Calving behaviour of single-suckled Angus cows and their calves born in the spring

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ABSTRACT

Behaviour patterns which were relevant to parturition and formation of the cow-calf bond were studied and where possible related to calf survival. The relationship of maternal experience (i.e., primigravid *v* multigravid) to these behaviours was also studied. It was possible to predict the order in which the cows calved and the time of calving. Social isolation, localisation and ingestion of the placenta and associated fluids were found to influence calf survival. Maternal experience was directly related to the occurrence of these behaviours.

INTRODUCTION

In commercial herds the total weight of calves weaned per unit number of cows mated is a management objective of major importance. Total weaning weight is dependent on the number of calves weaned and their growth rates. Greatest calf mortality occurs during the perinatal period. It has been estimated as 7 to 13 deaths per 100 cows mated, with two-thirds of these deaths occurring in the first 24 h (Montgomery, 1978).

Of the many factors influencing survival and growth, the dam's milk production is the only one which has received much attention. Another major component, that of behaviour, has received comparatively little emphasis. There have been only 2 published studies of cow and calf behaviour involving single-suckled beef cattle managed under New Zealand farming conditions (Walker, 1962; Nicol and Sharafeldin, 1975).

RESULTS AND DISCUSSION

Prediction of calving order and time of calving was based on visual assessment of physical and behavioural signs. There were 4 physical groups: labia, udder, pelvic ligaments, and body conformation—subdivided into 24 signs (Fig. 1). The 11 behavioural signs were in 3 categories: gait, posture and social activity.

There was a difference (χ^2 $P<0.01$) between primigravid and multigravid cows in the number of physical signs but not for the number of behavioural signs recorded prepartum. The signs differed in their usefulness and no single one could predict calving order. The labia was the most reliable physical group followed by pelvic ligaments, body conformation and udder in that order. Conversely, Dufty (1971) considered the pelvic ligament change to be the best for Herefords and Arthur (1961) found in dairy

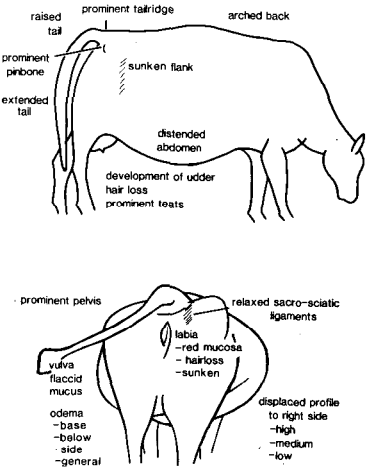

FIG. 1 Physical signs indicative of imminent parturition.

breeds that the changes in the udder were of most use. Of the behavioural groups, social activity was of the most value followed by posture and then gait. Other workers found that behavioural signs were limited to the immediate prepartum period and that they varied in their form between cows (Fraser, 1968; George and Barger, 1974). A similar conclusion was reached in this present study. There was no consistency between cows in the time or the sequence of their signs and therefore it was not possible to

extrapolate between animals; each cow had to be independently monitored.

The predicted calving order corresponded to the actual sequence (Spearman, $P<0.001$) for all except 2 animals, both of which were primigravid and were out of order by 1 position. Detection of 5 or more physical signs allowed prediction of calving to within 48 h. Prediction up to 2 to 3 h of calving required the detection of at least 3 behavioural signs: social isolation, specific resting postures or restlessness. This last term was used to collectively describe increased mobility, elimination and frequency of grazing bouts. Using behavioural signs to predict calving order or time was found to be less reliable than using physical signs. However, a combined utilisation of the 2 increased the accuracy of the estimate.

The multigravida calved throughout the 24 h period whilst there was a tendency (binomial, $P<0.01$) for the primigravida to calve during daylight. Calving occurred frequently (χ^2, $P<0.001$) in a certain location. Seven of the 8 multigravida calved in a stream bed which provided visual isolation from the rest of the herd. Only 1 of the first-calvers used this area. By the end of first stage labour, all except 3 cows had localised in an area of 20 m × 20 m. Of the exceptions, 1 was constantly disturbed by herdmates to which she responded by moving away. Subsequently she refused to allow her calf to suckle and it later died of starvation. The other 2 cows had extended (χ^2, $P<0.01$) second-stage labour. This dystocia was recognised by increased mobility and decreased straining in comparison to other parturient cows.

No consistent behavioural sign that first-stage labour had begun was found. A similar situation was reported by Dufty (1972); George and Barger (1974) and Johnsson *et al.* (1980). In the present study many of the behaviours were recorded up to 29 d prepartum. Restlessness was the most frequently and earliest recorded activity. The older cows tended to have a longer (χ^2, $P<0.05$) period of restlessness. These findings support those of Donaldson (1970) and Johnsson *et al.* (1980).

The different stages of labour were characterised by specific postures and behavioural sequences (Fig. 2). First stage was characterised by standing, interspersed by bouts of straining and restlessness. Standing strain was on one occasion recorded 10 d prepartum, but was most often seen within 3 h of rupture of the allanto-chorionic membrane.

From second stage onwards, recumbency became progressively more frequent and prolonged with the animal most often (χ^2, $P<0.10$) lying on its left side. Likewise, straining became more common and prolonged with time. In all except 1 instance, calves were born with the cow completely recumbent. Craig (1937) believed this posture to occur only during

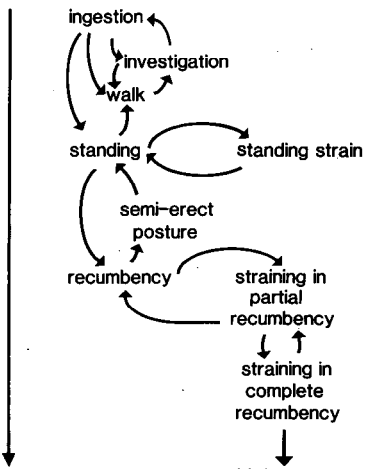

FIG. 2 Behaviour sequences and postures during parturition.

dystocia. Investigation and ingestion of uterine fluids and membranes most often occurred following a straining bout. This resulted in the cow remaining at the calving site even after the calf's birth. This continued presence of the cow determined the occurrence and rapidity of formation of the cow-calf bond. Twelve of the 14 cows exhibited placentophagia, the 2 exceptions were both primiparous. In another first-calver, pre-occupation with the placenta resulted in separation from her calf and subsequent rejection of its nursing attempts.

Vocalisation by the cow was also found to influence subsequent events. Bellowing, indicative of agonism or fright, was heard only from the primigravid cows. This calling resulted in herdmates congregating around the parturient animal and was followed by fighting and mounting. This interference always resulted in the dam attacking and/or rejecting her calf. With each successive calving interest from herdmates declined. It is suggested that calving older cows first might decrease problems in the cow-calf bond formation as these animals appear less susceptible to the effects of interference than are younger cows. Also the inexperienced cows appeared to learn from observing parturition, especially from the older animals. This learning was reflected in a reduction (χ^2, $P<0.001$) in both agonism and rejection of the calf.

ACKNOWLEDGEMENTS

The financial support of the Combined Beef Breeders' Research Committee and the Department of Labour Student Community Service Programme for one of us (VRA) is acknowledged with appreciation.

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