WesternBeef DEVELOPMENT CENTRE

FACT SHEET
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WINTER GRAZING BEEF COWS WITH STANDING CORN

Dr. Bart Lardner, Kathy Larson MSc, and Leah Pearce BSA

Introduction

Corn is an option for producers looking to extend the grazing season and reduce feed costs per cow per day. However, the equipment, hybrid seed, fertilizer cost, and unfamiliarity with growing corn for grazing often deters producers from trying it themselves. Western Beef first conducted grazing corn research in 2001 (read 2002 Fact Sheet). Advances in plant breeding have resulted in hybrid corn varieties that require less crop heat units and therefore can be grown more successfully in northern climates like Saskatchewan. Renewed interest in using corn to extend the grazing season led Western Beef Development Centre to evaluate five varieties in 2011.

Agronomics

The study site was a 30-acre field located just west of Termuende Research Ranch headquarters, Lanigan, Saskatchewan. In late May, this site was divided into five six-acre plots. Prior to seeding the site was harrowed and cultivated 19 May 2011. Soil tests taken in May of 2011 indicated moderate nitrogen (N) levels (30 kg/ha), elevated phosphorus (P_2O_5) levels (115 kg/ha), and high potassium (1085 kg/ha) and sulfur (62 kg/ha) levels. Granular nitrogen (N) fertilizer was applied 27 May with a Rogator at 135 kg/ha (120 lb actual N/ac). The site was harrowed 30 May to incorporate the fertilizer.

Five different corn varieties were seeded 1 June at 26,200 seeds/acre with a corn planter at a row spacing of 30 inches and depth of 1.5 inches. The field was sprayed with glyphosate 11 June at 1.5 L/ac. Corn varieties included three Pioneer (P7443R, P7535R, P7213R), one Hyland (HL SR06) and one Monsanto (DKC 27-54), ranging in crop heat units of 2050 to 2250.

Rainfall and Heat Units

During the 2011 growing season at Lanigan, Saskatchewan, rainfall at WBDC Termuende Research Ranch was 296 mm from 1 April to 31 October 2011, which provided good growing conditions for the corn. Long-term (25-year) average annual rainfall from April to October at Lanigan, SK is 300 mm. The seasonal corn heat unit (CHU) is calculated by a sum of the daily temperature from 15 May until the first -3° Celsius frost. Total CHU's at WBDC Termuende Research Ranch from 1 April to 31 October 2011 were 2417 CHU.

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[1]Typical recommended seeding rates for corn are between 28,000 and 30,000 seeds/acre. We sowed at a lesser rate due to the later seeding date.

[2]Note that typical weed management for RoundUp-Ready Corn would include a pre-seed burndown, 0.67 L/ac application before the three-leaf stage, and a 0.67 L/ac application before the eight-leaf stage.

Yield and Quality

Yield clips were taken in early September to determine dry matter yield. Dry matter yield ranged from 4.04 ton/acre to 5.74 ton/acre (see Table 1). All varieties had good cob development by the end of the growing season. Black layer development on individual kernels was observed on all hybrids.

Table 1. Dry matter yield of corn varieties (2011)

Item	P7443R	DKC 27-54	P7535R	HLSR06	P7213R
Crop Heat Unit	2100	2175	2100	2250	2050
Dry matter, %	40.1	50.3	37.0	38.1	49.4
t/acre, wet	11.8	11.4	10.9	10.8	11.4
t/acre, DM	4.75	5.74	4.04	4.13	5.64

Corn crop quality was determined through lab analysis of samples taken in September and at the start of grazing in November. September samples included submission of whole plant, leaves, or grain+cob samples from each variety and November samples were only whole plant (Table 2).

Table 2. Nutrient composition of corn varieties (2011)

Item [z]	P7443R	DKC 27-54	P7535R	HL SR06	P7213R
September 2011					
CP, %					
Whole plant	7.8	7.7	6.4	8.1	7.0
Leaves	7.4	13.1	12.0	13.6	13.0
Grain+Cob	12.3	10.9	11.4	12.9	11.2
TDN, %					
Whole plant	69.7	70.8	68.6	69.2	68.7
Leaves	49.7	60.6	60.5	59.7	55.1
Grain+Cob	89.3	90.3	90.1	89.8	90.8
November 2011[y]					
CP, %	7.7	8.5	8.7	9.7	6.7
TDN, %	62.1	63.0	64.7	66.5	57.1

[z]CP=crude protein; TDN=total digestible nutrients
[y]whole plant

Crude protein (CP) content of the whole plant for all varieties ranged from 6.4 to 8.1 percent (Table 2). Corn leaf CP levels ranged from 7.4 percent for P7443R to 13.6 percent for HLSR06. Grain+cob CP levels ranged from 10.9 percent for DKC2754 to 12.9 percent for HLSR06. Total digestible nutrient (TDN) content of the whole plant for all varieties ranged from 68.6 to 70.8 percent. Corn leaf

TDN levels ranged from 49.7percent for P7443R to 60.6 percent for DKC2754. Grain+cob TDN levels ranged from 89.3 persent for P7443R to 90.8 percent for P7213R. At start of grazing in November, CP levels ranged from 6.7 to 9.7 percent, while TDN levels ranges from 57.1 to 66.5 percent. Energy and

protein requirements for a 680 kg (1500 lb) pregnant beef cow in second trimester are 7.8 percent crude protein and 50 percent total digestible nutrients (NRC 2000). Overall, both CP and energy levels of all corn varieties would meet nutrient requirements of grazing dry, pregnant beef cows.

Grazing

Fifty cows were turned onto the first variety on 19 November 2011. The average starting weight of the cows was 1580 lb with an average body condition score of 2.57. The varieties were separated with high tensile electric fencing, and cows were limited on their access to each variety using poly wire and rebar posts. New feed access was allotted every 2-3 days. The last variety had 89 cows grazing and grazing ended 27 February 2012.

Grazing days and head counts were tracked for each variety (see Table 3). Grazing days per acre were calculated by dividing total grazing days (# head x grazing days) by the total acres of each paddock. Grazing days/acre ranged from 145 to 318 (average 246 d). The average grazing days per acre in 2011 was 66% higher than the grazing days/acre achieved with the varieties grown in 2001.

Economics

Crop production costs were calculated for each corn variety. A combination of actual expenses, suggested retail prices, and suggested custom rates from the Saskatchewan Ministry of Agriculture's 2010-11 *Farm Machinery Rental Rate Guide* was used to calculate crop expenses for each variety on a per-acre basis. Total crop expenses ranged from $205 to $223/acre (see Table 3). It is important to note 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; $/hd/day ranged from $0.70 to $1.42/hd/day and averaged $0.94/hd/day (see Table 3).

Table 3. Crop Production Expenses (2011)

VARIETIES	P7443R	DKC 27-54	P7535R	HLSR06	P7213R
	---------- $/acre ----------				
Harrowing (x 2)	$4.80	$4.80	$4.80	$4.80	$4.80
Cultivating	$5.66	$5.66	$5.66	$5.66	$5.66
Fertilizer	$91.54	$91.54	$91.54	$91.54	$91.54
Fertilizing	$7.50	$7.50	$7.50	$7.50	$7.50
Seed*	$85.09	$82.50	$90.71	$73.13	$79.84
Seeding	$15.00	$15.00	$15.00	$15.00	$15.00
RoundUp	$5.10	$5.10	$5.10	$5.10	$5.10
Spraying	$2.86	$2.86	$2.86	$2.86	$2.86
TOTAL	**$217.54**	**$214.96**	**$223.17**	**$205.58**	**$212.29**
Grazing (days)	1893	1755	2070	810	1068
Plot size (acres)	6.2	6.8	6.5	5.6	5.2
Days/acre	305	258	318	145	205
$/Head/Day	**$0.71**	**$0.83**	**$0.70**	**$1.42**	**$1.03**

* Seed comes in 80,000 seed bags; recommend seeding 30,000 seeds/ac; We seeded 26,200 seeds/ac =3 ac/bag

Note: Land rent is not included in the calculations above; $30/acre cash rent would increase costs by $0.12/hd/day on average. The cost of feeding the corn (labour, fencing supplies, mineral/salt) would add an additional $0.12/hd/day.

Conclusion

All five varieties produced good yields and were of suitable quality to meet nutrient requirements of grazing beef cows. However, caution should be observed in that corn is susceptible to early frost and low crop heat units during the growing season. Because cows selectively graze cobs first, it is important to control access to the corn to ensure proper utilization, and to provide a good water source and mineral/salt package. Grazing days per acre and cost/hd/day were not affected by yield differences. Further research needs to be conducted to determine palatability and preference differences between new corn hybrids.

For more on this research project, be sure to watch the YouTube video available at: http://youtu.be/IJR8BOczm_Y

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For more information contact:
Western Beef Development Centre
Box 1150
Humboldt SK S0K 2A0
Phone (306) 682-3139 Fax (306) 682-5080
www.wbdc.sk.ca

Canada
Government of Saskatchewan