THE USE OF CROP RESIDUES FOR SOIL AND MOISTURE CONSERVATION

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METHODS of crop production in the Great Plains have been greatly improved during the last 40 years. There remains, however, much to be done from the standpoint of reducing the number of crop failures. The hazards encountered in Great Plains agriculture are due not so much to the fact that the total rainfall is low as to its uneven seasonal distribution, high summer temperatures, and frequent extended periods of drought. The fact that most of the precipitation comes during the warm season makes it difficult to get deep penetration of water into the soil because of excessive evaporation losses. The total loss of water by evaporation in the Great Plains may equal or exceed the amount used by the crop and may be two to four times as much as the water lost by runoff.

Any method for increasing the efficiency of Great Plains rainfall should include the possibilities for improving moisture conditions by reducing the rate and amount of evaporation of water from the soil surface. Although the losses due to runoff may be the more easily controlled, if some practical method could be devised that would reduce simultaneously the moisture losses from runoff and from evaporation, it would be a definite step toward maximum efficiency of rainfall utilization.

In the experiments herein reported an attempt is being made to utilize crop residues directly to increase the efficiency of rainfall for plant production in regions of low precipitation. Under the present system of harvesting most of the small grain and some sorghums with combines, much more crop residue than formerly is left on the land. Furthermore, these residues are spread quite evenly over the surface of the fields. It has long been known that debris of any sort on top of the ground will increase the intake of water and also reduce evaporation. Recent results obtained by Duley and Kelly (2) through the artificial application of water have shown that the stubble and straw residue left by the combine is very effective in increasing the amount of infiltration that takes place during rains. Compared with cultivated bare soil, even a light covering of crop residue will greatly increase the amount of water entering the soil and will also reduce the evaporation loss of soil moisture. Erosion by either wind or water may be reduced to a minimum or practically eliminated where there is an appreciable amount of crop residue on top of the soil.

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3Figures in parenthesis refer to "Literature Cited", p. 709.