

What Is Good Hay?

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Hay is one of the necessary evils of livestock production. Even with the best forage programs, there will be certain times when some hay needs to be fed. If you are going to have to feed it, it is important to know the characteristics of good hay. Regardless of the forage species, good hay has certain things in common. It is a matter of knowing what to look for.

It is important to keep in mind that hay is a package to provide protein and energy in an animal's diet. These are the two nutrients needed in the greatest amounts. The best way to determine the nutrient content is to have a sample of the hay analyzed by a forage testing laboratory. This will let you know if the protein and energy content (expressed as TDN-Total Digestible Nutrients) is high enough to meet animal needs, or if some type of grain needs to be fed. But there are also certain physical characteristics that can be used as clues to hay quality.

1. Is the hay stemmy or leafy? As the proportion of leaves increase, the quality of hay increases. Leaves have the most protein and energy of any part of the plant. More leaves means more protein. Stems make the hay coarse, and not as palatable. Cut hay early to get as much leaf and as few stems as possible. On first cuttings of tall fescue and orchardgrass, cut the grass at the late boot stage, which means just as the seedheads are beginning to appear.

2. What color is the hay? Color can give a good indication of the conditions when the hay was produced. Hay cut early and cured fast will have the same green color as the growing plant. The more yellow or brown a hay is, the more mature the plant was when cut, and the longer it took to dry for baling. The longer hay is exposed to the weather before baling, even if it doesn't get rained on, the lower the quality will be. The weather conditions are out of our control, but try to be ready to cut when the weather permits, and don't waste that first day of good weather.

3. How does the hay smell? The goal is to have a clean odor in the hay. Hay that is put up wet will have a dusty or moldy odor. This makes hay less appealing. Also, if you have moldy hay, the quality is reduced because mold is using the protein and energy instead of the animals. Hay that is put up wet can

also heat up to the point that it looks dark brown and is burnt. The quality of this hay is probably so poor that it takes more energy to digest the hay than the animals can get from it.

4. Are there a lot of weeds in the hay? Weeds in a bale tell us two things. First, the quality of the hay is low. Weeds like buttercup, horsenettle, thistle, broomsedge etc., are low quality, so large amounts of them will reduce the quality and palatability of hay. Also, a weed is growing where a grass or clover plant should be. More weeds mean less yield from the pasture. It may be time to think about fertilizing and doing something to improve the stand of grass or renovate with clovers.

5. What should I pay for this hay? If all the above qualities are good, nutritional attributes will vary seasonally and year to year. In the end, we want a hay with adequate energy and protein at the best price. Most producers purchase hay based on price per bale without much consideration given to actual weight of the product. According to Dr. Andrew Griffith, Assistant Professor with UT Extension Agriculture and Resource Economics, round bales of the same dimensions (height and width) can vary widely which can greatly affect value. In fact, university studies have shown most growers over estimate actual bale weight. Furthermore, absence of a forage analysis creates a major guessing game which can be costly for gestating ewes. Dr. Griffith provides examples comparing protein percentages on an 800 pound bale of hay costing \$35.00 (See Figure 1). By evaluating unit cost of a pound of protein (and/or energy/TDN), the producer can get a much clearer idea of what the hay is actually worth (See Forage Test Results). Looking at the 800 pound bale, unit cost per pound of protein would be \$0.31 if hay tested 14% however cost increases to \$0.44 if test was 10% protein. Quite simply, you're getting fewer pounds of protein per bale

Figure 1:	Hay price (\$/800 pound bale)			
	\$20	\$25	\$30	\$35
8% Protein	0.31	0.39	0.47	0.55
10% Protein	0.25	0.31	0.38	0.44
12% Protein	0.21	0.26	0.31	0.36
14% Protein	0.18	0.22	0.27	0.31

as weight decreases. The forage results provided are adequate in protein so let's look at TDN unit cost. The example shows TDN values quite different at 55% and 49% thus unit cost of TDN will be greater on the lower TDN at \$0.09 with the higher TDN cheaper at \$0.08.

Would it be cheaper to supplement lower quality hay with corn or buy the higher quality hay? Most hays in the Southeast are sufficient in protein for gestating ewes, however may lack adequate energy (TDN). Corn is an excellent energy source often used to supplement rations. At a \$4.50 bushel price, corn will have a TDN unit cost of \$0.09, which is comparable to TDN cost of the lower quality hay, which is sample 2 in the example. In this case, it would be more cost effective to purchase the Bermudagrass hay as it requires less supplementation. A higher quality hay will have a lower cost per unit price (and require less supplementation) than a lower quality hay. To become better producers, we must strive to weigh purchased hay (preferable buy at ton price) and furthermore, request a forage analysis to determine nutritional quality. Your county extension agent is always there to assist you.

These are questions that you have probably thought of before. But reconsider them with respect to how they impact the value of hay to the animal. Since they are the ones that have to eat it, evaluate the hay from their point of view.

Visual evaluation of hay is good, however a lab forage evaluation with a recommendation for additional supplementation can help the producer save money by giving the flock exactly what they need and not under or over feeding nutrients. The following is an example of a forage test on two different types of hay. Each has a different nutrient profile. At the end of the analysis is a recommendation for additional supplementation depending on the ewe's stage of production.

Dr. Bates, received his Ph.D from the University of Georgia and his M.S. and Bachelor's of Science from Louisiana State University. He joined the faculty of The University of Tennessee in 1993 as an Extension Forage Specialist. Dr. Bates's educational program emphasizes the practices needed for profitable forage production. Forage species selection, establishment, fertilization, harvest and storage are the major areas of his program.

Debbie Joines, has a small flock of registered and commercial Katahdins in Middle Tennessee and is recently retired from UT Extension after 25 years with the Soil, Plant and Pest Center. She is president of TN Sheep Producers Association.

FORAGE TEST RESULTS

Sample #	1	2
Sample Type	Bermudagrass	Fescue/Orchardgrass
Moisture (%)	10.62	12.54
Dry Matter (%)	89.38	87.46
	AS-FED BASIS	AS-FED BASIS
Protein (%)	14.55	10.84
Fat (%)	1.76	1.48
Fiber-ADF (%)	31.64	35.08
Fiber-NDF (%)	63.97	58.62
Calcium (%)	0.44	0.59
Phosphorus (%)	0.34	0.25
Magnesium (%)	0.17	0.19
Potassium (%)	2.22	1.40
TDN	55	49
Net Energy Maint (MCal/lb)	0.56	0.48
RFV	95	85

Supplement Recommendations

Sample 1 – Bermudagrass

155 pound ewe, late-gestation, twins: Feed 0.75 lbs. corn (or equivalent energy source) with this hay.

Sample 2 – Fescue/Orchardgrass Hay

155 pound ewe, late-gestation, twins: Feed 1.5 lbs. corn (or equivalent energy source) with this hay.

The analysis for these two samples shows that if a ewe is carrying twin lambs during gestation, the Bermuda hay will need to be supplemented with an additional ¾ pounds of corn or a feed of similar energy values to meet her gestating needs. The Orchardgrass/fescue hay, being lower in nutrient value, will have to be supplemented with 1 ½ pounds of corn to meet her gestating needs.

This simple example shows the value of a forage test in determining what the ewe needs depending on her stage of production. Underfeeding can have deleterious effects on the developing lambs and over feeding can be costly to the producer in the form of wasted feed dollars.

Tennessee and Kentucky Hay Forage Testing Program

Tennessee Soil, Plant & Pest Center
<https://ag.tennessee.edu/spp/Pages/forage.aspx>

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