

## OBSERVATIONS ON FERTILITY PARAMETERS FOLLOWING SUPEROVULATION IN JERSEY CATTLE

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### Summary

Observations were recorded regarding various fertility parameters on 26 Jersey donor cows following superovulation under tropical conditions. These cows, in their mid-luteal phase were treated with 2,500-3,000 i.u. PMSG or 28-40 mg FSH followed by 500  $\mu$ g PGF<sub>2 $\alpha$</sub>  injection 48-60 hours later, to induce oestrus. The cows were bred artificially twelve hours following standing oestrus. Embryo collection was carried out 7 days after oestrus. PGF<sub>2 $\alpha$</sub>  was injected to each donor cow after embryo recovery to regress the corpora lutea. Fertility data (PGF<sub>2 $\alpha$</sub> -Oestrus interval, services per conception, days between embryo collection and successful service and any pathological condition) were recorded. PGF<sub>2 $\alpha$</sub> -Oestrus interval and correlation (*r*) between number of corpora lutea and PGF<sub>2 $\alpha$</sub> -Oestrus interval were  $30.9 \pm 6.3$  and 0.17, respectively. Of 26 treated donors, 19 conceived within a period of  $91.7 \pm 18.8$  days after embryo recovery. Average services per conception were  $2.3 \pm 0.3$ . Only two cows developed metritis which conceived after treatment with antibiotics. These observations indicated no profound adverse effect of superovulation on subsequent reproduction of donor cows, except some effect on services per conception, under tropical conditions.

(Key Words : Cow, Superovulation, Fertility, Tropical Conditions)

### Introduction

There is a paucity of information on the effect of superovulation on the subsequent reproduction in cattle. A few studies have indicated no serious adverse effect on reproductive parameters (Bak et al., 1989; Veselinovic et al., 1990). These studies reported days open, services per conception and pathological conditions in cattle following superovulation under temperate conditions. We report herein our observations on various fertility related parameters and some pathological conditions developed following superovulation in Jersey cows under tropical environment.

### Materials and Methods

This study was conducted at Livestock Research Station of National Agricultural Research Centre, Islamabad, Pakistan. The observations were recorded for eleven months i.e. from February to December, 1991. The tem-

perature range and relative humidity during different months of study are given in tabel 1.

Twenty six lactating and cycling Jersey cows, three to four months after parturition, in their mid-luteal phase of oestrous cycle were treated with 2,500-3,000 i.u. PMSG or 28-40 mg FSH; followed 48-60 hours later by 500  $\mu$ g PGF<sub>2 $\alpha$</sub>  (Cloprostenol) to induce oestrus. The cows were artificially inseminated twelve hours following standing oestrus. Corpora lutea were estimated by rectal palpation of each ovary, seven days after the insemination, and at this time the embryos were also recovered non-surgically. PGF<sub>2 $\alpha$</sub>  was administered to each cow soon after the embryo recovery to induce luteolysis. The cows were visually observed for behavioural oestrus twice daily i.e. early morning and early evening.

The data on following fertility parameters were recorded:

- PGF<sub>2 $\alpha$</sub> -Oestrus interval (days)
- Correlation between No. of corpora lutea and PGF<sub>2 $\alpha$</sub> -Oestrus interval.
- Services per conception: The data on services per conception of fourteen non-superovulated Jersey cows was compared with that of superovulated cows.

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d) Interval between embryo recovery and successful service (days).

e) Pathological conditions.

Statistical analysis was made using Student's t test.

TABLE 1. ENVIRONMENTAL CONDITIONS DURING THE EXPERIMENTAL PERIOD

Month	Temperature (°C)		Relative humidity (%)	Rain fall (mm)
	Min.	Max.		
January	3.2	16.6	73.3	9.9
February	6.4	17.8	58.6	88.9
March	9.8	22.7	69.6	93.7
April	13.4	26.0	60.3	114.6
May	19.2	33.3	41.5	22.9
June	23.2	38.1	39.4	61.9
July	25.5	36.5	55.7	253.4
August	23.8	33.1	70.1	265.3
September	21.5	31.5	71.3	220.1
October	12.8	29.5	52.9	2.3
November	7.4	24.3	61.8	4.6
December	6.2	19.1	73.8	22.8

Source: Meteorological Department, Government of Pakistan, Islamabad.

### Results and Discussion

Effect of superovulation on various reproductive parameters of experimental Jersey cows has been shown in table 2. Mean ( $\pm$ SE) interval between PGF<sub>2 $\alpha$</sub>  treatment and behavioural oestrus was  $30.9 \pm 6.3$  days. The median in this case was 13.0 days. Based on manifestation of oestrus following PGF<sub>2 $\alpha$</sub>  treatment, these cows were placed in three groups (figure 1). First group of fourteen animals (54%) seem to have responded to PGF<sub>2 $\alpha$</sub>  treatment where the interval ranged between 4 to 13 Days. Second group of six animals (23%) showed an interval range between 24 to 44 days; and third group comprising six animals (23%) showed an interval range of 66 to 107 days. PGF<sub>2 $\alpha$</sub> -Oestrus interval in Group-2 and 3 was longer compared to group 1 ( $p < 0.05$ ) which suggests that either these animals had not responded to PGF<sub>2 $\alpha$</sub>  or oestrus was too weak to detect by visual observation. In a previous study (Jones et al., 1986), superovulated heifers returned to oestrus after 18.2 days following the injection of 0.5 mg Cloprostenol and 11.3 days following 1.0 mg of Fenprostalene administration. Nature of prostaglandin used had a significant effect in bringing about luteolysis in superovulated heifers in this study. In the present study, only Cloprostenol was used for luteolysis and the results

were compared only with those obtained with Cloprostenol of the previous study. A previous study has also indicated that treatment with prostaglandin reduced cycle length in animals with multiple corpora lutea, but did not appear as effective as in animals with single corpus luteum (Row et al., 1978). It was found that luteal regression did not occur early by increasing the dose of PGF<sub>2 $\alpha$</sub> . Delay in oestrus after superovulation was attributed to delay in luteal regression and re-establishment of folliculogenesis (Mapletoft et al., 1991). In the present experiment, no significant correlation ( $r = 0.17$ ) was observed between the number of corpora lutea and PGF<sub>2 $\alpha$</sub> -Oestrus interval.

TABLE 2. EFFECT OF SUPEROVULATION ON FERTILITY PARAMETERS IN JERSEY CATTLE

Parameter	N	M $\pm$ SE
1. Embryo collection and successful service (days)	19	91.7 $\pm$ 18.8
2. PGF <sub>2<math>\alpha</math></sub> -Oestrus (days)	26	30.9 $\pm$ 6.3
3. No. of CL & PG-Oestrus interval (r)	21	0.17
4. Services per conception (No.)	19	2.3 $\pm$ 0.3

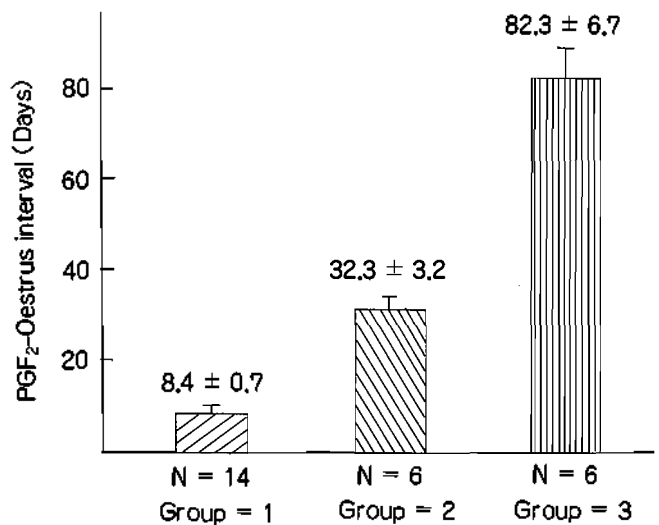


Figure 1. PGF<sub>2</sub>-Oestrus interval in superovulated Jersey cows.

Data on services per conception for superovulated cows have been depicted in figure 2. Of twenty six superovulated Jersey cows, nineteen conceived taking an average of 2.3 services. The conceived cows were distributed in two groups, taking 1-3 services (Group-1) and more than

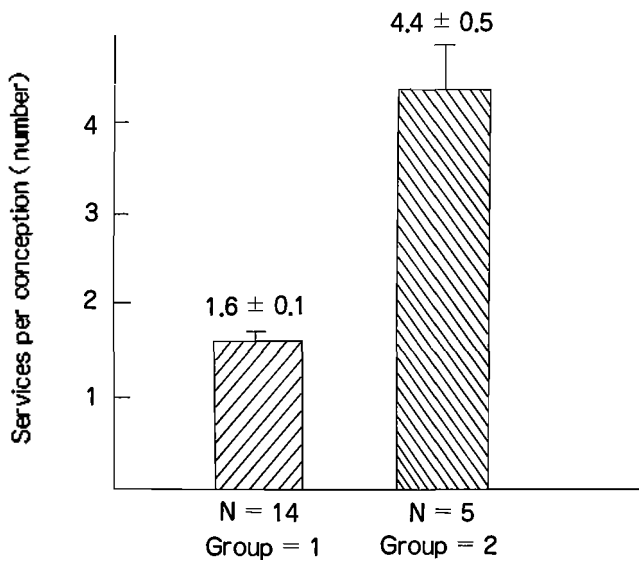


Figure 2. Services per conception in superovulated Jersey cows.

3 services (Group-2). The average services per conception in Group-1 and Group-2 animals were  $1.6 \pm 0.1$  and  $4.4 \pm 0.5$ , respectively. During this study, the data of non-superovulated Jersey cows was also obtained and services per conception in these cows were  $1.9 \pm 0.2$ , which was not different ( $p < 0.05$ ) from group-1 animals, however, different ( $p < 0.05$ ) from group-2 animals. These data revealed that 26% of superovulated cows required more than normal range of services per conception, thereby showing that some cows may take more than normal services to conceive following superovulation, under tropical conditions. In a similar study on Holstein cows, Veselinovic et al. (1990), reported 2.7 and 2.3 services per conception for superovulated and non-superovulated animals, respectively. In another study Bak et al. (1989) reported

1.9 services per conception for superovulated cows. This study has generally corroborated the findings of earlier studies.

Two cows developed endometritis following superovulation. These animals conceived after treatment with antibiotics. No other untoward effect of superovulation was observed in this study.

The data of this study have suggested some effect on services per conception, but no other profound negative effect of superovulation on fertility parameters of Jersey cows in tropical environment.

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