Curing Partially in Swath and Finishing in Windrow Proved Best in Iowa Station Tests

By H. D. Hughes and E. R. Henson

This business of getting hay cut, cured and stored in the barn without losing the leaves and the green color—that's the problem which annually confronts some 200,000 Iowa farmers who have about 3 million acres of hay land from which they harvest around a 5-million ton crop.

It's a tough problem. To help us arrive at the most satisfactory method of making hay in Iowa, we seeded a field of alfalfa here at the Iowa Station back in 1926 for no other purpose than to study the methods of making hay.

In this search for the best method of making hay, we tried 13 different methods. With some of these methods in certain years, hay was cured and ready for the barn at the end of 17 curing-hours (“curing-hours” are those between 7 a.m. and 6 p.m.); other methods required 50 hours and with one method we tried it took 96 hours.

It was not because of the difference in maturity of the hay, the time of cutting or the weather, because it was hay of the same field, cut side by side at the same time for the different methods and with, of course, the same weather conditions. The loss in curing varied from as low as 1 percent to 13, 16 and 20 percent. And, of course, the part lost was leaves—the best part of the hay. The method of handling hay in the curing process does make a difference in the value of the hay that gets into the barn. And a difference in the cost of getting it there, too.

Swath-Windrow Best

It is almost self-evident that to cure hay quickest, it should be left in the swath. But hay produced in this way is of poor quality, both from the standpoint of color and loss from shattered leaves. In four series of comparisons we made on different dates, hay completely cured in the swath ranked lowest in color and also lost the most leaves, except when hay was tedded. Leaf-loss then was excessive.

Hay which was allowed to wilt thoroughly in the swath and was then placed in the windrow ranked almost at the top in color value and showed a relatively small loss of leaves.

Hay is usually considered safe to put in the barn when the moisture content is down to 30 percent. The moisture content of alfalfa when cut usually ranges from 70 to 75 percent. When the plants are well wilted and the moisture content is down to about 60 percent the hay is said to be one-fourth cured. This seems to be the stage of curing at which the crop can best be put in the windrow to complete the curing process.

But how is a farmer to know when his hay is one-fourth cured?
Hay containing not more than 30 percent moisture proved satisfactory for the barn. When moisture content was below 27 percent it retained its green color well.

Our answer to that is: Hay can be considered one-fourth cured when the plants are well or completely wilted, thoroughly limp or soft. The plants will be in this same condition at one-half cured, except that a few leaves will have begun to stiffen and harden.

Our tests showed that if the hay is not allowed to become more than one-half cured in the swath and is placed in the windrow before the leaves have become sufficiently dry to shatter, the quality will be almost as good as when put in the windrow sooner, and curing can be completed in 3 or 4 hours less time.

When the hay is allowed to become more than one-half cured in the swath before it is placed in the windrow, the loss of leaves is likely to be excessive and the color inferior. This combination means relatively low feeding value in comparison with that possible by the use of better methods.

Some good hay enthusiasts have advised windrowing hay immediately following cutting. In our tests, hay handled in this way required from 2 to 5 hours longer to cure than when allowed to partially cure in the swath and then windrowed. Contrary to expectation, the color value of the hay was not any better when windrowed as soon as cut than when partially cured in the swath. The loss of leaves was slightly less, but this is not a very important factor because the loss of leaves was very low when the hay was not allowed to become more than one-half cured while still in the swath.

We obtained the very best quality of hay from the standpoint of color and low leaf-loss when the hay was placed in medium-sized cocks, either immediately after cutting or when not more than one-fourth swath-cured. Few Iowa farmers are interested in curing hay in the cock because of the excessive amount of labor required and the length of time that the hay must remain in the field after cutting. Twenty-six curing-hours were required to complete the job when the hay was one-half swath-cured and then placed in medium-sized cocks; fifty-one when placed in small cocks immediately after cutting; and fifty-six when one-fourth cured then placed in medium cocks; and ninety-two hours when put in medium cocks immediately after cutting.

Turning Windrows

The effect of turning the windrow with the tail of the rake was determined in four series of experiments. Windrows were turned when the hay was one-fourth, one-half and three-fourths cured, respectively. In our experiments, turning the windrow was of no particular value in hastening the curing of the hay. Probably the only time when it is worth while to turn the windrow with the tail of Alfalfa can be baled directly from windrows if moisture content of the hay does not exceed 24 percent. Simple field tests may determine the safe moisture maximum.
A special field was seeded to alfalfa for the hay-making experiments. The hay used to compare different curing methods was all cut at the same time, with the weather conditions, maturity of the hay and all other conditions of the experiment exactly alike.

**Hay Tedder Out**

A few years ago hay tedders were used on a good many farms, but now they are seldom found. This is as it should be. Tedding did not materially speed up the rate of curing in our studies. We found that tedding the hay, at almost any stage in the curing process, materially increased the loss of leaves, and loss of leaves seriously decreases the feeding value of hay.

With a very heavy crop of grass, such as timothy or brome grass, it is possible that curing can be hastened by tedding and without any serious loss of leaves. But this does not seem to be true with such crops as alfalfa or clover.

**When to Cut**

Having observed that plants are partially wilted in the field in the afternoon, some folks have been certain that afternoon cutting is advisable because a part of the excess moisture has already been lost. We wanted to know how much less moisture there was in the afternoon, so we determined the moisture content of alfalfa in the field hourly from 8 a.m. to 8 p.m. on certain days in July and August. The maximum difference was found to be not more than 4 percent, and generally 2 to 2½ percent. Because plants may give up from 10 to 15 percent of moisture in a 6-hour period after cutting, it is evident that when weather conditions are favorable nothing is to be gained by postponing cutting until mid-afternoon. The hay will be ready for the barn in the shortest time if cut relatively early in the day.

The results obtained at the Iowa Station agree with those obtained by other workers—they show that the moisture of the stem is not lost through the leaves; the stem dries as quickly with the leaves severed as when they are left on the plant. It is well to shade the leaves as much as possible, as in the windrow, but this is not so that the leaves may continue to function. It is to prevent them from becoming so excessively dry that they will be lost through shattering.

**When to the Barn?**

The general rules observed by farmers when making hay have too wide a latitude to insure good quality. In one community the moisture content from samples taken from hay being put in the mow was found to vary from 17 percent to 42 percent. Hay that is allowed to remain in the field after it is fully cured soon loses quality. The sun bleaches the hay and may do serious damage to its vitamin content, and in legume hay there is a serious leaf-loss. The loss resulting from handling over-cured hay has been shown to amount to as much as 20 percent. The losses resulting from storing under-cured hay also are tremendous—losses in lower feeding value and lower market grade of heat-damaged hay, to say nothing of the possible loss of the barn and livestock as a result of spontaneous combustion.

During these studies hay was placed in the mow with as low as 20 percent and as high as 58 percent of moisture. Hay that is allowed to remain in the field after it is fully cured soon loses quality. The sun bleaches the hay and may do serious damage to its vitamin content, and in legume hay there is a serious leaf-loss. The loss resulting from handling over-cured hay has been shown to amount to as much as 20 percent. The losses resulting from storing under-cured hay also are tremendous—losses in lower feeding value and lower market grade of heat-damaged hay, to say nothing of the possible loss of the barn and livestock as a result of spontaneous combustion.

The method in use by many farmers for years of deciding whether hay is dry enough for the barn, we found, works. This method consists of twisting a small handful of representative stems with the two hands until the stems twist in two and noting whether any moisture is brought to the barn. This method is best practiced by those who have hay in the mow. The method is described in the following paragraphs.

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