



Winter Grazing Beef Cows on Swath Corn

Scott Alm and Kevin Sedivec

Central Grasslands Research Extension Center, North Dakota State University, Streeter, N.D.

Corn is a high-yielding crop that can create a late-season grazing alternative by cattle grazing it as it stands or as swathed feed. We chose to swath the corn in the R3 (milk) stage to reduce the risk of founder. The study objectives were to 1) evaluate herbage production of two selected varieties, 2) compare costs of production by variety and 3) and compare livestock performance using a swath-grazing technique. The corn varieties Ray Brothers Forage Corn (BMR Forage Corn) and Canamaze CM440 Hybrid (CM440) were planted June 26 and swathed Sept. 6, 2018. Eighty-seven nonlactating pregnant Angus X cows (average turnout weight was 1,548 pounds) grazed from Nov. 26 through Dec. 18 (23 days) on 18 acres. BMR Forage Corn and CM440 produced 5.01 and 7.09 tons/acre, respectively, at a cost of \$20.48 and \$18.84/ton of dry matter, respectively. The cost to feed was \$1.13 and \$1.02/day for BMR Forage Corn and CM440, respectively. Cows lost 1.1 pounds/day during the 23 days; however, they did not lose any body condition score. The results indicate corn for late-season swath grazing is a viable, economic alternative to the cost of dry lot feeding, which averages \$1.25 per pregnant nonlactating cow at Carrington (Anderson et al., 2013).

Introduction

Corn is an option livestock producers may be interested in when looking to extend the grazing season and reduce feed costs per cow per day (Lardner et al., 2012). Advances in plant breeding have led to hybrid varieties that require less heat and contain lower lignin content, creating varieties that can be good in short growing season areas and high in palatability as standing forage.

Interest in grazing corn has increased in North Dakota; however, concerns of founder have kept many producers from grazing corn. This new interest in grazing corn led to the Central Grasslands Research Extension Center (CGREC) conducting a grazing corn study with two varieties in 2018. To reduce the risk of founder, the corn was swathed at the milk stage (R3) of development.

Procedures

The study site was an 18-acre field on the CGREC near Streeter, N.D. In late May, the field was split into two nine-acre plots. Soils comprised of a Zahl-Williams loam (82 percent) and Zahl-Max-Bowbells loam (15 percent) with slopes of 6 to 9 and 6 to 35 percent, respectively (USDA, NRCS 2019).

Prior to seeding, the site was sprayed for weeds using 1 quart/acre of Glyphosate, 1 ounce/acre of AIM EC and 6 ounces/acre of Destiny HC. Granular nitrogen (N) fertilizer (urea) was applied on

May 27 at a rate of 100 pounds of urea/acre or 46 pounds of N/acre.

On June 6, two grazing corn varieties were solid-seeded using a no-till drill with 15-inch spacing. These varieties were seeded at a rate of 40,000 seeds/acre at a depth of 1.5 inches. The field was sprayed with Glyphosate on June 11 at a rate of 1 quart/acre. The varieties were BMR Forage Corn and CM440.

The corn was swathed Sept. 6 using a haybine. The corn was in the milk R3 stage of development at the time of swathing and lay in the original position until cattle were placed on the land to graze.

Precipitation

The CGREC received 18.4 inches of rainfall during the growing season (April 15 through Oct. 15, 2018), which provided excellent growing conditions (NDAWN, 2019). The long-term 30-year average annual rainfall for this time period is 14.8 inches; thus, we received 125 percent of average. Although precipitation was 44 percent of long-term average through May 15, precipitation ranged from 126 to 153 percent of the long-term average during the corn-growing period.

Methods

Forage Production

Forage production was collected at six locations evenly distributed across the plot for each corn variety just prior to swathing. Each collection site was a rectangular frame 6 feet long and two rows wide. The conversion rate for this dimension is 8.92 (8.92 times grams of forage dried to 100 percent; Meehan and Sedivec, 2017).

Corn was clipped from within the frame, bagged, weighed (to determine moisture content) and dried at 105 F for seven days. Forage production for each variety was determined by averaging the six frames.

Animal Performance

The livestock average daily gain was determined by collecting two-day weights just prior to grazing turnout and collecting a one-day weight directly after terminating the grazing. Body condition score (BCS, Encinias and Lardy, 2000) also was determined for each cow prior to the grazing turnout data and immediately after cattle were removed from the project. Body condition score was collected by two individuals and averaged. The same two people did pre- and post-scoring.

Table 1. Forage production, pre- and post-grazing treatment for cow weight and body condition score by corn variety at the Central Grasslands Research Extension Center in 2018.

Corn Variety	Forage ¹ Production (ton/ac)	Average ² Pre-weight	Average Post- weight	Average Daily Gain	Average ² Pre-body Condition Score	Average Post-body Condition Score	Daily Change (-/+)
BMR Forage Corn	5.01 +/- 0.43 SD ^a	1,548 +/-193 SD ^x	1,522 +/- 187 SD ^x	-1.1 lb/d	6.04 +/- 0.52 SD ^x	6.18 +/- 0.64 SD ^x	0.006
CM440	7.09 +/- 0.48 SD ^b						

¹Varieties with same letters (a, b) are not significantly different ($P > 0.05$).

²Weights and body condition scores with the same letters (x, y) are not significantly different ($P > 0.05$)

Economic Measurements

Crop production costs were calculated for each variety. A combination of actual expenses (seed, fertilizer, and herbicide), suggested retail prices for fencing and material, and custom rates for North Dakota were used (Haugen, 2017).

Results and Discussion

Yield

Each corn variety was swathed Sept. 6, 2018. Dry-matter yield was 5.01 tons/acre for the BMR Forage Corn variety and 7.09 tons/acre of the CM440 variety (Table 1). Both varieties were grazed at the same time with one herd. The BMR Forage Corn and CM440 varieties comprised 41 and 59 percent of the carrying capacity, respectively.

Grazing

Both varieties were grazed at the same time with 87 bred, non-lactating Angus X cows. These cows were in their second trimester of pregnancy. The average starting weight of the cows was 1,548 pounds and the average BCS was 6.04 (Table 1). Twenty-three days of grazing occurred from Nov. 26 to Dec. 18, 2018. Grazing termination was based on a visual estimation of 75

to 80 degrees of disappearance of the swaths. Cattle were limit fed for eight days, with the last rotation of seven days. Cattle were able to graze previous section after each move.

The average weight of the cows was 1,522 pounds at the end of the project, and the average BCS was 6.18 (Table 1). We found no change ($P > 0.05$) in livestock performance (average daily gain) or body condition score after 23 days of grazing.

Economics

Total crop expenses ranged from \$102.59 to \$133.59/acre (Table 2). What is important to note is that costs will vary from operation to operation. Producers are encouraged to calculate costs according to their individual situation.

The cost per cow per day was calculated by dividing the crop production costs per acre by the grazing days per acre. The cost to feed a cow in this study was \$1.02 to \$1.13/head/day for BMR Forage Corn and CM440, respectively (Table 2).

The cost per cow per day was calculated by dividing the crop production costs per acre by the grazing days per acre. The cost to feed a cow in this study was \$1.02 to \$1.13/head/day for BMR Forage Corn and CM440, respectively (Table 2).

Table 2. Crop production expenses by corn variety at the Central Grasslands Research Extension Center in 2018.

Expenses (per acre)	BMR Forage Corn	CM440
Seed	\$29.00	\$60.00
Fertilizer (100 lb urea/ac, \$345/ton)	\$17.25	\$17.25
Herbicide (1 qt/a Glyphosate, 1 oz/a AIM EC, 6 oz/a Destiny)	\$10.59	\$10.59
Seeding	\$17.63	\$17.63
Fertilizing	\$6.39	\$6.39
Spraying	\$6.57	\$6.57
Swathing	\$12.54	\$12.54
Portable fence with charger (pro-rated across 5-years)	\$2.62	\$2.62
TOTAL	\$102.59/ac	\$133.59/ac
Grazing days/acre	91	131
\$/HEAD/DAY	\$1.13	\$1.02

Note: Land rent is not included in the calculations above; \$40/acre cash rent would increase costs by \$0.43 and \$0.30/head/day for **BMR Forage Corn** and **CM440**, respectively.

Conclusion

Both varieties produced good yields and were of suitable quality to meet nutrient requirements of grazing beef cows. The CM440 variety produced greater yields; however, we found no difference in livestock performance, compared with BMR Forage Corn. Swathing the corn prevented any instances of founder; the cows showed no signs of illness or founder while grazing swathed corn in the kernel blister stage.

Grazing days per acre were greater and cost/head/day lower in the CM440 variety. Further research needs to be conducted to determine palatability, production potential and costs among new corn hybrids.

Literature Cited

- Anderson, V., B. Ilse and C. Engel. 2013. Drylot vs. Pasture Beef Cow/Calf Production – 3-year Progress Report. Carrington Research Extension Center Annual Report, North Dakota State University, Fargo. Pg 43-45.
- Encinias, A.M., and G. Lardy. 2000. Body Condition Scoring I: Managing Your Cow Herd Through Body Condition Scoring. AS-1026. North Dakota State University Extension, Fargo. 8 pp.
- Haugen, R. 2017. Custom Farm Work Rates on North Dakota Farms, 2016. EC499 (Revised), North Dakota State University Extension, Fargo. 8 pp.
- Lardner, B., K. Larson and L. Pearce. 2012. Winter Grazing Beef Cows with Standing Corn. Fact Sheet #2012.03. Western Beef Development Centre, Humboldt SK. 4 pp.
- Meehan, M., and K. Sedivec. 2017. Range and Forage Production. R1838, North Dakota State University Extension, Fargo. 4 pp.
- NDAWN 2019. North Dakota Agricultural Weather Network. North Dakota State University. <https://ndawn.ndsu.nodak.edu/>. Accessed March 18, 2019.
- USDA, NRCS 2019. Soil Web Survey. U.S. Department of Agriculture, Natural Resource Conservation Service. <https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>. Accessed March 18, 2019.



NDSU