Performance of Dairy Calves Raised Indoors vs. Outdoors in the Milk-feeding Period in One Commercial Danish Dairy Farm

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Introduction

In Denmark, calves are traditionally raised indoors during the milk-feeding period. The use of outdoor housing is, however, becoming more common and applicable to Danish conditions. Increased outdoor housing systems have been advocated for various reasons, including animal welfare, decreased workload and increased profitability. Several investigators have been able to present results that favors outdoor systems over indoor systems. Reduced prevalence of Cryptosporidium, Eimeria and rotavirus among preweaned calves housed in hutches has been reported. Calves in hutches have also been reported to have increased immune response, increased plasma IgG, lower plasma cortisol and reduced incidence of respiratory disease compared to calves housed indoors. The present case study was done to compare live weight gain and health between calves raised indoors and outdoors in one commercial dairy herd in Denmark.

Materials and Methods

Data from 436 calves were collected between September 03, 2003 and July 04, 2004. Calves were raised in either indoor (single- and group-pens) or outdoor (single- and group-hutches) systems, and were moved from single to group housing at two to four weeks of age. Indoors calves where fed 3 L of milk replacer twice daily until four weeks of age, and then 3.5 L twice daily until they were excluded from the trial at six to eight weeks of age. In order to compensate for climatic conditions from November to May, outdoor calves were fed 25% more milk replacer in the single hutches, and 7% more in the group hutches. All calves were fed colostrum for three days and had free access to calf starter.

Results

Overall live weight gain (LWG) was significantly higher among single-housed calves raised outdoors than indoors (outdoor = 1.03 lb [468 g]/d vs. indoors = 0.81 lb [366 g]/d; $P<0.001$). Although there was no effect of housing on LWG in the group-housing period (outdoor = 1.45 lb [658 g]/d vs. indoors = 1.20 lb [545 g]/d), calves that had relatively high LWG in the single-housing period tended to have higher LWG in the group-housing period ($P=0.047$). There was no effect of the winter feeding program on LWG, however, feed conversion rate (FCR) for outdoor calves fell approximately 20% during the winter period ($P<0.001$). Therefore, the higher feeding levels for calves raised outdoors during winter seemed justified. Despite the higher feeding level during winter, individually housed outdoor calves had approximately 18% higher FCR than individually housed calves indoors ($P=0.015$). No difference in FCR was found in the group-housing period. Percentage of calves that were treated for respiratory disease was 42% and 10% ($P<0.001$), and for diarrhea 15% and 8% ($P<0.001$) for calves raised indoors and outdoors, respectively.

Significance

When the feeding level for outdoor calves is adjusted for low temperatures, these calves may perform as well or better than calves housed indoors. After the owner of the study dairy saw the results, he decided to raise all calves outdoors.