

ESTRUS SYNCHRONIZATION AND CALVING EASE AMONG FIRST CALF HEIFERS

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Managing heifer replacements so they will calve as two year olds with a minimum of difficulty has been, and continues to be a problem for many cow-calf producers. Over the years numerous sire breed types have been used for calving ease and range from the Angus breed, which has been most common, to dairy types such as the Jersey, and most recently the Longhorn. Success, of course, has been as diverse as the breed types used. Calving at three years of age normally results in very little calving difficulty, but is barely worth mentioning since the economics of beef cattle production won't allow such a lengthy delay. Several management tools are at the producers disposal, which when combined may be useful in getting more heifers bred early in the breeding season to sires known for calving ease. The management tools being considered are:

1. Artificial insemination.
2. Selection of progeny tested sires that are known for calving ease and performance in 1st calf heifers.
3. Estrus synchronization with Lutalyse to reduce labor.
4. Clean-up breeding with the Longhorn breed.
5. Short 45 day breeding season.

Combining artificial insemination and estrus synchronization, sires with above average performance and known calving ease can be used artificially in an A.I. breeding program while using only $\frac{1}{4}$ - $\frac{1}{3}$ of the time previously needed. Synchronization of heat cycles is being done with a naturally occurring compound called prostaglandin, which was released for use in this country in 1980 and is sold by veterinarians under the trade name, Lutalyse. Breeding artificially almost never results in 100% conception and therefore necessitates the need for clean-up bulls. Studies at this station have shown the Longhorn breed to be a very easy calving type and are being used for clean-up purposes. Adhering to a short breeding season of 45 days produces heifers that are either bred early in the breeding season or are open and can be sold or fed as feeder cattle.

Considering the criteria just discussed, a breeding management study was designed with the following objectives: (1) to evaluate two methods of synchronization with Lutalyse; (2) to minimize calving difficulty by using A.I. and progeny tested sires followed by clean-up with the Longhorn breed; and (3) to evaluate the overall efficiency and effectiveness of the heifer management systems being suggested.

During the winter growing period following weaning, Hereford and crossbred Angus X Hereford heifer calves are sorted by weight and fed to gain sufficiently to weigh 650 – 700 pounds at the start of the breeding season.

In order for estrus synchronization to be successful, beef females must be sexually mature and cycling properly. In 1979, KaMar heat detection devices and rectal palpation were used to identify those heifers that were cycling. This method was found to be totally unacceptable and a waste of time and money. In all other years of the study epididectomized sterile bulls with marking harnesses have been used to measure pre-breeding estrus activity. All animals that were wintered, with limited exceptions, were used in the breeding studies and were not eliminated until identified as open after being pregnancy tested.

Two breeding groups are being used in this study to evaluate two different management methods for using the estrus synchronizing compound, Lutalyse. A single injection of Lutalyse is being compared with the recommended double injection.

Group One was synchronized using the single injection method. With this method, heifers are inseminated conventionally during the first five days of the breeding season. On the sixth day at 8:00 A.M. all heifers not inseminated during the first five days of breeding are given 25 mg Lutalyse. After the Lutalyse is administered, A.I. breeding is continued until 80 hours has elapsed. At that time all remaining undetected heifers were inseminated as a group. Following the group insemination and a five day waiting period, the heifers were exposed to a Longhorn clean-up bull equipped with a chin-ball marker. Group Two was synchronized with the double injection method. Using this method, two injections of Lutalyse separated by eleven days are used. None of the heifers were inseminated during the eleven day period between injections. Our abbreviated description of how each group was synchronized is shown in Table 1.

Table 1. Design for Estrus Synchronization

| Single Injection Method: | | |
|---------------------------------|---|--|
| | Day of Breeding Season: | |
| | 1 | |
| | 2 | |
| Period I | 3 | Inseminate normally 1 st five days of breeding season. |
| | 4 | |
| | 5 | |
| | 6 | 8 A.M. administer 25 mg Lutalyse to all heifers not inseminated during Period I. |
| | | |
| Period II | 7 | Continue breeding normally until 80 hrs. post-injection time. |
| | 8 | |
| | 9 | At 4 P.M. (80 hrs. after the Lutalyse injection) all heifers not inseminated during Periods I and II were inseminated as a group without regard to standing heat. |
| | | |
| Double Injection Method: | | |
| | Day of Breeding Season: | |
| | 11 days before start of breeding season | Administer 25 mg Lutalyse. |
| | | |
| | 1 | The 2 nd injection of Lutalyse is given at 8 A.M. on the 11 th day, which is the start of the breeding season. |
| | 2 | Inseminate normally all heifers found in standing heat until 80 hrs. post-injection time. |
| | 3 | |
| | 4 | At 4 P.M. (80 hrs. after the 2 nd injection of Lutalyse) all heifers not inseminated during the 80 hr. period are inseminated as a group without regard to standing heat. |

The heifers were placed with a Longhorn clean-up bull after a five day waiting period.

Semen from an Angus sire, Shoshone Monitor 17An50, was purchased from Minnesota Valley Breeders Assn. in 1979, and in 1980 and 1981 semen from an Angus bull, Kadence Shoshone 7An47, was purchased from Select Sires, Plain City, Ohio. These sires have both been recommended by the suppliers as being easy calvers and known to transmit growth performance to their offspring.

Accumulated breeding results, calving difficulty, birth weights, and adjusted weaning weights are given in Tables 2, 3, 4 and 5.

Summary:

1. Three years of synchronization and calving data, and two years of weaning data have been summarized in this progress report.
2. Success with synchronization has been variable; ranging from no response in 1979 to a 74% conception rate this past year.

The combined three year average conception rate for the single injection group was 41% and 46% for the double injection group.

3. Combined three year average cost/cow conceiving for semen and Lutalyse was \$26.50 for the single injection groups and \$37.65 for the double injection groups.
4. There was a high correlation between the number of heifers cycling before the start of the breeding season and the number of heifers responding to estrus synchronization.
5. Calving difficulty has been extremely variable. In 1981, calving difficulty with the Kadence Shoshone Angus bull was zero; however, the next year, 62% of the heifers required assistance. Since the heifers originate from several diverse sire lines, it is our feeling that the semen used was improperly labeled.
6. Trial is being continued and will conclude and be finalized when the calves are weaned in the fall of 1983.

Table 2. Single Injection Method of Synchronization among First Calf Heifers

| | Single Injection | | | |
|--|-------------------------|------------------|------------------|------------------------|
| Breeding/calving year: | 1979 – 80 | 1980 – 81 | 1981 – 82 | 3 – Yr. Average |
| No. head | 20 | 24 | 19 | 63 |
| No. in heat before breeding started | 3 | 21 | 19 | 43 (68%) |
| No. inseminated 1 st 5 days of breeding | 4 | 9 | 5 | 18 (28.5%) |
| No. in heat and inseminated before 80 hours | 0 | 9 | 10 | 19 (30.2%) |
| No. not showing heat but inseminated at 80 hours | 16 | 6 | 4 | 26 (41%) |
| No. open | 1 | 8 | 0 | 9 (14.3%) |
| Conception rate for management system | 1 (5%) | 11 (46%) | 14 (74%) | 26 (41%) |
| Economics: | | | | |
| Breeding expense for semen and Lutalyse | \$200 | \$267 | \$222 = | \$689 |
| No. conceiving to synchronization | 1 | 11 | 14 = | 26 |
| 3 – year average cost/heifer conceiving | | | \$26.50 | |

Table 3. Double Injection Method of Synchronization among First Calf Heifers

| | Double Injection | | | |
|--|-------------------------|------------------|------------------|--------------------|
| Breeding/calving year: | 1979 – 80 | 1980 – 81 | 1981 – 82 | 3 Yr. Total |
| No. head | 21 | 24 | 18 | 63 |
| No. in heat before breeding started | 7 | 21 | 18 | 56 (73%) |
| No. in heat and inseminated before 80 hours | 4 | 18 | 14 | 36 (57.1%) |
| No. not showing heat but inseminated at 80 hours | 17 | 6 | 4 | 27 (42.9%) |
| No. open | 1 | 3 | 1 | 5 (7.9%) |
| Conception rate for management system | 4 (19%) | 14 (58%) | 11 (61%) | 29 (46%) |
| Economics: | | | | |
| Breeding expense for semen and Lutalyse | \$336 | \$432 | \$324 = | \$1092 |
| No. conceiving to synchronization | 4 | 14 | 11 = | 29 |
| 3 – year average cost/heifer conceiving | | | \$37.65 | |

Table 4. Calving Difficulty and Birth Weights among Synchronized First Calf Heifers

| Management Method: | Single Injection | | | | | Double Injection | | | |
|----------------------------------|--------------------------|----------------|------------------|--------------------|--|--------------------------|----------------|----------------|--------------------|
| | 1979-80 | 1980-81 | 1981-82 | 3-Yr. Total | | 1979-80 | 1980-81 | 1981-82 | 3-Yr. Total |
| No. calving | 19 | 16 | 18 ^{1/} | 53 | | 20 | 21 | 17 | 58 |
| No. calving unassisted | 18 | 16 | 10 | 44 | | 17 | 21 | 9 | 47 |
| Calving difficulty ^{2/} | | | | | | | | | |
| A.I. Angus | | | | | | | | | |
| Shoshone Monitor (17An50) | 1/1 | - | - | 1 | | 4/2 | - | - | 2 |
| Kadence Shoshone (7An47) | - | 11/0 | 13/8 | 8 | | - | 14/0 | 11/7 | 7 |
| Station Angus (A94) | 2/0 | - | - | | | 5/1 | - | - | 1 |
| Longhorn | 16/0 | 5/0 | 5/0 | | | 11/0 | 7/0 | 6/1 | 1 |
| % | | | | | | | | | |
| % Difficulty | 33% Angus 0% Longhorn | | | | | 29% Angus 4% Longhorn | | | |
| Birth Weight Summary | | | | | | | | | |
| 3 – year average: | Bulls | | Heifers | | | Bulls | | Heifers | |
| A.I. Angus | | | | | | | | | |
| Shoshone Monitor (17An50) | 72 | | - | | | 85 | | 72 | |
| Kadence Shoshone (7An47) | 72 | | 68.5 | | | 71.3 | | 69.5 | |
| Station Angus | 73 | | - | | | 67 | | 70 | |
| Longhorn | 63.6 | | 57.6 | | | 63.6 | | 58.5 | |

1/ One heifer died.

2/ First number indicates number of calves sired.

Second number indicates number calving with difficulty.

**Table 5. Two Year Adjusted Weaning Weights among First Calf Heifers Bred
To Angus Artificially and Clean-up with Longhorn**

| | Single Injection | | | | Double Injection | | | |
|------------------|------------------|-------|---------|---------|------------------|---------|---------|---------|
| | 1979 | | 1980 | | 1979 | | 1980 | |
| | Bulls | Hfrs. | Bulls | Hfrs. | Bulls | Hfrs. | Bulls | Hfrs. |
| A.I. Angus | | | | | | | | |
| Shoshone Monitor | | | | | | | | |
| (17An50) | | | | | 556 (2) | 589 (2) | | |
| Kadence Shoshone | | | | | | | | |
| (7An47) | | | 519 (5) | 524 (5) | | | 399 (7) | 564 (2) |
| Station Angus | | | | | | | | |
| (A94) | 520 (2) | | | | 473 (3) | 544 (2) | | |
| Longhorn | | | | | | | | |
| Longhorn | | | 404 (3) | 561 (1) | | | | |
| Longhorn | | | | | | | | |
| Longhorn | | | | | 463 (5) | 362 (6) | | 382 (4) |