Forage News

MISSISSIPPI STATE UNIVERSITY EXTENSION SERVICE

What is the Value of Hay?

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Hay is an important contributor of protein, energy, fiber and other nutrient to the rations of different livestock classes. In the last several years, hay has become a very expensive forage commodity due to drought conditions across the country and increase in fuel and fertilizer prices. Small square bales sell from $5 to $10.00 per bale while round bales range from $35.00 to $80.00 per bale depending on the size of the bale. The cost of producing hay and how it is sold depend on different factors such as the value of the nutrients removed, the nutritive value compared to other feeds and the deterioration of the hay (dry matter loss). Where you are producer or a buyer, the following calculations might help estimate the best way to sell or acquire this commodity.

Value of the Nutrients Removed When Making Hay

Figure 1. Fertilization, maturity, nutritive value, and storage conditions could have a large impact of hay prices and animal performance.

With the increase in fertilizer prices, the value of nutrients in a ton of hay cannot longer be ignored and considered insignificant. Producers need to ask themselves, what is the cost to of replacing these major nutrients (N, P, and K)? The value of nutrient removed varies for different crops, a reason of why it is important to understand the nutrient management of a hay production system. Besides nutrient removal, a producer should take into account the equipment cost, labor and spreading cost. For example, each ton of bermudagrass hay reomoves approximately 46 lbs of nitrogen, 12 lbs of phosphate (P_2O_5) and 35 lbs of potash (K_2O) per ton of hay. Urea (46-0-0) was quoted at an average price of $435/ton, DAP (18-46-0) was quoted at $524/ton and potash (0-0-60) at $647/ton. To replace these nutrients in a ton of hay will cost in average $51.43 per ton. Besides the fertilizer cost, there should be something figured in for spreading the fertilizer, the average cost for spreading dry bulk fertilizer is about $7.00/acre. While these nutrient costs are for purchased fertilizer, manure may be used to supply nutrients as well. Poultry litter has a 3-2-3 fertilizer grade and it is valued approximately at $60.00/ton. To replace these nutrients using poultry litter in a ton of hay will cost in average $46.00 per ton. Keep in mind that the use of manure might be limited by the levels of phosphorus already present in the soil and because poultry manure is organic matter, the availability of the nutrients (especially nitrogen) will be reduced. The value of nutrients in hay is the same as in fertilizer. Whether the nutrients are applied as fertilizer or manure they produce the same yield result of the fertilized crop. Some producers usually commented that they can grow hay without fertilizer which is true and happens all the time in Mississippi. But even under those circumstances, the nutrients removed should be accounted for whether they are replaced or not. Keep in mind that hay production without nutrient input is not recommended since soil mining can occur creating greater soil mineral imbalances that will be more costly to correct in the long-term.

The next step is calculating the cost of hay productions is the equipment cost. The equipment costs may vary, and if you know what they are in your operation, plug those into this calculation. Mowing is valued at $15.00/acre, tedding at

$17.50/acre, raking at $7.75/acre and large round bale baling and hauling at $27.47/acre. Since hay is always referred in terms of price/ton, the cost/acre needs to be converted into costs ($/ton). This is the place where a good fertility program will pay some dividends. As tonnage yields increase, equipment costs (mowing, tedding and raking) decreases on a per ton basis. Keep in mind that if you are making your own hay, these production costs are there whether that hay is mowed and baled at 13% crude protein and 65% TDN or at 8% crude protein and 50% TDN.

Let's assume that a hybrid bermudagrass is producing 5 tons per acre and large round (5'x5') bales are being made with an average weight of 1,100 lbs. The machinery costs are $3.00/ton for mowing, $3.50/ton for tedding, $1.55/ton for raking and $5.49/ton for baling and hauling. If only one tedding and one raking is needed before baling, the total machinery cost is $13.54/ton. Adding the machinery cost to the fertilizer cost results in a total hay production cost of $64.97/ton. This does not include the cost of spreading fertilizer/manure or depreciation of the equipment.

Value of Hay Based on Nutritive Value

This is a method that a buyer or even a producer can use to determine if the value of the hay being produced or purchased to meet the nutrient requirements of a specific livestock class. To achieve this, a forage testing program has to be in place. By knowing the nutritional value, you can minimize your cost and maximize your production. Forage testing helps to determine fair market value, an equitable price and testing helps in comparing forage quality year-to-year. By testing hay and using the analysis, producers can balance feed rations for their livestock. This enables them to use available feed sources to formulate and feed the most economical ration. The nutritive value of the hay when compared to other feed sources is based on two main constituents: Crude protein (CP) and energy (Total Digestible Nutrients, TDN). Corn is the most common feed source for energy and can be used to establish a basis for energy cost. Since corn is 80% TDN on an as fed basis that means we have about 45 pounds of energy in a bushel of corn that is selling for around $8.70 or 19 cents per pound of energy. For protein, soybean meal (44% CP) is the common feed source of comparison, and if it is selling for around $470 per ton, a pound of protein is worth about 54 cents. So, if your hay is 55% TDN and 12% CP, a ton of it would have 1,100 pounds of energy and 240 pounds of protein. This gives you $174.80 in energy and $129.60 in protein for a combined value of $304.40 per ton. Let's assume that the hay being fed is in the form 800 lb round bales. If the hay being fed has a 20% loss (storage and feeding), the bale would have a value of approximately $98.00.

Table 1. Estimated hay prices of a large round (4'x5') bale weighing 1,000 lbs. Hay was assumed to be stored outside on the ground with no cover from 3 to 24 months and having different depth of the weathering layer.

	Age of Hay (months)			
Round Bale Variables	**6**	**9**	**12**	**24**
Weathered layer (in)	0.5	2	4	6
Cost/Bale ($)	50.00	45.00	35.00	25.00
Weight of bale (lbs)	1000	1000	1000	1000
Value of hay ($/ton)	80.00	90.00	70.00	50.00
Edible weight of bale (lbs)	959	840	694	562.5
Value of edible hay ($/lb)	0.05	0.05	0.05	0.04
Adjusted value of edible hay in the bale ($)	52.15	53.55	50.40	44.44
Adjusted value of edible hay in the bale($/ton)	104.30	107.11	100.80	88.89
Percent of edible hay in the bale (%)	95.88	84.03	69.44	56.25

*Data adapted using the Value of Weathered Hay Calculator. The Noble Foundation.

Value of Weathered Hay

Quality hay declines as hay ages and also dependent on how it is stored. Unless stored properly, hay produced last year will have lower quality than hay produced this year. Hay stored properly should lose little nutritional value over time unless the hay is stored for periods of time longer than those considered reasonable. On the other hand, quality and dry matter of hay stored outside and uncovered is prompt to decline. Drought conditions has resulted in tight hay supplies and escalating prices that has forced livestock producers to purchase old hay that has been weathered outside and unprotected for over a year. The larger percentage (~33%) of the total volume of the round bale is the outer 6 inches of the bale where most of the weathering occurs. It is important to know the value of the old weathered hay when dry matter loss in taken into consideration.

To appraise the value of the hay, two factors have to be taken into considerations when determining the percent waste and they are: the diameter of the hay and the depth of the weathered layer (low quality hay not consumed by the livestock). Using these calculations, the edible part of the hay can be used to estimate the actual value. Let's assume that a buyer has the option to buy hay from a producer that has stored large round bales of bermudagrass outside for different periods of time (**Table 1**). The bales are 4'x5' and weigh an average of 1,000 lbs. Which hay will be a better deal?

According to the calculations, the 24-month old hay looks like a better deal, but in reality it has a 44% waste in the form of weathered, low quality hay that will not be eaten by the cows. Not only is the older hay more expensive on an edible hay basis, but the producer will need to purchase 44% more hay to meet the cow's total nutrient requirements for the winter or risk running out before winter grazing is ready.

Summary

While there are several methods for adjusting forage prices, the price ultimately will have to fall within the bounds of the local forage market that is controlled by supply and demand. The key to fair pricing of hay is information. Testing for nutrient removal and forage quality and accurate information for reference hay prices are essential. If you consider these costs as part of the production costs contributing to the yield of hay taken off the land, you can calculate a fair value for the nutrients being removed. Knowing the number of bales or loads of forage removed and the weight of each will allow you to get a estimate of the yield. The value of the nutrients in the hay can be calculated quite reasonably, and should form the starting point for negotiating a price that's fair to both the buyer and seller.

There are many factors that owners and buyers should consider when calculating the price of standing hay, but most of these factors only affect one party. The practice of purchasing forages, especially hay by small scale buyers, has for many years been based primarily on a visual appraisal by the buyer, without the guarantee of quality or nutrient content. Visual estimates are an essential part of hay evaluation to detect mold, foreign matter, leafiness, color, odor, sun bleaching, and maturity; but used alone they are unreliable as indicators of forage nutrient content. The basis for equitable pricing is testing for nutrient content. Therefore, feed pricing guidelines must be easy to understand, based on a simple, fast, and inexpensive test, designed to reflect the relative difference in animal performance as related to feed quality, and fair to both the feed producer and the purchaser.

Upcoming Forage Events

November 9, 2012—***SW Mississippi Grazing School***
Sage Farms, Meadville, MS
http://msucares.com/crops/forages/grazingschool/index.html
Contact Dr. Rocky Lemus at RLemus@ext.msstate.edu or (662) 418-9897

November 13, 2012—***White Sand Field Day***
White Sand Research Station, Poplarville, MS
Contact Dr. Daniel Rivera at DRivera@ext.msstate.edu or (601) 403-8777

November 29-30, 2012—***Mississippi Forage and Grassland Conference***
Raymond, MS
Field Day (Nov. 29th), Brown Loam Experiment Station
Conference (Nov. 30th), McKenzie Arena, T.H. Kendal Agricultural Complex
http://msucares.com/crops/forages/msu_grazing_conference2012/index.html
Contact Dr. Rocky Lemus at RLemus@ext.msstate.edu or (662) 418-9897