

## OESTRUS BEHAVIOUR IN NATURAL AND INDUCED OESTRUM IN DAIRY CATTLE BY PGF<sub>2</sub> $\alpha$ WITH GnRH AND hCG

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**Abstract:** Thirty two apparently healthy, parous, cyclic crossbred cows were utilized for this study. All the selected animals were randomly divided into 4 groups comprising of 8 animals in each group namely control (Group I), PGF<sub>2</sub> $\alpha$  (Group-II), PGF<sub>2</sub> $\alpha$ +GnRH (Group-III), and PGF<sub>2</sub> $\alpha$ +hG (Group-IV). Cows were artificially inseminated twice at an interval of 24 hours in observed estrum. The time taken for the onset of oestrus was  $70.50 \pm 3.27$ ,  $68.00 \pm 3.17$  and  $68.25 \pm 2.21$  hrs in Group (II), Group (III) and Group (IV), respectively. The Duration of oestrus in Group (I), Group (II), Group (III) and Group (IV) were  $20.50 \pm 0.41$ ,  $21.00 \pm 0.47$ ,  $19.50 \pm 0.33$  and  $19.25 \pm 0.56$  hours. The synchronized cows exhibited 8.33, 58.33 and 33.33 per cent of week, normal and intense oestrus, The administration of PGF<sub>2</sub> $\alpha$  causes rapid regression of corpus luteum and brought down the blood progesterone level within 24 hours after injection.

**Keywords:** cyclic crossbred, estrum, PGF<sub>2</sub> $\alpha$ , corpus luteum, ovulation.

### INTRODUCTION

Reproductive performance has been declining in dairy cows with increasing number of days open and decreased conception rates over the last 25 yr (Silvia, 1998). One major problem is lack of accurate estrus detection. Therefore, method to improve pregnancy rates through the administration of hormones and improved detection of oestrus could have significant impact on the dairy industry. Hence the present study was undertaken to study the onset, duration and intensity of oestrus in natural and induced oestrus in dairy cattle by PGF<sub>2</sub> $\alpha$  with GnRH and hCG.

### MATERIALS AND METHODS

The studies were conducted on crossbred cows maintained under standard feeding and managerial conditions in a private dairy farm in Namakkal District, TamilNadu. Thirty two apparently healthy, parous, cyclic crossbred cows weighing between 300 and 400 kg, which had no palpable abnormalities in the genital tract based on the service record were utilized for this study. All the selected animals were randomly divided into 4 groups

comprising of Eight animals in each group namely control (Group-I), PGF<sub>2</sub>α (Group-II), PGF<sub>2</sub>α+GnRH (Group-III) and PGF<sub>2</sub>α + hcG (Group-IV).

All the treatment group cows were induced estrum by administration of 25 mg of PGF<sub>2</sub>α intramuscularly (Lutalyse, Novartis India Limited) on day 10 of the oestrous cycle. Group III cows were treated with 25 mg of PGF<sub>2</sub>α on day 10 of the oestrous cycle and further administered with an intramuscular injection of 10µg of GnRH (ReceptaL Hoechst Roussel Vet India Ltd.) at the time of AI. In Group IV cows were injected with 25 mg of PGF<sub>2</sub>α on day 10 of the Oestrus cycle and were given an intramuscular injection of 1500 IU of hCG (Chorulon, Intervet, International, Holland) at the time of AI and it was done at 72 and 96 hrs after PGF<sub>2</sub>α injection in all the treated groups. Onset, Duration and Intensity of oestrous was recorded. Statistical analysis of data was carried out as per the standard procedure described by Snedecor and Cochran (1989).

## RESULTS AND DISCUSSION

The time taken for the onset of oestrus was  $70.50 \pm 3.27$ ,  $68.00 \pm 3.17$  and  $68.25 \pm 2.21$  hours in PGF<sub>2</sub>α, PGF<sub>2</sub>α+GnRH and PGF<sub>2</sub>α +hCG groups, respectively. The overall time taken for the onset of induced oestrus was  $68.91 \pm 2.88$  hours. There was no significant difference in onset of oestrus in the synchronized groups. This result was concurred with the observations of Mane *et al.* (1992), In contrast to the observations of Triveni dutt and Kharche (2000) that the mean onset of oestrus range from 72 to 144 hours ,76.5% and 77.8% in PGF<sub>2</sub>α and with serum gonodotropin ( Zeuh *et al.* ,( 2014) . The possible reason for the early onset of oestrus might be due to the stage / time of administration of PGF<sub>2</sub>α. The corpus luteum becomes more sensitive to the luteolytic effect of PGF<sub>2</sub>α as the stage of cycle advanced in mid luteal phase (Berardinelli and Adair 1989). Duration of oestrus in control, PGF<sub>2</sub>α, PGF<sub>2</sub>α + GnRH and PGF<sub>2</sub>α + hCG groups were  $20.50 \pm 0.41$ ,  $21.00 \pm 0.47$ ,  $19.50 \pm 0.33$  and  $19.25 \pm 0.56$  hours, respectively. The natural and PGF<sub>2</sub>α combined with GnRH and hCG oestrus had lower duration of oestrus than the PGF<sub>2</sub> alpha alone induced oestrus. The mean duration of natural oestrus was  $20.50 \pm 0.40$  hours. Which were in concurrence with the finding of Hafez (1992). In contrast, Dhande and Kadu(1994) observed that a comparatively lower duration of natural oestrus ( $18.22 \pm 0.59$  hrs) than synchronized oestrus ( $18.90 \pm 0.49$  hrs)  $14.20 \pm 2.56$  with PGF<sub>2</sub> α alone group. The environmental temperature plays a major role in the duration of oestrus and the animals came to oestrus during cooler part of the day would have a shorter duration of oestrus (Drost and Thatcher, 1987). In the present study the PGF<sub>2</sub>α treated cows had longer duration of estrum ( $21.00 \pm 0.46$  hrs) than the other groups. These

results were concurred with the observations of Jaume *et al.* (1980). Goley and Kadu (1995) reported that an increase in the duration of oestrus after  $\text{PGF}_2\alpha$  induced luteolysis and attributed that the prolonged follicular phase as the reason.

The synchronized cows exhibited 8.33, 58.33 and 33.33 per cent of week, normal and intense oestrus, respectively. The corresponding value in natural oestrus was 37.50 and 25.00 per cent respectively. Therefore it was evident that the normal and intense oestrus was higher and weak oestrus was lower in synchronized cows when compared to control cows which were in agreement with that of Dhande and Kadu (1994). The reason might be due to the fact that in natural oestrus the progesterone concentration obtains a peak level on day 15 and started to decline gradually and reaches the basal level on the day of subsequent oestrus (Chauhan *et al.* 1983). Low level of progesterone in the synchronized group during the proestrus might be the reason for the higher percent of intensified estrum.

## CONCLUSION

In the present study, synchronized cows showed 58.33 and 33.33 per cent of normal and intense oestrus, respectively. While the control group showed 37.50 and 25.00 per cent of normal and intense oestrus, respectively. Similar findings were observed by Dhande and Kadu (1994). The administration of  $\text{PGF}_2\alpha$  causes rapid regression of corpus luteum and brought down the blood progesterone level within 24 hours after injection (Komonpatana *et al.*, 1978), which might be the reason for more intense oestrus in synchronized cows.

**Table 1. Onset of oestrus in crossbred cows synchronized with Prostaglandin  $\text{F}_2\alpha$**

Groups	No. of animals	Onset in hours (Mean $\pm$ SE)
$\text{PGF}_2\alpha$	8	70.50 $\pm$ 3.27
$\text{PGF}_2\alpha$ +GnRH	8	68.00 $\pm$ 3.17
$\text{PGF}_2\alpha$ +hCG	8	68.25 $\pm$ 2.21
Overall	24	68.91 $\pm$ 2.88

**Table 2. Duration of oestrus in control and synchronized cows**

Groups	Duration of oestrus in hours (Mean $\pm$ SE)
Control (Group-I)	20.50 $\pm$ 0.41 <sup>a</sup>
$\text{PGF}_2\alpha$ (Group-II)	21.00 $\pm$ 0.47 <sup>b</sup>
$\text{PGF}_2\alpha$ +GnRH (Group-III)	19.50 $\pm$ 0.33 <sup>a</sup>
$\text{PGF}_2\alpha$ +hCG (Group-IV)	19.25 $\pm$ 0.56 <sup>a</sup>

**Table 3. Intensity of oestrus in control and synchronized cows**

Intensity of oestrus	Number (Percent) of occurrence of oestrus	
	Natural Oestrus	Induced Oestrus
Week	3(37.50)	2(8.33)
Normal	3(37.50)	14(58.33)
Intense	3(37.50)	8(33.33)

*Note: Figures in parenthesis are in percentages.*

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