

OESTRUS AND OVARIAN ACTIVITY IN LACTATING SAHIWAL-SHORTHORN BEEF COWS IN SOUTH-EASTERN QUEENSLAND

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Summary

Oestrus and ovarian activity were studied in a group of crossbred Sahiwal-Shorthorn beef cows over four lactation periods of varying length throughout different seasons of the year.

In the first lactation, cows were in poor condition (body weight 303 kg) and the mean interval from calving to first oestrus was 220 ± 16 days. Five cows were still anoestrus 18 months after calving and were culled. The interval to first post partum oestrus was correlated with the length of the suckling period, but not in the subsequent three lactation periods when the body weight (438 kg) was significantly higher ($P < 0.01$).

The shortest mean interval from calving to first oestrus was recorded in the summer period (93 ± 3 days). Follicular growth and regression occurred in about 30% of cows about 36 days before the first oestrus post partum.

Bos indicus crossbred cows exhibited oestrus between 90 to 140 days post partum irrespective of whether the calves were weaned at 95 or 188 days. If the calves were weaned at 14 days or less, oestrus occurred at a mean of 50 days post partum.

I. INTRODUCTION

The interval from calving to the first oestrous period in cattle varies between breeds (Clapp 1937; Warnick 1955; Lindley, et al. 1958), the nutritional plane (Joubert 1954a and 1954b; Wiltbank et al. 1962; Dunn et al. 1964), the length of the suckling period (Biswal and Rao 1960; Wiltbank et al. 1961), and the season of the year of calving (Hammond 1927; Warnick 1955; Kohli and Suri 1960.)

Studies in other countries on the interval from parturition to oestrus in both **Bos indicus** and **Bos taurus** cattle record a range of 46.9 to 467 days (Clapp 1937; Lasley and Bogart 1943; Lindley et al. 1958; Clamohoy 1952; Nazareno 1954). In north Queensland, Donaldson (1962) recorded the absence of oestrus in both Shorthorn and crossbred Zebu cows suckling calves younger than four months of age.

The purpose of this investigation was to study the occurrence of oestrus and ovarian activity in **B. indicus** crossbred cows (Sahiwal-Shorthorn) given uniform rations during lactation periods of varied lengths at different seasons of the year. The work was carried out at Lawes some fifty miles (80 km) west of Brisbane at 27° latitude.

II. MATERIALS AND METHODS

In July 1964, observations started on 65 Sahiwal-Shorthorn cross cows aged 20 months to 6 years which were in poor condition having been purchased from

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drought areas. Examination per rectum of all cows immediately on their arrival at Lawes showed that 23 were pregnant and due to calve from September to December 1964. The cows were held in yards throughout the experiment and fed baled lucerne hay daily and a ground concentrate mixture (cottonseed meal, barley, bonemeal 1% and salt 1%) twice weekly. Bodyweights were held constant throughout the test periods by adjusting the rations each week (Table 1).

To terminate lactation the calves were removed from the cows (weaned) at 89 to 300 days of age. The 65 cows were separated into three groups and inseminated over three 6 week periods in July-August 1965, January-February 1966 and April-May 1966 respectively. This provided three different seasons in which oestrous behaviour and ovarian activity could be studied during lactation (Table 1).

The functional state of the ovaries and uteri of all cows after calving was determined by palpation per rectum at weekly intervals. Records were kept of ovarian and uterine changes in the form of coded drawings and comments which could be compared at each weekly examination. The comments included position and size of follicles and corpora lutea, tone of uterus and other signs such as vulval swelling, hyperaemia of vestibulum, and presence of mucus. In addition the ovaries of any cow exhibiting oestrus were palpated every two hours to determine the time of ovulation. To detect oestrus, cows were observed for at least 15 minutes every day at 0700, 1000, 1300, 1500 and 1800 h.

In the first lactation period studied, three young crossbred bulls five months of age and possessing libido, but too small to serve the cows successfully, were used to assist in the visual determination of oestrus. Later these bulls were replaced by two steers. Mature bulls could not be used without incurring the risk of conception. In all the other observation periods, Sahiwal-Shorthorn bulls were placed in yards on either side of the cows to assist the detection of oestrus.

Oestrus was defined as the period during which the cows would readily accept mounting by another animal. "Heat detectors" (KaMar Inc., Steamboat Springs, Col., U.S.A.) were fitted to the cows to detect oestrus occurring at night and between routine observations (Baker 1965).

Over 60 cervical mucus samples were taken and examined for fern-leaf pattern (Bone 1954; Alliston, Patterson and Ulberg 1958; Abusineina 1962). These were used only to help confirm the presence or absence of oestrus in cases which showed a positive heat mount detector but where oestrus could not be completely confirmed by either visual means or rectal palpation.

Throughout the test periods the cows were weighed at fortnightly intervals and one week after calving; they were also treated regularly for the control of internal parasites.

III. RESULTS

All results are summarized in Table 1; the "t" test was used to test significance.

(a) Lactation Period 1

Bodyweight at first oestrus post partum (P.P.O.) was significantly lower by 0.29 ± 0.08 kg for each day that lactation had continued beyond the minimum length, and there was a significant increase of 0.84 ± 0.16 days in the interval to first oestrus with each increase of one day in length of lactation.

TABLE 1
Summary of results of four lactation periods studied in Sahiwal-Shorthorn cows

Lactation Period	No. of cows lactating	Lactation length (days)	Interval from parturition to first oestrus (days) \pm S.E.	Bodyweight 5 days after calving (kg) \pm S.E.	Bodyweight of cows at weaning (kg) \pm S.E.	% of cows with follicular activity prior to first oestrus post partum	Days after calving to this activity (mean)
1. September-December 1964 to March-May 1965 (Spring to Autumn)	23	180 \pm 14	220 \pm 16	310 \pm 10	303 \pm 9	35	160
2. (a) April, May to August 1966 (Autumn to Winter)	10	110 \pm 4	134 \pm 3	426 \pm 11	405 \pm 14	20	110
(b) April, May to November 1966 (Autumn to Spring)	12	188 \pm 8	140 \pm 9	420 \pm 18	367 \pm 9		98
3. October-December 1966 to February 1967 (Spring to Summer)	8	105 \pm 4	107 \pm 2	448 \pm 20	446 \pm 19	37	72
4. January, February 1967 to May, June 1967 (Summer to Winter)	7	95 \pm 4	93 \pm 3	485 \pm 17	488 \pm 18	29	71

Significance of differences

Post partum oestrus interval: Period 1** > 2, 3, 4
1, 2, 3** > 4
Lactation length: Period 1, 2* > 3, 4
Body weight six days after calving: Period 1 ** < 2, 4
Period 1 * < 3, 4

* ($P < 0.05$) Significant difference at 5% level.

** ($P < 0.01$) Significant difference at 1% level.

Five cows in the first lactation period studied failed to come into oestrus after weaning and so were culled the following year. The mean bodyweights at calving and weaning of these cows were 288 and 254 kg respectively.

(b) Lactation Period 2

In this study, calves were divided into two groups of 10 and 12 and weaned after a mean interval of 110 and 188 days respectively. The subsequent P.P.O. interval of the cows was not affected by lactation length, bodyweight five days after calving or at weaning.

(c) Lactation Periods 3 and 4

In Lactation Period 3, calves were weaned at a mean of 105 days (range 89 to 116 days), and in Lactation Period 4, at a mean of 95 days (range 80 to 120 days).

The P.P.O. interval of the cows in both Periods 3 and 4 was independent of length of lactation, bodyweight five days after calving and at weaning.

During the four test periods, two calves died at birth and two more calves were weaned at 10 days of age due to the poor milk supply of their mothers. In these cases, the mean P.P.O. interval of the cows was 50 days.

(d) Ovarian Activity during lactation

In all four observation periods, follicular activity commenced before the first P.P.O. Ovarian activity was detected as developing follicles which reached estimated sizes of 10-15 mm and later regressed. In only two cases were corpora lutea detected without follicles having been previously palpated. Both these cows, however, had shown positive heat detectors in the previous week. It was therefore assumed that the follicles had not been detected at the previous palpation and that a normal oestrus must have occurred.

(e) The Effects of Season on P.P.O. Interval

The mean P.P.O. interval of 220 days was significantly longer ($P < 0.01$) during the spring-autumn period than any other period studied. The shortest ($P < 0.01$) mean P.P.O. interval of 95 days occurred in the summer-winter period.

IV. DISCUSSION

In the four lactation periods studied, the mean P.P.O. intervals were well within the range recorded by previous workers for both *B. taurus* and *B. indicus* cattle. The protracted lactation anoestrus of 220 days recorded in the first period could have reflected the extremely poor condition of the animals. But of the 23 cows used, 5 remained in anoestrus and were culled the following year. There was a high correlation between the length of the suckling period and the interval to first oestrus. This correlation was not significant in the subsequent studies when the bodyweight was significantly higher, but increasing bodyweight was confounded with increasing age of the cows and perhaps with other variables.

The post partum oestrous interval was at a minimum during the summer (93 days) and at a maximum during the winter (138 days).

In the four lactations, 20-37% of cows showed ovarian follicular activity 36 days before the first P.P.O. This finding is in accord with Hammond and Sanders (1923), Casida and Wisnicky (1950), Kidder, Barrett and Casida (1952), and

Burns *et al.* (1954), in that ovarian activity was detected, but disagrees with them in that ovulation was not detected prior to the first P.P.O.

Koger *et al.* (1962) and England, Temple and Farthing (1963) indicated that a significant interaction between breed and lactation status occurred because non-lactating cows of all breeds performed at nearly the same level, while lactating cows showed wide breed differences.

It appears from the present work that suckled *B. indicus* crossbred cows, provided they do not have unduly low bodyweight, should demonstrate oestrus between 90 to 140 days post partum irrespective of whether the calves are weaned at 95 or 188 days. If weaned at 14 days or less, the first post partum oestrus can be expected to occur within 65 days.

V. REFERENCES

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