Calf Notes.com

Calf Note #118 – Early Management & Later Growth

Introduction

Does management early in the life of the calf affect later growth, and, ultimately, factors such as age at first calving or size of heifers entering the milking string? Although this question has been addressed many times in the past (with the answer almost always being "yes"), some research published in the 2005 Journal of Dairy Science (Heinrichs et al., 2005) evaluated a number of farms in the Northeastern U.S. to address the issue.

The researchers used data from 21 commercial dairies in Northeastern Pennsylvania. There were 795 Holstein calves monitored throughout the study. Calves were followed from birth periodically until calving, when heifer body weight (**BW**), age at calving, wither height and body condition score were determined. Due to some farms dropping out of the study, results were available from 686 calves.

The researchers monitored several variables that reflected important aspects of calf management, including intake of starter and milk and feed quality (as indicators of the nutrition program), barn ammonia concentration, humidity and temperature (indicators of housing quality), characteristics of the calf's dam (including age and calving score), the number of days the calves were ill and days calves were treated with antibiotics. They also looked at a couple of interesting methods of analyzing the data statistically, but this part of the study is beyond the scope of this Calf Note.

Important herd factors that affected characteristics of first calf heifers included several management factors listed below.

A difficult birth. For each one unit increase in calving ease score, the age at first calving increased by about 17 days. In this study, the authors calculated calving ease on a three point scale – 1 = unassisted, 2 = easy pull, and 3 = hard pull, mechanical extraction, caesarean section. There's a lot of published data that show that as calving difficulties increase that morbidity and mortality increase, also. So from a management perspective, it's critically important to make sure that cows are in proper body condition (i.e., not too fat), first calf heifers are the proper size prior to calving, and you should pay attention to calving ease bulls, particularly in smaller animals.

Illness. The effect of health of calves during the first four months of life did affect the way calves grew and reach calving. Generally, calves that were treated with antibiotics tended to calve older than calves that weren't treated. Also, these calves tended to be taller – which the authors hypothesized was due to that fact that calves were older, but not heavier. On the other hand, the treating calves with antibiotics didn't affect BW at calving or body condition score at calving. This is probably due to the fact that calves were older when they calved, but they calved at the same size and BW. For every day that a calf was treated, age at first calving was increased by 10 days.

Of course, the number of days that calves are treated could be related to a number of management problems – most of which are related to either colostrum management (i.e., calves are not fed sufficient amounts of high quality colostrum at an early enough age) or poor sanitation, which increases the calf's exposure to disease causing pathogens. It's also important to point out that it's not the veterinary treatment that affects age at calving – it's the calf getting sick in the first place.

Nutrition. Generally, the nutrition program of calves, especially prior to weaning, had little effect on age at first calving, BW or calving score. Interestingly, maximum intake of milk from birth to 4 months of age (expressed as a percent of BW) caused greater age at first calving (each 1% increase in milk DM intake resulted in 18 days later age at first calving). To understand how these data were reported, let's look at the calf fed 1 lb (454 grams) of milk replacer. If the calf weights 100 lb (45 kg), then the amount of milk DMI expressed as a percent of BW is 0.454 kg / 45 kg = 0.01 or 1%. Calves fed additional milk DM generally had later age at first calving and greater body condition score at calving. The implications of this observation are not perfectly clear, but it appears, at any rate, that increased milk feeding in this study did not reduce age at first calving.

Forage ADF concentration was measured during the study (during the first 4 months of the study) as an index of overall forage quality (generally, higher ADF means lower energy content of the forage) fed to calves. Farms that had higher forage ADF had greater age at first calving – each 1% increase in ADF concentration resulted in 0.5 d increased age at first calving. Therefore, if calves were fed hay containing 35% ADF instead of 25% ADF would mean that these heifers would calve $(35 – 25 = 10) \times 0.5 = 5$ days later.

Housing. When calves were housed in housing with higher humidity and temperature, age at first calving was increased by an average of 1.2 and 1.0 d for each percent increase in maximum humidity and mean temperature, respectively. Unfortunately, the authors did not report the humidity or temperatures measured in the study. In addition, maximum concentrations of ammonia in the barn environment had significant effect on age at first calving. What we can learn from this information is that the environment in which calves live during the first four months of life can have a lasting effect on their growth and, ultimately, affect the age at which calves enter the milking string.

Summary

The data from this study showed clearly that the ways that we manage calves during the first four months of life can have a lasting effect on their growth and their readiness to enter the milking string. Clearly, efforts to improve the way that we take care of calves early on will pay great dividends in earlier calving, and less cost in the heifer enterprise.

Reference

Heinrichs, A. J., B. S. Heinrichs, O. Hare G. W. Rogers, and N. T. Place. 2005. A prospective study of calf factors affecting age, body size, and body condition score at first calving of Holstein dairy heifers J. Dairy Sci. 88:2828–2835.

Written by Dr. Jim Quigley (24 September 2006)

Calf Notes.com (http://www.calfnotes.com)