Creep Feed and Cow-Calf Performance and Its Relative Impact on Milk Production as Measured by Milk Expected Progeny Difference

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Introduction

Genetic trends for milk expected progeny difference (EPD) across most breeds have continued an upward trend, although direct selection pressure on milk EPD has not been an over-arching goal of seedstock breeders in recent years. Creep feeding has become very popular in the seedstock industry to maximize animal performance and to condition animals destined for a production sale. However, the animal behavior aspects of creep feeding and the individual impact on the dam's milk EPD have rarely been studied or quantified. This study used the Super SmartFeed™ (C-Lock Inc., Rapid City, SD) to monitor calf creep feeding behavior and individual intake of creep feed during mid-to late-lactation.

Objectives of this study were to:
1) Quantify individual feed consumption among calves being creep fed relative to the dam's milk EPD.
2) Track individual performance differences of calves offered ad libitum, limit-fed, or no creep feed.
3) Determine if creep feed consumption is influencing milk EPD.

Materials and Methods

Eighty-one spring-calving registered Angus cow-calf pairs (age 3-5) at the McNay Research Farm, Chariton, Iowa, were used to monitor cow and calf performance as impacted by creep feeding. Pairs were rotationally grazed across cool-season, fescue-based pastures and the mobile Super SmartFeed™ feeder was moved throughout the paddocks. The feeder-controlled animal intake and measured total intake per day, number of feeder visits per day, and duration of each stay through electronic identification tags.

The study design was a 2 x 3 factorial arrangement with two milk EPD classifications and three creep feeding strategies (n = 13/treatment). Cows and calves were allotted to one of two treatment groups based on dam milk EPD: 1) low milk EPD (LM) or 2) high milk EPD (HM). Within each milk EPD group, calves were randomly assigned to one of three creep-feeding strategies: 1) No creep feed, 2) limited creep feed access (up to 2 lb/calf per day), or 3) ad libitum creep feed access (up to 15 lb/calf per day).

The milk EPD of the cows used in this study ranged from +15 to + 33. Calves were born between March 7 and May 25, 2020, and were weighed on test July 30 following a two-week acclimation period on the creep feeder. The test concluded October 13 for a 75-day trial. Cow and calf body weights were collected on two consecutive days at study initiation and conclusion. Likewise, a mid-point body weight was taken in conjunction with a weigh-suckle-weigh measurement. Carcass ultrasound measurements of 12th rib fat thickness, ribeye area, and percent intramuscular fat were collected on cows and calves at the beginning and ending dates. Due to the limitations of carcass ultrasound image

analysis based on muscle depth, many of the lightweight calves could not be analyzed for percent intramuscular fat.

Results and Discussion

Of the calves that had access to creep feed, 73 percent from the HM group visited the feeder and consumed feed. Only 48 percent of the LM group visited the feeder. It is unclear if the unique Super SmartFeed™ design influenced 'traditional' creep feeding behavior, additional trials are underway to test this unknown. This study indicates creep feeding behavior could be an aspect of selection for increased milk EPD, especially since weaning weight is the predominant performance trait used to calculate it.

The LM group consumed more feed on average, but the variation was quite large for both groups (HM, 2.23-7.48 lb/day; LM, 0.64-7.28 lb/day). With the limited treatment group size, it is difficult to analyze efficiency of gain, especially because it cannot be dissected what portion of calf gain was due to milk, creep feed, or additional forage consumed while grazing alongside their dam.

Calves with ad libitum access to creep feed that entered the feeder had higher ADG (2.44 lb/day for the HM group, 2.28 lb/day for the LM group) compared with calves that either refused to consume creep feed or those that were not allowed access (1.72 lb/day for HM, 1.75 lb/day for LM). The limit-fed creep group appeared to gain intermediate to the ad libitum and non-creep groups, with the exception of the LM calves offered no creep. Ironically, those calves gained 1.94 lb/day. The weigh-suckle-weigh data also indicated the LM no creep cows offered more milk than any other group (6.52 lb) The poorest milking cows were the HM cows whose calves had ad libitum access to creep feed (5.53 lb). These findings agree with other previous research that milk EPD is a rather poor indicator of actual milk production in beef cattle.

Real-time carcass ultrasound indicated minimal changes in body composition of the dams, regardless of the group they were assigned throughout the trial. Body condition scoring at the same time points agreed with this assessment. It can be hypothesized that most of the loss in condition of cows happens prior to the introduction of the creep feeder in spring calving cows. As expected, calves did get larger ribeye areas and fatter as the trial progressed, but statistical differences among treatment groups were unfounded.

If performance information at weaning was submitted on these calves, on average, the calves from the HM group would have a 54-lb advantage over those that either refused to enter the feeder or were not allowed. The same holds true in the LM group, where the advantage is 40 lb. In the genetic evaluation, both the weaning weight (WW) and milk EPDs would reflect the added performance, even though the environmental conditions and the calf's willingness to enter a creep feeder may explain much of the differences in performance.

This data indicates breed associations may consider alternative methods for calculating milk EPD, or potentially exclude WW from calves offered ad libitum access to creep feed. Uncoupling the portion of milk EPD that results from additional creep feed consumption versus cow productivity could help commercial producers make better selection decisions by finding genetics that more closely mirror their environmental conditions.

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Table 1. Effects of creep feeding on calf and cow weights, gains and amount of creep feed consumed by milk EPD and access to creep feeder

	High milk, ad-lib creep	High milk, limit creep	High milk, no creep	Low milk, ad-lib creep	Low milk, limit creep	Low milk, no creep
Calf performance[1]						
IBW, lb	328.7	328.8	339.1	312.8	304.2	304.5
FBW, lb	501.2	468.4	470.7	474.2	426.7	400.2
ADG, lb/d	2.3	1.9	1.8	2.2	1.7	1.3
Total creep feed consumed/calf, lb	283.1	47.2	0.0	222.4	23.9	0.0
Cow performance						
IBW, lb	1060	1114.2	1089.2	1086.1	1086.0	1082.5
FBW, lb	1052.5	1116.7	1083.3	1113.1	1092.3	1079.6
ADG, lb/d	-0.1	0.0	-0.1	0.4	0.1	0.0

[1]Abbreviations: IBW = initial body weight; FBW = final body weight; ADG = average daily gain (negative values denote average daily weight loss).