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# INTERVAL FROM CALVING TO FIRST OESTRUS IN AUTUMN- AND SPRING-CALVING HERDS IN THE SAME LOCALITY

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SUMMARY

Mean post-partum intervals to first oestrus of 38, 31 and 51 days were recorded in three consecutive years in a small herd of autumn-calving cows. Mean intervals of Angus, Friesian and Friesian × Angus cows within this herd were 42, 32 and 42 days, respectively. Considerably longer intervals to oestrus of 90, 88 and 65 days were recorded in three years in spring-calving Angus cows in the same locality. Although there was a significant negative relationship between calving date and post-partum interval to oestrus in spring-calving cows, no such relationship existed for autumn-calving animals. As a result of the short intervals from calving to first oestrus in the autumn herd, the pattern of calving was more concentrated.

## INTRODUCTION

Protracted intervals from calving to first behavioural oestrus contribute to low reproductive performance in spring-calving beef cows (Knight and Nicoll, 1978; Morris *et al.*, 1978). At the time bulls are first introduced, many cows have not returned to oestrus. This can result in a subsequent long spread of calving, or, if the period of mating is restricted, increased barrenness.

Many factors influence the length of the interval to first behavioural oestrus, including calving date, nutrition, lactation, cow breed and age. Changes in post-partum anoestrous interval (PPAI) have also been related to time of the year (Thibault *et al.*, 1966).

This paper reports PPAI recorded in autumn- and spring-calving cows at Invermay Agricultural Research Centre.

## METHOD

The autumn-calving herd comprised mixed-age Angus, Friesian × Angus and Friesian cows. Cows calved during March and April and were joined with entire bulls for 60 days from early June. The spring-calving herd comprised Angus cows of mixed age run separately from the autumn herd. Calving commenced in mid-

August and cows were joined with entire bulls for 60 days from mid-November.

Calving was recorded daily. Vasectomized bulls were run with the herds from the commencement of calving and replaced by entire bulls at mating. All bulls were fitted with chinball mating harnesses, and mating marks were recorded three times per week.

Records for PPAI included in the analysis were from cows rearing their second or subsequent calf following unassisted delivery. Relationships between calving date and PPAI were calculated within breed and year of calving and slopes compared by analysis of variance. Proportions of cows calving within 21-day periods were calculated within years and averaged over three years for Angus cows in each of the spring- and autumn-calving herds.

## RESULTS

Mean values for PPAI by year of calving ranged from 31 to 51 days in the autumn herd (Table 1). Individual intervals varied widely and some very short intervals were recorded.

Regression coefficients for the relationship between PPAI and calving date were not significantly different from zero and accounted for only a small proportion of the variance in Angus and Friesian cows. Both the slope common to the three years and yearly deviations from this slope were not significant. In Friesian × Angus cows, regression coefficients were significantly different from zero in 1976 and 1978 (Table 2), but the slope was negative in 1976 and positive in 1978. Values for PPAI averaged over the three years were 42, 32 and 42 days for Angus, Friesian, and Friesian × Angus cows, respectively.

Mean values for PPAI by year for spring-calving Angus cows were 90, 88 and 65 days (Table 3). The mean PPAI was shorter in 1978 after cows had been intentionally calved later. Regression coefficients indicate a strong relationship between calving date and PPAI in all three years (Table 4). Deviations from the common slope between years were not significant and the overall decrease was 0.6 days in PPAI for each day later that the cow calved.

Liveweights of Angus cows calving in spring and autumn differed considerably in relation to physiological state (Fig. 1). Those calving in autumn were approximately 85 kg heavier at the start of calving than those calving in spring and lost weight during calving and mating. Spring-calving cows lost weight during calving, but then gained weight rapidly until after mating.

TABLE 1: MEAN INTERVAL FROM AUTUMN CALVING TO FIRST OESTRUS IN ANGUS, FRIESIAN × ANGUS AND FRIESIAN COWS

| | *Year of Calving* | | |
|---|---|---|---|
| | *1976* | *1977* | *1978* |
| Number of records | 28 | 27 | 35 |
| Mean interval (days) | 38 | 31 | 51 |
| Standard error of mean | 3.54 | 2.43 | 3.98 |
| Range | 17-99 | 12-64 | 8-121 |

TABLE 2: THE CHANGE IN THE INTERVAL TO FIRST OESTRUS (DAYS) FOR EACH DAY LATER THAT THE COWS CALVED DURING AUTUMN

| *Breed* | *No. of Records* | *Slope* | *Standard Error* |
|---|---|---|---|
| Friesian × Angus | | | |
| 1976 | 8 | –1.70* | 0.69 |
| 1977 | 8 | 0.70 n.s. | 0.57 |
| 1978 | 11 | 2.89** | 0.89 |
| Angus common slope | 45 | –0.26 n.s. | 0.21 |
| Friesian common slope | 18 | –0.27 n.s. | 0.46 |

TABLE 3: MEAN INTERVAL FROM SPRING CALVING TO FIRST OESTRUS IN ANGUS COWS

| | *Year of Calving* | | |
|---|---|---|---|
| | *1975* | *1977* | *1978* |
| Number of records | 30 | 13 | 13 |
| Mean interval (days) | 90 | 88 | 65 |
| Standard error of mean | 5.31 | 3.30 | 3.40 |
| Range | 41-187 | 60-101 | 47-86 |

TABLE 4: THE CHANGE IN THE INTERVAL TO FIRST OESTRUS (DAYS) FOR EACH DAY LATER THAT ANGUS COWS CALVED DURING SPRING

| *Year* | *No. of Records* | *Slope* | *Standard Error* |
|---|---|---|---|
| 1975 | 30 | –0.63* | 0.30 |
| 1977 | 13 | –0.44* | 0.15 |
| 1978 | 13 | –0.84** | 0.20 |
| Common slope | 56 | –0.60** | 0.18 |

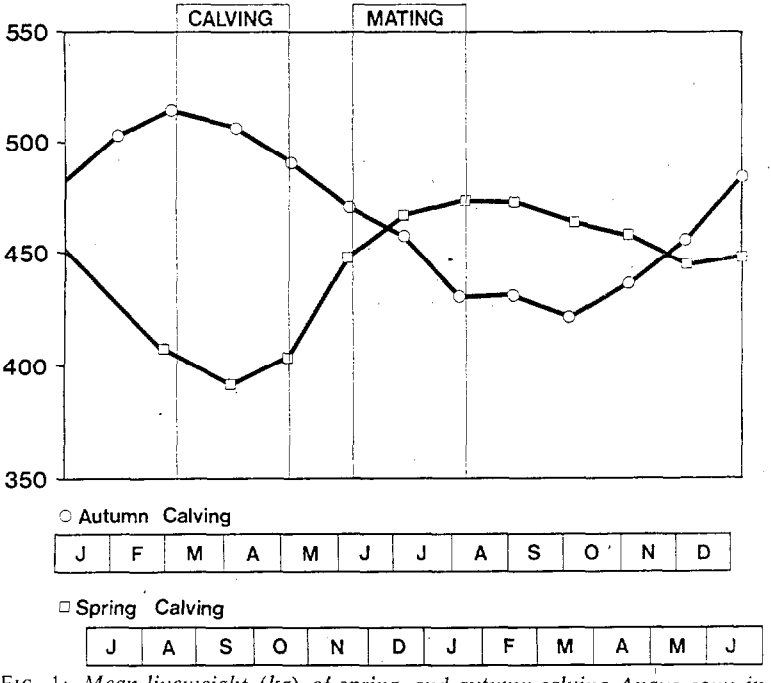


FIG. 1: *Mean liveweight (kg) of spring- and autumn-calving Angus cows in relation to calving and mating.*

The proportion of cows calving during successive 21-day period differed significantly between herds ($P < 0.05$). Eighty-two percent of Angus cows calved within the first 21 days of autumn calving, whereas only, 49% of Angus cows calved in the corresponding period in spring. The mean day of calving was 13 and 27 days after the start of calving for autumn- and spring-calving cows, respectively.

## DISCUSSION

The duration of PPAI recorded in the autumn herd (31 to 51 days) was similar to values reported in other autumn-calving herds overseas. Macfarlane *et al.* (1977) reported intervals of 35 to 38 days for Hereford × Friesian cows and Laster *et al.* (1973) reported intervals of 49 days for Angus cows. These intervals are considerably less than the 65 to 90 days recorded in spring-calving Angus cows. Similar values to these have been reported for spring-calving cows elsewhere in New Zealand (Knight and Nicoll, 1978; Morris *et al.*, 1978).

The results also show that there was no relationship between PPAI and calving date in autumn-calving cows in contrast to the significant negative relationship recorded in spring-calving cows (see also Knight and Nicoll, 1978; Morris *et al.*, 1978). However this may be a function of the concentrated pattern of calving in the autumn herd. In cows calving over a longer period in autumn, Laster *et al.* (1973) recorded a significant positive relationship between PPAI and calving date.

There are several possible explanations for the difference between seasons in PPAI. Thibault *et al.* (1966) described seasonal variations in PPAI and suggested that the variation was related to photoperiod. Pre- and post-calving nutrition are also important factors affecting PPAI (Wiltbank *et al.*, 1962; Dunn *et al.*, 1969). Consequently, shorter intervals to oestrus observed in the autumn herd and in late calving spring cows may be related to differences in both nutrition and photoperiod. The results presented in Fig. 1 suggest that, if nutrition is important, then it is during the period prior to calving that it has its greatest influence.

Short PPAI in autumn-calving cows resulting in more cows cycling early in the joining period led to a concentrated calving pattern. Thus it is likely that a reduction in the average PPAI in spring-calving cows would also lead to a more concentrated calving, and reduced barrenness in herds with restricted joining periods.

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