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ESTROUS SYNCHRONIZATION AND INDUCTION OF PUBERTY IN  
BRAHMAN HEIFERS

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SUMMARY

Alfaprostol given as a 5 mg intramuscular injection was effective in estrous synchronization of 15 - 17 month old Brahman heifers which had reached puberty. Treatment for 9 days with the Norgestomet ear implant and injection with Norgestomet plus Estradiol Valerate at implantation or Alfaprostol injection on day 7 after implanting were effective in estrous synchronization and induction of estrus and puberty in 15 - 17 month old Brahman heifers.

Synchromate-B treatment resulted in lowered first service conception rates compared to all other treatments. This resulted in a slight depression in pregnancy rate within 5 days of the breeding season. Use of the progestin, Norgestomet, as an ear implant and Alfaprostol on day 7 after implanting appeared to give the best results in 15 - 17 month old Brahman heifers.

OBJECTIVE

The objective of this experiment was to determine the efficacy of Alfaprostol, Synchromate-B®, and Norgestomet plus Alfaprostol for induction of puberty and estrous synchronization in Brahman heifers.

PROCEDURE

Virgin Brahman heifers between 15 and 17 months of age were randomly assigned to treatment groups within ovarian status as determined by rectal examination. The treatments were: a) no treatment, control, b) 5 mg Alfaprostol (a prostaglandin analog), c) Synchromate-B® (an injection of Estradiol Valerate and Norgestomet plus an ear implant with Norgestomet); and d) Norgestomet ear implant plus 5 mg Alfaprostol (Table 1). Estrus detection using sterile marker bulls began after injection of Alfaprostol and removal of the Norgestomet ear implants. All heifers were inseminated 12 hours after detection of estrus. Pregnancy was determined by rectal examination 45 days after breeding.

## RESULTS

Two injections of 5 mg Alfaprostol 8 - 11 days apart were not effective in inducing estrus or puberty in 15 - 17 month old Brahman heifers as about the same proportion of control heifers were bred within the first 25 days of breeding as Alfaprostol treated heifers (Table 2). Alfaprostol synchronized estrus in 62.5% of the heifers which were having estrous cycles. Both the Synchronate-B and Norgestomet plus Alfaprostol treatments were equally effective in induction of estrus in 15 - 17 month old Brahman heifers as twice as many heifers were bred within the first 25 days of breeding as in the control of Alfaprostol treated groups.

First service conception rates were the highest and equal in the control and Alfaprostol groups (Table 3). The Synchronate-B treatment group had lower ( $p < .05$ ) first conception rates than all other treatment groups.

Pregnancy rates within the first 5 days of breeding were lower ( $p < .05$ ) in the controls than in the Alfaprostol group (Table 4). This indicated that estrous synchronization was occurring with a fertile estrus in the Alfaprostol group. Due to the lower first service conception rate in the Synchronate-B group, no increase over Alfaprostol alone was seen in pregnancy rate within 5 days after treatment with Synchronate-B. The Norgestomet plus Alfaprostol treated heifers had the highest pregnancy rate within the first 5 days of breeding as first service conception rates were normal and expression of fertile estrus was increased. Pregnancy rates over 25 days of breeding were lower ( $P < .05$ ) in the controls than in the Synchronate-B or Norgestomet plus Alfaprostol groups. The Synchronate-B treated group were fertile enough at their second insemination to equal the Norgestomet plus Alfaprostol pregnancy rate after 25 days of breeding.

Alfaprostol alone effectively synchronized estrous in 15 - 17 month old Brahman heifers which had reached puberty and they had normal fertility to artificial insemination. Any treatment including the Norgestomet ear implant was effective in the induction of estrus in 15 - 17 month old Brahman heifers. Replacement of the Norgestomet plus estrogen injection in the Synchronate-B treatment regime with an Alfaprostol injection resulted in normal first service conception

rates in an equal proportion of estrus heifers and an increase in numbers of heifers conceiving within 5 days of treatment.

TABLE 1. EXPERIMENTAL DESIGN OF TREATMENTS

| Trial Day                 | Control | Alfaprostol                                 | Synchromate-B       | Alfaprostol + Norgestomet |
|---------------------------|---------|---|---------------------|---------------------------|
| 0                         | --      | --  | Implant + Injection | Implant                   |
| 7                         | --      | --  | --                  | Injection                 |
| 9                         | --      | Injection                                   | Remove Implant      | Remove Implant            |
| BEGIN BREEDING ALL GROUPS |         |   |                     |                           |
| 17-20                     | --      | Inject All Heifers Which Have Not Been Bred | --                  | --                        |

TABLE 2. EFFECT OF TREATMENTS ON EXPRESSION OF ESTRUS

| Treatment                 | Estrus Detected |                   |         |                   |
|---------------------------|-----------------|-------------------|---------|-------------------|
|                           | 5 Days          |                   | 25 Days |                   |
|                           | n               | %                 | n       | %                 |
| Control                   | 2/44            | 4.5 <sup>a</sup>  | 16/44   | 36.4 <sup>a</sup> |
| Alfaprostol               | 10/42           | 23.8 <sup>b</sup> | 16/42   | 38.1 <sup>a</sup> |
| Synchromate-B             | 27/42           | 64.3 <sup>c</sup> | 33/42   | 78.6 <sup>b</sup> |
| Alfaprostol + Norgestomet | 23/43           | 53.5 <sup>c</sup> | 32/43   | 74.4 <sup>b</sup> |

<sup>a</sup> Means with different superscripts differ p<.05.

TABLE 3. EFFECT OF TREATMENTS ON FIRST SERVICE CONCEPTION RATE

| Treatment                 | First Service Conception Rate |                   |
|---------------------------|-------------------------------|-------------------|
|                           | n                             | %                 |
| Control                   | 12/16                         | 75.0 <sup>a</sup> |
| Alfaprostol               | 12/16                         | 75.0 <sup>a</sup> |
| Synchromate-B             | 13/32                         | 40.6 <sup>b</sup> |
| Alfaprostol + Norgestomet | 20/32                         | 62.5 <sup>a</sup> |

<sup>a</sup> Means with different superscripts differ p<.05.

TABLE 4. EFFECT OF TREATMENTS ON PREGNANCY RATE

| Treatment                 | Pregnancy Rate |                    |         |                    |
|---------------------------|----------------|--------------------|---------|--------------------|
|                           | 5 Days         |                    | 25 Days |                    |
|                           | n              | %                  | n       | %                  |
| Control                   | 1/44           | 2.3 <sup>a</sup>   | 12/44   | 27.3 <sup>a</sup>  |
| Alfaprostol               | 7/42           | 16.7 <sup>b</sup>  | 13/42   | 30.2 <sup>ab</sup> |
| Synchromate-B             | 10/42          | 23.8 <sup>bc</sup> | 21/42   | 50.0 <sup>b</sup>  |
| Alfaprostol + Norgestomet | 15/43          | 34.9 <sup>c</sup>  | 20/43   | 46.5 <sup>b</sup>  |

<sup>a</sup> Means with different superscripts differ p<.05.

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