BEEF CATTLE RESEARCH UPDATE

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Limit Feeding of Hay to Cows

Due to the drought, many cattle operations have very limited forage resources and will be looking for ways to optimize the use of limited forages. Recent University of Minnesota research evaluated how access time to round-bale hay feeders affected cow body weight (BW), hay intake, and hay waste.[1] In this study, gestating Angus cows (1219 lb initial weight) were allowed access to grass hay (9.5% crude protein and 54.6% TDN, dry matter basis) for 6, 14, or 24 hours per day. All cows had ad libitum access to a complete loose mineral and salt supplement and water. Hay was offered in the whole round bale form and each bale was weighed individually before delivery. A new bale was added to the hay feeder based on visual observations of hay left in the ring. If cows had a sufficient amount of hay to last 12 hours, hay would not be added. Hay waste (left on the ground) was collected when a new bale was added.

Cows with 6 or 14 hours per day access to hay consumed 22.6 and 10.9% less hay dry matter (DM) than cows with 24 hours access to hay (Table 1). Similar results were observed for hay waste with waste (expressed as a percentage of DM intake) being greatest for cows with 24 hour access (7.7%) compared to cows with 6 (0.8%) or 14 hours access (4.2%). Cow BW change did not differ when hay access was reduced from 14 to 6 hours (37 vs. 27 lb, P >0.10). However, cows with 24 hour access gained more weight (51 lb) than cows with restricted hay access. These researchers concluded that restricting access to hay reduced hay intake and hay waste while permitting maintenance of cow BW.

Table 1. Effect of restricting time of access to hay on hay intake and waste and cow BW change.

	Access Time/day			P-value	
Item	6 hr	14 hr	24 hr	24 hr vs. restricted	14 vs. 6 hrs
Hay DM intake, lb	21.2	24.4	27.4	<0.0001	<0.01
Hay DM waste, %	0.8	4.2	7.7	<0.0001	0.0026
Cow BW change, lb	27.3	36.5	51.2	0.051	>0.10

Adapted from Jaderborg et al., 2011.

Similar results were previously reported in a 2007 University of Illinois study.[2] This research used Simmental cows in the third trimester of gestation in two trials to determine the effect of time-restricted access to large round hay bales on cow performance and hay disappearance. In trial 1, cows were offered access to hay (17.6% crude protein and 62.3% TDN, DM basis) for 3, 6, 9, or 24 hours per day over an 87 day trial. In trial 2, cows were offered access to hay (15.4% crude protein and 61.2% TDN, DM basis) for 6, 9, or 24 hours per day over an 89 day trial.

The results of Trial 1 are shown in Table 2. Cows on all treatments gained BW and body condition during the trial with gains increasing as time of access to hay increased. Hay disappearance (calculated as the amount of hay that was placed in the feeders minus that refused) increased linearly as time of access increased. Hay disappearance was 48.5, 28.4, 14.3% lower for cows with 3, 6, and 9 hours hay access, respectively, as compared to 24 hours access. Hay waste expressed in lb/day increased linearly with increasing time of access. It was noted that the of amount hay waste for the cows with 24 hours access was more than double that of cows limited to 3 or 6 hours of access. Hay waste expressed as a percentage of hay disappearance did not statistically differ across treatments ranging from 23% for the cows with 6 hours of access to 40% for the cows with 24 hours access.

Table 2. Effect of restricting time of access to hay on cow performance, hay disappearance and waste (Trial 1).

	Time of Access				P-value	
Item	3 hr	6 hr	9 hr	24 hr	Linear	Quadratic
Initial BW, lb	1257	1241	1246	1259	0.81	0.64
Final BW, lb	1376	1402	1438	1466	0.10	0.45
BW change, lb	119	161	192	207	0.006	0.03
Initial BCS	5.7	5.4	5.4	5.4	0.32	0.05
Final BCS	5.8	5.8	6.1	6.2	0.04	0.36
BCS change	0.1	0.5	0.7	0.8	0.01	0.03
Hay disappearance, lb DM/day	17.6	24.5	29.3	34.2	0.0001	0.0001
Hay waste, lb DM/day	6.0	5.7	9.3	13.5	0.009	0.70
Hay waste, %	33.3	23.2	31.5	39.5	0.21	0.49

Adapted from Miller et al., 2007

The results of Trial 2 are shown in Table 3. As observed in Trial 1, all treatments gained BW and body condition during the trial. However, weight gains in this trial did not statistically differ across treatments. Cows with 24 hour access to hay tended to gain more weight and body condition. Hay disappearance increased linearly with increasing time of access. Hay disappearance was 16.9 and 13% lower for cows with 6 and 9 hours hay access, respectively, as compared to 24 hours access. Hay waste expressed as either lb/day or as a percentage of hay disappearance did not display a linear difference but did exhibit a quadratic difference with more waste at the 6 and 24 hour times than at the 9 hour time. Hay waste was less in this trial than that observed in Trial 1.

Table 3. Effect of restricting time of access to hay on cow performance, hay disappearance and waste (Trial 2).

	Time of Access			P-value	
Item	6 hr	9 hr	24 hr	Linear	Quadratic
Initial BW, lb	1319	1321	1257	0.22	0.80
Final BW, lb	1458	1477	1424	0.42	0.63
BW change, lb	141	159	168	0.12	0.36
Initial BCS	5.7	5.9	5.5	0.22	0.26
Final BCS	6.1	6.5	6.2	0.82	0.08
BCS change	0.4	0.6	0.7	0.10	0.32
Hay disappearance, lb DM/day	23.6	24.7	28.4	0.0005	0.73
Hay waste, lb DM/day	3.7	2.0	4.6	0.10	0.06
Hay waste, %	16.1	8.5	16.4	0.38	0.06

Adapted from Miller et al., 2007

These researchers concluded that restricting the time that cows have access to large round bales of hay to as little as 3 hours per day will result in acceptable cow performance depending on hay quality. In addition, limiting time of access will also reduce hay use by limiting intake and decreasing hay waste, thereby reducing feed costs for the cow-calf producer.

In summary, both the Minnesota research and Illinois research suggest that limit feeding of hay can reduce hay intake and waste while maintaining acceptable cow performance provided the hay is of adequate quality. Thus, such a program could potentially extend forage supplies and reduce feed cost. Both of these studies suggest that restricting time of access to hay results in more efficient use of hay. This improved efficiency of hay use could be due to reduced hay wastage and increased digestibility of the hay. Factors such as cow stage of production, mature cow size, cow condition, age of cow, hay quality, and environmental conditions are variables that would determine whether such a program could be successfully utilized.[3] It is recommended that the hay be analyzed to ensure that it is of adequate quality to prevent restricting intake of poor quality forage and thus,

sacrificing cow performance. Strategic supplementation may be necessary to maintain adequate body condition.

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[1] Jaderborg, J. P., G. I. Crawford, and A. DiCostanzo. 2011. Access time to hay feeder by gestating beef cows affects dry matter intake and hay waste. 2011 University of Minnesota Beef Report Publication BR-1103. Available: http://www.ansci.umn.edu/beef/2010-11%20MN%20BEEF/files/research_reports/BR1103-Jaderborg.pdf.

[2] Miller, A. J., D. B. Faulkner, T. C. Cunningham, and J. M. Dahlquist. 2007. Restricting time of access to large round bales of hay affects hay waste and cow performance. Prof. Anim. Sci. 23:366-372.

[3] Cunningham, T. C., D. B. Faulkner, A. J. Miller, and J. M. Dahlquist. 2005. Restricting intake of forages: An alternative feeding strategy for wintering beef cows. Prof. Anim. Sci. 21:182-189.