K-STATE Research and Extension

2025 SEREC AGRICULTURAL RESEARCH

# Effects of Supplementing Corn Silage to Fall-Calving Heifers and Cows Grazing Bermudagrass and Calf Performance and Physiology – Year 2

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## Summary

The objective was to test the effect of supplemental feeding on cows grazing bermudagrass pastures on cow-calf performance and pasture management. In a completely randomized design, (n = 24) primiparous and multiparous Angus-based cross cows were allocated to bermudagrass pasture with one of two levels of supplemental feeding (non-supplemented or supplemented at 1% of BW on a DM basis of corn silage). Each treatment consisted of (n = 4) pastures stocked with three cows of different ages, a young (first-calf heifer), middle-aged (3-5 yrs.), and old (≥ 6 yrs.) cow, each averaging 146 ± 3 d of gestation at turnout. Cows were fed silage (32-42% DM and 7.83% CP) daily in fence-line bunks, with feeding amount being adjusted at each weigh date. Cows were weighed on two consecutive days prior to turnout (middle of the second trimester), midpoint (beginning of the third trimester), and at about 2 weeks prior to the estimated calving date for the herd. Body weight, body condition score (BCS), hair score, hair length, and rump fat measurements were taken at each weigh date. Following the final measurement day, cows were relocated to calving pastures consisting of a mixture of bermudagrass, tall fescue, and prairie grass. Calves were weighed at birth and used in weigh-suckle-weigh to estimate milk output. Forage accumulation (FA) and forage mass (FM) were estimated every 28 days using the paired-cage method. Supplementation did not affect cow body weight, body condition score, hair score, or hair length during gestation ($P > 0.13$). During peak lactation, BCS ($P > 0.35$) and cow weights ($P = 0.79$) were not different. Calf birth weight was not affected by their dams being fed corn silage in late gestation ($P = 0.91$). Although visual BCS did not differ, cows that were supplemented with corn silage measured a greater rump fat accumulation than non-supplemented cows through the end of the second trimester ($P = 0.06$). Forage mass and forage accumulation did not differ ($P > 0.78$) based on supplementation method. Corn silage supplementation during late gestation, while cows graze growing bermudagrass, had no physiological effects on cows or calves. Contrary to a previous year, supplementation had no effect on available forage.

## Introduction

Bermudagrass (*Cynodon dactylon*) is revered as the go-to warm season perennial for pasture and hay production in the southern U.S. (Hill et al., 2001). Bermudagrass has multiple different hybrids, but the most prevalent cultivar is Coastal bermudagrass,

which occupies more than 4 million acres nationwide and was developed by Glenn Burton, USDA-ARS, Tifton, GA. This cultivar gained popularity for its notable adaptability, stability, yield, and quality (Hill et al., 2001). Bermudagrass is usually known to inhabit the deep southeastern sectors of the U.S. (Aiken, 2002). Bermudagrass can also be used in conjunction with cool season forages like fescue (Stokes et al., 1988), ryegrass, and/or clover (Rouquette, 2017) to extend the grazing season in the central plains (Peel, 2003; Mullenix and Rouquette, 2018). According to Kallenbach (2015), 50% or less of available dry matter (DM) in a mixed-species pasture is credited to fescue, especially in the summer months. This percentage relies heavily on annual precipitation, fertilization, grazing management, and the interspecies competition that can be expected in the dynamic of pairing cool- and warm-season grass growth (Kallenbach, 2015).

A two-year study by Aiken (2002) investigated the impact of supplemental feeding of yearling steers grazing bermudagrass with different amounts of ground corn on their average daily gain (ADG) and feed cost. The researchers concluded that feeding steers at 0.99 and 2.97 lb per calf per day increased ADG, with the 2.97 lb per calf per day treatment having the lowest cost per additional ADG unit for the grain and cattle prices during the time of the experiment (1998-1999; Aiken, 2002). Wheeler, et al., (2002) looked at how the supplemental feeding of protein (soybean meal) in increasing amounts to beef cows on stockpiled bermudagrass pasture affected performance. Cows being supplemented lost more weight and body condition during the first year of the study than their non-supplemented contemporaries. But in year two, supplemented cows gained more weight and lost less body condition. Additionally, forage intake tended to increase in supplemented cows, though the amount of protein supplementation did not have an effect (Wheeler et al., 2002). In a digestion trial with (n = 4) steers, forage intake increased 16% and organic matter (OM) intake increased 30% in supplemented steers compared to non-supplemented steers (Wheeler et al., 2002). Diet OM digestibility also increased 14.5% and total digestible OM intake increased 49% in supplemented compared to non-supplemented steers.

The goal of this study was to explore how the inclusion of corn silage would affect the physiology and performance of cattle grazing bermudagrass pasture, with a secondary objective of increasing forage savings in an intense drought environment.

## Experimental Procedures

### *Cow and Calf Measurements*

The study was conducted at the Mound Valley Branch of the Southeast Research and Extension Center in Mound Valley, Kansas. Cows were allocated to one of eight bermudagrass pastures, with four pastures being non-supplemented and four pastures being supplemented at 1% of BW corn silage on a DM basis in fence-line bunks. Both treatments had access to free choice mineral. Following a two-day weigh period, cattle were turned out on May 21, 2024, then weighed again on July 7, 2024, and at end of the study for two consecutive weights on September 19, 2024. These time points corresponded with mid-gestation, beginning of third trimester, and about 2 weeks prior to the start of calving. Following turnout to calving pastures, pairs were gathered and sorted for a calf weigh-suckle-weigh on December 2, 2024.

***Weight measures:*** Cattle were restrained in an Arrowquip Q-Power 107 Series hydraulic squeeze chute (Arrowquip, Woodlands, Manitoba, Canada), with weights being recorded by a Gallagher TWR chute scale head (Gallagher Group Limited, Riverside, MO). Average weights at the beginning and middle of the experiment were used to adjust feed allocation. Initial, middle, and ending weights were used to determine the total body weight change. Calf birth weight was also collected via hanging scale. Weights were recorded in pounds (lbs).

***Body condition score and rump fat:*** Three independent evaluators recorded body condition scores at each measurement period using the standard 0-9 scale. Rump fat was recorded using an ALOKA 500 ultrasound machine (Hitachi, LTD., Wallingford, CT) with a 3.5-megahertz short probe capturing the image in Cattle Performance Enhancement Company software. Measurement was taken over the rump by a trained technician and recorded in millimeters (mm).

***Hair score and hair length:*** One independent technician evaluated hair scores at each measurement period using the standard 1-5 scale. Hair length was taken chute side using a slide ruler and recorded in millimeters (mm).

***Calf weigh-suckle-weigh:*** Pairs were gathered and sorted, with calves being separated from dams overnight. Calves were then weighed empty. After empty weight was recorded, calves were turned back in with their dams to nurse until full. Then calves were sorted once more and weighed to get a "full" weight. The empty weight was then subtracted from the full weight to determine the change in calf body weight due to milk and multiplied by two for a 24-hour estimate of milk production.

### *Pasture Measurements*

***Forage mass:*** Forage mass per square foot was collected every 28 days by sampling a 1 by 1 ft area that was being grazed by the cows in four locations through each pasture. This measurement was used to determine the amount of available forage for the cows. These samples were clipped with about one inch of stem remaining.

***Forage accumulation:*** This was used to determine the amount of forage that was growing and was measured using the paired-cage method. Within each pasture there were four exclusion cages that were sampled via clipping a sample every 28 days. Then the cages were moved to another location within the pasture. To calculate forage accumulation the amount of forage measured within the exclusion cage was used and then the amount of forage measured from outside the cage during the previous 28 days was subtracted.

## Results

### *Cow Performance*

There was no statistical difference in body weight change between treatment groups from the middle of second trimester to about 2 weeks prior to calving (Table 1). There was also no difference regarding supplemental feeding on calf birth weight, and there was no difference in estimated milk production of the cows via the weigh-suckle-weigh measurement methods. Additionally, cow body condition score and rump fat thickness were not impacted by supplementation methods. Cows all had slick hair coats and were not impacted by the feeding regimen.

### *Pasture Measurements*

Contrary to results in 2023, there was no difference in forage mass or accumulation with supplementation.

## Conclusions

Supplementally feeding the late gestation, fall-calving cows grazing bermudagrass pasture did not impact cow or calf performance. Also, there was no difference in forage production.

## References

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**Table 1. Cow and calf performance results**

| | Treatment | | | |
|---|---|---|---|---|
| Item | Non-Supplemented | Supplemented | SEM | *P*-value |
| Mid second trimester weight, lb | 1218 | 1194 | 73 | 0.82 |
| Beginning third trimester weight, lb | 1361 | 1370 | 83 | 0.93 |
| Prior to calving weight, lb | 1481 | 1476 | 85 | 0.96 |
| Gestation weight gain, lb | 264 | 282 | 21 | 0.57 |
| Peak lactation weight, lb | 1250 | 1276 | 66 | 0.79 |
| Lactation weight change, lb | -199 | -200 | 22 | 0.37 |
| Body weight change through lactation, lb | 67 | 75 | 6 | 0.91 |
| Mid second trimester BCS (scale 1-9) | 5.13 | 4.99 | 0.34 | 0.78 |
| Beginning third trimesters BCS | 6.68 | 6.89 | 0.21 | 0.50 |
| Prior to calving BCS | 7.19 | 7.13 | 0.23 | 0.83 |
| Gestation change in BCS | 1.62 | 1.50 | 0.22 | 0.70 |
| Lactation BCS | 5.82 | 5.92 | 0.25 | 0.79 |
| Change in BCS during lactation | -1.55 | -0.92 | 0.28 | 0.13 |
| Mid second trimester rump fat, mm | 6.86 | 7.61 | 0.81 | 0.51 |
| Prior to calving rump fat, mm | 10.36 | 13.81 | 1.52 | 0.12 |
| Calf birth weight, lb | 79 | 74 | 4 | 0.43 |
| Calf weight due to milk, lb[1] | 21.4 | 22.1 | 1.87 | 0.95 |

[1] Calf weight gain from empty is used to estimate a cow's milk production.

**Table 2. Pasture production based on treatments (results are on a dry matter basis)**

| | Treatment | | | |
|---|---|---|---|---|
| Item | Non-Supplemented | Supplemented | SEM | *P*-value |
| Forage mass, lb/a | 4374 | 4253 | 300 | 0.78 |
| Forage accumulation, lb/a | 4105 | 4960 | 1309 | 0.72 |