Hay Feeder Design Can Spare Nutrients and Lower Feed Costs

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Harvested feed is the largest cost contributor to maintenance of beef cows in the upper Midwest, and feed cost is the single largest variable influencing profitability of the cow-calf enterprise. Most of this harvested feed is packaged, stored and fed as large round hay bales. Harvest, storage and feeding losses may occur. Feeding losses depend on the feeding method used and can exceed 30 percent of the dry matter fed. Excessive round-bale feed waste increases feed costs, pest habitats, pathogen loads and concentration of feed nutrients around the feeding site.

A comprehensive study conducted at the Michigan State University (MSU) Beef Cattle Teaching and Research Center (BCRC) examined the relationships between feeder design, animal behavior and hay waste. One hundred sixty beef cows were used to evaluate the quantity of hay loss from various designs of round bale feeders. Twenty cows were allotted to one of eight pens with four feeder designs: cone, ring, trailer or cradle. Alfalfa and orchard grass round bales were weighed and sampled before feeding. Hay that fell onto the concrete surrounding the feeder was considered waste and was collected and sampled daily. At the end of one week, each feedertype was assigned to a different pen for a second one-week period. Animal behavior was recorded using time-lapse video. Dry matter hay waste ranged from 3.5 to 14.6 percent for the various feeders (Table 1). Cows feeding from the cradle feeder had nearly three times the agonistic interactions (headbutting and displacement of other cows) and four times the frequency of feeder entrances compared with cows feeding from the other feeder types. Feed losses were positively correlated with agonistic interactions and feeder entrances. This study revealed that design features are important in reducing the amount of hay waste associated with feeding in round-bale feeders.

Estimated nutrient losses of nitrogen (N), phosphorus (P) and potassium (K) are depicted in Figure 2 for an individual feeder. Estimates assume that a feeder would supply 20 cows for 200 days (e.g., Oct. 15 to May 1) and that the percentages of protein, phosphorus and potassium in the hay are 11, 0.25 and 2 percent, respectively. These nutrients would be lost to an area immediately surrounding the feeder. This poor distribution of nutrients would increase the likelihood that these nutrients would run off and contaminate surface water. Therefore, feeding methods that control hay waste not only help manage distribution of feed nutrients but also protect water quality.

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Purchasing new feeders may not always be a practical way of controlling costs and keeping depreciation expenses low. However, the cost of hay waste can be substantial, especially when the hay price is relatively high. The value of hay waste at various hay prices for a 20 cow feeder is shown in Table 2. This table again assumes 200 days of feeding. For example, when hay is valued at $100/ton, reducing waste from 30 percent to 10 percent would be expected to result in an annual savings of $1,942/feeder ($2,622 - $680).

In summary, managing hay waste can help keep feed costs in line while better managing forage nutrients and preventing environmental problems.

Figure 1. Estimated nutrient loss per season of different round bale feeder types.

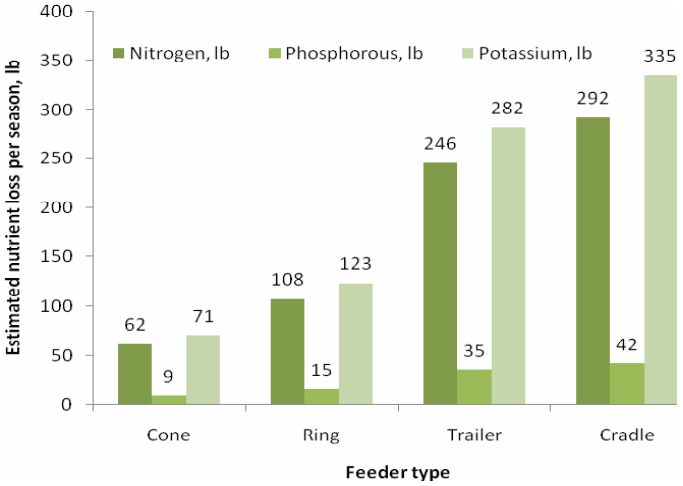

Table 1. Hay waste from various designs of round bale feeders based on dry matter

Item	Cradle	Cone	Ring	Tralier
Daily hay waste, lb/cow	4.2	0.9	1.6	3.5
Hay waste, %	14.6	3.5	6.1	11.4

Table 2. Value of hay waste at various levels of waste for a 20-cow feeder for 200 days

	Hay Price, $/ton		
% Waste	$80/T	$100/T	$120/T
0%	-	-	-
10%	$544	$680	$816
20%	$1,224	$1,530	$1,835
30%	$2,098	$2,622	$3,146

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