The Effect of Breeding Group on the Incidence of Calf Neonatal Diarrhea in Range Beef Cattle

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Severe diarrhea in newborn calves (calf neonatal diarrhea) is one of the most important diseases of calves, resulting in considerable economical losses to producers. Recent studies have indicated that the cause of calf diarrhea involves an interplay between enteropathogenic bacteria and viruses (enteropathogenic E. coli, rota and corona virus-like viruses), the immunity of the calf and the effects of environment. The importance of colostral immunity in preventing calf scours is also well established.

The objective of this study was to compare four breed groups of beef cattle for their susceptibility to calf scours under range condition. If breed differences exist, they could be important in reducing the incidence of the disease in newborn calves by raising the more resistant breed groups in the infected regions. The influence of age of dam and sex of calf on the incidence of calf scours was also examined.

Materials and Methods

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The health records of 2111 calves born from 1974 to 1979 inclusive, at the University of Alberta Research Ranch at Kinsella, Alberta were used in this study. The calves belonged to one of the four following breeding groups; Hereford, Beef Synthetic (36% Angus, 34% Charolais, 21% Galloway), Dairy Synthetic (28% Holstein, 26% Brown Swiss, 11% Simmental and 35% Beef breeds), and Crossbred. All the calves that had been treated at least once for diarrhea were considered as having calf scours regardless of the period of sickness. During 1979 calving season, antibiotic pills were used as preventive measure and therefore only those calves which received additional treatments were considered infected in that particular year. The relative frequency of the incidence of calf scours among the four breed groups was compared. The incidence of scours in calves from first calf heifers was compared to those from older dams and the prevalence of scours in male and female calves was also assessed.

Results and Discussion

The relative frequency of calf scours in the four breed groups in each year is presented in Table 1 as a percentage of calves in a given group which were treated for diarrhea. It can be observed that the frequency of calf scours was quite variable in different years, ranging from a low of about 9 to a high of 33% (average over the four breed groups). While it is not possible to single out the exact
<table>
<thead>
<tr>
<th>Breed</th>
<th>Age of Dam</th>
<th></th>
<th></th>
<th>Sex of Calf</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2 years</td>
<td>3 plus years</td>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No. of Calves</td>
<td>Infected Calves %</td>
<td>No. of Calves</td>
<td>Infected Calves %</td>
<td>No. of Calves</td>
</tr>
<tr>
<td>Hereford</td>
<td></td>
<td>131</td>
<td>43.5</td>
<td>285</td>
<td>7.0</td>
<td>208</td>
</tr>
<tr>
<td>Beef Synthetic</td>
<td></td>
<td>272</td>
<td>40.1</td>
<td>591</td>
<td>10.3</td>
<td>429</td>
</tr>
<tr>
<td>Dairy Synthetic</td>
<td></td>
<td>64</td>
<td>51.6</td>
<td>176</td>
<td>13.1</td>
<td>117</td>
</tr>
<tr>
<td>Crossbred</td>
<td></td>
<td>163</td>
<td>41.7</td>
<td>429</td>
<td>4.3</td>
<td>300</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>630</td>
<td>42.2</td>
<td>1481</td>
<td>8.3</td>
<td>1054</td>
</tr>
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</table>
causes of this variation, environmental factors such as climatic conditions and managerial practices were certainly among the major causes of this large variation.

The differences in the frequency of the incidence of calf diarrhea between the four breed groups were much smaller compared with the differences between years. From this, it may be concluded that there was very little genetic difference in resistance to calf scours between the four breed groups in the present study. This is probably due to the fact that resistance or susceptibility to calf scours is primarily influenced by changes in environmental rather than genetic factors. On the average the crossbred calves had the lowest incidence of calf scours compared with the other three breed groups which were quite similar.

Calving difficulty may be considered as an important predisposing factor in calf scours, as it generally results in weaker and less viable calves with less resistance to pathogenic organisms than calves born normally. Therefore all genetic and environmental factors affecting the incidence of difficult parturition could indirectly influence the incidence of calf scours. Table 2 presents data concerning the incidence of calf scours in the four breed groups, classified by the age of dam and the sex of calf within each breed.

There are a number of factors which could have contributed to the differences between the two age of dam groups. Calving management between the two groups differed.
First and second calf heifers are wintered in one group and older cows in another. The feeding system is generally similar for the two groups but in severe winters, heifers were given some extra feed during February and March prior to calving. Cow weight losses from October to the third week of March in 1973-74 averaged about 50 kg, in the remaining years small losses or gains were experienced.

At birth all calves are given a Vitamin A, D, E injection, weighed, tagged, tattooed and all but the Beef Synthetic group have any horns removed by caustic application.

Prior to calving the first calf heifers are moved to the performance test feedlot area of the ranch where they can be more easily observed. They are calved in straw-bedded, open-front, partially-roofed pens previously occupied by calves on performance test. After the calves are well accepted by their dams and provided they are strong and healthy, dams and calves are transferred to small pasture areas and after two or three weeks they are moved to more extensive pasture areas. All pasture areas have natural bush shelter. An attempt is made to keep the numbers in each grouping small (e.g. less than 50 pairs in the later groupings).

Cows, three years and older, are mostly calved on pasture and after the required records and calf treatments are completed, cow and calf are transferred to an extensive pasture area which has a cover of approximately 40% bush and
which had been left ungrazed since the previous spring.

Calves born from heifers may therefore be exposed to a higher level of infection. Also their resistance may be lower because of a greater incidence of calving difficulty (see 1978 Feeders' Day Bulletin p. 15) or because of lower immunity from insufficient colostrum at the critical time. Calves from heifers are, of course, smaller and generally weaker than those from older cows.

It is likely that the prime contributor to the greater incidence of scours among calves from first calf heifers is related to the greater degree of crowding particularly at and after calving, causing a higher level of infection once the disease gets a start. Further research is necessary to see whether the incidence can be reduced by more extensive management of the heifer group.

Although the incidence of calf scours was somewhat higher in males compared to females, the difference was relatively small (19.8 vs 17.1%). It appears that sex of the calf does not influence the incidence of calf scours directly. However, since male calves are generally heavier than females at birth, this contributes to a higher incidence of difficult parturition which in turn may increase the incidence of calf scours.

**Summary**

Health records of 2111 calves from four different breed groups born from 1974 to 1979 at The University of Alberta
Research Ranch, Kinsella, Alberta were compared for the rate of incidence of calf scours. The study showed that:

1. There was a great variation in the frequency of calf scours in different years, which indicates that the incidence of the disease is primarily influenced by environmental conditions.

2. The differences in the frequency of calf scours between the 4 breed groups were relatively small, indicating that the susceptibility to calf scours was approximately the same in the 4 breed groups under study.

3. The incidence of calf scours was higher among calves born from heifers than calves born from older cows. Sex of calf had negligible effect on the incidence of calf scours.

Resumen

Los registros sanitarios de 2111 terneras de cuatro grupos raciales diferentes nacidas desde 1974 a 1979 en la Universidad de Alberta, Research Ranch, Kinsella, Alberta, se compararon con los tipos de frecuencia de diarrea de los terneros. El estudio demostró que: 1. Existe una gran variación en la frecuencia de la diarrea en los diferentes años, lo que indica que la frecuencia de la enfermedad está influenciada primariamente por las condiciones ambientales; 2. Las diferencias en la frecuencia de la diarrea entre los cuatro grupos raciales fueron relativamente pequeñas, indicando que la susceptibilidad a la diarrea es aproximadamente la misma en los cuatro grupos estudiados; 3. La frecuencia de la diarrea de los terneros fue más elevada en los nacidos de novillas que en los de vacas de más edad. El sexo del ternero no tiene efecto apreciable sobre la frecuencia de la diarrea.