



Western Beef Development Centre

Backgrounding Calves on Swathed Corn & Barley

In addition to traditional rations which include forages and grain, producers often use feeding strategies to background calves using all-forage diets. Over the past few years the Western Beef Development Centre has evaluated several annual crops including corn for extending the grazing season. Typically, corn (*Zea mays* L.) is grown and harvested by livestock producers for either grain or silage. However, in this study grazing corn was swathed whole crop and then compared to swath grazed barley as a feed source for weaned calves. Both crops were evaluated for differences in yield, quality, animal performance and costs for backgrounding calves.

Field Management & Weed Control

Twenty-two acres of each crop were seeded in a field where grazing corn was grown the previous year. Prior to seeding, field preparation in late May included cultivation with harrow sweeps and soil packing. A corn variety, DKC27-12, is now available from Monsanto for fall grazing. This variety is appealing because it grows aggressively and typically provides earlier flowering and maturity. As a Roundup Ready hybrid, it also has an easy means of weed control. A smooth-awned barley variety, Excel, was seeded for comparison purposes. The corn was seeded May 30th once soil temperatures reached 10° Celsius and the barley was seeded June 16th to allow for good crop quality prior to swathing. The corn was seeded at 35,000 seeds per acre (30-inch row spacing) and the barley at 2.0 bushels per acre (8-inch row spacing). Both crops were direct seeded at a depth of 1" with a 40-foot Seed Hawk air seeder.

Soil samples taken in early May indicated nitrogen levels of 122 lb/acre, phosphorous at 120 lb/acre, potassium at 1080 lb/acre and sulfur at 45 lb/acre. Elevated levels of soil nutrients were due to heavy fertilization in 2002. However, both crops received an additional 50 lb acre of 46-0-0 (urea) at seeding time at a cost of \$9.78 acre. On June 15th, 1.0 L acre Roundup was applied to the corn to control weeds. On July 16th, broadleaf weeds were controlled on the barley using Buctril-M at 0.405 L/acre. In addition, grasshopper and gopher damage was significant to both crops by the end of July.

On August 28th the barley was swathed when the crop was in the soft dough stage. The corn was also swathed September 15th to allow for a fair comparison to the barley as both crops were grazed by growing beef calves.

Crop Yield and Quality

Forage yield and quality was estimated for both crops in early September (Table 1). The corn and barley yields were nearly six and two tons per acre, respectively. The lack of significant rainfall during the summer may have reduced crop yields. Total rainfall at Lanigan for June, July and August was 1.65, 1.77 and 0.9 inches, respectively. Energy and protein requirements for a 500 lb growing calf are 11.4% crude protein (CP) and 62.5% total digestible nutrients (TDN) to achieve an estimated 2.0 lbs/day of gain. Crude protein levels in the corn were only 10.8% where protein levels in the barley were adequate at 14.8 percent. Energy levels in both crops were sufficient for growing calves (Table 1).

Table 1. Crop yield and quality

	Yield ¹ (Ton/Acre)	Crude Protein ² (%)	Total Digestible Nutrients (%)
CORN ³	5.67	10.8	71.7
BARLEY	1.86	14.8	69.9

¹wet matter basis; ²dry matter basis; ³corn variety DKC27-12, barley variety Excel

Calf Performance

On November 6, 2003 one hundred ninety-one (191) calves, averaging 529 lbs, were allocated to either the barley or corn fields. Animal access to either crop was controlled using electric fence with only three to four acres allocated at any one time. All animals were weighed at the beginning and end of the study. Ninety-seven (97) calves grazed the barley swaths until December 12th. The other group of ninety-four (94) calves grazed corn until December 13th. Calf weights coming off the barley and corn averaged 565 and 584 lbs, respectively. Water was hauled every second day to the study site and provided in 400 gallon troughs. Free choice mineral (1:1) and trace mineral salt was provided throughout the trial in mineral feeders in each field.

Calves targeted for rates of gain from 1.9 to 2.5 pounds per day are generally placed directly on a finishing ration following the backgrounding phase. Weight gains were lower than expected. Calves on the corn swaths gained 1.50 pounds per day while the calves on the barley only gained 0.99 pounds per day (Table 2). Animal grazing days were similar between the two groups of calves however, total pounds gained per acre was greater (224 lbs/acre) from the corn, than from the barley (148 lbs/acre).

Table 2. Calf performance grazing swathed barley or corn

	ADG ¹ (Lbs)	AGD ² (Days)	Total Lbs Gained/Acre
CORN	1.50	156	231
BARLEY	0.99	151	153

¹ADG=average daily gains are shrunk weights (4%); ²AGD=animal grazing days

Prior to the start of the study, daily energy intake was discussed as a possible limitation for growing calves needing to gain 2.0 pounds per day. Energy intake is a function of dry matter intake and dietary energy concentration. Weight gains during the backgrounding phase enable cattle to obtain most of their skeletal growth while on a specific program, thus keeping finishing time and feeding costs to a minimum.

Compensatory growth following a low input, low growth winter system allows good gains during the next feeding period. In the backgrounding system managed at the Termuende Farm, calves grazed corn and barley swaths during November and December and gained between 0.99 and 1.5 pounds per day. Following the swath grazing period, calves were housed separately in pens and fed a ration of alfalfa hay, screening pellets and straw. The gains on those calves during that period did improve with heifers and steers averaging 1.7 and 2.0 pounds per day, respectively.

Input & Grazing Costs

Table 3 shows all the production and grazing costs associated with this study.

Table 3. Corn & Barley Grazing Expenses

Crop Production Expenses	Corn (\$/Acre)	Barley (\$/Acre)
Field preparation (harrow & packing)	7.00	7.00
Seed	78.31	14.00
Seeding	14.00	14.00
Herbicide & application	11.53	12.38
Fertilizer	9.78	9.78
Swathing	10.00	10.00
Land Rent	25.00	25.00
Total Crop Production Expenses (A)	155.62	92.16
Grazing Expenses		
Fence & water depreciation	1.10	1.10
Labour & equipment for fencing & hauling water	60.07	60.07
Minerals & salt	3.27	3.27
Total Estimated Grazing Expenses (B)	64.44	64.44
Total Expenses (A + B)	220.06	156.60
Total Pounds Gained/Acre	230.73	152.78

Total expenses calculated for the corn were \$4841.32 and total beef production was calculated at 5076 pounds of gain. Therefore the cost per pound gained from grazing the corn was **\$0.98** (\$4841.32/4931 lbs). Total expenses for the barley were \$3,445.20 therefore cost per pound gained was \$3,445.20/3361 lb = **\$1.03**.



Figure 1. Calves grazing corn and barley swaths

Conclusions

This project was managed to provide growing calves with adequate intake of swathed crops on a daily basis. Access to available forage was monitored daily and the electric fence was moved more often than if cows were being swath grazed on these crops. Between November 15th and December 1st the average temperature was -20 °C, which may have had a potential impact on feed intake, water consumption and subsequent calf performance. Even though water was hauled to the project site, the cold weather may have impacted daily water intake. Finally, total costs per pound were very high on both crops due to several factors suggesting calves could have been backgrounded in a drylot more economically. More studies are needed to evaluate the performance of growing calves on swath grazed crops such as corn and barley in western Canada.