



AI Appointment

MU presents opportunities to synchronize estrus and facilitate fixed-time AI.

Story by
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Appointments are made for cattle every day — semen-testing bulls, vaccinating calves and pregnancy-checking cows. David Patterson, University of Missouri-Columbia (MU) professor of beef cattle reproduction, urged producers to make an appointment to breed their cow herds with artificial insemination (AI).

Presenting Jan. 23 at an MU Extension beef breeding seminar titled “New Opportunities for Beef Producers to Use AI,” Patterson and other researchers explained current AI trends, estrus synchronization products, and AI protocols for beef heifers and beef cows.

AI today

Starting the seminar off with some statistics, Patterson revealed to the group that:

- 1) 69% of cow-calf enterprises are secondary income sources;
- 2) 50% of producers report an established breeding season of a specific duration;
- 3) 34% of beef herds are routinely pregnancy-checked; and
- 4) 10% of beef cattle enterprises utilize AI.

Since AI isn't used by a majority of beef cattle producers, it may not come as a surprise that, from 1993 to 2003, the number of units of semen sold in the U.S. decreased by 8%. In contrast, semen

sales in South America, specifically Brazil, increased 161% during the same time period (see Fig. 2).

“Unless efforts are taken to implement change in the U.S. beef cattle industry, the products of our research and technology may be exported to more competitive international markets,” Patterson said. “Improvements in methods to synchronize estrus create the opportunity to significantly expand the use of AI in the U.S. cow herd.”

Products

The tools used to AI beef cattle probably aren't going to change significantly, Patterson noted, introducing Mike Smith to expand upon the topic. Smith, who is a professor of reproductive physiology and interim director of the MU Division of Animal Sciences, introduced three estrus synchronization products to the group:

Prostaglandin, or PG, causes regression of the corpus luteum (CL). PG has no effect on noncycling cattle and does not cause the induction of cyclicity, or “jump-starting,” of cattle. PG is effective on days 6 to 16 of the estrous cycle. Examples include Lutalyse[®], ProstaMate[®], Estrumate[®], estroPlan[™] and In Synch[®].

Gonadotropin-releasing hormone, or GnRH, is a product used to induce both ovulation and the formation of a CL; it also synchronizes follicular waves. Examples of GnRH products include Cystorelin[®], Factrel[®], Fertagyl[®] and Ovacyst[®].

Progestins act like progesterone. Examples include melengestrol acetate (MGA) and CIDR[®]s.

“Successful administration of treatment protocols requires careful attention to detail,” Smith reported. He emphasized that producers should follow all label recommendations provided by the respective product supplier.

Beef heifer protocols

Jackie Atkins, graduate research assistant at the MU Division of Animal Sciences, presented research based on estrus synchronization protocols for beef heifers. Atkins shared advantages of AI through the “Show-Me Select” replacement heifer sale, where AI-bred heifers averaged \$80 more per head than heifers bred by natural service.

Atkins identified three characteristics for replacement heifer selection:

Age. It is generally thought that the older the heifer, the more likely she will be to breed early and become a viable replacement in the cow herd. This may be true much of the time, but Atkins said producers often discover too late it may not always be the case.

Target weight. Atkins suggested that replacement heifers weigh 65% of their mature weight at breeding. To estimate mature weight, it may be worth your time to weigh your cows and establish the average mature weight of your cow herd.

Early breeding. Choose heifers that will breed 20 days prior to cows — earlier breeding will allow heifers a longer postpartum period and will increase the heifer's chance of breeding early as a 2-year-old.

But, Atkins reported, while these three items are generally thought of as guidelines for picking replacement heifers, they're not all that needs to be considered. Her research encompassed reproductive tract scores (RTSs). A description of ovarian and uterine maturity, RTS is

determined by measuring the size of the uterine horns; the length, height and width of the ovary; the size of follicles; and the possible presence of a CL. RTS is based on a scale of 1 to 5, with 1 being infantile and 4 and 5 being cycling.

Further research involving RTS proved that the oldest and heaviest heifers were not always the most reproductively mature.

“Reproductive management in the herd needs to be proactive,” Atkins reported. “Don't base your replacement heifer decision on weight and age alone — the heifers need to be palpated.”

The bottom line, she said, is the more reproductively mature a heifer is, the more likely she is to breed early, rebreed early as a 2-year-old and remain a productive animal in the cow herd.

Taking a closer look at AIing heifers specifically, Atkins said there are not yet protocols that facilitate fixed-time AI in heifers, but new protocols are being evaluated.

So, what protocol should you use on your heifers? Atkins suggested basing your decision on your farm or ranch goals, management and organization, facilities, and time and labor considerations.

Beef cow protocols

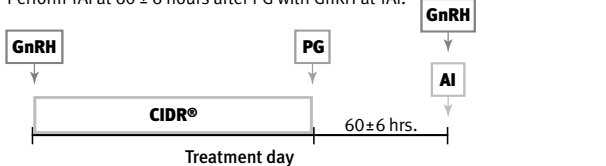
Dan Busch, senior research specialist in reproductive biology in the MU Division of Animal Sciences, presented information regarding estrus synchronization protocols for beef cows.

Shortening the AI breeding season, Busch said, will result in more cows becoming pregnant early in the breeding season. This practice results in an older, heavier calf crop at weaning time, creating a more uniform group of cattle to sell. It will also have beneficial effects

Fig. 1: Protocols for fixed-time AI (TAI) for cows

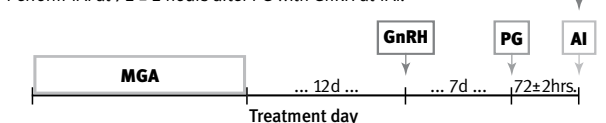
Co-Synch + CIDR[®]

Perform TAI at 60 ± 6 hours after PG with GnRH at TAI.



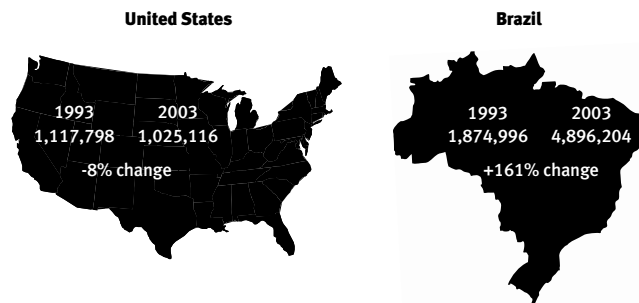
MGA[®] Select

Perform TAI at 72 ± 2 hours after PG with GnRH at TAI.



Source: North Central Region Bovine Reproduction Task Force.

Fig. 2: Import and domestic beef semen sales
(in units of semen)



Source: NAAB, 2003; ASBIA, 2003.

on the next breeding season by allowing more cows to calve earlier, allowing more days postpartum at the next breeding season.

“Estrus synchronization is never a substitute for nutrition, herd health or proper management,” Busch said. Proper management is important, he noted, “because reproduction is the lowest priority in undernourished heifers and cows.”

Busch explained that cows need to be in good condition and carry an acceptable body condition score (BCS). His research suggested that cows with a BCS of 5 or greater (on a 9-point scale) at calving time had significantly increased rates of cyclicity at 41 days postpartum. (An explanation of how to condition score cows and examples of Angus cattle of various scores can be accessed online at www.cowbcs.info.)

Busch reported on MU research involving 650 cows. The research compared two protocols — MGA Select and Co-Synch + CIDR — used to synchronize ovulation prior to fixed-time AI (see Fig. 1). The pregnancy rate that resulted following fixed-time AI was 61% for MGA Select and 66% for Co-Synch + CIDR-treated cows. Of the cows that became pregnant by the end of a 60-day breeding period, 88% conceived within the first 25 days of the breeding season.

Busch later discussed how a producer knows which cows were bred as a result of AI. He suggested waiting at least 10 days after AI to introduce cleanup bulls to a group of cows. He also suggested using ultrasound 45-50 days post-AI and confirming AI by actual calving dates.

As far as which protocol to use with cows, Busch noted, “The results from this experiment demonstrate that comparable pregnancy rates to fixed-time AI can be achieved using MGA Select or Co-Synch + CIDR protocols to synchronize estrus in postpartum beef cows.”

Wrapping up

To conclude the evening, Patterson cited work by Harlan Hughes. “Opportunities for increasing profits lie in managing females from the later calving intervals forward to the first and second calving intervals,” he said. “High-production herds see 61% of the calves born by Day 21, 85% by Day 42, and 94% by Day 63.”

Research is under way, he said, to develop new protocols for heifers that will facilitate fixed-time AI, while the technology currently exists to successfully inseminate postpartum beef cows at predetermined fixed times with resulting high pregnancy rates.

On a final note, Patterson added, “Improvements in methods to synchronize estrus create the opportunity to significantly expand the use of AI in the U.S. cow herd.”



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