

Using a Cotton Module Builder for Alfalfa

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After reading an article in *Hay and Forage Grower* (January 1994) written about a farmer who harvests 700 acres of high quality hay using a cotton module builder, farmers in Raisin City, CA were anxious to try this method themselves. By buying, modifying, and borrowing the required equipment, they were able to test this technique with little initial investment.

Alfalfa harvest operations progress in the usual manner until the point where the hay would be baled. The field is swathed and raked, but instead of baling, a chopper gathers the windrow and blows the chopped alfalfa directly into an enclosed trailer. When the trailer is full, the chopped material is delivered to the yard where it is dumped into a cotton module builder. A hydraulic ram spreads and compresses the alfalfa inside the module builder making a stack approximately 32' long, 6' wide, and 8-9' tall. Each stack contains approximately 10-12 tons of dry hay.

The Hepners believe that several factors combine to maintain the quality of the hay in a module. By chopping into a totally enclosed trailer, leaf loss is kept to a minimum and quality is maintained. When baling, it is not uncommon to see leaves lost with each movement of the plunger. Less handling also adds to the maintenance of quality. Because the hay goes into the module builder chopped, it can be used directly in a total mixed ration. When baled hay is used, not only are leaves lost in the baling process, but if the hay is chopped prior to mixing, additional leaf material is lost in the process.

These growers have moduled alfalfa from each cutting during the season. They've made modules from chopped alfalfa of various moisture contents to determine the conditions that result in high quality forage. In general, factors that must be considered when baling are as important, if not more so, when the alfalfa is going into a module builder. The larger the package, the more difficult it is to maintain quality. Moisture content is critical. If the alfalfa is wet, it will mold more readily in the module than in the bale. Letting the alfalfa remain in the windrow for an additional one day drying period should improve the odds that it can be safely moduled. In one trial, alternate checks were either baled or moduled. The average moisture content in the bales was 22.7% and the average in the module was 17.0%. Temperature probes indicated that modules heated only slightly (about 5°F) during the first week, but then temperatures gradually declined over the course of the month to about 77°F. There was much greater diurnal variation in bale temperature readings. Temperatures fluctuated between the mid-60's to the high 80's over the course of the month, with a gradual trend to decreasing temperatures.

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Samples were taken from the field prior to harvest and also from the modules and hay bales to compare selected quality parameters. Data presented here was collected by the grower and represents one field and one cutting. It indicates that moduling had no apparent detrimental affect on forage quality.

	<u>Moisture Content</u>	<u>MCF</u>	<u>Protein</u> (90% DM basis)	<u>TDN</u>
Module	12.8	23.5	18.3	52.8
Bale	13.9	24.5	18.9	52.0

As a result of their success in making hay using the module builder, the Hepners decided to try to make haylage using the same techniques. When making haylage, the chopper follows the swather by a few hours to a day depending on the moisture content of the alfalfa. The completed module is covered with plastic to exclude oxygen. Moisture content is critical in putting up good haylage. One of the modules was put up too wet and it was a disaster. One idea the Hepners would like to try the next time they put up haylage using the module builder is to install a perforated pipe, like a leach line, in the middle of the module to help aeration.

The Hepners believe a cost savings could be achieved when using a module builder to make haylage compared to having a custom operator come do the job. Custom operators charge about \$6/ton to bag haylage. They covered two 24-ton modules using one roll of plastic (\$100/roll) which works out to a cost of 48 cents per ton. The quality of the feed was excellent.

The direct cost of putting up hay in modules is also less than the cost associated with small bales, and efficiency is greater. Twine costs are eliminated, and there is less handling of the forage. Hay from the module doesn't require recutting for mixing. Although new mixers can handle the hay straight out of the bale, the old style agar mixer requires that the bales be sawed before mixing.

If they were to continue moduling alfalfa hay and haylage, the Hepners would be looking at a major investment in equipment. They are able to borrow a module builder now, but they would have to purchase one in the future at a cost of about \$10,000 (used). If they were able to purchase additional enclosed trailers, they could continue chopping in the field while filled trucks carried loads to the module builder. Currently, they must wait while each trailer travels to the yard to dump its load and returns before chopping can continue. Ideally, they would like to have 2-3 choppers and 4-5 trailers operating to make the process more efficient. Acquiring a module mover would also help them increase their efficiency because they could build the modules next to the alfalfa field and move them to the yard when time allows. However, haylage modules would have to be built in in the yard since module movers most likely could not carry the 25-30 ton load. Although the Hepners were very happy with the moduled hay and haylage, until additional equipment can be found and purchased, moduling alfalfa for hay and haylage has been terminated.