

# Estrus Synchronization and Reproduction Management of Beef Herds in the South

Gene E. Cope, D.V.M.,  
Extension Veterinarian  
University of Florida, Gainesville, Florida

Estrus synchronization has potential for increasing beef production. It has been adopted in many areas, but low fertility among southern cattle possibly due to nutrition and high environmental temperatures has impeded progress. For example, a Florida breeding trial (G.E. Cope 1980<sup>9</sup>) had to be delayed from October to May because cattle purchased from a producer that had declared bankruptcy were not cycling due to inadequate nutrition. The animals in the trial were all diagnosed as cycling by palpation. Approximately a week later synchronization began. Two injections of prostaglandins were given 11 days apart. The trial was to determine conception of breeding 80 hours after the second injection vs. breeding at 72 and 96 hours. The results were 19% conception in the cows bred at 80 hours and 28% conception in those bred at 72 and 96 hours. The poor results were thought to be due to hot weather which caused many animals to stop cycling in the three weeks interim between palpation and breeding. Because conception rates are usually poor during summer it was decided to delay the trial until January. The trial format was used at this time was the same, pregnancy was determined by palpation 60 days post breeding with the following results:

80 hour	54%
72 & 96 hour	43%
TOTAL	49%

G.E. Cope, 1981<sup>9</sup>

The importance of doing everything right was again emphasized. Semen ordered from a breeding service did not arrive in time. Therefore, low quality semen from a neighbor's bull was used. Seventeen cows were bred with this bull's semen and only two conceived. Results of conception not counting the low fertility bull were:

80 hour	70%
72 & 96 hour	77%
TOTAL	73%

G.E. Cope, 1981<sup>9</sup>

**Since cows must be cycling for synchronization to be effective, this paper outlines management practices successful in the south and trials underway to improve estrus synchronization in Brahman type cattle.**

The majority of reproductive problems are caused by correctable management factors such as: inadequate nutrition; poor management of heifers; excessive parturient deaths; retention of slow or repeat breeder cows (poor culling practices); or diseases.

The nature and magnitude of reproductive losses vary from ranch to ranch and from year to year. Wiltbank et al<sup>1</sup> reported distribution of reproductive losses in one trial as:

Failure to conceive	17%
Fetal death	3%
At calving	7%
Birth to weaning	4%
Total Calf Crop	70%

The losses from failure to become pregnant result from anestrus or failure to conceive. The magnitude of the losses will again vary from ranch to ranch and year to year, but an idea of the problem can be gained by looking at the losses in the above study.

## "Why Cows Suckling Calves Do Not Conceive"

Cows fail to show heat	21%
Cows bred one time	
Last 30 days of breeding season	17%
Prior to last 30 days of breeding	17%
Cows bred two or more times	45%

J.N. Wiltbank<sup>1</sup>

We need to get more cows in heat early in the season and improve cows conceiving from a single breeding.

## Nutrition of the Breeding Herd

Nutrition is probably the most important environmental influence affecting reproduction.

Most work<sup>2</sup> has shown that to get a high percentage of cows in heat and to get the maximum possible number successfully bred, cows should gain  $\frac{1}{2}$  to  $\frac{3}{4}$  pounds per day after calving and throughout the breeding season.

Calving Time	PREGNANT AFTER BREEDING (%)					
	20 days (Mar. 13-Apr. 2)			80 days (Mar. 13-June 1)		
	Thin*	Moderate*	Good*	Thin*	Moderate*	Good*
1st 20 days (Dec. 20-Jan. 9)	40	55	60	81	95	95
2nd 20 days (Jan. 10-Jan. 30)	33	47	58	80	94	95
3rd 20 days (Jan. 31-Feb. 9)	20	27	25	74	88	93
4th 20 days (Feb. 10-Mar. 2)	6	9	12	54	78	85

\*Condition at Calving Time

*J.N. Wiltbank<sup>1</sup>*

Cows unusually thin at calving should gain 1½ to 2 pounds per day following calving. Such gains are expensive; the best solution is to have them in good condition at calving and making moderate gains after calving. Do not attempt to economize on feed during the breeding season. If cows do not gain weight after calving, reproductive performance will be poor or cows will breed late in the season.

Most situations involve a combination of conditions. This is trial data showing the effect of cow condition and time of calving on pregnancy. The breeding season was 80 days long and started 80 days after the calving season started.

#### Management of Heifers

If the first calf heifers are bred at the same time as the mature cow herd they will have fewer calves during their second breeding season because they take longer than mature cows to cycle following calving and sometimes don't come into heat during the breeding season. This delay is

because they are required to function as a mature cow regarding body maintenance, lactation, rebreeding and growth. In addition, heifers are shedding incisor teeth. This limits capacity for grazing. Thus heifers require extra nutrients or some body functions will decline and the first to be eliminated is rebreeding.

Management of first-calf heifers establishes their lifetime calving pattern and is the key to successful herd health programs. Two successful management practices for first-calf heifers are breeding virgin heifers 20 to 30 days earlier than the regular cow herd and early weaning of their calves. Weaning of calves from heifers at 30 to 90 days of age removes the stress of lactation and leaves nutrients for growth and rebreeding. This practice is especially effective during drought conditions. Data indicate that separating the calf from its mother for 48 hours can increase both estrous and pregnancy rates. This technique may not be effective with thin cows. For best results cows should be gaining weight when calf removal occurs.

#### Short Term Calf Removal and Pregnancy

	No. Cows	Cycling Prior To Treatment (%)	After 21 days of Breeding	
			Heat (%)	Pregnant (%)
Control	52	13	31	17
Calves Removed for 48 Hrs.	52	23	62	44

*J.N. Wiltbank<sup>1</sup>*

Short term weaning combined with estrus synchronization has produced synergistic results in a number of trials.<sup>1</sup>

In a study to determine if reproductive performance and pounds of calf weaned could be increased by changing some management practices, 140 yearling Angus heifers were assigned to either new or conventional breeding programs.<sup>4</sup> The new management heifers were managed to calve early and in a short time by starting breeding 20 days earlier than the cow herd; breeding for only 45 days; synchronizing

estrus; breeding 70% more heifers than were needed for replacements; and selecting replacements from heifers that became pregnant early in the breeding season. In contrast, the conventionally managed heifers were exposed for breeding for 90 days, starting the same day as the cow herd. In subsequent years, open and poor producing cows were replaced. Heifers were not switched between groups and

were managed as the group they originated from. Replacement heifers for the conventionally managed group were selected on 205 day adjusted weights, conformation, and production potential of their dam. These criteria were

not used for selection in the new management group. Instead, all available heifers were bred and the heifers becoming pregnant earliest were selected as replacements.

	<u>New Management</u>	<u>Conventional Management</u>
Number of pregnant replacements needed <sup>a</sup>	50	50
Number of heifers exposed for breeding	86	54
Breeding season started <sup>b</sup>		
Virgin Heifers	4/22/81	5/12/81
Cows	5/12/81	5/12/81
Length of breeding season	45 days	90 days
Synchronization of estrus <sup>c</sup>	yes	no

<sup>a</sup>The number of heifers needed or exposed in the first year of the experiment. In subsequent years, the number of replacement heifers needed and exposed varied.

<sup>b</sup>The start of the breeding season varied 2 to 3 days during the 5-year study.

<sup>c</sup>Three different methods of synchronization of estrus were used during the course of this study.

*Spitzer, et al (1975)<sup>4</sup>*

#### Cows in Heat and Pregnant in Days of Breeding Season (4-year average)

	New Management		Conventional Management	
	<u>Estrus</u>	<u>Pregnant</u>	<u>Estrus</u>	<u>Pregnant</u>
First 25 days of breeding season	98%	74%	81%	60%
First 45 days of breeding season	100%	87%	93%	78%
End of breeding season	—	—	100%	92%

*Spitzer et al (1975)<sup>4</sup>*

The criteria for measuring reproductive performance were cows in heat and cows pregnant. More cows exhibited estrus and became pregnant earlier in the new management group than in the conventionally managed group. Final pregnancy rates were essentially the same in both groups, 87 and 92% for new management and conventional management groups, respectively. However, the 87% was obtained with a 45-day breeding season while the 92% was over a 90-day breeding season. This four year test showed an increase in pounds of calf weaned with the improved reproductive performance in new management cows.

#### Calf Data (Four Calf Crops)

	<u>New Management</u>	<u>Conventional Management</u>	<u>Difference</u>
Calf weaning weight (lbs.)	446	413	33
Calf age (days)	210	187	23

*Spitzer, et al (1975)<sup>4</sup>*

#### Calving Time When Cows Were Two Years Of Age

Calving Time	<u>New Management Group</u>	<u>Control Group</u>
February 9 or before	31	0
February 10 to March 6	19	23
March 7 to March 26	0	7
March 27 to April 16	0	7
April 17 and after	0	3
TOTAL	50	40

#### Estrus Synchronization

Manufacturers recommend timed breeding 80 hours following the second synchronizing injection. In a number of trials conducted in Florida<sup>7</sup> there was approximately 10% increase in conception by breeding at 72 and again at 96

hours following the second injection. Dr. M.J. Fields<sup>7</sup> recommends the use of three inseminators if breeding approximately 100 head or more in one day. His data shows a significant increase in conception when an inseminator would breed five cows then rotate to another inseminator. If an inseminator has trouble breeding a cow rotate immediately.

Cattle with Brahman breeding are difficult to breed by artificial insemination. Estrus is harder to detect and they are also in heat a shorter time than British breeds.

### Bovine Estrous Cycle

	British	
Estrous Cycle Length	19-22 day	19-22 day
Estrus (Heat)		
(Southern Cattle)	10-12 hr	7 hr*
Estrus to LH Surge	3-5 hr	.4±3.4 hr
Estrus to Ovulation	25-28 hr	19-26 hr

\*26% between 2.0 and 3.5 hr.

*Michael J. Fields, PhD*

The excitable nature of these animals, the short duration of estrus and other less apparent physiological differences in Brahman or Brahman-cross cattle, will require modification of traditional beef management<sup>6</sup>. Research trials conducted in Florida showed estrus is suppressed by inserting a breeding pipette through the cervix (sham A.I.). (Heifers synchronized with cloprostenol and inseminated upon observed estrus, expressed estrus equally during the period from day 1 through 3 & 4 through 7 respectively. However,

in timed A.I. (sham A.I.) 66 heifers expressed estrus on days 1 through 3 while only eight expressed estrus on days 4 through 7. Thus passing a catheter suppresses estrus in animals that would normally show estrus late in the synchronized period). Why this occurs is under investigation. A working hypothesis is that vaginal stimulation induces release of L.H. thereby suppressing estrus. Brahman cows synchronized with cloprostenol (CLP) also had much lower levels of serum progesterone than pasture mates cycling normally. This suggests that the follicles are not developing fully when estrus is synchronized. These phenomena do not occur in British breeds.

**Estrus synchronization, especially in Brahman cattle, requires more research but there is enough known in southern British breeds to produce reasonable results. For this major shift in beef cattle management to be accepted by the beef industry it will need to be encouraged by the veterinary profession. It could be beneficial to both your practice and your client.**

### References

1. Wiltbank, J.N., E.J. Warwick, E.H. Vernon, B.M. Priode. 1961. Factors Affecting Net Calf Crop in Beef Cattle. *Journal Animal Science*, Vol. 20, p. 409.
2. Beverly J.R., J.C. Spitzer. Management of Replacements for high Reproductive & Calving Rate. *Bull. 1213 (1980), Tex. Ag. Ext.*
3. Beverly J.R. Ways to Increase Percent Calf Crop in Beef Cattle. *Bull. 1107, Tex. Ag. Ext.*
4. Spitzer, J.C., D.B. LaFeuer, J.N. Wiltbank. Increase Beef Cow Productivity by Increasing Reproductive Performance. *Colo. State Univ. Exp. Sta. Bull., General series 949 (1975)*
5. Wiltbank, J.N., S.E. Mares. Proceedings of the 11th Conference on Artificial Insemination in Beef Cattle. (1977) Denver, Colo.
6. Hardin, D.R. Wornick, A.C., Wise, T.H., Schultz, R.H., Fields, M.J. Artificial Insemination of Subtropical Commercial Beef Cattle Following Synchronization with Cloprostenol *Theriogenology*, Oct. 1980, Vol. 14, No. 4.
7. Beverly, J.R. Personal correspondence.
8. Fields, M.J. Personal correspondence.
9. Cope, G.E. Unpublished data.

*Editor's note: D. Duane Mickelson's paper will appear in the 1982 Bovine Practitioner*

