Erosion and Production Under Missouri Grazing Systems
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The study of pasture systems has been an integral part of investigations underway at the Missouri Soil Conservation Experiment Farm, McCredie, Mo. The soil is Putnam silt loam and is representative of approximately 10 million acres of midwestern claypan soils, half of which lie in Missouri. These soils tend to be excessively wet in the spring and droughty in the summer. In the past, large acreages of corn, soybeans, and small grain have been planted without regard to the land slope. This intensive cropping on a soil of moderate to low fertility with little attention paid to conservation measures has had serious erosional effects. Declining soil fertility, climatic hazards involved in grain production, and accompanying low yields have prompted development of a pasture type of agriculture for this soil area by the Missouri Agricultural Experiment Station.

The Experiment

Seven years of study were completed on five pastures in 1946. Three bluegrass pastures had been under production measurement for four years and under water loss measurement for two years at the end of 1946. For comparative purposes, five grain systems have been included in various sections of the paper. Measurements began on the small grain and lespedeza systems in 1940 and on the remaining grain rotations in 1941. In every case each crop of the rotation was represented on a plot each year. Measurements were made from triplicate plots in the case of the small grain-lespedeza systems not pastured. Water loss measurements on the three bluegrass pastures were made with type H rate-measuring flumes from the entire 2-acre area of the pasture. Soil and water loss measurements on the remaining pastures were made from triplicate plots located within the 2-acre pasture, the same size and on the same degree of slope as those used in the grain systems. The latter plots were within steel plot divides 90 feet long and 10 1/2 feet wide, on a 3% slope. Three and one-half foot borders on both sides of each plot were farmed the same as the plot itself. Farming operations were up-and-down slope. Measurements of runoff and soil loss were made in the manner previously described (4). Table 1 gives the cropping systems and soil treatments of the eight pastures and five nonpasture rotations which will be discussed.

Results

Soil and Water Losses

Results of these studies point conclusively to the fact that good pastures are a powerful means of controlling erosion. Soil and water loss data are summarized for the 7 years in Table 2. The data tabulated for the bluegrass pastures are not comparable with those from the other areas because runoff is collected from a slope length of approximately 450 feet. From all appearances some sub-surface flow comes to the surface on the lower end of these areas and passes through the measuring flumes. This is not the case on the other plots which are only 90 feet long.

Timothy with lespedeza as well as the same crops supplemented by sweetclover have averaged less than 1/2 ton of soil loss per acre per year. The latter combination has given somewhat better control from a water loss standpoint. It has on the average retained 2 inches more water per year than the plot where...