Table 1. Average time per plot to obtain an herbage sample and average herbage yields per acre obtained with a rotary lawn mower and a sickle-bar mower on two stands of crested wheatgrass near Fort Collins, Colorado.

<table>
<thead>
<tr>
<th>Area (old stand):</th>
<th>Average time per plot (seconds)</th>
<th>Average herbage yield (pounds per acre green weight)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rotary mower</td>
<td>Sickle-bar mower</td>
</tr>
<tr>
<td>Man A</td>
<td>30</td>
<td>64</td>
</tr>
<tr>
<td>Man B</td>
<td>30</td>
<td>60</td>
</tr>
<tr>
<td>Average</td>
<td>30</td>
<td>62</td>
</tr>
<tr>
<td>Area 2 (young stand):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Man A</td>
<td>31</td>
<td>83</td>
</tr>
<tr>
<td>Man B</td>
<td>30</td>
<td>80</td>
</tr>
<tr>
<td>Average</td>
<td>30</td>
<td>81</td>
</tr>
</tbody>
</table>

Herbage was raked and placed in a large cloth sack for weighing. All weighing was done with a hand-held milk scale. The time for sampling each plot from the time the mower entered the plot until the herbage sample was placed on the scales was recorded. The plots were mowed to a 1½-inch stubble, the shortest stubble obtainable with the sickle-bar mower. (It is possible to cut to a lower height with the rotary mower.)

With the rotary mower, each plot was sampled in less than half the time required with the sickle-bar mower (Table 1). The saving in time with the rotary resulted from not having to rake the herbage and put it into a sack before weighing.

The average herbage yield obtained by the two mowers differed little (Table 1). However, more green leaves were left uncut and more mowed green leaves were left on the ground when the sickle-bar mower was used. The close agreement between the two mowers in average yield appeared to result from raking dry stems from the ground when the sickle-bar mower was used; these dry stems made up for the green leaves left on the plot. This dry material in the sample would upset any chemical analyses. The rotary mower showed little tendency to pick up dry stems lying on the ground. Yields and times varied less when the rotary mower was used. There was a much greater variation between men for average herbage yields with the sickle-bar mower than with the rotary.

Some difficulties were experienced with the rotary mower. When the ground was dry and loose, considerable dust was discharged. Some of this dust was collected in the grass catcher with the herbage and could influence chemical analyses. The cutting rotor is equipped with 2 vanes to increase suction. These were removed to reduce the amount of dust picked up, but the problem was not entirely eliminated. When used without the grass catcher in place, the mower would sometimes discharge debris and small stones back past the operator at a considerable velocity. The mower can be converted in a few minutes to side discharge to avoid this hazard by use of the metal baffle plate furnished. The rotary mower chops the herbage into such small pieces that separation by species would be impossible.

In spite of the above-mentioned disadvantages of this rotary mower, it does appear to have a great deal of promise for sampling range vegetation and warrants more extensive field testing at other locations.

LITERATURE CITED


ADDITIONAL MODIFICATIONS OF THE POINT FRAME

JUSTIN G. SMITH

Range Conservationist, Intermountain Forest and Range Experiment Station, Forest Service, U. S. Department of Agriculture, Ogden, Utah.

Heady and Rader (1958) presented some modifications of the point frame that they found particularly suitable for the short, thick cover of the California annual type. This note describes further modifications that we believe improve the apparatus for use under the conditions encountered in southern Idaho.

The frame shown in Figure 1 is made of extruded aluminum angle 1x1x½-inch. A piece 83 inches long will provide the U-frame and crosspiece. The third leg, which is hinged at the top with a 2x⅞-inch T-hinge, is 18 inches long excluding the attached point and is made of 1x 5/16-inch aluminum bar stock. The three points, fastened to the ends of the legs, are cut from 1x⅞-inch spring steel and are hardened to minimize blunting.

The over-all height of the frame is 21 inches, width 22 inches, and the crosspiece is positioned 11½ inches from the tips of the points on the legs. The crosspiece is cut out at each end so that the outside face (back side in photo) is flush with the
FIGURE 1. The point frame with hinged third leg and clock-spring brake assembly.

outside face of the U-frame; it is also bent down about 1 inch on each end to provide firm contact with the legs of the U-frame. All joints except those showing bolts are welded.

The brake assembly, which provides sufficient tension on the pins to keep them from falling through, is made of %x0.032-inch clock spring. Each piece is heated, bent to shape on a form, and fastened to the crosspiece with a brass lo-gauge roundhead machine screw and nut. Tension on the pins can be adjusted by bending the brakes in or out with a pair of pliers. Spare brakes are carried in the field and are easily installed, but replacement should seldom be necessary.

The pins are %x0.5-inch bronze welding rods sharpened to a needle point with a long bevel and are spaced 2 inches apart in the frame as shown. We prefer welding rods because they are cheap and do not rust except on the tips where the surface is removed in sharpening.

The hinged leg permits quick and easy adjustment to any desired angle and is slightly longer than the other two rigid legs so that the frame can be used in a vertical position. If a constant angle is required, the hinged leg can be fastened to the crosspiece with a small chain of the proper length. On an uneven ground surface three legs provide more stability than four.

The frame with pins weighs approximately 4% pounds. As Heady and Rader (1958) suggest, the aluminum should be painted to prevent sun glare and rubbing-off of the metal during handling.

LITERATURE CITED


LIMESTONE PELLETING OF SUBTERRANEAN CLOVER TESTED ON ACID SOILS

WILLIAM A. WILLIAMS AND BURGESS L. KAY

Associate Professor of Agronomy and Assistant Specialist in Agronomy, University of California, Davis, California

Subterranean clover (trifolium subterraneum) is a valuable reseeding annual legume for improving California rangeland (Williams et al., 1957). Initial attempts at establishing this legume are sometimes unsuccessful, and inoculation difficulties have been pointed to as an important cause of stand failure (Williams et al., 1954). Research workers in Australia recently reported that pelleting seed with limestone in the proportion of 2:1 favors nodulation of subterranean clover and barrel medic (Medicago tribuloides) on acid soils (Loneragan et al., 1955; and Cass Smith and Goss, 1958). To determine whether limestone pelleting might solve California range legume inoculation problems, field experiments were established in the autumn of 1957 on four soil series that are representative of important range areas. The soils were on the acid side, with pH ranging from 4.6 to 6.0 in glass electrode determinations on saturated pastes (Table 1).

Mt. Barker subterranean clover seed, both limestone pelleted (calcium carbonate) and unpelleted, was obtained from commercial sources in Australia. These were compared with unpelleted seed planted in a band of agricultural limestone applied at the rate of 200 pounds per acre. Inoculation treatments consisted of a commercial culture for subterranean and crimson clovers and of soil from a thriving stand of subterranean clover. The inoculation treatments were applied in a factorial design, with the above treatments, plus controls, in four randomized blocks at each site. The same commercial inoculum was used in all of the experiments, but a different source of soil inoculum was used for each experiment. The commercial inoculum was applied to the seed in a slurry at approximately the recommended rate, and the soil inoculum was applied at the rate of 100 g. per 10-foot row, which constituted a plot. One hundred seeds were planted in each row. Seeds were planted ½-inch deep over a band of single superphosphate 1½-inches deep, applied to all plots at a rate of 400 pounds per acre. Rows were spaced 5 feet apart. Antiseptic precautions were taken during planting to make certain there was no contamination between the inoculation treatments. The seed showed an average germination rate of 88.50 per cent in the