EFFECTS OF VOLUNTARY COLOSTRUM INTAKE
AND CALF MANAGEMENT ON CALF MORTALITY

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SUMMARY

Data from 386 Friesian calves were used to study the time regime for colostrum feeding and the quantity of colostrum consumed during the first 36 hours of the calf’s life, in relation to calf mortality until weaning. The time at which colostrum was first fed ranged from 2.7 to 4.5 h, depending on the time of calving. Subsequent feedings occurred at 13, 25 and 37 h post-partum. Cumulative consumption of colostrum was 2.2, 4.5, 7.2 and 9.7 kg per calf at the first, second, third and forth feedings, respectively. Mortality rate until weaning (56 days of age) was 3.62%. Main causes of mortality were associated with E. coli (septicaemia or enteritis) and pneumonia. Many cases of diarrhoea were treated successfully with the feeding of a solution containing electrolytes, streptomycin and glucose, which replaced completely the daily milk feeding for three days. It was concluded that high colostrum intake combined with good hygiene reduced the mortality rate of calves.

INTRODUCTION

Colostrum is vital for the survival and normal growth of the calf. It is widely accepted that immunoglobulin in colostrum is essential for the health of the newborn calf (Gay et al., 1965; Roy, 1970a,b), and colostrum provides other nutrients, particularly energy and vitamin A. It is also generally accepted that the newborn calf has the ability to absorb immunoglobulins during the first 24 to 36 h after birth and that the coefficient of absorption is reduced by delaying the feeding, becoming zero 36 hours after birth (Kruse, 1970a,b).

Although the calf is a by-product of the dairy herd, it is valuable either for beef or as a replacement heifer. Annual calf production per cow in Cyprus is very low (Conway, 1990), the main reason being the high calf mortality in early life. A system of ad lib colostrum feeding of calves associated with good management and proper treatment of diarrhoea of calves was introduced in the Dairy Unit of the Agricultural Research Institute, in an effort to reduce calf mortality. The objective of this work is to report on the regime of colostrum feeding and the relationship between colostrum intake and mortality of calves from birth to weaning.

MATERIALS AND METHODS

Data from 386 Friesian calves born at the Experimental Dairy Unit of the Agricultural Research Institute, Athalassa, from 1980 to 1987 were used. The calves were reared in individual pens, and were bucket-fed colostrum ad lib during the first two days and 200 l of fresh cow milk, offered in one meal daily, until weaning at 56 days of age (Economides and Georgiades, 1983). Individual pens were naturally ventilated and were drought free at calf level, with concrete
floors bedded with wood shavings. Each pen was cleaned and disinfected and remained unoccupied for at least two weeks before a new calf was placed in it.

Colostrum was hand-milked from cows soon after calving (up to 4 kg of colostrum) from all udder quarters. Subsequently, cows were machine-milked twice daily and up to 6 kg of colostrum were milked in the first milking. The time at which colostrum was offered and the quantity of colostrum consumed were recorded for four successive feedings. The data was divided into three time intervals i.e., 07.00 to 16.00 (working hours), 16.00 to 24.00 and 00.00 to 07.00. Calf losses, cause of death and incidence of diarrhoea until weaning were also recorded.

Diarrhoea was the main symptom of death in calves. Most cases of diarrhoea were treated by discontinuing milk feeding and providing the calf with a solution of electrolytes containing glucose and streptomycin for three consecutive days. On the 3rd day, milk was re-introduced and was increased gradually to 4 kg daily in 3 days. In cases of high temperature an antibiotic therapy was followed. When advanced dehydration of calves occurred, intravenous injections of electrolytes were provided.

RESULTS AND DISCUSSION

The number of calves born within the time intervals 07.00 to 16.00, 16.00 to 24.00 and 00.00 to 07.00 was 170 (44%), 77 (20%) and 139 (36%), respectively. Time of first colostrum feeding for calves born within the first time interval (Table 1) was shorter compared to the other two (2.7 vs 4.50 h).

Table 1. Elapsed time from birth to first and subsequent colostrum feedings

<table>
<thead>
<tr>
<th>Interval (h)</th>
<th>Feeding 07.00-16.00</th>
<th>16.00-24.00</th>
<th>00.00-07.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>170</td>
<td>77</td>
<td>139</td>
</tr>
<tr>
<td>First</td>
<td>2.74±1.57</td>
<td>4.50±4.06</td>
<td>4.50±1.91</td>
</tr>
<tr>
<td>Second</td>
<td>13.44±6.27</td>
<td>14.30±2.77</td>
<td>11.72±2.60</td>
</tr>
<tr>
<td>Third</td>
<td>24.91±3.23</td>
<td>25.63±7.06</td>
<td>27.86±4.45</td>
</tr>
<tr>
<td>Fourth</td>
<td>36.81±6.67</td>
<td>38.30±2.75</td>
<td>35.53±2.61</td>
</tr>
</tbody>
</table>

All calves had on average the first colostrum feeding within 5 h after birth, which was suggested as optimum (Kruse, 1970c). However, calves born late in the afternoon and during the night were first fed the colostrum 3.5 h after birth, which was recommended by Roy (1971). The fourth colostrum feeding occurred about 37 h after birth. Kruse (1970b) reported that colostrum feeding had a large effect on the absorption coefficient of immunoglobulins in the calf's blood and that there was no absorption 36 h after birth. Thus, delaying feeding of colostrum reduced the total amount of immunoglobulins absorbed by the calf and decreased its resistance to E. coli infections (Roy, 1970a). Average consumption of colostrum at the first feeding ranged from 2.0 to 2.4 kg and total consumption of colostrum was 9.7 kg per calf (Table 2). The amount of colostrum fed during the first 24 h of the calf's life, is in agreement with the recommendation of Roy (1971). Feeding of 7 kg of colostrum should supply the calf with 400g of immunoglobulins within the first 24 h of life, providing adequate protection of the newborn calf to various diseases and particularly colibacillosis. The high intake of colostrum in the first 36 h (9.70 kg/calf) had no detrimental effects on the health of calves, because the gut of the newborn calf has a very high absorption capacity and is able to utilize a big volume of colostrum (Kruse, 1970b).

Table 2. Cumulative consumption of colostrum (kg/day) at four feedings in relation to calving time

<table>
<thead>
<tr>
<th>Interval (h)</th>
<th>Feeding 07.00-16.00</th>
<th>16.00-24.00</th>
<th>00.00-07.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>170</td>
<td>77</td>
<td>139</td>
</tr>
<tr>
<td>First</td>
<td>2.16±0.60</td>
<td>2.03±0.66</td>
<td>2.41±0.62</td>
</tr>
<tr>
<td>Second</td>
<td>4.59±1.07</td>
<td>4.56±0.99</td>
<td>4.68±0.95</td>
</tr>
<tr>
<td>Third</td>
<td>7.14±1.34</td>
<td>7.09±1.33</td>
<td>7.30±1.25</td>
</tr>
<tr>
<td>Fourth</td>
<td>9.80±1.73</td>
<td>9.72±1.55</td>
<td>9.75±1.64</td>
</tr>
</tbody>
</table>

Mortality of calves until weaning was 3.62% (14 out of 386). Mortality of male calves was higher than that of female calves (71.50 vs 28.50%). Diarrhoea was the main symptom of death and E. coli septicaemia or enteritis and pneumonia were the main causes of calf mortality. The treatment followed against diarrhoea was successful and most calves recovered and grew normally until weaning. Another important management
factor, which contributed to the low calf mortality, was the proper housing of calves and particularly the practice of keeping individual pens empty for at least two weeks. Roy (1971) reported that the use of uncontaminated pens to break the cycle of infection had the greatest effect on the disease pattern in farms.

Epidemiological studies of calf losses under Cyprus conditions are not available, but losses are considered moderate to high in different dairy farms. The low calf mortality in this study can be ascribed to the high colostrum intake and the associated high absorption of immunoglobulins, and the proper management, housing and treatment of calves suffering from diarrhoea.

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REFERENCES


