UNIVERSITY OF MISSOURI
FORAGE SYSTEMS RESEARCH CENTER
AGRICULTURAL EXPERIMENT STATION
COLLEGE OF AGRICULTURE, FOOD AND NATURAL RESOURCES

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April-June, 2008

Forage Systems Update
Vol 17, No. 2

Nutrient Value of Baled Hay

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Many cow-calf farmers have asked me about the fertilizer value of nutrients contained within a bale of hay. Although the majority of hay feeding is over for the year, I believe farmers have realized that large price increases in commercial fertilizer needs to be offset by an increase in hay prices. Hay prices this past winter in our region have nearly double to what the price was the previous year.

A significant amount of fertility is contained within a bale of hay so we recommend feeding hay in areas where you would like to increase soil fertility. Of course, not all hay is created equal when it comes to the quantity of nutrients per ton of dry matter. Hay differs in nutrient content due to species, yield, growing conditions including soil fertility, haying conditions, etc. Summarized below In Table 1 are estimated hay nutrient values for some of the commonly grown forages in our region.

Approximate quantities of nutrients contained per ton of hay dry matter for selected hay species.

	N	P2O5	K2O
Forage species	-------- lbs/ton DM --------		
Alfalfa	55*	15	60
Clover-grass mix	50*	15	60
Bromegrass	35	15	60
Tall Fescue	40	20	50
Orchardgrass	50	20	60
Timothy	40	15	60

*most of the N derived from nitrogen fixation by legumes.

As a rule of thumb, cool season grasses will contain approximately 40 lbs N, 20 lbs P2O5, and 55 lbs K2O per ton of hay dry matter. However, N losses from a hay feeding system can often be in the neighborhood of 75% so that only 25% of the N contained in the hay is returned to the soil and available to be utilized by growing plants.

Our current fertilizer prices at Brookfield, MO ($/lb) are: N $0.62, P2O5 $0.75, and K2O $0.50. Using the rule of thumb stated above, we estimate that there is $67.30 worth of nutrients (N, P, and K) contained in a ton of grass hay (this equals $40.38 worth of nutrients per 1200 lb bale). After adjusting for the expected loss of nitrogen from the system, we estimate the value of nutrients returned to the soil from feeding a 1200 pound bale of grass hay is approximately $29.22. Remember to manage nutrient deposition (manure distribution) to areas where it is most needed by unrolling hay, moving bale rings across the landscape, or by space bale feeding.

Forage producers can reduce some of their fertilizer bill by accounting for nutrients returned through hay feeding, adding legumes to their pastures, and adjusting soil pH to near neutral. Winter feeding options that will help reduce fertilizer needs include managed (strip grazing) stockpile systems that result in uniform manure/nutrient distribution, bale feeding in areas where additional fertility is needed, unrolling hay to distribute nutrients more evenly across the pasture, and supplement feeding in areas requiring added fertility. When buying hay you should not only consider the feed value of the hay but should also consider the value of nutrients contained within the bale. Often times, purchased hay is a better deal than hay grown and baled on your own farm when considering both feed and nutrient values of the hay.

The Missouri Agricultural Experiment Station is the research arm of the

College of Agriculture, Food and Natural Resources

at the University of Missouri-Columbia

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