



These are the only three products available on the market in the U.S. to synchronize breeding in beef cattle. The success of any synchronization program depends not upon the product used, but largely upon the management program.

Synchronized Breeding

Study the Options

by Jeri Lynn Gilleland

Few technological advances have brought about as much improvement in the genetic base of the purebred beef industry as artificial insemination. Last year, 30 percent of all calves registered by the American Angus Assn. were the result of A.I. breeding. Some purebred registries are recording over 50 percent A.I. calves, while a few others have much lower percentages due to more stringent A.I. rules. Nonetheless, the opportunity to use top genetics for maximum herd improvement has been seized by countless breeders.

But along with this valuable tool there have been limitations. Certainly near the top of the drawbacks list are heat detection and labor requirements. In many beef cattle operations these factors have been the stumbling blocks to good, practical A.I. programs.

Enter estrus synchronization. The concept of breeding an entire herd of cows at the same time has attracted many breeders. Early on, innovators provided test herds for

various animal health companies, and today more producers are giving synchronization products a try.

But estrus synchronization has not been without problems. When first introduced, many breeders were anxious to capitalize on the potential of estrus synchronization. Expectations though, more often than not, were too great and results disappointing. Many producers had (and some still have) misconceptions about what a synchronization program could do for them. Most found it wasn't the miracle cure they first perceived

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The fact is: A well-planned estrus synchronization program is an effective management tool with advantages that can translate into increased profits. But it is only a tool, not a cure-all. Producers should study their lesson and weigh all the facts before deciding to enter into an estrus synchronization program.

Advantages of synchronization

Why synchronize? Most advantages are obvious. Estrus synchronization can make A.I. easier and more practical. The genetic progress expected from a top A.I. sire can be greater if more cows are bred A.I., and less by a clean-up bull. Numbers of clean-up bulls needed can be reduced.

Shortened breeding and calving seasons not only save time but allow for their scheduling around farm and ranch activities. This

NDC 0009-0327-10
30 ml vial Sterile Solution

Veterinary

Lutalyse®
(dinoprost tromethamine)

Equivalent to 5 mg dinoprost per ml

Upjohn

For Intramuscular Use for Estrus Synchronization in Beef Cattle and Non-Lactating Dairy Heifers and for Abortion of Foalot Heifers

Store at controlled room temperature 15°-30°C (59°-86°F)

Caution: Federal (U.S.A.) law restricts this drug to use by or on the order of a licensed veterinarian.

is also a stress reducer on the manager.

Calves born when the breeder wants can help alleviate calf mortality problems.

A more uniform calf crop lends more control over herd health and other management factors. Along with uniformity, more pounds at weaning can mean increased profits.

Time and labor normally spent on heat detection are reduced. Synchronization allows heifers to be bred and timed to calve ahead of cows.

With successful heat synchronization a producer can start breeding later in the season and still end up with the same average birth dates on his calves.

The advantage of breeding repeat services in a shorter period of time is one often overlooked by many producers. The conception rate for these repeat services is generally higher than for the first service. Exactly the opposite would be true for a non-synchronized herd.

Many embryo transfer programs would not be possible without the ability to synchronize recipient cows.

The embryo transfer aspect is one reason why Northcote Angus of Forest, Va., has a planned synchronization program. Manager Albert Epperly says, "Estrus synchronization has been an absolute necessity for our embryo transfer program. We synchronize about 150 recipients each year." In addition, over 80 percent of their 200-cow registered Angus herd has been involved in a synchronization program for the past several years.

For Lettunich & Sons of Payette, Idaho, synchronization has allowed more cows in their 700-cow herd to be bred to top sires. Ed Lettunich says, "With as many cows as we breed A.I. it would be almost impossible to do it without a synchronization program. We'd be out there all summer trying to breed cows by natural heat detection."

Lettunich feels many purebred breeders are not getting the maximum number of calves possible by A.I. sires. "For a purebred breeder, synchronization maximizes potential in A.I.," says Lettunich. "But it also requires a lot of facilities and a lot of manpower to make it work. I'm not overly enthusiastic about it for a commercial cow breeder."

Management is the key

Producers are advised to consult their veterinarians and A.I. technicians or semen suppliers before entering into an estrus synchronization program for the first time. Like successful A.I. programs, successful estrus synchronization programs don't just happen. The bottom line is there has to be good management to get good results.

Dr. Mike Smith, reproductive physiologist at the University of Missouri, says, "Before producers use any synchronization program or before they go into any A.I. program, they need to have a good management system. There is absolutely no question about this."

Smith adds, "If cows are in poor condition producers might as well forget synchro-

nizing. Breeders have got to really be on top of the nutrition of these cattle. They also have to be very cautious of where they get their semen and who breeds their cows. They have to have a good overall herd health program."

The estrous cycle

To fully understand how estrus synchronization works it is necessary to understand the cow's estrous cycle. The normal estrous cycle is sometimes likened to a 21-day clock. The cycle is repeated approximately every 21 days, unless the animal becomes pregnant. With pregnancy, the cycle ceases during the 9-month gestation period. After calving and a post-partum rest, the cycle resumes. Normally a beef cow starts cycling

Estrus synchronization can make A.I. easier and more practical.

around 45 to 70 days following parturition. (Mature cows will start cycling sooner after calving than will first-calf or second-calf females.) An insufficient number of days post-partum can result in a less than successful synchronization program.

On day 1 of the cycle an ovarian follicle is producing estrogen resulting in visible signs of heat. On day 2 ovulation (release of the egg) takes place.

By day 5 of the cycle there is formation of a corpus luteum (C.L.) on the ovary. The C.L. is a temporary endocrine gland which produces the hormone progesterone. As long as the C.L. is present (about 10 to 12 days) the production of progesterone keeps the animal from exhibiting estrus. Progesterone also prepares the uterus for pregnancy.

If the animal has not become pregnant, then on day 15 or 16 of the cycle, the hormone prostaglandin is produced by the uterus. It causes C.L. regression and there is then subsequent formation of a new estrous cycle.

The estrous cycle is influenced by various body hormones, principally estrogen, luteinizing hormone, follicle stimulation hormone, progesterone and prostaglandin. (Refer to page 108 for article on "Hormonal Control of the Estrous Cycle.")

Commercial synchronization products

Artificial regulation of this cycle, if done properly, can allow producers to maximize their herd's reproductive efficiency. Currently there are three products available commercially to U.S. beef producers for estrus synchronization. They are Estrumate, Lutalyse and Syncro-Mate-B. The first two are injectable prostaglandin products which will cause regression of the C.L. and bring animals into heat for breeding. The third product consists of an injection of a progestin

and estrogen solution and an ear implant of progestin that creates a false C.L. Removal of the implant causes estrus.

While Estrumate and Lutalyse are the only prostaglandin synchronization products currently on the market, a third is awaiting FDA approval. A spokesman for Hoffman-LaRoche, producers of the product, says it likely will be one to two years before their product will be available commercially. The patent name is alphaprostal and the solution is already being marketed for use in horses under the name Alfavet. Research work at Kansas State University and Texas A&M University shows alphaprostal essentially achieves results similar to Estrumate and Lutalyse.

Diamond Laboratories Inc., a Syntex Company, currently distributes Bovilene, an abortifacient. They are exploring various label extensions on the product and bovine estrus synchronization is a possibility.

Lutalyse and Estrumate

Lutalyse, from the Upjohn Co., is the prostaglandin F₂alpha. It has been available commercially in the United States since November of 1979.

Estrumate is produced by Imperial Chemical Industries of England and has been marketed since early 1982 in the United States by Haver-Lockhart, Bayvet Division, Miles Laboratories Inc. (Bayvet is awaiting FDA approval to produce Estrumate in the United States.)

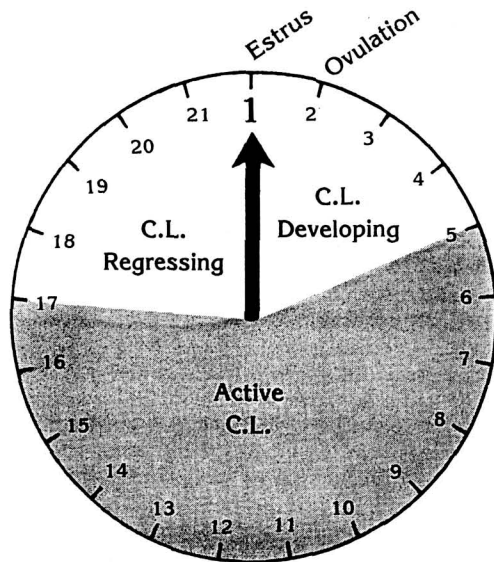
Essentially, these two prostaglandin products work in the same manner and methods for their administration are basically the same. It should be noted, however, that Estrumate is a more potent solution than Lutalyse, and therefore less dosage is recommended (2cc of Estrumate per injection vs. 5cc of Lutalyse) for synchronization purposes. Both products are prescription drugs available only through a licensed veterinarian. Estrumate is approved for synchronization use in beef and dairy cows and heifers. Lutalyse is approved for synchronization use in beef cows and heifers and dairy heifers only.

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Both products can also be used for therapeutic purposes such as abortion of unwanted pregnancies and mummified fetuses. Only Estrumate is approved for treatment of luteal cysts and only Lutalyse is approved for treatment of pyometra.

The important factor that sets these two products apart from Syncro-Mate-B is that for Estrumate and Lutalyse to be effective, the animals must have a functional C.L. in

21-Day Estrous Cycle



The estrous cycle is likened to a 21-day clock with the cycle being repeated every 21 days unless the animal becomes pregnant. Estrumate and Lutalyse work by causing the C.L. to regress and then the animal comes in heat for breeding. Therefore, they will work only when the animal has an active C.L. Syncro-Mate-B will be effective at any stage of the cycle.

order for the prostaglandin to induce luteolysis (C.L. regression). Therefore, the products will work only when the animal is between days 5 to 18 of the estrous cycle. However, cows more than day 18 into their cycle are not considered a problem as they will be returning to estrus at approximately the same time as those treated with the prostaglandins. Animals which are less than day 5 into their estrous cycle will not respond to the prostaglandin treatment. Producers can determine which animals have a C.L. present by having an experienced technician or veterinarian perform a rectal palpation.

Both Estrumate and Lutalyse are for intramuscular injection. Careless injection of the product, such as not using the recommended gauge needle, neck injections or not taking into consideration the flesh condition of the animal can result in subcutaneous injection and failure of the animal to respond to the drug.

Systems for prostaglandin administration

Systems by which these two products can be administered are numerous. Most are flexible and involve either one-injection or two-injection programs. Breeders should determine which system will work best for their operation based on available labor and capital as well as herd size. Not only drug and technician costs, but also semen costs, especially for the purebred breeder, are important variables. Some of the more popular prostaglandin administration programs include:

1) Observe heat for five days, breeding those cows which come in. Theoretically, 5 percent of the cows in a herd should be in heat each day. Therefore 25 to 30 percent of the herd should come in heat during this period. Failure to observe these percentages

can either indicate the females are not yet cycling or the heat detection accuracy is poor. (Although in small herds these numbers will be affected by the laws of chance.) If the cyclicity of the herd is observed as normal, then on day 6 inject all cows which have not been bred with one shot of prostaglandin (either Estrumate or Lutalyse). Heat check and breed cows as usual (approximately 12 hours after heat detection). Cattle not already inseminated may be bred

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at 72 hours post injection or both at 72 hours and 96 hours following injection. This type of program will be a favorite of those breeders doing their own A.I.

2) Another single injection program calls for palpation of the ovaries to sort out cattle that could not respond to the injection (those not having a mature C.L. or those with reproductive problems). This is followed by A.I. at observed estrus. If heat detection is not possible animals can be force bred at 72 hours post injection or both at 72 and 96 hours. The obvious savings in drug costs makes the one injection program popular.

3) Two prostaglandin injections can be given at 11-day intervals (10-day to 12-day)

followed by A.I. at observed estrus, or forced breeding at 72 hours post second injection, or breeding both at 72 and 96 hours post second injection. In general, high conception rates are achieved with breeding following heat detection vs. timed insemination only.

4) Two injections can be given at 11-day intervals followed by breeding with heat detection after the first injection. The second injection is then given to those cows not already bred. Breeding may follow after observed estrus, or at 72 hours or both at 72 and 96 hours post second injection. This method, a favorite of many producers and technicians, allows for maximum flexibility.

Following prostaglandin injection, the female may be in heat as soon as 48 hours, yet others may take up to over 100 hours to respond. Heifers generally respond sooner than cows—some as early as 36 hours post-injection.

The 72-hour timed insemination recommendation comes from the Estrumate people, as well as many universities and technicians. However, literature distributed with Lutalyse recommends breeding at 80 hours following injection.

Smith believes the 72 hours is more accurate. He also advocates heat checking as opposed to timed insemination only. "With the prostaglandin products many animals are in heat 48 hours after you inject them. If you wait until 80 hours to force breed them that can be too late. A cow ovulates 30 hours after she comes in heat and the egg lives only for about 20 hours. Proper timing is essential to allow enough time for the sperm to be capacitated and get up there to fertilize the egg," says Smith.

The Northcote Angus synchronization program involves the use of Estrumate. Estrumate was used first experimentally in their herd; they had good results, so they stuck with it.

Epperly explains the Northcote system, "Cows are grouped so they are at least 45 days post-partum before starting the synchronization program. All cows in the herd are first palpated to detect any problems at the onset. Cows are bred for five days and on the morning of the sixth day any cows that have not come in heat are injected with Estrumate. Cows are then bred for the next five to six days. On day 11 any cows which have not come in heat and been bred receive a second injection."

Syncro-Mate-B

Syncro-Mate-B, a product from CEVA Laboratories Inc., has only been on the market since April of 1983. It has been approved for use only in beef and dairy heifers. CEVA is currently awaiting FDA clearance for use in beef cows. According to John Olsen, CEVA marketing manager for reproductive products, the company is optimistic that FDA approval for use in beef cows will come early this spring.

Unlike the prostaglandin products, Syncro-Mate-B is available as an over-the-counter product which can be administered by

the producer. Market channels are primarily through major A.I. studs and local veterinarians.

Olsen estimates that 80 percent of the Syncro-Mate-B sold last year went for use in beef cattle and 20 percent for use in dairy cattle. For competitors Estrumate and Lutalyse, company spokesmen report just the opposite. (Note: All Syncro-Mate-B is sold for synchronization only. There are no exact figures available to show how much Estrumate and Lutalyse are sold for synchronization vs. therapeutic purposes.)

Syncro-Mate-B advertising and promotion has been targeted primarily to beef producers, even though the dairy industry dominates A.I. statistics (80 percent of all dairy cows are artificially bred compared to only 5 percent of all beef cows). Some of the reasons for CEVA's advertising direction include: 1) Syncro-Mate-B will not be cleared for use in lactating dairy cows—only dairy heifers. 2) Dairy producers have already been successfully using the prostaglandin products. So CEVA initially sought a new market of beef producers not necessarily already using A.I. 3) The mode of action of the product.

Olsen explains the third reason: "The beef man doesn't want to mess around with heat detection and that's our big selling point. We can get good results with timed breeding. Also, the beef people are very amiable towards and experienced in implanting cattle, and the dairy people are not."

The product itself is made up of two components: an ear implant containing a potent progestin compound called norgestomet; and an injectable solution of norgestomet and an estrogen called estradiol valerate.

Implantation and intramuscular injection are administered at the same time. This should occur 12 days prior to the planned insemination date. The implant should be removed nine days after implanting. Heifers can then be inseminated without heat detection 48 to 54 hours after implant removal.

Syncro-Mate-B will work at any time in the estrous cycle. It is not necessary that the animal have a functional C.L.

Unlike the prostaglandins, most beef cattle field trials are showing best results come from timed breeding as opposed to heat checking.

"We've had people who said 'I don't believe you' and they heat detected," says Olsen. "They found, though, that they were breeding the animals in that six hour period anyway."

Smith agrees that his experience has shown no advantages to breeding at observed estrus.

Syncro-Mate-B will work at any time in the estrous cycle. It is not necessary that the

animal have a functional C.L. The implant insures that no animals will exhibit estrus before its removal. The combination injection-implant treatment assures that animals in heat will not form a C.L.; animals which had just ovulated will not form a C.L.; and the C.L. will regress in animals with a C.L. present at the time of treatment.

Albert Epperly has had good success using Estrumate at Northcote Angus and sees no reason to change.

"When the product is cleared for use in beef cows," says Olsen, "one system of administration that we will stress involves calf removal."

Olsen is referring to the Shang method which was developed by Smith as a graduate student at Texas A&M working under Dr. Jim Wiltbank. (Wiltbank, a noted reproductive authority, is currently at Brigham Young University in Provo, Utah.) At the time of implant removal calves are removed from cows for 48 hours prior to breeding. Calves are then reunited with their mothers as they are turned out of the breeding chute.

The purpose of the Shang method is to cause a noncycling cow to come in heat. "There is a synergistic action between calf removal and Syncro-Mate-B that causes cycling. By using the Shang treatment in noncycling cows you get more cows in heat over a shorter period of time," explains Smith. "There is no known advantage of calf removal in the cycling animal."

Smith says, "Our research has never shown any problems with stress, disease, scours or mothering cows and calves up. Neither does it decrease milk production in the cows or weaning weight in the calves."

He suggests producers might want to separate cows and calves so they are not right across the fence from each other.

"People get worried and don't like to take the calves off the cows. I don't like to either, but the point is that there are definite advantages to doing it," says Smith.

In addition to the Shang treatment inducing cyclicity, Syncro-Mate-B by itself can also induce cyclicity in some animals. "Syncro-Mate-B can start heifers which are approaching puberty and post-partum cows cycling earlier than they normally would," says Smith. "But these animals need to be close to cycling."

Olsen agrees that Syncro-Mate-B will start some animals cycling. But he also cautions, "This has been misinterpreted. There is a misconception that producers can take a group of heifers and not worry about how big they are, what their nutritional plane is or how old they are and get results from Syncro-Mate-B. That is absolutely false."

Which product to use?

There are breeders across the country

who have used each of the three products discussed very successfully in their program. Breeders need to choose a product adaptable to their operation. Labor involved, facilities, skilled technicians available and costs of each product and its system of administration will certainly weigh heavily in the decision making.

For Ed Lettunich Syncro-Mate-B works best. He says, "We used the prostaglandin products in the past and weren't too excited about them. But Syncro-Mate-B is a product that's working pretty good for us."

"Producers have got to be sure to flush the animals and be sure they are coming in heat—or ready to come in heat," advises Lettunich. "One thing we like about Syncro-Mate-B is that it helps them to come in heat."

Albert Epperly has had good success using Estrumate at Northcote Angus and sees no reason to change. He says, "We used Syncro-Mate-B on a very small basis. But because of the extra labor involved to give the implant we haven't used it on a larger basis. We've also used Lutalyse before and we had every bit as much success with it as we do Estrumate. One reason we like Estrumate is because we give a smaller dosage. It's also been economical for our situation."

Epperly also warns that cows have to be on a high plane of nutrition and that cows must have an adequate post-partum rest prior to administering a synchronization program. "If you go through and observe heat in the cattle before you use the drug, it will save a lot of heartbreak," he says.

Costs of the products will vary across the country.

Costs of the products will vary across the country. Generally, Lutalyse will cost from \$4.00 to \$5.00 per injection and Estrumate is approximately \$4.00 to \$6.00 per injection. Costs range widely for Syncro-Mate-B, but producers should expect to pay around \$10.00 per cow.

The percent of cows bred with each product is certainly comparable. Well-managed synchronization programs using prostaglandins can expect conception rates ranging from 50 percent to 70 percent, possibly even higher. Olsen reports CEVA is finding field results, on the average, are ranging between 65 percent and 75 percent for producers using Syncro-Mate-B.

Whether or not to synchronize, which product to use for synchronization and the system used to administer it are decisions many breeders will be facing this spring. The potential to be realized from any type of synchronization program will only be as great as the management involved. Thus, success of a synchronization program is determined long before any drug is given.

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