

CATTELEMEN CAN FOOL MOTHER NATURE

by Ann Gooding

The product has great potential. It might even be considered one of the most important developments in the beef cattle industry in recent years. But it won't work miracles. It is effective only when used hand-in-hand with good management.

The product Lutalyse (generic name dinoprost tromethamine), a prostaglandin, has the potential to synchronize estrus in cattle. It is the first prostaglandin product to be approved by FDA for use in beef heifers and cows and non-lactating dairy heifers in the U.S. It was developed and is marketed through veterinarians by Upjohn Co.

Discovered nearly 50 years ago but little understood until recently, prostaglandins are chemicals that occur naturally in the body. The result of years of research, Upjohn's Prostin®, a prostaglandin developed for use in mares, was the first such product approved, making it through the FDA labyrinth in 1976. Upjohn's next step was Lutalyse; approval was more complicated because food-producing animals, beef and dairy cattle, were involved. Lutalyse's new animal drug application (which grew to 11 volumes of 500 pages each) was submitted Feb. 4, 1977, and finally met approval Nov. 2, 1979. With FDA's stamp of approval, the means to synchronize estrus in cattle became available in this country.

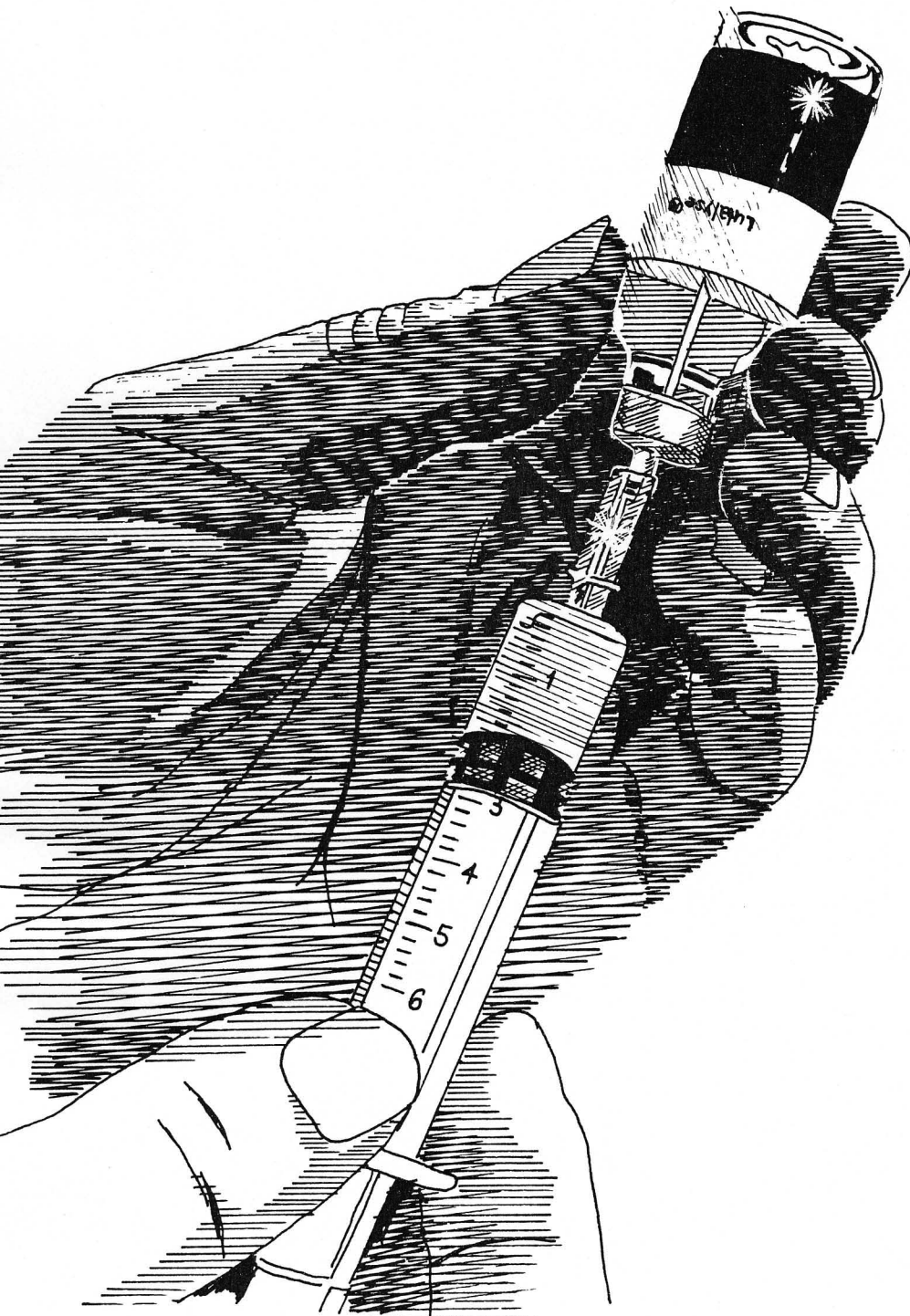
And estrus synchronization, because it makes artificial insemination more practical, is expected to have some important effects on the beef cattle industry, both short- and long-range.

Over the Long Haul

The increased use of A.I. means more breeders will be able to use semen from genetically superior bulls. And experts concur that the use of those bulls is the fastest means to genetic progress.

The dairy industry provides us with our most conclusive evidence that A.I. is a useful tool in upgrading a species. An article by Dr. E.L. Moody, Montana State University, furnished this information: "In 1945 less than 1% of the lactating dairy cows in the U.S. were bred A.I. In 1976 more than 55% were bred by this method. During this 30-year period, milk production per dairy cow more than doubled. No doubt A.I., which permits extensive use of genetically superior sires, was a major reason for this dramatic production even though other factors such as better nutrition and improved management practices also contributed.

"A.I. benefits to be gained in beef cattle breeding probably outshine those derived



by the dairy industry. The heritability estimates of economically important traits in beef production are significantly higher than for milk production in dairy cattle."

The article lists milk production in dairy cattle as being 20% heritable, while in beef cattle, weaning weight is 30% heritable, weight gain from birth to weaning is 30%, post-weaning feedlot gain is 45%, weight at 12 months is 50%.

In the Short Run

Long-range benefits alone may convert a lot of cattlemen, but it's the short-range ones that will get the program off the ground.

Heat detection—twice a day, day-in and day-out for days and days—is probably the most limiting factor when a breeder is considering using A.I. The use of prostaglandin either reduces significantly or completely eliminates the need for heat detection.

The prostaglandin-based A.I. program results in a shorter breeding season with, of course, a subsequent shorter calving season. If breeding and calving seasons can be limited, the cattleman not only has more time to do other work but calving and breeding, if they are of short duration, are more likely to get more attention. The cattleman will have the luxury of scheduling calving and breeding to fit in with his other work. On top of that, breeding can be timed to take advantage of peak nutritional seasons in an area. Optimum feeding before and during breeding, if used, would be necessary for a shorter time and obviously would be less expensive.

Synchronized cows have more time to rest and recycle between calving and the next breeding. And their calves, born earlier and in a shorter period of time, will not only be more uniform but should market heavier.

In field studies conducted over the years, Lutalyse has not been shown to impair fertility of cattle and has no detrimental effects on offspring.

Not All in One Day

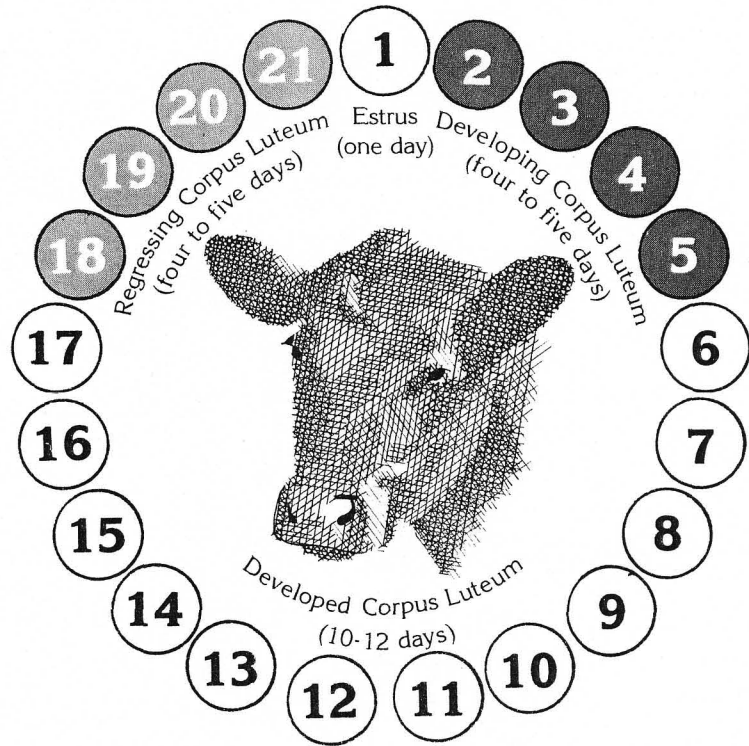
Although the breeding season is very short, calves are not all born at once. If all breeding is done in one day, calving will spread out over about 12 days—six days before and six days after the due date, according to information from the National Assn. of Animal Breeders.

Since breeding that would normally be spread out over 21 days will be condensed into half that time or even one day, depending on method used, there is one caution. Some thought should be given to who and how many will be needed to inseminate.

An understanding of the nature of a normal estrus cycle is necessary to understand how prostaglandins work.

The 21-day cycling period of a cow is controlled essentially by levels of the hormone progesterone. Decreased levels allow continuance of cycling activity; increased levels repress the reproductive system, prepare the uterus for pregnancy and, if

Normal Estrous Cycle



pregnancy occurs, maintain the uterus for that condition.

The accompanying chart illustrates this simplified explanation.

On day one an egg is released; the cow is in heat. In the following four to six days the corpus luteum (yellow body or CL) forms on the ovary at the site of ovulation. This yellow body produces progesterone. If pregnancy does not occur, the CL begins to regress (about day 16) and another egg-bearing structure begins to develop. By day 21 the cycle is complete; everything is geared to day one again.

The Cycle

It is the regression of the CL that signals the end of one cycle, the beginning of another. And prostaglandin, produced naturally in the uterus, breaks down the CL. Prostaglandin, then, is the substance that orchestrates the whole process. (Because it does break down the CL, prostaglandin will cause abortion.)

So when a female is injected with prostaglandin, her biological clock is tricked. An initial shot, by breaking down the CL and signaling the end of a cycle, will synchronize those animals between days six and 16. Since it won't affect those cows in days one to five or days 17-21, a second shot is necessary. This second shot will cause CL regression in all cycling animals, both those synchronized by the first shot and those not previously affected because they did not fall within day six to 16.

In a normally cycling herd, cows would

be in heat randomly throughout a 21-day period. Prostaglandin, used in any of several ways, groups estrus in females, bringing them all into heat within a short period of time.

Upjohn's labeled use of Lutalyse (that which the FDA approved) involves two 25-mg. injections (intramuscularly in the rump) given 11 days apart. Cows then either can be inseminated 75-80 hours after the second injection or they can be inseminated for five days on detected heat. Both programs have their advantages. The first eliminates the need for any detection and works well in herds known to be cycling. The second is probably the best when cycling status has not been determined—the visual detection then becomes a management aid and from it cycling activity can be estimated. The second method does require observation, although detection is concentrated in four or five days.

Other Methods

In addition to those approved by FDA and recommended by Upjohn, several other methods are seeing use.

One involves injection and 11 days of detection and insemination. As in a conventional A.I. program, cattle are detected and inseminated throughout the first five days. Then on day six animals either not in heat at that time or not already bred (remember, prostaglandin will cause abortion) are injected. Detection and breeding continues for five more days.

Of course, following any method, addi-

tional A.I. or natural service can be used.

The single-injection system obviously involves less investment in the drug itself (priced in the \$4-\$6 range per injection) and the cattle have to be handled less. This method will work best for the inseminator who is concerned about inseminating a large group of females in one day.

This system also allows for last-minute decisions. After five days of detecting, the percent of females cycling can be calculated and the cattleman can then decide whether that percentage warrants investment in prostaglandin.

The 2-injection system requires fewer days of insemination, and it can eliminate detection altogether. But drug costs are higher and labor, though needed for a shorter period of time, is more concentrated.

More complete information on systems can be obtained from the Upjohn Co., breeding services or veterinarians. And the National Assn. of Animal Breeders, P.O. Box 1033, Columbia, Mo. 65205, has a booklet available on the subject. The first copy is free, additional copies are 25¢ plus postage.

Management Makes or Breaks It

Lutalyse's developer, Upjohn Co., stresses that proper management is absolutely vital to the success of the program. The product will not synchronize females that aren't already cycling. It will not magically render non-fertile females fertile. In fact, the percent of animals already cycling in the herd is a good indication of the expected success or failure of the system in a particular herd.

The management conditions that make for a successful prostaglandin program are the same as those necessary for a successful A.I. program. An article in ANIMAL NUTRITION AND HEALTH by Rodney Gasch sums up the situation:

"Upjohn officials emphasize that Lutalyse is not a panacea for poor management. A heat synchronization program will tend to show up health and nutritional deficiencies rather than cure them.

"Upjohn is acutely aware of the potential pitfalls of Lutalyse use in herds with unhealthy management. 'Product promotion, in this case, is really product education,' states J.H. Sokolowski, Upjohn product manager. 'It is imperative that

veterinarians, artificial inseminators and cattlemen be totally familiar with the drug's features and benefits as well as acquire the knowledge to successfully use it.' To aid this information flow, Upjohn has increased its veterinarian staff and programs.

Educational Efforts

"According to G.A. Welch, Upjohn director of marketing, 'Upjohn is sponsoring a series of Lutalyse symposia in several locations and will be conducting extensive educational programs to inform people about Lutalyse and the breeding management needed.' Company brochures outline five essentials to successful Lutalyse breeding management:

"Animals must be cycling.

"Cattle must be on a 'gaining plane of nutrition' before calving and through breeding. Heifers should have reached 65% of mature body weight before breeding.

"Adequate handling facilities must be available to restrain animals three times in 15 days.

"Cattle should be vaccinated according to a veterinarian's recommendations.

"Use high-quality semen and a qualified inseminator."

HERE'S WHAT USERS SAY:

Nelson Tyler, Willow Springs, Mo., knew about the work on Lutalyse and had been waiting for several years for its approval. A call from his veterinarian last fall told him the prostaglandin product was finally available.

"We had real good luck," Tyler says. "We used it on 15 heifers and got 12 settled in the first go-round." Tyler used the 2-shot method, 11 days apart, breeding 80 hours after the last shot. He says normal A.I. conception rate has always been in the 70% range but adds, "This has been much easier. You don't have to spend so much time. We are planning on using it this spring on at least 40 cows."

After its approval last fall, Bill Borrer of Tehama Angus Ranch, Gerber, Calif., used the Upjohn product on 80 yearlings and 75 first-calf heifers. "We bred the cattle five days as we normally would and then gave them shots, then bred another five days, detecting visually. The conception was excellent—80% of the heifers." He adds that normally they would have been breeding 24-25 days and had never gotten more than 60% bred in that time. "I know they (Upjohn) wouldn't say that it does, but for some reason, for us the prostaglandin seemed to help conception."

He cautions that everyone isn't going to have those results, that good management is very important. But used under the right management conditions, he says, it will solve some problems, adding that if everyone uses prostaglandins, it may not help the bull market.

After participating in Upjohn's trials for two years under the direction of Dr. E.L. Moody, Montana State University, Gordon Booth, Cherry Creek Angus Ranch, Veteran, Wyo., plans to use Lutalyse again. He stresses good management as the key to success in this as in any A.I. program.

With about 70 heifers and 140 cows on the trial each

year, Booth heat detected for four days, administered Lutalyse and then used the detection method again.

He says his heifer breeding program is where prostaglandin proves most valuable. Synchronization, he explains, gives heifers a full three months to rest after their first calf. "Trying to get those first-calf heifers bred back has always been the big problem out in this country. By using prostaglandin, you can give every heifer out there the full amount of rest."

Shorter calving time is another advantage. Normally, Booth says, he would give heifers two chances, which takes 42 days, and that means about a 52-day calving season. "If you have to get up and check those heifers every night for two months, that gets old. And so if you can get it all over in two weeks, just look at all the sleep you can get."

Booth adds, "Everybody is worried about having their calves come all in one day," but he claims it doesn't work that way. Most of the cows calve in a 10-day period.

He says the 75% conception rate on first service (this figure is for the first year, the second year's data is not completed) is about average.

As part of his management program, Booth flushes his cows before breeding. "We start to flush the cows about 10 days before we go to breed. If we were using a regular A.I. program, we would have to feed them that extra ration at least 31 days; in fact, it would be closer to 40. With prostaglandin to cycle the cows, we only have to flush for about 20 days, half the time." And that, he says, results in a much lower feed bill.

Booth did have several cows the second year that had some problems breeding back, but a check of his records showed that there was no correlation with prostaglandin use—a couple of the cows had had prostaglandin shots while a couple (from a control group) had not.

And Booth's brother, a veterinarian who runs some cows himself and is in charge of the herd's health, sees no ill effects from the use of prostaglandin.