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If someone could find a way to dependably time the estrus or heat cycle in livestock to coincide with working hours, many animal producers using artificial insemination might some day have as normal an eight to five workday schedule as their city cousins. They also may improve their profit picture.

Things don't happen that way naturally but if they could, livestock births would be strung out over several days or weeks during calving season. Farrowing might be in the daytime and sheep producers might have a sane lambing season to look forward to. The producer could spend his time doing other chores rather than inspecting female animals for heat or constantly waiting for parturition.

5 Livestock Modern Tools?

If heat timing could be done with a higher percentage of certainty, it would constitute a major scientific breakthrough and certainly make AI attractive as a tool to many more cattlemen and other livestock producers. Presently, few producers can afford to buy a sire as good as the one they can use artificially.

We May Already Have A Tool

Dr. Guy Kiracofe, reproductive physiologist for the Department of Animal Sciences and Industry at Kansas State University, and other animal scientists around the country think that effective tools to synchronize heat might already have been discovered. Prostaglandin, for one, might be used to produce a dependable synchronization of heat in cattle. Com-

pounds derived from this naturally occurring body chemical injected into a female that's the right age for breeding and is cycling may also provide a number of other fringe benefits for livestock producers that open the door in the future to development of still other techniques, such as superovulation, embryo transfer and mass induced calving. With these developments, ways to increase conception rates may also be developed.

Scientists may be on the verge of introducing such products into the market. Presently there are several hormones actively being investigated for the Food and Drug Administration approval as effective and marketable heat synchronization products.

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Kiracofe said, "it is apparent that the discovery of one action of one type of prostaglandin eventually will constitute a major breakthrough in meat animal production. The surface so far has just been scratched. There will be other uses found for prostaglandin and the usefulness will not be limited to PGF₂ alpha, one of several types of prostaglandin."

Compounds mentioned by Kiracofe under test for FDA approval for estrus synchronization in cattle include:

Name	Company	Hormone
Lutalyse	The Upjohn Co.	Prostaglandin F ₂ alpha (PGF ₂ alpha)
Estrumate	Imperial Chemical Industries	PGF ₂ alpha Analogue (ICI 80996 or Colprostenol)
Syncro-Mate B	G. D. Searle Co.	Norgestomet Implant (SC 21009) and Estradiol Valerate Injection
PRID Vaginal Coil	Abbott Laboratories	Progesterone

PROSTAGLANDIN F₂Alpha

For livestock producers with some chemistry background, prostaglandin is an unsaturated fatty acid with a cyclopentyl ring that has the basic skeleton of prostanoic acid. Translated, that means that prostaglandin may be produced in all body cells, but its richest source is in the sexual tract — the uterus, placenta, and seminal vesicles. It can be used to depress progesterone production (a hormone that prevents heat by inducing corpus luteum regression.)

What Will It Mean?

It means that a potent new experimental compound that scientists have developed (called PGF₂ alpha) can cause females to show heat when the producer wants them to. The meat animals have very minimal side effects to the new compound when it is given in heavy doses, according to Kiracofe. "Various degrees of effectiveness have been demonstrated in research at Kansas State University and at other places for some of the potential uses of this compound," he said.

Kiracofe said in addition to the convenience the compound offers in heat synchronization in cattle, other benefits may be, producing earlier calving dates resulting in larger calves at weaning, or allowing earlier breeding of replacement heifers and pre-determining breeding time for the entire herd.

Prostaglandin F₂ alpha may also remedy some female problems in livestock, such as retained corpora lutea,

luteal follicular cysts, silent ovulations and other related problems.

Abortion sometimes are desirable in meat animals. For example, pregnancies are something feedlot operators would like to avoid because fat heifers present a multitude of problems that could spell economic loss. PGF₂ alpha, one form of prostaglandin, solves this problem. It has shown to be an effective abortifacient in early gestation of heifers (up to 3 months), according to Kiracofe.

"More data is needed, however, regarding effective levels later in gestation and in combination with various feed additives, growth stimulants and

stress factors. The compound may also be a source which could be used to abort heifers bred too young or cows bred to an undesired bull. Breeding animals that are thought to be pregnant by an undesirable male or at an undesirable time could be treated without complication. This is not the case with estrogens or other abortifacients that have been used in the past," he explained.

Theoretically, PGF₂ alpha has the same potential uses in sheep as it has in cattle. It will stop the heat cycle and allow the ewe to return to heat any time except the first three to four days after ovulation and any time except the first five days in the cow. The sow is relatively less responsive to this compound during all periods except for late cycle or during gestation. This means it should not be considered as a heat synchronizer in swine, but might be used to induce farrowing at a desired time.

Sperm transport in both the male and female tract can also be affected by this prostaglandin. Increased number of sperm have been collected following PGF₂ alpha administration. There is thus far no practical application for this information, but some day it might be used to improve AI potential.

Syncro-Mate B


Syncro-Mate B treatment for estrus or heat synchronization involves placing a 6 milligram norgestomet implant in the ear of the cow for nine days. The

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Nebraska Juniors Elect Officers

The Nebraska Junior Angus Association held their annual meeting and futurity at Grand Island in conjunction with the 28th Annual Nebraska Angus Association Futurity Show and Sale.

Newly elected junior officers for the 1979 term are Jennifer Uhrig, Hemingford, president; Judd Baldrige, North Platte, first vice-president; Brian Fitzgerald, Harrison, second vice-president; Roberta Barr, Liberty, secretary-treasurer; Kerri Votaw, Wellfleet, news-reporter; Kenton Peterson, Holdrege and Tim Minert, Dunning, new directors.

Showmanship winners to represent Nebraska at the National Junior Angus Showmanship Contest held during the National Junior Angus Heifer Show at Indianapolis, Indiana, in July will be Brian Fitzgerald, Harrison, and Jennifer Uhrig, Hemingford. Alternates are Susan Grabouski, Beatrice, and Mark Slagle, Sargent. 

cow or heifer is injected intramuscularly with 5 milligrams of estradiol valerate and 3 milligrams of norgestomet at the time of implantation.

The estradiol-norgestomet injection puts the cow in a stage of the cycle where she is capable of coming in heat once the implant is removed. The norgestomet implant holds the cow out of heat until the implant is removed nine days later. Removing suckling calves at the time the implant is removed speeds up and more closely synchronizes heat in lactating cows. With this procedure calves are usually put back with the cows at breeding 48 hours after implant removal.

Syncro-Mate B is effective in inducing heat in non-cycling cattle; however, fertility after induced estrus appears to vary from good to low between herds.

Progesterone

The first attempts at synchronizing heat was with the hormone progesterone. Progesterone is normally produced by the corpus luteum (a gland that forms on the ovary after ovulation) and prevents heat and ovulation. Both natural progesterone and orally active

progestogens such as melengesterol acetate are effective in synchronizing heat in cycling animals by preventing heat and ovulation until all animals are in the physiological state that occurs just prior to heat.

When the foreign progesterone is removed, animals tend to show heat at the same time. Researchers have found that it is necessary to administer progesterone for them nearly the length of the normal progesterone phase of the cycle (approximately 16 days in the cow) to accomplish good synchronization. The problem is conception rates after such treatments have been low at the first synchronized heat.

Interest in progesterone treatment for synchronization was revived in the early 1970's by Abbott Laboratories with the invention of the progesterone releasing intravaginal device called PRID. Although some favorable results were obtained by this method of progesterone administration, testing of the PRID has been suspended in the United States.

Applied Use Of Estrus Or Heat Synchronization

Kiracofe said experimental results look encouraging with both PGF₂ alpha and Syncro-Mate B, but he warned not to expect more than the treatment is capable of providing.

Kiracofe said, "Reproductive efficiency will always be decided by proper management and nutrition. Estrus synchronization should only be looked at as a management tool."

"The number of cows that settle during a synchronization period, or at an appointed breeding time is highly dependent on the number of cows properly cycling at the time the synchronization tool was used. The percentage of cattle cycling at the beginning of the breeding season is usually highly over-estimated, so is the pregnancy rate (percent of the herd pregnant)," Kiracofe said.

According to Kiracofe, "Few herds have a pregnancy rate as high as 70 per cent after 21 days of breeding. This means you should not expect to get 70 per cent of the herd settled to a synchronized estrus during the first one to five days of the breeding season."

Kiracofe also said that the pregnancy rates with synchronized heat have varied from 30 to 70 per cent in experimental trials at Kansas State, but have been comparable to non-synchronized controls. "In all cases, a higher percentage of synchronized cows have settled in a 25-day AI period than with cows not artificially synchronized," he said. 