breeding periods. It can have long-term effects since early-calving females have more time to recover after calving and resume normal estrous cycles prior to the next breeding period. Thus, they are more likely to continue to conceive early.

Factors affecting success

Dahlen says the choice of protocol used to synchronize females for natural service is important. Some protocols used for AI are not recommended. Success will also be influenced by several factors associated with the females and the bulls involved.

Dahlen says two things, days postpartum (time since delivering a calf) and body condition, are primary indicators of a cow's readiness to resume estrous cyclicity. So those things determine whether she is fit, physiologically, for synchronized breeding.

Physiological and physical fitness is important in a bull, but so is skill.

According to Dahlen, one of the most frequently fielded questions relates to stocking rate or bull-to-cow ratio when pasture-breeding synchronized females. Multiple studies and economic analyses suggest that 1:25 is an optimal ratio, but the suitability of bulls used can depend on bull age, breeding soundness and libido.

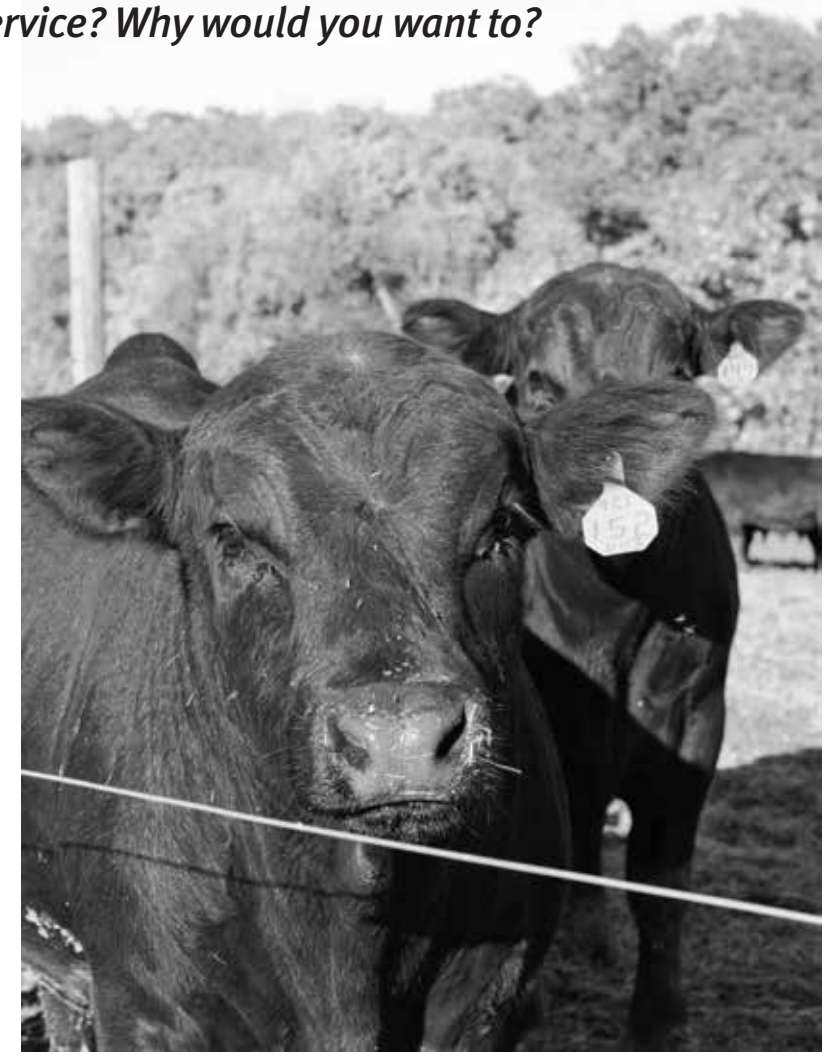

PHOTO BY SHAUNA ROSE HERMEL

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"Taken together," says Dahlen, "results of these studies highlight the fact that experienced bulls (2 years of age or more) are the best candidates for use with synchronization for natural service."

Prior to each breeding season, it is generally recommended that all bulls undergo a breeding soundness examination, including evaluation of semen motility and morphology, as well as determination of whether the bull is physically able to breed cows. According to Dahlen, common sense should tell producers that bulls receiving a "deferred" or "questionable" classification are not satisfactory candidates for natural service following synchronization. These bulls might mount and service cows, but pregnancy rates may be very disappointing.

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A measure not directly obtained through breeding soundness examination is the concentration of sperm in a bull's ejaculate. Dahlen says producers sometimes ask if a bull running with a large group of synchronized females could "run out" of sperm. He answers by explaining semen production in mature bulls

Table 1: Breeding behavior and fertility of bulls of different ages

	Age of bull		
	Yearling	**2 years**	**3+ years**
No. of bulls	29	36	27
Females per bull	20.1	26.2	27.8
No. of mounts	207[a]	120[b]	85.8[b]
No. of services	54.5	37.6	40.5
Estrus females serviced, %	69.4	73.8	72.0
Preg. rates of serviced females, %	39.6[a]	59.4[b]	62.2[b]
Overall preg. rate, %	30.9[a]	41.5[b]	49.9[c]

[a,b,c]Means within row lacking common superscript differ (P<0.05; Adapted from Pexton et al., 1990).

occurs at a rate of about 5 million spermatozoa per minute. That means a mature bull would produce the amount of sperm contained in a typical dose of commercial AI semen (20 million sperm) in approximately four minutes. Furthermore, *Bos taurus* bulls in single- or multi-sire pastures may breed one cow every 30 minutes, over a 30-hour period of synchronized estrus.

"Based on the frequency of breeding and speed of natural sperm production, it doesn't appear that the number of sperm in ejaculates, after heavy mating loads, is limiting the number of cows a mature bull can successfully breed," states Dahlen.

However, he reminds producers that a breeding soundness examination cannot measure a bull's libido, or sex drive. Producers can't assume libido is adequate just because exam results were "satisfactory." Dahlen recommends taking sufficient time to observe and evaluate the breeding activity of bulls after they are turned into breeding pastures. That's advisable even if females are not synchronized. Lazy libido is never good, and it's definitely unacceptable in bulls used for synchronized natural service.

"Watch for yearling (and mature) bulls that aggressively seek and breed females as potential candidates for servicing synchronized females in upcoming years," suggests Dahlen.

When choosing a synchronization protocol for use with natural service, Dahlen warns against protocols including administration of gonadotropin-releasing hormone (GnRH) near time of breeding. After receiving GnRH, he explains, females may not display signs of estrus necessary to be bred by bulls. Many protocols developed to narrow the window during which females ovulate, to better facilitate fixed-time AI, involve administration of GnRH two to three days after administering a prostaglandin (PG) product. Therefore, protocols used for AI following heat detection are recommended for synchronization with natural service.

According to Dahlen, one acceptable protocol involves giving females a PG injection on the same day bulls are turned out, prompting females to show heat over the next five days. Another protocol option involves administering PG four or five days after bull turnout.

"This (latter) method allows bulls to acclimate to breeding pastures and breed roughly 20% of cyclic females before the synchronization protocol is initiated," explains Dahlen, noting that other females would be induced to show heat during the five days following delayed administration of PG. "Using this method, a large portion of females would be in heat within the first 10 days of the breeding season."

A protocol using only the controlled intravaginal drug-releasing (CIDR®) device, for seven days, allows for more gradual distribution of estrus than occurs with the more common coupling of the vaginal inserts with PG. Another reason for using a CIDR in a natural-service synchronization protocol is to initiate cyclicity in anestrous females (due to progestin released by CIDR) so they breed earlier. However, Dahlen says evidence suggests cows that are cyclic at the time of CIDR insertion are most likely to respond to synchronization with the seven-day CIDR method.

The Select Sync protocol, as well as Synchro-Mate B, and 14-day MGA

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(melangestrol acetate)-PG protocols, have been applied successfully for natural service. Dahlen says producers should be aware, however, of the potential effect of long-term exposure to progestins that occurs with use of the MGA-PG protocol. Fertility is reduced during the first heat females experience after progestin withdrawal. Dahlen calls it imperative that PG not be administered until 17-19 days after progestin is withdrawn.

Dahlen says synchronization for pasture breeding is a strategy that can work, but it may not work well for all producers. Just as with synchronization for AI, it's important that the chosen synchronization protocol be administered carefully and according to schedule. Dahlen emphasizes the importance of monitoring breeding pastures to evaluate breeding activity. Results won't be satisfactory if the bulls are not willing and able to do their part.

Editor's Note: *Troy Smith is a cattleman and freelance writer from Sargent, Neb.*

ARSBC symposium coverage available online

Approximately 350 cattlemen gathered Dec. 3-4 at the The Ramkota Hotel and Conference Center in Sioux Falls, S.D., to focus on how to utilize advancing technologies to improve herd reproductive efficiencies, profitability and the end product — beef.

George Perry, South Dakota State University (SDSU) extension beef reproduction specialist and event coordinator, called the event "a tremendous opportunity to hear 27 speakers from across the U.S. and Canada discuss topics including how to profit from implementing these technologies, and the latest research in the fields of reproduction, nutrition and genetics." Presentations ranged from producer testimonials to tips on semen and embryo handling to the very latest in reproductive technology.

Your *Angus Journal* staff is providing full event coverage — including summaries of the presentations, proceedings, PowerPoints, audio and more — in the Sioux Falls 2012 newsroom at *www.appliedreprostrategies.com*.

LiveAuctions.tv provided live streaming video from the conference and DVDs will be made available. Watch future issues for details.

The 2012 Applied Reproductive Strategies in Beef Cattle (ARSBC) program was hosted by the Beef Reproductive Task Force, SDSU and iGrow, in cooperation with the University of Missouri Conference Office. Post-event coverage is available at *www.appliedreprostrategies.com/2012/SiouxFalls/newsroom.html*.

The Beef Reproduction Task Force is composed of representatives from major land-grant universities in eight states. The group was formed to coordinate the many beef breeding protocols being developed, ensuring a consistency in terminology and protocols. The group's goal is to increase use of artificial insemination.

For more information about the conference, contact Perry at 605-688-5456. For more information about API's online coverage, contact Shauna Hermel, editor, at shermel@angusjournal.com or 816-383-5200.