Hay is a valuable commodity. Save money by limiting storage and feeding waste!

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Abstract
Storage and feeding losses can accrue for any hay bale type, but large, round hay bale management systems often lead to the greatest and most consistent losses. By the time that hay is fed, much of it will have lost more than 25 percent of its feeding value. Research on hay storage often supports what many producers say, "I get about three bales' worth of feed out of every four bales that I put up."

Keywords
Agronomy

Disciplines
Agricultural Science | Agriculture | Agronomy and Crop Sciences

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Hay is a valuable commodity. Save money by limiting storage and feeding waste!

by Stephen K. Barnhart, Department of Agronomy

What a Waste!

Storage and feeding losses can accrue for any hay bale type, but large, round hay bale management systems often lead to the greatest and most consistent losses. By the time that hay is fed, much of it will have lost more than 25 percent of its feeding value. Research on hay storage often supports what many producers say, "I get about three bales' worth of feed out of every four bales that I put up."

The traditional large, round bale storage method has been "outside, on the ground." Under average weather conditions, you can expect 25 to 35 percent dry matter and nutritive quality loss on unprotected bales stored outside, on the ground. While there are a few inches of weathering on the tops and sides, much of the loss is on the bottom of the bales where they are in contact with the wet soil. Simply storing
round bales on a few inches of crushed stone (or on pallets, tires, etc.) can lead to considerable savings during storage. A stone pad is a cost, yes, but often a very economical one.

The next most often used storage step is to cover individual bales or groups of bales with some type of tarp or plastic cover. Another significant savings in forage can be gained by covering outside-stored bales but at additional cost and, in this case, shorter useful life for the investment. Covered and off the ground is getting close to the savings of inside or under-roof storage. I must note that there is still about a 5 percent loss in dry matter under the best of conditions with inside storage. The cost of permanent roof cover for the hay storage site can be quite economical, depending on the initial cost and any alternate uses that the structure can provide. The table below is a good summary of some of these cost and savings tradeoffs.

<table>
<thead>
<tr>
<th>Method</th>
<th>Total Cost</th>
<th>Useful Life</th>
<th>Dry Matter Loss (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outside on Ground</td>
<td>--</td>
<td>--</td>
<td>30</td>
</tr>
<tr>
<td>Outside on Gravel Pad</td>
<td>$4,000</td>
<td>10 years</td>
<td>20</td>
</tr>
<tr>
<td>Outside on Gravel Pad</td>
<td></td>
<td>10 years (pad only)</td>
<td>10</td>
</tr>
<tr>
<td>Plastic Bale Wrap</td>
<td>$350</td>
<td>1 year</td>
<td>7</td>
</tr>
<tr>
<td>Under Roof</td>
<td>$6,000</td>
<td>25 years</td>
<td>5</td>
</tr>
</tbody>
</table>

*From University of Kentucky Hay Storage Decision Aid program with assumptions of the storage methods*

Feeding losses are expensive too. Hay costs between $0.02 and $0.07 per pound of dry matter, usually more than double the cost for the same amount of nutrients from pasture. In many forage/livestock production operations, more than 50 percent of the hay that is produced is wasted by either poor storage methods or improper feeding practices, or both.

No matter how hay is packaged, if you waste it during feeding, you lose money. Below are some general recommendations that can help minimize waste during feeding.

**Feed hay in small amounts or in a feeder to minimize waste:** When fed a limited amount of hay at a time, cattle have less opportunity to trample and soil the hay. As shown in the table on page 278, feeding hay in a rack or a “hay ring” also limits the opportunity that animals have to trample or soil hay and will reduce waste substantially if you intend to provide more than a day’s worth of hay at one time. This applies to large hay packages too. Large bale systems are designed to minimize labor, not waste.

Another popular system is to unroll the bale and feed it on the ground as loose hay. This can result in high trampling and soilng losses if too much hay is fed at one time. If a three-day (or longer) supply of hay is unrolled and left for cattle to consume on their own, feeding losses of 40 percent or more can be expected. However, if fed on a daily basis, feeding losses run about 12 percent. One advantage of unrolling bales is that it gives you the opportunity to move the hay feeding areas around the pasture and distribute manure and nutrients evenly over a large area.

**Feed hay in well-drained areas:** If you intend to feed hay in a single location all winter,
then providing a footing, such as crushed stone or even concrete, can help minimize problems with mud. Perhaps more cost effective is to move hay-feeding areas around the farm to minimize the damage to any one area of the pasture.

**Feed hay stored outside before hay stored inside:** Hay stored outside usually has more spoilage during storage and lower palatability than hay stored inside. Cattle will waste a greater percentage of poor-quality hay than they will of good-quality hay. Animals fed high-quality hay early in the season will often refuse poor-quality hay when it is offered later.

**Estimated losses (percentage of hay offered) from different hay-feeding methods.**

<table>
<thead>
<tr>
<th>Bale Type</th>
<th>With Rack 1-Day Supply (%)</th>
<th>With Rack 7-Day Supply (%)</th>
<th>Without Rack 1-Day Supply (%)</th>
<th>Without Rack 7-Day Supply (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small square</td>
<td>3.9</td>
<td>4.1</td>
<td>6.7*</td>
<td>--</td>
</tr>
<tr>
<td>Large round or square</td>
<td>4.9</td>
<td>5.4</td>
<td>12.3*</td>
<td>43.0*</td>
</tr>
<tr>
<td>Formed haystacks</td>
<td>8.8</td>
<td>15.0</td>
<td>22.6</td>
<td>41.0</td>
</tr>
</tbody>
</table>

*Bales spread or unrolled across pasture

Table adapted from an article by Rob Kallenbach, University of Missouri Extension.

*Stephen K. Barnhart is a professor of agronomy with extension, teaching, and research responsibilities in forage production and management.*

This article originally appeared on pages 277-278 of the IC-498(25) -- November 12, 2007 issue.

Updated 11/16/2007 - 5:35pm

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