

# SYNCHRONIZATION:



*A new two-shot protocol may make synchronizing cows more successful.*

BY SHAUNA ROSE HERMEL

## PGF<sub>2α</sub> (Prostaglandin)

Regresses the corpus luteum (CL) and brings cycling cows and heifers into heat (shortening the estrous cycle)

### Commercial Products\*:

Lutalyse, Estrumate

## GnRH\*\*

(Gonadotropin Releasing Hormone)

Causes release of the luteinizing hormone (LH) and follicle stimulating hormone (FSH), causing ovulation; GnRH synchronizes follicular growth to tighten the degree of synchrony to PGF<sub>2α</sub> in the GnRH-PGF<sub>2α</sub> protocol

### Commercial Products\*:

Cystorelin, Factrel, Fertagyl

\*Cost As these products are available by prescription only, check with your veterinarian for an exact cost. Researchers involved in these studies say GnRH will be available for about \$3 (\$0-\$7/shot; prostaglandins for \$2 (\$0-\$4/shot).

\*\*GnRH does not carry FDA approval as a synchronization product.

Less than 5% of the nation's cow herd is bred by artificial insemination (AI).

That's about to change, believes Les Anderson, Ohio State University (OSU) beef reproductive specialist.

Researchers at four universities have been evaluating variations of a new synchronization-AI protocol: giving a shot of GnRH on Day 0, followed by PGF<sub>2α</sub> on Day 7, then breed following a detected heat. The new synchronization program, says Anderson, has shown a dramatic improvement in pregnancy rates over what has been available to date.

### Jump-starting the cycle

One of the primary reasons synchronization programs haven't worked with cows is that often one-third to one-half of the cows aren't cycling at the start of the breeding season, says Jeff Stevenson, Kansas State University (KSU) reproductive physiologist.

"Conventional synchronization

programs are designed to work on cows that are already cycling." It becomes a trade-off: synchronizing early in the breeding season and getting fewer calves to the synchronized breeding or waiting until more cows start to cycle, which delays your calving time.

Besides the new protocol, the Syncro-Mate-B system is the only synchronization method research has shown to "jump-start" estrous cycles, says Stevenson. "It has the ability to cause some anestrous cows to cycle; but, some of those heats are not ovulatory heats." He describes them as behavioral heats.

"The two treatments we tested have the ability to induce a fertile estrus in a cow that hasn't cycled," Stevenson says. Those two treatments:

1. GnRH+PGF<sub>2α</sub>, with shots given seven days apart. For instance, if cows are given GnRH on Monday, they should get prostaglandin the following Monday.

2. **GnRH+NORG+PGF<sub>24</sub>** The cows are given a shot of GnRH and implanted with a norgestomet ear implant. Seven days later, the implants are removed and the cows are given prostaglandin.

Those treatments were compared to the control **2xPGF<sub>24</sub>** treatment, which consisted of giving two shots of prostaglandin 14 days apart.

The cows in all treatments were bred following a detected heat after the final prostaglandin injection. Table 1 shows the results. Overall, the **GnRH+NORG+PGF<sub>24</sub>** and **GnRH+PGF<sub>24</sub>** synchronization programs increased the number of cows detected in heat 24 and 12.7 percentage points, respectively, and pregnancy rates 13.1 and 10.5 percentage points, respectively, over the control group without altering conception rates.

While the **GnRH+NORG+PGF<sub>24</sub>** program resulted in more cows in heat and a higher pregnancy rate, Stevenson says it has two big drawbacks:

- It's more expensive — double the cost of the **GnRH+PGF<sub>24</sub>** program.
- You have to catch the head of the cow twice — once to implant and once to remove the implant.

In two of the four herds (all spring-calving) used for the study, the **GnRH+NORG+PGF<sub>24</sub>** and **GnRH+PGF<sub>24</sub>** treatments resulted in pregnancy rates over 50%. Of the other two herds, one was considerably thinner; the other was drylotted longer.

On a herd basis, the data shows that with extremely thin cows that aren't cycling well, you're obviously not going to have as much success with any system, says Larry Corah, KSU beef specialist. "The best results we had were on two herds where we got a flush on the cattle by putting them on grass nearly a month before we did the synchronization."

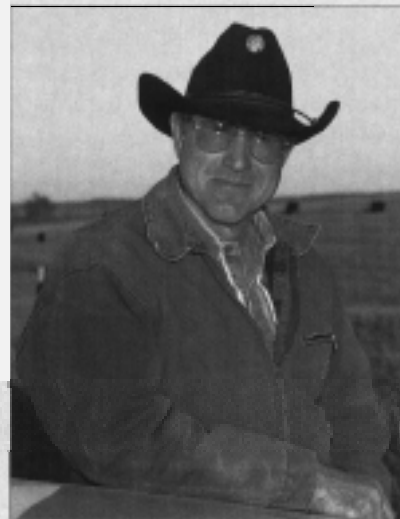
Anderson and OSU Beef Reproductive Specialist Mike Day also used the two shots of prostaglandin 14 days apart as a control and the same **GnRH+PGF<sub>24</sub>** treatment as KSU. Their third treatment included MGA (melengestrol acetate) feeding between the GnRH and prostaglandin injections.

"We expected to see an additional inductive effect with the MGA," says Anderson. They didn't.

## Make AI feasible

Synchronization makes AI possible by reducing labor costs, says Kansan Jon Ferguson. From a risk-management perspective, you're better off calving over a 21 -day period. Still he says, the benefits of Aling his 700-head commercial cow herd outweigh that negative. The reasons are threefold:

1. **Improving replacements.** "From a maternal perspective, Aling to get replacements is a no-brainer," he says. "You can really target the type of cattle you want for replacement females."
2. **Flexibility in terminal sires.** Good bulls cost, says Ferguson. "But as soon as you use them, their value, except for breeding, is cull price." That makes selling them harder when you need to switch genetics to meet changing targets. "With AI, that's no problem; I just order different semen."
3. **Better genetics.** "You can get better genetics cheaper than you can with buying bulls," says Ferguson. "If you can come up with a workable system of AI — and synchronization is part of that system because it reduces labor costs -then I feel AI is a good investment."



Over the years, Ferguson has tried several synchronization programs on his cows. Success has ranged from 40% to 55% overall pregnancy. "My goal," he says, "is 50 percent."

- "The MGA-Lutalyse works great on cows if you can get consistent delivery of the MGA," says Ferguson. That's hard to do breeding on pasture.
- One-shot Lutalyse works well if cows are cycling, says Ferguson, adding it's yielded pregnancy rates of 50-55% When cows aren't cycling, rates don't look that good.
- The two-shot Lutalyse system reduces the time you have to detect heat, he says. Again, results have been variable.
- Last spring (spring of '96) Ferguson let Kansas State University researchers evaluate two new protocols in his herds. "There was an obvious advantage to the GnRH-Lutalyse over the two-shot Lutalyse program," says Ferguson, quick to point out this was just one year's data. "You give two shots in either case. The cost of GnRH is about double the cost of Lutalyse, so you've added maybe \$2 to the cost of the program. For that, you're gaining about 10 percent conception."

### 2-year-olds in deeper anestrus

In two groups synchronized with **GnRH+PGF<sub>24</sub>**, one had a pregnancy rate of 65% (Columbus herd), whereas the other (Jackson herd) was only 35%. "The biggest difference was we induced more cows to cycle in Columbus than we did in Jackson," says Anderson, adding the Jackson herd was thin, especially the 2-year-olds. "In the Columbus cows, we induced estrus in 83 percent of the anestrus cows. In Jackson we only induced estrus in 50 percent."

The 2-year-old cows in the Jackson herd pulled down the pregnancy rate average, Anderson says, "We consider the 2-year-olds in a deeper state of anestrus. Our synchronization protocol wasn't able to induce estrus in those animals." Excluding first-calf heifers, the **GnRH+PGF<sub>24</sub>** pregnancy rate was 46% (vs. 35%) in the Jackson herd.

"If your 2-year-olds were calved 30 days ahead of the rest of the herd and in good

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**Table 1: Expression of estrus, conception and pregnancy rates**  
(Kansas State University)

Herd	No. Cows	BCS <sup>a</sup>	Days <sup>a</sup>	Estrus, %			Conception, %			Pregnancy, %		
				A <sup>b</sup>	B <sup>b</sup>	C <sup>b</sup>	A	B	C	A	B	C
1	206	4.7	81	92.1	76.5	60.9	67.2	75.5	52.4	61.9	57.8	31.9
2	266	4.6	73	89.5	79.8	71.6	57.1	69.0	68.2	51.2	55.1	48.9
3	329	4.5	68	54.6	44.4	25.7	53.4	55.3	57.1	28.7	24.1	14.7
4	110	3.8	64	38.9	23.5	25.0	57.1	37.5	55.6	22.2	8.8	13.9
<b>Total</b>	<b>911</b>	<b>4.5</b>	<b>72</b>	<b>71.0</b>	<b>59.7</b>	<b>47.0</b>	<b>58.9</b>	<b>65.7</b>	<b>60.6</b>	<b>41.6</b>	<b>39.0</b>	<b>28.5</b>

<sup>a</sup>BCS=body condition score and days postpartum at beginning of the breeding season (time of the final PGF<sub>2α</sub> injection)

<sup>b</sup>A=GnRH+MORG+PGF<sub>2α</sub>; B=GnRH+PGF<sub>2α</sub>; and C=2xPGF<sub>2α</sub>.

condition, I would try it," he says. "But, realize it probably won't be as successful as it would be with mature cows."

The OSU researchers also evaluated the GnRH+PGF<sub>2α</sub> system on yearling heifers. The rates were not good, says Anderson. "This is by far the best system for postpartum cows, but the best system for heifers is the MGA+PGF<sub>2α</sub> system (feed MGA 14 days; 17 days after the last MGA feeding, give prostaglandin)."

#### Adjusting for timed breeding

Colorado State University's (CSU) Tom Geary and Jack Whittier looked at the program with a different twist: using timed breeding. The system requires an additional GnRH shot — administering the first on day 0, the prostaglandin on day 7, the second GnRH shot 48 hours later, then time-breeding.

The dairy industry has been using this system, breeding 24 hours after the second GnRH injection, with quite a bit of success, says Whittier, CSU Extension cow-calf specialist. The dairy industry calls the protocol Ov-Synch.

"One of the real hang-ups of the Ov-Synch system for beef producers is that it means working the cows four times," he explains. "We wanted to see if we could simplify that and get acceptable results." So, the CSU researchers compared success rates of the traditional Ov-Synch program to inseminating at the same time they gave the second GnRH shot.

"That's three trips through the chute, including breeding, which isn't really too much different than the Syncro-Mate-B or two-shot prostaglandin systems," says Whittier. "We saw exactly the same pregnancy rate (48%) whether they were bred 0 or 24 hours after the second GnRH."

Compared to timed breeding with Syncro-Mate-B, Ov-Synch provided an 11 percentage point higher pregnancy rate

(52% vs. 41%) Whittier reports.

"It appears this system will stimulate cows that are not cycling and still give pretty high pregnancy rates," he adds. In one group of late-calving cows (56 days postpartum), 60% weren't cycling. The group still had a 58% pregnancy rate to the Ov-Synch program, breeding 24 hours after the second GnRH shot, with short-term calf removal. According to Geary, CSU reproductive physiologist, the Ov-Synch program actually provides two chances to induce a cow to start cycling — one with each shot of GnRH.

#### Results still preliminary

The preliminary summarized results from Kansas, Ohio and Colorado look good — and consistent, says Whittier.

"Regardless of which herd we looked at," adds Geary, "the GnRH-prostaglandin protocol resulted in as good or better synchronized pregnancy rates than other protocols." Still, both CSU researchers say they'd feel more comfortable with another year of research before making any widespread recommendations.

Bill Beal Virginia Polytechnic Institute and State University (VPI), agrees. Though the VPI data set is still being analyzed, the reproductive physiologist says they found equal response to 2xPGF<sub>2α</sub> as to

GnRH+PGF<sub>2α</sub>. Using a little different scenario, VPI researchers evaluated the programs in a fall-calving purebred herd that was in very good condition. Most of the cows were cycling, says Beal, so you'd see less benefit from inducing estrus.

"This really is the next step in estrous synchronization," says Beal, who says he is not negative about the program. "We know how to control the length of the cycle by controlling the corpus luteum. Now, let's control the follicle that's going to ovulate to get better synchrony and potentially better fertility, although the early results say the fertility is equal to a normally cycling cow."

#### Available commercially

Roy Wallace, with Select Sires, is confident enough in the GnRH+PGF<sub>2α</sub> protocol to begin recommending it this spring (spring '97) as the "Select Snych" program. "The two-shot system," he says, "makes it relatively easy to administer. It's relatively inexpensive, provides good conception rates and tight synchrony."

Wallace says he hopes that will encourage commercial cow-calf producers to start AIing cows. "We breed lots of heifers, but the percent of cows bred artificially in the United States has been a very stagnant number," he says.

"Because you induce estrus with this program, you can decrease the average number of days postpartum when cows are bred," Wallace continues. "Not only are you getting some synchrony, you're getting your cows bred earlier, which can mean heavier calves at weaning."

\*Reprinted with permission from BEEF magazine's March 1997 issue.

<sup>1</sup>Larry Anderson is currently Extension beef reproductive specialist at the University of Kentucky.

<sup>2</sup>Larry Corah is now director of production systems with the National Cattlemen's Beef Association.

### Know Your Rates

Conception rate = No. of cows pregnant ÷ No. of cows bred.

Pregnancy rate = No. of cows pregnant ÷ No. of cows in the entire group.

Example: Say you synchronized 100 cows; 70 came into heat and were bred AI; 50 became pregnant.

Conception rate: 50 ÷ 70 = 71%

Pregnancy rate: 50 ÷ 100 = 50%