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Behaviour factors influencing the rearing of Sahiwal-cross calves

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ABSTRACT

Trials carried out over 3 seasons are reported. In 1980, 59 Sahiwal \times Friesian (S \times F) and 56 Friesian (F) male calves were reared on a system of free access to cold milk or colostrum outdoors. Death rate in S \times F calves was 19% while none of the F calves died. Surviving S \times F calves fed on whole milk to 9 weeks had average growth rates of 0.47 kg/d compared with 0.64 kg/d for F calves. The high death rate and poor growth rate of S \times F calves appeared to be due to behavioural factors adversely interacting with aspects of the rearing system.

In 1981 suckling behaviour on monozygotic twin dams of 8 S \times F and 8 *Bos taurus* dairy-bred calves was compared. No differences were found in suckling patterns and growth rates, nor was there a lack of 'suckling' drive while at pasture. Thirty-eight S-cross calves were also successfully reared on a 'calfeteria' with twice-daily feeding.

In 1982 the *ad libitum* system was modified to include individual training, feeding with warm milk, changing the teat ratio from 1 per 10 calves to 1 per 2 calves and keeping calf groups indoors until weaning at 5 weeks of age. The S \times F calves consumed more milk and grew faster from birth to weaning (0.92 kg/d v 0.74 kg/d) than F calves. As well as indicating the dairy beef potential of these S \times F calves this final trial showed the importance of breed behavioural factors and the need to adapt rearing systems to animals rather than the reverse.

INTRODUCTION

There is now a good export market for Sahiwal \times Friesian (*Bos indicus* \times *Bos taurus*) heifers and it is desirable to establish suitable rearing methods. There is also a need to record the growth performance of Sahiwal-cross bulls to evaluate their beef potential. This paper reports an initial comparative trial in which Sahiwal \times Friesian (S \times F) and Friesian (F) male calves were reared, further investigation of some of the problems which arose during this trial and another comparative rearing trial after appropriate changes had been made to the rearing system to accommodate the different behaviour traits of S \times F calves.

METHODS

Trial 1, 1980

In mid-August 59 S \times F and 56 F male calves were purchased when approximately 4 days old and given *ad libitum* access to cold milk or colostrum from 200 l drums for 1 week indoors and then at pasture. It was planned to wean at either 4 or 7 weeks after purchase. Because of problems encountered the S \times F calves were withdrawn from the trial 3 weeks from the start and reared for survival.

Trial 2, 1981

Several aspects of the behaviour of Sahiwal-cross calves were studied in 1981.

(a) The daily sucking patterns and general social responses of calves at pasture were studied. At least five 24-hour observations were made on each of 8 Sahiwal-cross (*Bos indicus* \times *Bos taurus*) and 8 pure dairy-bred (*Bos taurus*) calves suckling their own dams which were monozygotic twins.

(b) Thirty-eight S \times F calves were removed from their dams at 12 or 72 h after birth and offered 2 to 2.5 l of warm whole milk and colostrum twice a day. Records were kept of the learning responses of each calf.

(c) It had been suggested that calves with *Bos indicus* ancestry originating in tropical regions may suffer from a degree of hypothermia under New Zealand conditions. Rectal temperatures were recorded for all calves within 24 h of birth.

Trial 3, 1982

Changes were made to the *ad libitum* calf-rearing system to suit the S \times F calf behaviour traits revealed in Trials 1 and 2. In early August 30 S \times F and 30 F calves were purchased at 4 days of age (where possible from the same source farms) and matched for body weight and date of birth. Each calf was offered 2.5 l of warm whole milk on the day of arrival and then 2.5 l twice daily via the calfeteria until drinking was judged satisfactory (average 4 days). The calves were then penned according to breed and warm whole milk was offered *ad libitum* from 200 l drums providing 14 teats/30 calves. The milk remaining was measured

before the warm milk was added each day. The drums were cleaned 3 times a week. The milk temperature was slowly lowered as the trial progressed to prevent an abrupt change from warm to cold milk. Concentrates were available *ad libitum* until 10 weeks after arrival. All calves remained indoors until weaning during week 5 (average 36 days). They were then run as 1 group in a semi-covered barn for 2 days, with water replacing milk in the drums, before being let out to pasture for a further 5 weeks.

RESULTS

Trial 1, 1980

The F calves adjusted readily to the *ad libitum* cold milk rearing systems but the S × F calves did not. The adjustment problems for S × F calves revolved around 3 factors — there was a reluctance to drink cold liquids. As a result 2 weeks after purchase 54% of these calves were at or below their purchase weight and 3 calves had died. By the third week 7 more calves had died due to malnutrition or associated conditions. Another calf died subsequently. Although liquid intakes were low those calves surviving retained their urge to suck as evidenced by their sucking the ears and navels of group mates.

There were differences in social behaviour in the groups. Observation indicated that the S × F calves moved as a group around the paddock or to and from the feeder. As the whole group converged upon the feeder at once, 1 teat per 10 calves, while adequate for F, was inadequate for S × F calves in a paddock situation. Improvements to milk intake were noted when the teat ratio was increased to 1 per 5 calves, and more so at 1 teat per 2 calves.

Inclement weather discouraged the S × F calves from moving out of sheltered areas to the feeders. When the feeders were moved into sheltered positions intake increased and a further increase was noted when the feeders and calves were moved into the barn. The surviving S × F calves remained on milk until 9 weeks and on concentrates until 10 weeks after purchase.

The distribution of live weights at 10 weeks after purchase of the S × F and the F calves in the 1980 trial is shown in Fig. 1. While some of the S × F calves grew satisfactorily many did not, and 39% of the survivors were below 70 kg at 10 weeks. In contrast the F calves, despite being weaned at 4 or 7 weeks, had grown well and only 5% were under 70 kg at 10 weeks.

Trial 2, 1981

Suckling patterns during day and night were similar in calves of the same age irrespective of sire breed. Growth rates were 1.08 ± 0.12 kg/d for Sahiwal-cross and 0.89 ± 0.17 kg/d for dairy calves. For the 4 cases where 1 twin produced a calf to Sahiwal and

the other to Friesian semen, average birth weight were 34.4 and 29.9 kg, average weight gains were 1.13 and 0.94 kg/d, and average weight gain/d as a percentage of birth weight was 3.3% and 3.2% for calves sired by Sahiwal and Friesian semen respectively. No calves were observed to suck any other calves in the period up to weaning.

Table 1 indicates the learning behaviour of calves fed individually, without the possibility of learning by imitation or social facilitation at a calfeteria. Sahiwal-cross calves left with their dams for several days were not more difficult to teach to drink than those removed as soon as possible. All calves were taught to suck with minimum problems and were reared without loss on a twice-daily feeding regime.

Rectal temperatures averaged 38.62°C (± 0.53 , range 37.7 to 39.5) for 37 Sahiwal-cross calves and 38.54°C (± 0.69 , range 37.1 to 39.4) for 8 *Bos taurus* dairy bred calves.

TABLE 1 Behaviour of Sahiwal-cross calves fed singly at a calfeteria.

	Age when removed from cow		
	12 h	72 h	
No. of calves	20	18	
Time to suck at 1st feed	< 20 sec	11	3
	20 sec-3.5 min	7	15
	> 10 min	2	0
Average feeds to consistently find teat on own	4.4	3.6	

Trial 3, 1982

All but 1 calf from each breed group were drinking by the second feeding. All the S × F calves were heavier than their purchase weight by week 2, which was in strong contrast to Trial 1 where 54% were the same weight or lighter at that age. The average daily milk consumption of the S × F calves was 9.6 l/calf, the highest recorded at the Ruakura Beef Unit by *ad libitum* fed calves and this was 15% higher than the average intake levels for the F calves in Trial 3. Daily intakes ranged from 4.9 l/calf on 1 day when chilled milk was offered, to 14.3 l/calf. Overall intakes tended to increase with increasing age but also were higher on the days fresh milk was offered (11.6 l/calf) than when milk was added to that left from the previous day (9.5 l/calf).

Total meal intake while milk was available was low (1.3 kg/calf for S × F; 1.8 kg/calf for F) but after weaning the daily meal intake averaged 1.76 kg/calf over 35 days. Fig. 1 shows the live weights for both groups of calves in 1982 at 10 weeks. Despite a check

in growth during the week of weaning, no S × F calf weighed less than 70 kg and 86% weighed over 90 kg, often regarded as a target 10-weeks weight.

Four calves, 3 F and 1 S × F, died during the trial. One death was due to a selenium deficiency and poor health on arrival, 1 from unknown causes following weaning, and the other 2 (1 from each group) died within 2 days of weaning from peritonitis due to perforated ulcers of the abomasum.

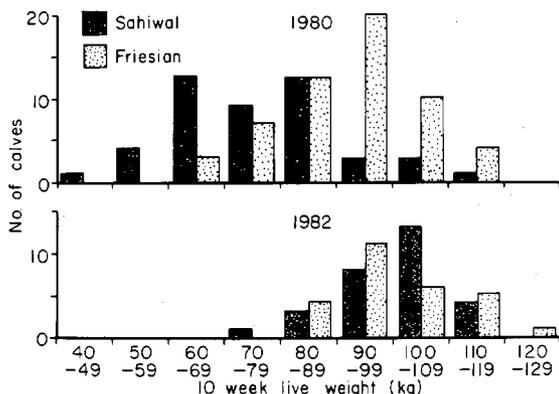


FIG. 1 Distribution of 10-week live weights in 1980 and 1982.

DISCUSSION AND CONCLUSIONS

The cold milk/colostrum *ad libitum* rearing system which was designed for rearing groups of calves (particularly Friesians) with minimal equipment costs and low labour, was not successful for rearing S × F calves outdoors. These calves were reluctant to drink cold milk and difficult to train to do so. They moved as a group around the paddock and to and from the feeder which meant that only a small proportion of

the calves could feed before the whole group moved away. During inclement weather the S × F calves were disinclined to move out of shelter.

High milk intakes and satisfactory growth rates resulted when modifications to the rearing procedures were made. These included: careful initial training to suck warm milk; no abrupt changes from warm to cold milk; increases in the number of teats available to allow most of the group to suck together; provision of shelter. The learning rate of S × calves removed from their dams at either 12 or 72 h after birth were similar. All normal healthy calves were easily taught to drink, although tall, strong S × calves sometimes required quiet handling and patience to avoid startling them into running and jumping about.

Other possible modifications to rearing techniques deserve investigation. These include the speed with which milk temperature can be lowered without affecting intake, the influence of the frequency of drum cleaning on intake, and the best procedures for weaning. The cause of the abomasal ulcers in the weaned calves needs further study.

The modifications made in the 1982 trial to accommodate the behaviour differences of Sahiwal-cross calves allowed an initial evaluation of their dairy beef potential. Once the basic behaviour information was available small changes to rearing routines were easily made to meet breed differences, emphasising once again the importance of modifying management or design to best utilise behaviour traits, rather than expecting animals to adapt to a rigid regime imposed upon them.

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