HAY CRUSHING
For Faster Field Curing

By J. H. RAMSER and R. W. KLEIS

Circular 693

UNIVERSITY OF ILLINOIS COLLEGE OF AGRICULTURE
EXTENSION SERVICE IN AGRICULTURE AND HOME ECONOMICS
CRUSHING HAY IS AN EFFECTIVE WAY to get faster field curing and so avoid some of the weather hazards that reduce the quality of a crop or even completely ruin it. This circular describes the hay crusher, a relatively new machine, and reports on tests showing how it can be used and what benefits can be expected.

What the crusher does

The crusher cracks the stems lengthwise and reduces them to the equivalent of several smaller ones (Fig. 1). The crushing also opens up the moist inner parts of the stems to bring them into more direct contact with the air. As a result, the stems dry rapidly and at almost the same rate as the leaves.

When hay is crushed, large stems are broken apart so that each is like a bunch of several small stems. (Fig. 1)

1 J. H. RAMSER, Associate in Agricultural Engineering; and R. W. KLEIS, Instructor in Agricultural Engineering. Some of the information on quality of hay is based on work done by K. A. Kendall of the Department of Dairy Science.
How the crusher operates

The crusher consists of a pair of steel rollers, held together by adjustable springs. A pick-up unit lifts the swath and feeds it through the rolls. After being crushed, the hay is dropped back onto the stubble, still in the swath.

Most crushers follow directly behind the tractor and crush the swath which was mowed the previous round (Fig. 2); an extra round is then needed to crush the last swath in the field. With this arrangement, you have less side-draft than with the earlier machines, which were offset and crushed directly behind the cutter bar. Also you do not have to drive on the hay after it is crushed.

Three choices of equipment

You can buy a mower-crusher combination unit. This gives you a complete outfit, consisting of a standard mower — usually a 7-foot cut — with a crusher unit designed around the same power-transmission system.

The most common type of crusher mows a new swath while the previous swath is being crushed. (Fig. 2)
You can use the mower you have for cutting and buy a separate crusher. This calls for the lowest investment in new equipment, but means that mowing and crushing have to be done as separate operations (Fig. 3). Although twice over the field costs more in time and money, it may be worth it if you already have a good mower and a relatively small acreage of hay. Another advantage of this method is that you can use a smaller tractor.

You can find out whether a separate crusher can be connected to your mower. Your dealer will know if your mower is made so this can be done. At present only one manufacturer makes this type of crusher and it will fit only one particular make of mower.
Cost considerations

Prices differ somewhat from place to place and with various types and models. The three choices of equipment mentioned above differ considerably in cost. The difference in cost between a separate crusher and a mower-crusher combination of the same make is approximately the cost of the mower.

You may find that you have a large enough acreage of hay to justify the purchase of a crusher to put up better hay and avoid damage or complete loss due to bad weather. Saving 20 or 25 acres of hay that would otherwise be ruined will pay back much of the cost of a crusher unit.

If you do not grow enough hay yourself to pay to have a crusher, you might consider the possibility of owning one jointly with one or two neighbors or supporting a custom crusher in your community.

Power needed to operate a crusher

Both the mower and the crusher are operated from the tractor power take-off. A two-plow tractor provides enough power under nearly all operating conditions. In extremely hilly or soft fields, a three-plow tractor may occasionally be required.

Two main adjustments

Adjust the pick-up mechanism so that it picks up the swath cleanly and without gathering trash out of the stubble. The fingers should, of course, clear the ground during normal operation.

Adjust the roller pressure according to the kind of hay, the stage of development, and the yield. Tighten the springs enough to crush the stems but not enough to squeeze out the plant juices. The juice contains feed value which is lost if it does not dry in the hay.

Some results of research on crushing

Research work done at various times since 1932 by the Illinois Agricultural Experiment Station has brought out several points about crushing.
Crushed hay dries in one-third to two-thirds the time required for uncrushed hay. Crushing reduces the drying time by about half for alfalfa (Figs. 4 and 5) and clover. Coarse-stemmed soybean hay when crushed dries in about a third the normal time. Typical results of drying tests were:

<table>
<thead>
<tr>
<th></th>
<th>Hours of drying time</th>
<th>Percent decrease in drying time due to crushing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Crushed</td>
<td>Uncrushed</td>
</tr>
<tr>
<td>Alfalfa, first cutting</td>
<td>25.3</td>
<td>52.3</td>
</tr>
<tr>
<td>Alfalfa, second cutting</td>
<td>23.6</td>
<td>45.3</td>
</tr>
<tr>
<td>Red clover</td>
<td>23.3</td>
<td>45.3</td>
</tr>
<tr>
<td>Soybean hay</td>
<td>49.9</td>
<td>127.0</td>
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Crushing has no effect on the loss of nutrients in storage. Although there is considerable loss of carotene during the storage period, tests indicate there is no difference in this loss between crushed and uncrushed hay.

The various crushing machines now available differ little in construction, operation, and effectiveness.
Values you can expect from crushing

Reducing the time the hay has to be left in the field to cure is the key to the benefits obtained by crushing.

Cuts weather damage. Reducing the field curing time by half will more than double your chance of getting the hay put up without damage.

Saves more hay. By preventing the loss of leaves and small stems which results from extra drying and handling after rains, you may save as much as 10 percent more hay.

In this test also, the crushed alfalfa dried about twice as fast as the uncrushed. (Fig. 5)

Conserves feeding value. More carotene is saved by the relatively short exposure to sun and rain. Rapid curing means that you also save the protein that would otherwise be lost in shattered leaves. Color is also better.

Shortens the haying season. Faster curing means that men and equipment are not tied up so long in haying operations. Still more time and work are saved if you can avoid having to turn windrows to get them dried out.
Improves palatability. Crushing reduces the stems, especially the coarser ones, so that they are less harsh and brittle. This, together with the probable saving of leaves, makes the hay more palatable.

Faster drying after rain or dew. Crushing puts the hay in better condition for rapid drying. After getting wet, it will still dry more quickly than uncrushed hay.

**May be a part of any method of hay making**

Crushing is merely another operation in hay making, with the single purpose of speeding up field curing. After the hay is cured, it can be stored as long hay, baled in the field, or chopped with a field harvester, as you wish. The crusher can also be used in connection with a mow finisher to further shorten the field-curing time.