

THE USE OF A LONG-ACTING PROGESTAGEN TO SUPPRESS  
OESTROUS ACTIVITY IN BEEF CATTLE

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SUMMARY

Two experiments investigated a hormonal method for suspending oestrous activity in cows and heifers to prevent unwanted pregnancies. Promone-E (Upjohn), a preparation containing Meroxypregesterone acetate was injected subcutaneously into females showing oestrous behaviour in doses ranging from 50 to 1,350 mg. Oestrous activity ceased for up to 8 months, and this period depended on dose. The treatments did not impair the ability of the animals to become pregnant after they eventually returned to oestrus. It is concluded that 500 mg Promone-E could be used to prevent pregnancy for about 6 months in extensively-run cows. (Key words: Oestrus, progestagen, beef cattle).

INTRODUCTION

In the pastoral areas of the north-west of Western Australia, many cows fail to recover sufficiently from the setback imposed by the stress of their first calving, to survive their second. This problem is exacerbated in heifers and cows suckling their first calf, which need to grow as well as to lactate. In older cows it is also an advantage to prevent pregnancy while their condition is improved in readiness for marketing. A technique for selective contraception which would prevent pregnancy for three to six months would help to overcome this problem. Such a technique must have at least four attributes: (1) it must be simple to use and inexpensive, (2) it must be effective for long enough to span the wet season in north-western Australia when mustering is difficult or impossible, (3) it must not interfere with the subsequent fertility of the animals, and (4) it must not leave harmful residues.

A long-acting depot progesterone, Medroxyprogesterone acetate (MAP) was chosen as a likely substance for the purpose. It is widely used as a long-term contraceptive in women in the form of Depo-provera (Upjohn) (Fraser and Weisberg 1981). Promone-E (Upjohn) is a commercially available preparation of MAP which can be used subcutaneously. Only two experiments using Promone-E in cattle have been reported. A single subcutaneous injection of 150 mg prevented oestrus in Aberdeen Angus heifers for 120 days in Argentina (Arano and Arano 1980). Steffan (1983), in France, found that 500 mg inhibited ovulation for more than three months in aged Charolais cows and 2-3 year old heifers.

Two experiments were conducted to study the use of Promone-E for the long-term control of reproductive activity in cows and heifers. The objectives of the experiments were to test the hypothesis that Promone-E (1) prevents oestrus in cattle, (2) can do so for a period which can be controlled by the dose given, and (3) does not interfere with fertility when oestrous activity is re-established.

The preliminary report of the first experiment presented here has been published as a short communication (Surjoatmodjo et al. 1984).

## MATERIALS AND METHODS

### Experiment 1

Forty Shorthorn-type cows were allowed to calve and were allocated to three treatments:

- (1) Control
- (2) Single injection of 100 mg **Promone-E**
- (3) A single injection of 200 mg **Promone-E**.

Two teaser steers with **chinball** harnesses, injected subcutaneously each week with oestradiol benzoate (Lang et al. 1968; Sawyer and Fulkerson 1981) at a dose of 8 mg/250 kg live weight were run with the cows to detect the re-appearance of cyclicity after parturition. **Promone-E** was given during the first week of the first observed cycle post-partum, then the cows were transferred to a paddock with a fertile bull fitted with a **chinball** harness. Oestrous activity was monitored and suspected pregnancies based on the service data were confirmed from rectal palpation from day 35 after service.

### Experiment 2

Forty non-pregnant heifers from the south of Western Australia were run with two steers fitted with **chinball** harnesses and treated as in Experiment 1. Groups of 10 animals were constituted randomly as the animals showed cyclicity and were injected with **Promone-E** as follows:

Group A: 50 mg;    Group B: 150 mg;    Group C: 450 mg;    Group D: 1350 mg.

The heifers were then put with two fertile harnessed bulls. The incidence of oestrus following injections was checked daily and pregnancies were confirmed by rectal palpation.

Both experiments were conducted at the University of Western Australia's farm at Allandale, 70 km east of Perth. Cattle were supplemented with hay during the dry summer months.

## RESULTS

### Experiment 1

The effectiveness of **Promone-E** injections to suppress oestrous cycles was measured by the length of the interval between the original oestrus just before injection, and the subsequent oestrus of the cows. Table 1 shows that the treated groups took significantly longer ( $P < 0.01$ ) to come into heat than the non-treated group. Injections of 100 mg **Promone-E** were able to suppress oestrus in post-partum cows for a mean of more than two months and the 200 mg dose prolonged for nearly four months. The fertility of the cows following treatment was unimpaired as all cows were pregnant from one to three cycles later (Table 2). The average number of services per conception did not differ among the control and treated groups.

Table 1 Effect of **Promone-E** on interval between the first and the second oestrus post-partum

| Treatment groups | No. of animals | Interval between the first and the second oestrus (d) |                          |
|------------------|----------------|-------------------------------------------------------|--------------------------|
| Control          | 15             | 20                                                    | 0.6 ( $\bar{x} \pm SE$ ) |
| 100 mg           | 13             | 68.7 $\pm$ 3.3                                        |                          |
| 200 mg           | 12             | 112.8 $\pm$ 9.2                                       |                          |

Table 2 Conception rates of cows conceiving within the first three services after injection of **Promone-E**

| Treatment groups | First | Services Second | Third | Average services per conception |
|------------------|-------|-----------------|-------|---------------------------------|
| Control          | 13/15 | 2/2             | --    | 1.13                            |
| 100 mg           | 9/13  | 2/4             | 2/2   | 1.46                            |
| 200 mg           | 8/12  | 3/4             | 1/1   | 1.42                            |

Experiment 2

The average interval from oestrus to the next oestrus increased with increasing doses of **Promone-E** and the intervals were compatible with those in Experiment 1. One heifer which received 50 mg of **Promone-E** had an extremely long interval of 224 days which was calculated to be an "outlier" by the test of Dixon (1950) and was omitted from the results shown in Table 3.

Table 3 Effect of **Promone-E** on interval between the first and the second oestrus

| Treatment groups | No. of animals | Interval between the first and the second oestrus (d) |                      |
|------------------|----------------|-------------------------------------------------------|----------------------|
| 50 mg            | 9              | 43.8 $\pm$ 8.3                                        | ( $\bar{x} \pm SE$ ) |
| 150 mg           | 10             | 74.9 $\pm$ 9.7                                        |                      |
| 450 mg           | 10             | 205.1 $\pm$ 25.7                                      |                      |
| 1,350 mg         | 10             | 269.9 $\pm$ 16.2                                      |                      |

All treatment differences were significant one from the other. The conception rates of the treated heifers were not affected by the injection of **Promone-E**. The number of services per conception varied from 1.4 in the group receiving 450 mg **Promone-E** to 2.6 in the group receiving 50 mg (Table 4).

## DISCUSSION

Results show that **Promone-E** can be used successfully to suppress oestrus in cattle and that fertility is not impaired. The dose range in Experiment 1 did not appear to exploit the full potential of **Promone-E** to suppress oestrus as there was a large difference between the response to the 100 mg and the 200 mg doses. As there was no plateau in the dose response line it seemed reasonable to assume that higher doses would suppress oestrus even longer than

Table 4 Conception rates of heifers conceiving within the first four services after injection of **Promone-E**

| Treatment groups | Services |        |       |        | Average services per conception |
|------------------|----------|--------|-------|--------|---------------------------------|
|                  | First    | Second | Third | Fourth |                                 |
| 50 mg            | 3/10     | 1/7    | 3/6   | 3/3    | 2.6                             |
| 150 mg           | 5/10     | 2/5    | 2/3   | 1/1    | 1.9                             |
| 450 mg           | 7/10     | 2/3    | 1/1   | --     | 1.4                             |
| 1,350 mg         | 5/10     | 3/5    | 1/2   | 1/1    | 1.8                             |

four months. This was verified in Experiment 2 where increasing the dose to 450 mg suppressed oestrus for over six months. Increasing the dose to 1,350 mg lengthened the period of suppression but by a smaller extent. We can conclude from these results that a dose of about 500 mg per animal of **Promone-E** can suppress oestrus for about six months. Six months appears ideal for managing young female cattle during the wet season in the north of Western Australia. This interval should be sufficient to span the period during which mustering is difficult because of the wet season.

Six months is probably also sufficient to allow adequate growth before young animals can be permitted to become pregnant without severe penalty. If not, a further single injection could be administered and the dose could be chosen to give a total period of anoestrus from 6 to 12 months with reasonable predictability.

A most important result from these experiments is that even the very high dose of 1,350 mg **Promone-E** did not impair fertility. Overall fertility following treatment was good. All heifers used in both experiments were pregnant and half of them were pregnant from the first mating at the oestrus following injection.

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