A review was made of literature on the several methods for determining differences in lodging resistance of small grains. For a certain experiment with wheat, the most promising mechanical method appeared to be that reported by Clarke and Wilson. Results of measurements with this and similar machines to test culm breakage reported in the review have not always been significantly correlated with natural lodging of small grains.

The machine shown in figure 1 is similar in design to that described by Clarke and Wilson except that the force is applied at a constant velocity with an electric motor instead of being hand operated. This machine can be used in the field or laboratory, because it receives electric power from a 12-volt car battery. The second internode above the crown of a wheat culm, with the leaf sheath removed, is placed between 2 fulcrums 3 inches apart. As the panel with the fulcums is raised with power supplied by the reversible motor, the force is applied to the hook attached to the flexible chain. A reading is taken on the pendulum scale in grams when the culm breaks. A gearbox and pulley arrangement moves the sliding panel at a constant speed of 0.6 cm. per second. Ball bearings are used in the hub of the pendulum arm.

The effects of plant populations and nitrogen fertilizer rates on 3 varieties of spring wheat were studied in a 216-plot experiment in 1958. Data were obtained on the natural lodging, and the lodging potential with the machine. The correlation between the mechanical culm breakage of fresh plant material at the time when the wheat headed and the natural lodging was significant at the 1% level \( (r = -0.449, 214 \text{ d.f.}) \). The measurements were repeated on the same number \( (10) \) of individual dry

natural lodging in this experiment \( (C.V. = 0.6539, 214 \text{ d.f.}) \) being significant at the 1% level. The measurements \( (r = -0.449, 214 \text{ d.f.}) \) have not always been significantly correlated with natural lodging of small grains.

Figure 1—A mechanical device for measuring the breaking strength of culms of small grains.

A study was made in 1959 on the mechanical lodging and lodging of wheat, with rill spacing, right angles and parallel to the rills, and plant population as variables. The mechanical culm breakage and natural lodging were again correlated at the 1% level \( (r = -0.213, 158 \text{ d.f.}) \) with the lower coefficient of variability for the former. Because of severe natural lodging, data on mechanical culm breakage taken after harvest of the 1959 season be used, owing to broken and distorted culms.

**EFFECT OF CHEMICAL FALLOW AND MOISTURE STORAGE**

In a recent article the authors suggested that proper weed control can be obtained by the use of chemicals, moisture storage during the fallow period is similar to what can be expected with stubble mulch. To substantiate this contention, additional results of a chemical fallow and moisture storage was conducted at the Southwestern Great Plains Field Station, Pullman, Washington.

Total moisture changes in Pullman silt loam during the fallow period from July 22, 1958, to April 22, 1958, were evaluated to a depth of 4 feet with chemical fallow and moisture storage was conducted at the Southwestern Great Plains Field Station, Pullman, Washington.

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