

A comparative appraisal of serum progesterone level during oestrous cycle in normal and repeat breeder crossbred cows with ovulatory problem

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ABSTRACT

An investigation to find out variation in the levels of serum progesterone during the estrous cycle was conducted on 117 crossbred cows; clinically the animal were categorised as 10 normal breeders, 26 repeat breeders with anovulation, 30 repeat breeders with delayed ovulation and 51 repeat breeders with normal ovulation. On day 0, 10 and 18 of the oestrous cycle the respective mean serum progesterone concentration were recorded as 0.58 ± 0.12 , 6.50 ± 0.69 and 1.08 ± 0.05 ng/ml, in normal breeder cows; 0.26 ± 0.04 , 0.45 ± 0.05 and 0.25 ± 0.04 ng/ml, in repeat breeder cows with anovulation; 0.57 ± 0.28 , 4.48 ± 0.23 and 0.99 ± 0.05 ng/ml in repeat breeder cows with delayed ovulation and 0.59 ± 0.04 , 4.76 ± 0.14 and 1.19 ± 0.01 ng/ml in repeat breeder cows with normal ovulation. There was significant ($P < 0.01$) variation in serum progesterone level between the days of oestrous cycle in repeat breeder cows with delayed ovulation and normal ovulation. Serum progesterone level in normal breeders on day 10 of oestrous cycle, was higher ($P < 0.01$) than that on days 0 and 18, which was also found to be higher on day 10 in repeat breeders with anovulation, delayed ovulation and normal ovulation, revealing progesterone deficiency in repeat breeder cows.

Key words: Serum progesterone, Repeat breeder, Crossbred cows, Anovulation, Delayed ovulation, Oestrous cycle.

Oestrous cycle is under the influence of oestrogen and progesterone from the ovary. Several attempts have been made to study blood progesterone profile at different stages of the oestrous cycle in both normal and repeat breeder cattle (Pope *et al.*, 1969; Smith *et al.*, 1975; Webb *et al.*, 1980; Vacca *et al.*, 1983). However, data on serum progesterone profile in cattle affected with specific ovulatory disturbances, such as, anovulation and delayed ovulation are scanty. Hence, the present investigation was undertaken to record the serum progesterone profile of repeat breeder crossbred cows associated with anovulation and delayed ovulation.

A total of 117 crossbred cows comprising 10 normal breeders, 26 repeat breeders with anovulation, 30 repeat breeders with delayed ovulation and 51 repeat breeders with normal ovulation belonging to private farmers around the College of Veterinary Science campus, Guwahati, were included in the study. Normal ovulation, anovulation and delayed ovulation were detected on the basis of rectal palpation of the ovaries on day 0, 1, 2 and 10 of the oestrous cycle. Blood sample was collected from each cow on day 0, day 10 and day 18 of the oestrous cycle by puncturing the jugular vein and estimated for serum progesterone concentration by radioimmunoassay (RIA) (Abraham *et al.* 1971). The data was analyzed

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by analysis of variance (Snedecor and Cochran, 1967).

The mean levels and the ranges of serum progesterone at different stages of oestrous cycle in normal breeder and repeat breeder crossbred cows with anovulation, delayed ovulation and normal ovulation are presented in Table I. Level of progesterone on day 0 of oestrous cycle in normal breeder and repeat breeder cows with delayed ovulation and with normal ovulation was very low (ranging from 0.57 to 0.59 ng/ml) which increased to a significantly ($P < 0.01$) higher level (ranging from 4.48 to 6.50 ng/ml) on day 10 and then dropped to a level ranging from 0.99 to 1.19 ng/ml on day 18 of the cycle. This variation in the level of serum progesterone was at par with the results of clinical examination with regards to presence or absence of the corpus luteum in the ovaries. The higher level of blood progesterone recorded on day 10 of oestrous cycle was in consonance with the presence of mature corpus luteum in the ovary on day 10. Similar pattern of variation in blood progesterone level in cattle was reported by several workers. Dobrowolski *et al.* (1973) observed that plasma progesterone level in cows increased from 0.3 ng/ml at oestrous to a peak range of 5.92 to 8.5 ng/ml between day 10 and 18 and the level dropped sharply thereafter. Pope *et al.* (1969), Smith *et al.* (1975) and Sreenan and Gosling (1975) observed that blood progesterone level was as high as 6 - 9 ng/ml in mid cycle which was less than 1 ng/ml at oestrous and on day 17 to day 20 of the oestrous cycle.

In repeat breeder cows with anovulation, the level of serum progesterone on different days of oestrous cycle was much lower (0.25 - 0.45 ng/ml) as compared to that in normal breeders and repeat breeders with delayed and normal ovulation. This might be due to lack of formation of corpus luteum in the ovary. Vacca *et al.* (1983) also reported that level of circulating serum progesterone was less than 0.5 ng/ml in absence of palpable corpus luteum in the ovaries of zebu cows. Low concentration of serum progesterone obtained in repeat breeding cows with anovulation might be attributed to secretion from the persisting anovulatory follicle of the ovary. Turner and Bagnara (1961), Tribble *et al.* (1973) and Webb *et al.* (1980) also reported the secretion of progesterone from follicle. The level of serum progesterone, although low in repeat breeding cows with anovulation, increased significantly ($P < 0.01$) on day 10 which might be due to secretion of progesterone from the partially luteinized anovulatory follicle. It was reported that anovulatory follicle became partly luteinized, persisted and regressed during the cycle as did the normal corpus luteum (Arthur, 1977).

It was evident from the present study that although the serum progesterone level increased

Table I. Level of serum progesterone (ng/ml) (Mean \pm S.E.) on different days of oestrous cycle in normal breeder and repeat breeder crossbred cows with anovulation, delayed ovulation and normal ovulation

Day of oestrous cycle	Normal breeder	Repeat breeder with anovulation	Repeat breeder with delayed ovulation	Repeat breeder with normal ovulation
Day 0	0.58 \pm 0.12 ^a (0.00 - 0.96)	0.26 \pm 0.04 ^a (0.00 - 0.65)	0.57 \pm 0.28 ^a (0.10-0.97)	0.59 \pm 0.04 ^a (0.00 - 0.98)
Day 10	6.50 \pm 0.69 ^b (4.36-9.95)	0.45 \pm 0.05 ^b (0.00 - 0.98)	4.48 \pm 0.23 ^b (3.10-8.20)	4.76 \pm 0.14 ^b (3.20 - 6.34)
Day 18	1.08 \pm 0.05 ^a (0.95-1.24)	0.25 \pm 0.04 ^a (0.00 - 0.80)	0.99 \pm 0.05 ^c (0.39-1.74)	1.19 \pm 0.01 ^c (0.86-1.52)

Figures in the parentheses indicate ranges.

Means bearing similar superscript in a column do not differ significantly.

significantly on day 10 from the level of day 0 in both repeat breeder with delayed and normal ovulation, but it was lower when compared with that of normal breeding cows recorded on day 10. This might be indicative of progesterone insufficiency in repeat breeders that could explain conceptional failures and consequential repeat breeding condition of the cows.

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