Supplementing Cattle Grazing Corn Residue with a Lick Tub

Michael Undi and Stephanie Becker
Central Grasslands Research Extension Center, Streeter, N.D.

Methods of supplementing grazing cattle in the winter should aim to reduce winter feed costs, which are the single highest annual cost in a cow-calf operation. Eliminating pasture visits in the winter can reduce labor and fuel costs. This study evaluated a lick tub as a strategy for supplying extra nutrients to cattle partially overwintered on corn residue. Results suggest that corn residue can be a sole forage source for beef cattle in early winter. Supplementation may be beneficial as corn residue quality and quantity decline with advancing winter.

Summary

This study evaluated the use of a lick tub (Crystalyx® HE-12%) as a source of extra nutrients for beef cattle partially overwintered on corn residue. Non-lactating pregnant Angus cows grazed corn residue or corn residue plus a lick tub during two winters starting in 2017. Supplementation with a lick tub did not impact animal performance, suggesting that early winter supplementation of cattle grazing corn residue may not be beneficial.

Introduction

Corn residue is a readily available feed resource for grazing cattle in the winter in North Dakota. However, corn residue is a low-quality feed that can be improved by targeted supplementation. Beef cattle grazing corn residue mostly have been supplemented with distillers grains with solubles (DDGS) (Warner et al., 2011; Jones et al., 2015; Gross et al., 2016).

Supplementation methods that reduce labor and fuel costs by eliminating pasture visits are of interest to beef producers. A recent study at the CGREC (Gross et al., 2016) showed that pasture visits in the winter can be minimized by delivering loose DDGS every third day versus daily supplement delivery.

Cattle lick tubs are a great way to supplement protein, minerals and vitamins to grazing beef cattle when pastures are deficient in these essential nutrients (Vitti, 2010). Lick tubs are convenient to producers because they minimize pasture visits (Jones et al., 2015). Strategic placement of lick tubs allows effective pasture utilization. The objective of this study was to evaluate a lick tub as a method of supplementing cows grazing corn residue for part of the winter.

Procedures

This two-year study was conducted on a 24-hectare field planted to corn. The field was divided into six 4-hectare paddocks using high-tensile wire electric fencing.

Starting in the fall of each year, non-lactating pregnant Angus cows (n = 60, 2017, body weight [BW] = 632 ± 32 kilograms [kg]; 2018, BW = 617 ± 31 kg) were divided into six groups of similar total body weight and allowed to graze corn residue or corn residue supplemented with a lick tub (Crystalyx® HE-12%). The lick tub contained 12 percent crude protein (CP) and consisted of a nutrient-dense blend of molasses solids, protein meals, hydrolyzed vegetable oil, vitamins and minerals and trace minerals (Crystalyx.com).

Cows were allotted a portion of the corn field, and access to new sites was controlled by using one portable electric wire. Two-day body weights were taken at the start and end of the study. Two observers assigned body condition scores (BCS) using a 9-point system (1 = emaciated, 9 = obese; Wagner et al., 1988; Rasby et al., 2014) at the start and end of the study. Animal handling and care procedures were approved by the NDSU Animal Care and Use Committee.

Results

The nutrient composition of corn residue is shown in Table 1. Components with the highest nutrient content are the grain and the leaf. The husk, cob and stalk have low CP content, but neutral detergent fiber (NDF) is high. In vitro dry-matter digestibility (DMD) is lowest in the cob and stalk and highest in grain (Table 1).

Table 1. Composition of whole corn and components.

	Whole	Residue[1]		Grain	Leaf	Husk	Cob	Stalk
CP	7.8±1.06	3.0±0.05		9.3±0.92	7.2±0.14	2.9±0.04	2.3±0.54	2.7±0.07
NDF	39.2±12.71	68.3±1.83		30.0±6.73	66.6±9.15	83.3±3.96	86.0±4.30	77.6±7.89
ADF	19.8±6.36	41.3±0.61		3.3±0.70	36.9±4.00	43.2±1.50	44.7±0.79	50.0±7.07
Ca	0.11±0.03	0.33±0.01		0.02±0.00	0.88±0.31	0.15±0.04	0.02±0.00	0.26±0.04
P	0.23±0.06	0.08±0.01		0.28±0.07	0.14±0.02	0.09±0.02	0.06±0.00	0.08±0.01
IVDMD	78.0±1.79	59.9±0.18		92.4±2.69	59.7±2.86	66.4±3.28	44.2±0.45	49.0±11.55

[1]Whole plant minus grain.

Table 2. Performance of cows grazing corn residue.

	Treatment (T)			Year (Y)			P-value		
	Residue	Tub	SE	2017	2018	SE	T	Y	T x Y
Initial BW, kg	626	624	6.3	631	618	6.3	0.854	0.029	0.626
Final BW, kg	638	641	7.9	660[a]	619[b]	7.9	0.789	<0.001	0.646
Daily gain, kg/d	0.32	0.39	0.11	0.69[a]	0.02[b]	0.11	0.521	<0.001	0.952
Initial BCS	5.6	5.6	0.04	5.5[b]	5.7[a]	0.04	0.968	<0.001	0.871
Final BCS	5.5	5.5	0.05	5.7[a]	5.4[b]	0.05	0.858	<0.001	0.426
BCS change	-0.08	-0.07	0.04	0.19[a]	-0.34[b]	0.04	0.855	<0.001	0.405

[a,b]Means within housing and within year followed by a different letter differ ($P \leq 0.05$).

Initial cow BW and BCS were similar (P > 0.05) between treatments in both years (Table 2). We found a significant difference (P < 0.05) between years in daily gains and BCS change (Table 2).

Cattle lick tubs are meant to supplement protein, minerals and vitamins to grazing beef cattle when pastures are deficient in these essential nutrients. Supplementation with a lick tub did not influence (P > 0.05) final BW and average daily gains. As well, we found no difference (P > 0.05) in final BCS and BCS change between treatments (Table 2).

The nonresponse to supplementation suggests that corn residue can be a sole source of forage for beef cattle in the fall/early winter. Supplementation may not be beneficial because corn residue quality and quantity decline as winter advances.

Grazing residue in the winter can result in considerable cost savings. Corn residue is a cost-effective source of feed for cattle in the winter because its production is paid for by the grain operation (McCutcheon and Samples, 2015).

We calculated the value of grazing corn residue based on feeding similar quality or average grass hay, as suggested by McCutcheon and Samples (2015). Using this simple model, we calculated that grazing corn residue in this study resulted in average savings of $1.14/head/day during a 50-day grazing period. This value was calculated on average cow weight of 625 kg, hay intake of 2.5 percent of BW, including a 10 percent hay loss, and a hay price of $60/ton.

Acknowledgements

We thank Dwight Schmidt, the late Rodney Schmidt, Scott Alm, Cody Wieland, Thomas Mittleider and Rick Bohn for technical assistance.

Literature Cited

Jones, M., MacDonald, J.C., Erickson, G.E. Klopfenstein, T.J., Brooks, K.R., Burken, D.B., Bondurant, R., and Watson, A.K. 2015. Comparison of commercial lick tubs to distillers grains supplementation for calves grazing corn residue. Nebraska Beef Cattle Report. University of Nebraska – Lincoln Extension. pp 27 - 29. http://digitalcommons.unl.edu/animalscinbcr/831

Gross, S.M., Neville, B.W., Brummer, F.A., and Undi, M. 2016. Frequency of feeding DDGS as a supplement to beef cows grazing corn residue. July 19-23. ASAS-ADSA-CSAS-WSASAS Joint Annual Meeting. Salt Lake City, Utah. Abstract # 612. J. Anim. Sci. Vol. 94, E-Suppl. 5/J. Dairy Sci. Vol. 99, E-Suppl. 1. www.jtmtg.org/JAM/2016/abstracts/283.pdf

Gustad, K.H., Klopfenstein, T.J., Erickson, G.E., Vander Pol, K.J., MacDonald, J.C., and Greenquist, M.A. 2006. Dried distillers grains supplementation of calves grazing corn residue. Nebraska Beef Cattle Reports. http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1113&context=animalscinbcr

Loy, T.W., MacDonald, J.C., Klopfenstein, T.J., and Erickson, G.E. 2007. Effect of distillers grains or corn supplementation frequency on forage intake and digestibility. J. Anim. Sci. 85: 2625-2630.

McCutcheon, J., and Samples, D. 2015. Grazing corn residue. ANR-10-02. The Ohio State University Extension. Extension Fact Sheet. www.agrireseau.net/bovinsboucherie/documents/0010[1].pdf

Rasby. R.J., Stalker, A., and Funston, R.N. 2014. Body condition scoring beef cows: A tool for managing the nutrition program for beef herds. University of Nebraska–Lincoln Extension.

Vitti, P. 2010. Lick tubs more than convenience. Grainews. www.grainews.ca/2010/10/04/lick-tubs-more-than-convenience/

Wagner, J.J., Lusby, K.S., Oltjen, J.W., Rakestraw, J., Wetteman, R.P., and Walters. L.E. 1988. Carcass composition in mature Hereford cows: Estimation and effect on daily metabolizable energy requirement during winter. J. Anim. Sci. 66:603-612.

Warner, J.M., Martin, J.L., Hall, Z.C., Kovarik, L.M., Hanford, K.J., and Rasby R.J. 2011. The effects of supplementing beef cows grazing cornstalk residue with a dried distillers grain based cube on cow and calf performance. Prof. Anim. Sci. 27:540 – 546.

Photos by Michael Undi, NDSU