

Package Options for Alfalfa

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Most of the hay crop in Kentucky is harvested as dry hay and stored in round bales of various sizes for feeding on the farm. Most of the round-baled hay in Kentucky is used on-farm in feeding beef and dairy cattle. When alfalfa hay in round bales is left outside without protection from the weather, large losses in DM yield and in forage quality usually result. We routinely measure DM losses in the range of 20-35% for a normal length hay storage season. Our research has shown that several economical storage options exist for protecting this hay from weathering. See AGR-171, Round Bale Hay Storage in Kentucky, for more information. Heavy-duty tarps can be used to cover pyramid stacks 3 or 4 bales high. Ventilation is restricted under the tarp so extra care is needed to be sure the hay is dry enough, 18% moisture or less, to store well. Also, it is best not to stack round bales that will not be covered because rain water shed from the upper layers penetrates into the bales below and causes even greater damage than if the bales were placed in rows on the ground.

Small rectangular bales are a preferred package for hand-feeding situations such as are common on many horse farms. The bale weights that perform best in this situation are usually in the lighter weight range for this package size, 45 to 60 lb. Alfalfa hay is well suited to feeding horses as are alfalfa/timothy mixtures, or pure timothy. Alfalfa/timothy mixes yield mainly alfalfa on regrowth harvests.

The recommended safe baling moisture for alfalfa hay varies with package size and density (TABLE 1). The smaller size and typically lower densities of small rectangular bales allows baling at moistures of 20%. In comparison, we recommend that hay to be packaged in round bales should be at 18% moisture before baling to ensure similar storage behavior.

In recent years mid-size rectangular bales have begun to appear in the eastern U.S. including Kentucky. Mid-size bales usually weight near 800 lb while large rectangular bales weigh 1800 lb or more. Previously, these packages were predominately used in western cash hay producing regions. Their higher densities compared with round bales or small rectangular bales makes them ideally suited for transportation. We have done storage trials with mid-size

rectangular bales to determine their performance under Kentucky weather conditions.

Table 1. Hay package weight and size options.

Bale shape	Diameter		Length	Typical	DM	Safe Baling
	r	Width		bale	Density	Moisture
				weight		
				-lb [†] -	-lb/c ft-	--%--
Rectangular	14 in	18 in	38 in	60	8-11	20
Rectangular	32 in	32-36 in	7 ft	900	14-16	12-16
Rectangular	4 ft	4 ft	7-8 ft	1800	14-16	12-16
Round	4 ft	--	5 ft	850	10-13	18
Round	5 ft	--	4 ft	1000	10-13	18
Round	5 ft	--	5 ft	1300	10-13	18
Round	6 ft	--	5 ft	1900	10-13	18

† Assumes 16% moisture concentration.

Mid-size and large rectangular bales have become the predominant preservation method for hay produced for cash sale in many regions of the U.S. but have not been evaluated under Kentucky conditions. We used a Hesston Model 4755 (AGCO Inc.) mid-size rectangular baler to prepare alfalfa bales that spanned the anticipated safe baling moisture for higher density bales. This baler produces dense, 32"x32", bales of various lengths, generally 6 to 7 feet.

We prepared alfalfa hay at 18.4, 14.7 and 13.4% moisture to determine effects on storage of hay in these packages. Initially, we observed little elevation in temperature following baling in late June. The figure below shows that after about 1 week of storage temperatures in alfalfa baled at 18.4% moisture began to rise. Over the next 2 weeks temperatures increased to a peak near 105 F. Although this temperature is not generally associated with significant heat damage, the

pattern of heating does suggest that further work is needed to assess moisture effects with these larger sized packages. Visual evaluation of the bales after storage showed increased dustiness in the bales that had shown elevated temperatures. These and other data have led to the recommendation that hay should be at 16% moisture before being baled in mid-size rectangular packages.

Storage Temperatures of Alfalfa Hay in Mid-Size Rectangular Bales

