BEEF CATTLE RESEARCH UPDATE

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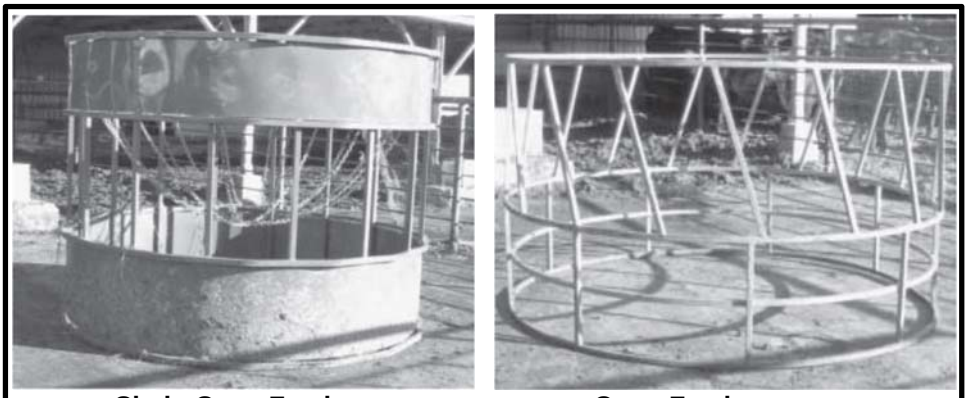
November 2015

Effect of Stocking Rate and Feeder Design on Hay Waste

University of Missouri research and Oklahoma State University research have indicated that hay feeder design can greatly impact hay waste.[1,2] In these studies, hay waste was clearly greatest with open bottomed feeders with the least waste with cone-type feeders and intermediate with solid bottomed feeders (see December 2013 Beef Cattle Research Update[3]). Additional University of Missouri research compared hay waste using 96 mid-gestation spring-calving cows (1255 lb average body weight, BW) with two types of hay feeders (cone vs. open bottomed) at three stocking rates (8, 16, or 24 cows per feeder).[4] The cone feeders (Figure 1) were equipped with cradle-chains, sheeting on upper (20 inches) and lower (24 inches) portion, and 16 feeding stations (17.8 inches wide) separated by vertical bars (7.5 ft. diameter and 5.6 ft. tall). The open bottomed feeders (Figure 1) had no sheeting and 17 feeding stations (17.5 inches wide) separated by angled bars (7.9 ft. diameter and 3.9 ft. tall). Tall fescue round hay bales (87.3% dry matter, DM; 6.3% crude protein, CP and 5 ft. width with 5.6 ft. diameter) were offered on the circular end and replaced every third day, every other day, or daily, respectively for the three stocking rates, 8, 16, or 24 cows to ensure ad libitum hay access. A single bale was offered to 8 and 16 cow groups each period, while three bales were offered to the 24 cow groups.



Chain Cone Feeder **Open Feeder**

Figure 1. Hay feeder designs. Source: Moore and Sexten, 2015

These researchers reported that estimated DM intake (DMI) did not differ ($P > 0.10$) as a percent of BW (2.0) or lb/head/day (26 lb). Hay waste was expressed in three manners (lb/head/day, % of hay disappearance, and % of hay DMI). Hay waste was significantly greater ($P < 0.05$) with the open bottomed feeders than the cone feeder for the 8 and 24 head stocking rates and tended to be greater ($P = 0.09$) for the 16 head stocking rate (Table 1). These authors concluded that increasing stocking rate to greater than one cow per individual feeding space did not reduce estimated DMI. They also concluded that stocking hay feeders at greater than one cow per individual feeding space or having no defined feeding space within a feeder increased hay waste.

Table 1. Effect of hay feeder stocking rate and design on hay waste.

Stocking Rate, # cows:	8		16		24	
Feeder Design:	Open	Cone	Open	Cone	Open	Cone
Hay waste:						
lb/head/day	6.4	4.4	6.0	4.6	7.3	3.8
% of hay disappearance	18.8	14.0	18.8	15.4	22.4	12.5
% of hay DMI	23.4	16.4	23.6	18.3	29.2	14.7
P-value, Open vs. Cone	< 0.05		0.09		< 0.05	

Adapted from Tomczak et al., 2015

In the previous Missouri research,[1] the effect of bale feeder design (open vs. chain cone) and forage quality on hay waste was evaluated. The two forage qualities evaluated were alfalfa haylage (high quality: HQ, 41% DM and 17% CP) and fescue hay (low quality: LQ, 92% DM and 7.5% CP). These researchers reported that percent bale waste with LQ forage was 19.2% in open feeders vs. 8.9% in cone feeders. Whereas, with HQ forage, hay waste did not differ between feeders designs (7.0% vs. 6.5% for open and cone feeders, respectively. In the Oklahoma research,[2] hay waste (low quality prairie grass hay) with four different bale feeder designs was 21.5, 20.6, 12.7, and 5.6% with an open bottomed polyethylene pipe ring, an open bottomed steel ring, a sold bottomed steel ring, and a modified cone feeder (Figure 2), respectively.

Figure 2. Modified cone feeder.

Both of the Missouri studies and the Oklahoma study indicate that hay waste of low quality forage is clearly greatest with open bottomed feeders compared with cone-type feeders. Using a cone-type feeder may reduce hay waste by as much as 50%. The decrease in wasted hay will more than pay for the additional cost of the cone-type hay feeders.

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[1] Moore, W. A. and W. J. Sexten. 2015. Effect of bale feeder and forage on hay waste, disappearance, and sorting. Prof. Anim. Sci. 31: 248-254.

[2] Sparks, J. D., A. J. Sexten, C. P. McMurphy, G. L. Mourer, M. A. Brown, C. J. Richards, and D. L. Lalman. 2013. Effects of bale feeder type and supplementation of monensin on hay waste, intake, and performance of beef cattle. J. Anim. Sci. 71 (Suppl. 1):4.

[3] Hicks, B. 2013. Effect of Bale Feeder Type and Forage Quality on Hay Waste. Beef Cattle Research Update. December, 2013. Oklahoma Cooperative Extension Service. Available: http://oprec.okstate.edu/animal-science/research-newsletters/by-topic/Update%20Dec%202013.pdf

[4] Tomczak, D. J., N. E. Mertz, D. L. Hamlin, and W. J.Sexten. 2015. Stocking rate and feeder design affects hay waste. J. Anim. Sci. 93 (Suppl. s3): 836 (Abstr.).