

Synchronized Breeding Made Simpler



The FDA's approval of the CIDR is deemed the first advancement in reproductive control in 20 years.

Story by
CORINNE BLENDER

The Eazi-Breed™ CIDR® Cattle Insert is a progesterone-impregnated vaginal insert used to synchronize estrus and hasten either puberty or postpartum cyclicity in the beef cow and heifer. The product was approved for marketing and use in the United States June 16, 2002. [PHOTO COURTESY OF PHARMACIA ANIMAL HEALTH]

A new controlled internal drug release (CIDR, pronounced "seeder") insert for estrus synchronization has been approved for use in beef herds. The Eazi-Breed™ CIDR® Cattle Insert is now marketed worldwide exclusively by Pharmacia Animal Health of Kalamazoo, Mich., and can be purchased over the counter (OTC) from veterinarians and from embryo transfer centers.

The CIDR is a T-shaped insert (see photo) that is impregnated with progesterone, the same hormone that is secreted by the corpus luteum (CL) in the cow. The CIDR is inserted into the animal using a device that resembles a bolus gun. While the insert is in place, the female should not come into heat because the progesterone prevents estrus and ovulation.

"It is the first product that we have had approved in beef and dairy for reproductive control for more than 20 years," says Darrel Kesler, Extension reproductive biologist at the University of Illinois, Urbana-Champaign. Kesler was part of the early trial work in the FDA approval process.

While the insert is in the animal's vagina, it continually releases progesterone. Its removal and the corresponding injection of Lutalyse® (a prostaglandin, or PGF) triggers a drop in the female's progesterone level that results in estrus and ovulation.

"What it is being used for is A) to synchronize estrus and B) to hasten either puberty or postpartum cyclicity," Kesler says.

FDA approved protocol

The FDA approved CIDR protocol consists of placing the insert into a cow's vagina for seven days; then, 24 hours before removal, injecting the cow with a regular dose of Lutalyse. Heat will generally occur very quickly (within 2-3 days) after the CIDR is removed on Day 7.

"One of the nicest things I like about them is they really tighten

your heat. You can expect a cow in heat 48 hours after you pull them out," says Troy Marple, purebred beef specialist at Kansas State University (K-State). Most of your cows are going to come into heat within a 12-hour window.

In Kesler's research, using the FDA-approved protocol, the CIDR synchronized pregnancies in about 50% of the beef heifers that had not yet reached puberty, while less than 10% were synchronized without any treatment (see Table 2).

"It really jump-started those heifers into cyclicity," he says. "It can be used to synchronize those that are cycling and to jump-start those that aren't and synchronize them as well."

Will it work for me?

University researchers have been evaluating other protocols using the CIDR for several years under investigative new animal drug licenses authorized by the Center for Veterinary Medicine (CVM) of FDA. Some of those studies have reported higher success rates than the studies supporting the product's FDA approval.

Jeffrey Stevenson, professor of reproductive physiology at K-State, was the lead researcher with Marple in some studies at K-State. Believing the addition of an injection of gonadotropin-releasing hormone (GnRH) would foster better results, they used the CIDR with the CoSynch protocol.

CoSynch-CIDR involves injecting GnRH when the CIDR is inserted, removing the CIDR after seven days and then injecting a prostaglandin. Forty-eight hours later, another dose of GnRH is injected and the animal is time-bred (See Figure 1).

Their first study using CoSynch-CIDR resulted in pregnancies in 66% of the cows. The control group, which received the CoSynch protocol alone, had a 61% pregnancy rate. Stevenson says that was high, with pregnancy rates of 30% to 50% being more common using CoSynch alone without the CIDR.

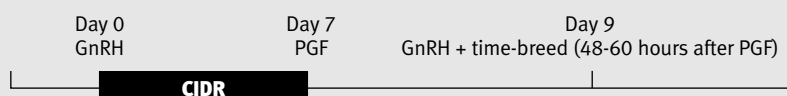
"It varies from year to year depending on the body condition of the cows," Stevenson says, "which is a reflection of the winter and their winter supplementation program."

The CIDR will always produce better results, Stevenson adds. But the key is using the two protocols in combination.

Stevenson says the CIDR can induce some cycling activity, but GnRH is the real key. "They do two different things. GnRH will cause the follicle to ovulate, and that forms the first corpus luteum. The CIDR by itself can do that, but it won't induce ovulation at a very high rate. The CIDR acts mostly on the uterus, basically preparing the uterus for pregnancy."

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Fig. 1: CoSynch-CIDR system



Source: Jeffrey Stevenson, professor of reproductive physiology at Kansas State University

Table 2: Pregnancy rates using the CIDR in FDA beef heifer study

	Pregnancy rate*	
	Prepubertal	Cyclic
Control	6%	9%
PGF	6%	19%
CIDR + PGF	28%	49%

* Treatment $P < 0.01$.

Source: Darrel Kesler, Extension reproductive biologist at the University of Illinois, Urbana-Champaign

Fig. 2: Development of follicular waves during the 21-day estrous cycle of cattle. Estrogen levels peak at approximately 21 days, and progesterone levels are elevated from Day 5 to Day 17.

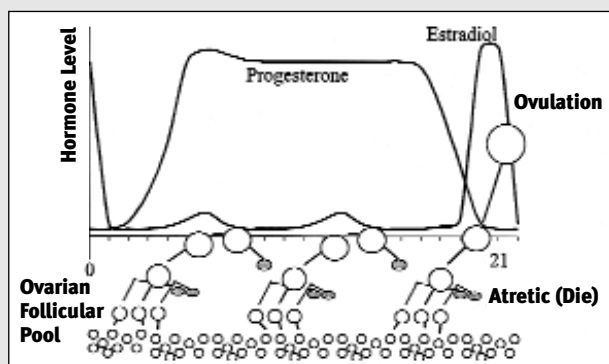


Table 3: Effect of CoSynch + CIDR on pregnancy rates

Status	Progesterone ₄ at PGF	No.	CoSynch	CoSynch + CIDR
Cyclic	High	234	58%	58%
Cyclic	Low	99	43%	79%
Anestrus	High	62	40%	53%
Anestrus	Low	55	38%	66%

Source: Lamb et al. (2001)

Synchronized (from page 36)

Without exposure to progesterone (e.g., the CIDR insert), the GnRH injection would likely cause a suckled beef cow to ovulate and the CL would form, Stevenson explains. But it would be short-lived, and the cow would probably be back in estrus in about eight to 12 days.

“So even if she were inseminated and the egg fertilized, before the embryo could develop to a sufficient point, the corpus luteum would regress prematurely and the uterus would kick the embryo out,” he says. “The uterus has to be progesterone-primed. In other words, it has to be exposed to some progesterone or it

will cause the corpus luteum to be short-lived.”

The progesterone prevents early release of PGF from the uterus, which would cause a short-lived CL. “That’s why the CIDR is really important in the system. ... Basically it helps prepare the uterus to carry a normal embryo after she conceives at the next estrus.”

Specialized uses in commercial herds

Kesler says this product is just another device for the reproductive toolbox, one that can be used in combination with other tools. The CIDR isn’t expected to be too expensive, with prices speculated anywhere

from \$6 to \$8, but that price could be a limiting factor.

PGF can synchronize cows and heifers that are cycling without the need of progesterone at a cost of about \$3, Stevenson says. But, Kesler adds, “It only works on those that are on Day 5 of the cycle or greater. It will not be effective on animals that are on Day 0 through Day 4. You’re not working with 100% of the animals when you use prostaglandin alone.”

If you could identify which cows were cycling, the most cost-effective approach might include a combination of protocols. Stevenson refers to a regional research project (NC-113) that included K-State, Illinois (Kesler), Minnesota and Missouri locations as an example.

Out of the 450 cows in that study, 234 were identified by blood tests to be cyclic with high progesterone levels on Day 7 (spontaneous cyclicity established before GnRH with a CL present just before the PGF injection; see Table 3). There was no difference in the 58% pregnancy rate with CoSynch alone and the 58% pregnancy rate with CoSynch plus the CIDR. Those cows could have been as successfully synchronized and artificially inseminated (AIed) without the added cost of the CIDRs.

With the 99 cows identified to be cyclic with low progesterone levels on Day 7 (spontaneous cyclicity established before GnRH but no CL present just before the PGF injection), the research achieved a 79% pregnancy rate with CoSynch plus the CIDR vs. 43% with CoSynch alone. With the anestrus cows that had high progesterone levels on Day 7 (anestrus before GnRH but in response to GnRH ovulation occurred and a CL formed before the PGF injection), researchers achieved a 53% pregnancy rate with the CoSynch-CIDR combination, 40% without. The 55 cows that were anestrus and had low progesterone levels on Day 7 (anestrus before GnRH, no response to GnRH and no CL formed before the PGF injection) had a 66% pregnancy rate with the CIDR, 38% without. So, for a total of 216 cows, the CIDR made vast improvements on pregnancy rates.

“In just more than half the cows you will probably get a real benefit

from using the CIDR,” Stevenson says. “The question is, how can you know which cows are cycling when you start the breeding season? And short of taking blood samples from cows, which is impractical, what could one do?”

Identify effective uses

Stevenson identifies a couple ways that producers could determine on which animals the CIDRs would have an effect. He says the first scenario could include applying heat detection patches (about \$1.50 each) three weeks before initiating the program. Tail chalk, which is used more commonly in dairies, could offer the same identification option. Or you could watch the entire herd for heat, which is too time-consuming and impractical for most.

“That would be one way to eliminate the cycling cows that we would not put CIDRs in,” Stevenson says. “That’s the cheapest way to do it.” CoSynch alone can be just as effective with the animals found cycling during this time.

Another scenario producers could enact involves dividing the cows by a few common denominators, including calving dates, body condition scores (BCSs) and cow age. Identify animals that are at risk for not conceiving in the first week of the breeding season. These are the best candidates for a CIDR.

The cows that calve late in the season, thin cows, and your 2-year-old cows are at greater risk of being anestrus, Stevenson points out.

Whether producers should use the CIDR in all animals, or try to determine in which animals the CIDR would be most effective, depends on the individuals and their goals for their breeding program.

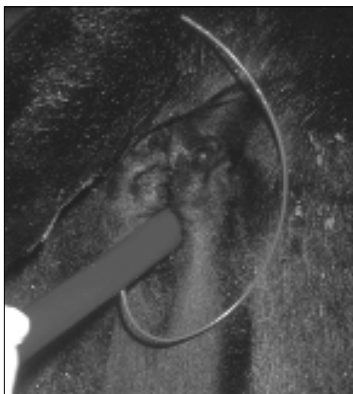
“The commercial producer has probably got to look for a way to tailor-make this system so it uses a little more expensive treatment with those cows at risk and a little cheaper system on the cows that are probably cycling,” Stevenson says.

For a more in-depth review, see the October 2002 *Angus Journal* online at www.angusjournal.com.

Steps for inserting and removing the CIDR:



1. Shift the animal's tail to one side and clean the vulva. [PHOTOS COURTESY OF PHARMACIA ANIMAL HEALTH]



2. Make sure the tail of the CIDR insert is on the underside of the applicator to ensure the tail will be hidden from curious penmates.



3. Open the lips of the vulva and insert the applicator at a slightly upward angle, moving forward over the pelvic bone until it meets resistance.



4. Dispense the insert from the applicator by depressing the plunger, then slowly withdraw the applicator.



5. To prevent removal by penmates, you may clip the tail, but be careful not to clip it too short because the CIDR will usually settle deeper inside the animal.



6. To withdraw the insert, give the tail a gentle but firm pull.

Cleanliness is a must when using CIDRs

Anyone who has worked with the Eazi-Breed™ CIDR® Cattle Insert will stress the importance of good sanitation practices. “No. 1,” says Troy Marple, purebred specialist at Kansas State University (K-State), “cleanliness is next to godliness with these things. You’re putting it in a pretty sensitive area in a female, and you just don’t want to take anything in there with the CIDR.”

Darrel Kesler, Extension reproductive biologist at the University of Illinois, Urbana-Champaign, also stresses the need for wearing latex or plastic gloves when handling this product. The outside of the insert has progesterone on it, which could affect the handler.

“But more importantly, our hands have bacteria on them,” he adds. “Even if you wash, you will still have some bacteria on your hands. And if you handle them with your ungloved hands, it is very likely that you will introduce into the vagina some bacteria as well as the insert. You need to wear gloves.”

Six-factor comparison of MGA and the CIDR

Darrel Kesler, Extension reproductive biologist at the University of Illinois, Urbana-Champaign, says there are advantages to the MGA® (melengestrol acetate) and prostaglandin (PGF) system, as well as to the newly approved Eazi-

Breed™ CIDR® (controlled internal drug release) Cattle Insert and PGF system.

“MGA is probably not as convenient in the beef cow. But MGA does work very nicely in beef heifers. It is a progestrone; it will jump-start those anestrus

beef heifers as well,” Kesler says. Product effectiveness would be very similar for both the CIDR and the MGA in a beef heifer.

Kesler has done extensive research with both products. He poses the follow-

ing six considerations when comparing the two products:

- “Cost-wise, there is nothing cheaper than MGA and prostaglandin. Although the CIDR is not going to be expensive, it is definitely going to be more expensive than MGA and prostaglandin.”

- The MGA system requires about 35 days from the first day of feeding to breeding. With the CIDR system, you remove it seven days after insertion, and the cows are in estrus about two days after that. “You are cutting the time frame down by about 75%.”

- The number of animal handlings would favor the MGA system. With the MGA system you only have to handle them to give the PGF injection and then to breed them. With the CIDR system, you handle them at least three times, possibly four depending on when you give the PGF shot.

Table 1: Advantage analysis of MGA/PGF synchronization and CIDR/PGF synchronization

Advantage	MGA/PGF	CIDR/PGF
Cost	Y	
Shortest time (from initiation)		Y
Fewer number of handlings	Y	
Flexibility of groupings		Y
Less chance of scheduling error		Y
Robustness	Y	

- “With the MGA system you treat the whole group. You don’t do any sub-grouping. But with the CIDR system you could actually go into a group of 100 animals and treat 50 of them, then come back a week later and do the other 50.”

- “I’ve done field studies with the MGA system. Because it is such a long time frame and there are many steps involved, people do mess up on that system occasionally. With the CIDR system there is less chance of error because you put them in on a Monday and you come back the next Monday and you pull them out. You can’t get much more straightforward than that.”

- “We know the MGA system is very robust and can be used in almost any scenario and work very effectively. We don’t have that data yet for a CIDR.

“I have it down to three advantages for MGA and three advantages for the CIDR system. It depends on your management system. That’s why I call it a tool for the reproductive toolbox,” Kesler says. “For one operation the CIDR may be the ideal way to go. For another operation MGA may be the ideal way to go.”