

Producing High Quality Hay

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Haying season will soon be here with opportunities to produce higher quality hay for winter feeding of cattle. The value of hay production in Georgia is over \$100 million annually according to the Georgia Agricultural Statistics Service, greater than all other crops except cotton, peanut, tobacco, and corn. However, much of this hay is surplus from pastures and often of low quality. The two main hay crops in Georgia are hybrid bermudagrass and tall fescue.

Why produce high quality hay?

Hay is fed in winter to supply the nutrient requirements of cattle when pastures are not productive. Dry pregnant beef cows can be fed relatively low quality hay containing only 8% crude protein and 50% TDN (total digestible nutrients) for maintenance. However, lactating cows with their calves require hay with 11 to 12% crude protein and 60% TDN. If the hay is not of the needed quality, then protein and/or energy supplements must be fed or the animals will suffer and rebreeding may be affected. Supplements are expensive so poor quality hay increases the cost of wintering cattle.

What affects hay quality?

There are a number of factors that affect hay quality such as grass variety, fertilization, rain during hay curing, baling hay that is too wet, and bale storage, but the most important are maturity at harvest and fertilization.

Bermudagrass:

Good hybrid bermudagrass varieties for hay production are Coastal, Tifton 44 and Tifton 85 (not cold hardy in northern Georgia). However, Tifton 85 is higher yielding and more digestible than other hybrids as shown by a 3-year experiment by G.M. Hill, R.N. Gates, and G.W. Burton at Tifton, GA where the hay was harvested at 6-week intervals during the growing season.

Variety	Hay yield tons/acre	Digestibility %
Tifton 85	8.3	60
Tifton 44	7.0	55
Coastal	6.9	54

Although Tifton 85 is of higher quality than other bermudagrass varieties, quite acceptable quality hay can be made from them if they are harvested at early maturity. Many experiments have been conducted across the southern USA which show the effect of maturity on nutritive quality of Coastal bermudagrass:

Weeks between hay harvests	Crude protein	Digestibility
4 weeks	10-12%	58-62%
8 weeks	6-8%	45-50%

Unfortunately, most bermudagrass hay is harvested at around eight weeks of age and the quality is barely adequate to maintain a dry beef cow and certainly inadequate for lactating cows without substantial feeding of supplements. It can be argued that it is cheaper to harvest bermudagrass hay at eight weeks since less harvests are needed and the total hay yield will be higher. However, these advantages will be more than offset by the increased cost of feed supplements or lower animal performance.

Tall fescue:

Information on tall fescue hay quality was obtained in a 3-year experiment I conducted in cooperation with Nick Hill and Greg Durham on a red clay soil near Athens, GA. We found little difference in hay yield or quality of three endophyte-free tall fescue varieties - AU Triumph, Jesup, and Kentucky 31. AU Triumph is less well suited for spring hay cutting because of its winter growth and early heading in spring when weather

conditions may be unfavorable for haymaking. The spring harvest on these varieties was made at late boot, early bloom, and seed dough stages with additional cuts made in summer and again in late autumn. Generally 3 cuts per year were obtained and in a few cases, four were made. Nitrogen was applied at 75 lb N/acre in early March, after the first cut, and again in September each year. No irrigation was used. Hay yields and quality of the Jesup variety were as follows: (See figure 1)

Cutting at early bloom stage resulted in a higher spring yield than at late boot in spring but there was little advantage in yield by harvesting at seed dough stage. However, it is important to point out that subsequent regrowth was greater with early spring cutting as compared to seed dough stage. Recovery growth was very slow after harvesting at seed dough stage in spring, as compared to late boot or early bloom stages, resulting in heavy growth of volunteer crabgrass and other weeds in summer. Cutting at seed dough stage reduced crude protein content and greatly lowered digestibility, making it a low quality hay. On many farms, spring-cut tall fescue is cut at hard seed stage, making hay quality even lower than shown here.

Digestibility of hay cut in summer was similar to that at spring-cut seed dough stage, 54%, but crude protein was excellent, 15%. Autumn-harvested tall fescue hay was of excellent quality, 16% crude protein and 67% digestibility, a result of the high leaf content and absence of seed stems. Under an all season hay harvest system, stands of all three endophyte-free tall fescue varieties were excellent after three years. The main reason endophyte-free tall fescue stands are lost is by overgrazing in summer. This problem can be reduced or alleviated by

Figure 1

Maturity stage	Dry hay yield, tons/acre		Spring cut percentage	
	Spring cut	Total for year	Crude protein	Digestibility
Late boot	1.61	4.95	15	69
Early bloom	2.41	4.83	13	62
Seed dough	2.56	4.95	10	53

maintaining a 3 to 4 inch stubble in summer, rotational grazing, or using an all hay-cut system. The new Jesup variety is more tolerant of stress and will maintain good stands longer than other endophyte-free varieties.

Making quality hay

The two most important factors affecting hay quality are fertilization and maturity at cutting. Hay fields should be soil tested and the recommended lime, phosphorus, and potassium applied. Nitrogen recommendations are based on research results.

Hybrid bermudagrass:

Apply 75 to 100 lb N/acre in spring and after each harvest except the final one in autumn. Make first spring harvest when grass is 15 to 18 inches tall with subsequent cuts at 4- to 5-week intervals.

Hay yields of 5 to 7 tons/acre are realistic, depending on location.

Tall fescue:

Apply 75 lb N/acre in March, after the spring cut, and again in September. Make the first spring harvest at early bloom stage, aftermath at six weeks, midsummer if conditions permit, and again in autumn. On most farms, the main tall fescue hay harvest is obtained in spring, then grazed during late spring and summer, and if moisture is adequate another harvest is obtained in autumn. Hay yields of 4 to 5 tons/acre can be obtained.