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# Increasing the Frequency of Twinning in Beef Cows

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The beef cow must be maintained throughout the year to produce only one useful product, a weaner calf. If she fails to wean a calf, the costs of maintaining her must be borne by the productive members of the herd. In the United States, the estimated percent calf crop ranges from 65 to 90% with 85% suggested as average for the more productive areas of the country. This means maintaining 100 cows for every 85 calves weaned. However, the rancher normally must add replacement heifers at the rate of 15% of the cow herd each year. This means marketing 70 weaning calves per 100 cows. One potential method of improving production efficiency is to increase the number of calves per 100 cows. Twinning could be a method of reaching this goal.

The natural frequency of twinning in dairy cows is about 1 out of every 55 births, while it is 1 out of 250 births in beef cows. In addition, the heritability of twinning is low. Therefore, increasing the frequency of twinning through selection would be expected to be very slow.

Basic research conducted during the 1920's and 30's provided the information that twinning could be increased experimentally by the injection of certain hormones recovered from certain glands of the female's body. Follicle stimulating hormone (FSH) is one of these substances.

## Materials and Methods

### Experiment 1

Fifty yearling, sexually mature, Hereford-Angus crossbred heifers were used in this study. The experimental design is shown in table 1. Either 7 or 10 mg FSH were injected subcutaneously on either day 15 or days 15 and 17. A high lumbar laparotomy was performed on each heifer 72 to 96 hours after estrus so as to accurately count the number of ovulation sites.

### Experiment 2

Forty-five of the heifers used in experiment 1 were allowed 12 weeks for recovery and then reallotted to treatments in experiment 2. The experimental design for experiment 2 is shown in table 2. Treated heifers received a total of 10 mg FSH. This was given as a split dose on either days 15 and 17 or 16 and 18. Also, one-half of the heifers receiving FSH also received FSH during the next estrous cycle even though they were inseminated at the first estrus. This allowed an opportunity to superovulate those heifers which did not conceive at first service.

Laparotomies were performed 45 days post-breeding in order to accurately count the number of fetuses.

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## Results

### Experiment 1

The results from experiment 1 are presented in table 3.

These results indicate that FSH injections will increase the frequency of multiple ovulations in beef females. Also, 7 or 10 mg FSH do not stimulate the ovaries into excessive ovulations. Less than one-half of the heifers multiple ovulated.

### Experiment 2

In view of possible commercial application of these treatments, groups assigned to receive FSH on days 15 and 17 or on days 16 and 18 were divided equally in order to study the effects of FSH injections administered during two consecutive estrous cycles. The heifers were inseminated artificially at the first estrus post-treatment and also at the estrus following the second treatment if this estrus was expressed. Results are shown in table 4.

These data indicate that FSH injections can be given to a cow that is 15 or 16 days pregnant without causing pregnancy failure. This allows inducing multiple ovulations in two successive estrous cycles. A total of five sets of twins were observed in this study and all of these resulted from first service conceptions following FSH injections on days 16 and 18.

## Summary

These data are to be considered as preliminary. Differences in ovulation rate between treatment groups were encouraging. FSH injections on days 16 and 18 yielded a greater number of multiple ovulations than injections on days 15 and 17, 7/20 and 1/20, respectively. Ten mg FSH did not result in excessive ovarian stimulation (maximum was 3 ovulation sites). FSH can be given during two successive estrous cycles without causing pregnancy failure.

Table 1. FSH Dosage Levels and Days of Injection

| Treatment | No. of animals | Total dose FSH (mg) | FSH (mg) Day 15 | FSH (mg) Day 17 |
|---|---|---|---|---|
| Control | 10 | 0 | -- | -- |
| 1 | 10 | 7 | 7 | -- |
| 2 | 10 | 7 | 3.5 | 3.5 |
| 3 | 10 | 10 | 10 | -- |
| 4 | 10 | 10 | 5 | 5 |

Table 2. Days for Receiving an FSH Injection

| Treatment | No. of animals | FSH (mg) Day of injection 1st estrous cycle 15 | 16 | 17 | 18 | Day of injection 2nd estrous cycle 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|
| Control | 5 | -- | -- | -- | -- | -- | -- | -- | -- |
| 1 | 10 | 5 | -- | 5 | -- | -- | -- | -- | -- |
| 2 | 10 | 5 | -- | 5 | -- | 5 | -- | 5 | -- |
| 3 | 10 | -- | 5 | -- | 5 | -- | -- | -- | -- |
| 4 | 10 | -- | 5 | -- | 5 | -- | 5 | -- | 5 |

Table 3. Influence of 7 or 10 mg FSH Given As A Single or Split Dose on Frequency of Multiple Ovulations in Heifers

| Treatment | Day injection | Number of Heifers In the group | Failing to ovulate | Single ovulation | Multiple ovulation | Average ovulation rate |
|---|---|---|---|---|---|---|
| Control | -- | 10 | 0 | 10 | 0 | 1.0 |
| 7 mg FSH | Day 15 | 10 | 0 | 8 | 2 | 1.5 |
| | Days 15 and 17 | 10 | 1 | 6 | 3 | 1.3 |
| 10 mg FSH | Day 15 | 10 | 0 | 9 | 1 | 1.1 |
| | Days 15 and 17 | 10 | 1 | 4 | 5 | 1.7 |

Table 4. The Influence of FSH Injections on Number of Fetuses at 45 Days Post-Insemination

| | Day(s) of receiving 10 mg FSH | | | | |
|---|---|---|---|---|---|
| | None | Days 15 and 17 (C1)[a] | Days 15 and 17 (C1) Days 15 and 17 (C2)[b] | Days 16 and 18 (C1) | Days 16 and 18 (C1) Days 16 and 18 (C2) |
| **Cows per treatment** | 5 | 10 | 10 | 10 | 10 |
| Cows conceiving at first service | 5 | 6 | 6 | 2 | 7 |
| Calves at 45 days resulting from first service | 5 | 6 | 6 | 4 | 10 |
| Cows returning to second estrus | 0 | 2 | 2 | 7 | 2 |
| Cows conceiving at second service | -- | 2 | 2 | 4 | 2 |
| Calves at 45 days resulting from second service | -- | 2 | 2 | 4 | 1 |
| Open cows at 45 days | 0 | 2 | 2 | 4 | 1 |
| Potential calf crop, % | 100 | 80 | 80 | 80 | 120 |

[a] (C1) refers to the first treated estrous cycle.
[b] (C2) refers to the second treated estrous cycle.