



Research Report: Effect of Calf Management Factors on 1st Lactation Milk Production

Introduction

Calf health is critical for efficient and profitable raising of herd replacements. Research has shown that adverse calfhoo health events (e.g., treatments for scours or respiratory illness) are associated with greater likelihood of calf mortality, poorer growth, and older age at first calving. Accumulating evidence suggests that calfhoo events may also impact milk production potential as adults, therefore, recent research (Heinrichs and Heinrichs, 2011) has sought to determine the relationship between specific performance and health indices as calves and lactation performance as cows.

Materials and Methods

A multi-year study was conducted in Pennsylvania to establish the effects of calf management, nutrition, and environment during the first 4 months of life on subsequent lactation performance in the milking herd. 795 Holstein calves were included in the initial study of calfhoo performance and health. Of those animals, 442 had complete 1st lactation records. Statistical analysis was conducted to determine which calfhoo variable had a significant effect on lactation performance [actual and 305-d mature equivalent (ME) production of milk, fat, and protein]. Calfhoo variables that were significant in the final statistical model are listed in **Table 1** below.

Table 1. Herd variables used in the analysis to study effects of calf and heifer management on milk production.

Item	Mean	Standard Error
Delivery score ¹	2.2	0.90
Weaning age ²	1.5	0.60
Wean DMI, lbs/d ³	6.2	2.5
Grain age, days ⁴	70.5	19.8
Days ill ⁵	1.0	1.9
Days treated ⁶	0.20	0.74
Age at first calving, days ⁷	868.7	128.5
Body weight at calving, lbs ⁸	1218.5	163.1

¹Difficulty of the heifer's birth (1 = unassisted, 2 = easy pull, 3 = hard pull, mechanical extraction, or C-section)

²Weaning age (0 = ≤ 60 d, 1 = 61 to 90 d, 2 = >90 d)

³Dry matter intake (DMI) at weaning (grain + forage)

⁴Days of age that heifer first consumed 2 lbs/d grain (DM basis)

⁵Days ill = number of days heifer had scours or cough during her first 4 mo of life

⁶Days treated = number of days during first 4 mo of life that the heifer had scours or cough requiring antibiotic treatment

Results & Discussion

Delivery score (calving ease) was shown to negatively impact 305-d ME and actual milk production – each unit increase in delivery score (progressively more difficult birth) corresponded to a decrease of 430 lb of 305-d ME milk production and 627 lb of actual milk production in 1st lactation.

What this means: Difficult calvings can have a long-lasting impact on heifers. Therefore, calving pen management (e.g., employee training, utilizing proper obstetric practices) is critical for getting calves off to a good start and setting them up to be productive cows.

DMI at weaning was associated with greater 305-d ME milk production – every 1 lb of DMI at weaning corresponded with an increase of 287 lbs of ME milk.

What this means: Adequate calf starter intake is critical for successful weaning in order to maintain growth trajectory and reduce stress that may predispose calves to respiratory disease. If a large breed calf, such as a Holstein, weighs 175 lbs and is gaining 1.8 lbs/day around the time of weaning, the calf needs to consume over 5 lbs/day of 18% CP calf starter in order to maintain growth rates. A small breed calf (e.g., Jersey) that weighs 130 lbs and is gaining 1.3 lbs/d requires approximately 3.5 lbs/day of calf starter intake to keep growing at the same rate. These benchmarks should be kept in mind when deciding when to wean.

Days ill had a negative effect on 305-d ME milk production – each day that the heifer was scouring or coughing was associated with a 278 lb decline in 305-d ME milk

Days treated tended to be positively related to 305-d ME milk production – each day that a calf was treated was associated with 442 lbs more 305-d ME milk

What this means: For the calves in this study, more sickness led to less first lactation milk production, but more days treated was associated with more first lactation milk. These results suggest that both reducing clinical illness and paying greater attention to health management (e.g., recognizing symptoms, treating early, resolving disease) are underlying factors supporting greater first lactation performance.

Summary

- Delivery score is critically important for raising a productive heifer. Minimizing difficult births should be a major objective on dairies.
- Calves should not be weaned unless they are consuming adequate amounts of calf starter. Calf starter management is extremely important to facilitate maximum intake, and weaning age should be determined based on liquid feed program, average calf size, and average calf starter consumption.
- Striving to minimize illness while achieving early identification and treatment of calfhood diseases is important not only for performance and health, but also for maximizing 1st lactation milk production.

References

Heinrichs, A. J. and B. S. Heinrichs. 2011. J. Dairy Sci. 94:336-341.