USE OF A FIELD CHOPPER FOR HARVESTING FORAGE PLOTS

ROTARY field choppers have recently come into popular use for harvesting forage crops. With small adaptations some of them can be used for harvesting forage plots. At the Western Washington Experiment Station a John Deere No. 10 was used successfully during the 1957 season to harvest both pasture and hay plots. The following adaptations were made:

1. The width of cut was reduced from 60 inches to 45 inches by removing 4 knives from each end of the rotor.
2. A 2-inch metal block was placed between the hydraulic cylinder and the frame to lower the minimum height of cut to 2 inches.
3. A sheet metal funnel was made to catch the chopped forage as it was blown from the spout.
4. A basket of 1/4-inch mesh screen was suspended from the end of the spout to hold the forage. To facilitate weighing, the basket was suspended from a dial scale and the bottom was hinged for dumping. These adaptations are shown in figure 1.

An alternate method of catching and weighing the forage was used at the Southwestern Washington Experiment Station. Forage was blown into large burlap bags hooked to the end of the funnel. These were carried off the plots for weighing and dumping.

A 2-plow tractor provided adequate power when the plot length was no greater than 18 feet. With longer plots, loss of momentum might occur in heavy forage. It was essential that the tractor be equipped with a continuously rotating power take-off since the chopper must be operating at full speed before it entered a plot and must continue to operate for a few seconds after leaving a plot in order to empty the machine.

Plot size used at this station is commonly 6 by 23 feet. A tractor with front and rear wheels adjustable to 6 feet was used so that the plots could be straddled. The chopper trailed to the right of the tractor with its right wheel on the border of the next plot. The left wheel ran in the row of plots cut previously. In this way no forage was trampled before cutting.

A test was made to compare the speed of this machine with a conventional method. The method consisted of cutting with a Gravely sickle bar mower, raking and hauling to a trailer. The entire area of the test. A uniform area of red clover was marked off in 24 columns 6 by 84 feet wide between the ends of plots were moved in 4 plots 21 feet long standing for harvesting. The plots were paired and individual columns randomly assigned to be harvested by the chopper or by the conventional method.

Three men harvested 48 plots by the conventional method in 90 minutes. The same 3 men then harvested using the chopper, in 45 minutes. Both operations included cutting, weighing and removing a moisture sample from each plot. No comparison was made of cleanness by the two methods, but by blowing the forage from the chopper can greatly expedite this operation.

Analyses of variance were made of the percentage dry matter and dry weight data for both harvesting methods. The results are shown in Table 1. Analyses of variance were made of the percentage dry matter and dry weight data for both harvesting methods. The results are shown in Table 1. In the conventional method, the chopper yields were about 40% higher on the basis of pounds per 53.33 square feet.

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On examining the data according to direction, it was observed that the conventional yield was 20% higher when cutting against the prevailing west wind. The dry weight of the westbound plots had a higher coefficient of variation either the 24 eastbound plots or the whole cutting in one direction would have provided a better estimate of the actual yield, but the sampling precision would not have been improved. Such a procedure would have increased the man-hours required in harvesting by about one-third. The chopper dry weight coefficients of variability were identical for both travel.

The percentage dry matter was practically the same for both harvesting methods with a slightly lower coefficient of variability for the chopper. Since the chopper collected a larger and more heterogeneous mass of forage it might not have a higher coefficient of variation as compared to the samples taken from the chopper collector.

Table 1.—Comparison of chopper and conventional methods for green weight, percentage dry matter and dry weight determinations.

<table>
<thead>
<tr>
<th>Method</th>
<th>Green Weight</th>
<th>Percentage Dry Matter</th>
<th>Dry Weight</th>
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<tbody>
<tr>
<td>Chopper</td>
<td>28.5 lbs.</td>
<td>33.5%</td>
<td>9.52 lbs.</td>
</tr>
<tr>
<td>Conventional</td>
<td>20.4 lbs.</td>
<td>33.6%</td>
<td>7.0 lbs.</td>
</tr>
</tbody>
</table>

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