RESPONSE OF WHEAT VARIETIES TO APPLICATIONS OF SUPERPHOSPHATE FERTILIZER

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WINTER wheat when grown on upland soil in the eastern one-fourth of Kansas usually has responded favorably to applications of phosphate fertilizer (6, 7). As information was desired on the reactions that different varieties of wheat might show, an experiment was outlined to obtain it. The present paper is a report on the results obtained over a period of 8 years, 1931 to 1938, at Manhattan, Kans., on Geary silt loam soil.

REVIEW OF LITERATURE

Several experiments testing the differential effect of fertilizers on small grain varieties have been reported upon from other states. Lamb and Salter (4) found with 17 varieties of oats grown on four fertility levels over a 4-year period at the Ohio Agricultural Experiment Station that the variety-level interaction of oats probably was not significant. The same authors (3) found a significant variety-level interaction in a study of 11 wheat varieties grown at four fertility levels for five seasons and concluded that wheat varieties respond differently to a series of fertility levels.

Lamb and Bayfield (2) tested 10 varieties of wheat grown at 15 locations of Ohio during four seasons. In yield of grain, weight per bushel, protein content of the grain, and wheat ash, nonsignificant variety-location interactions were obtained. The locations represented widely different soil types.

Worzella (8) tested five varieties of wheat on three levels of soil fertility on each of three soil types in Indiana during a 5-year period. He concluded that, "while the variety × fertility level interactions for grain yield are significant, the interactions are not great enough to change yield ranks".

MATERIALS AND METHODS

Three varieties of winter wheat, Turkey, Tenmarq, and Quivira, representing late, medium, and early maturity, respectively, were grown in each of the years 1931 to 1938, inclusive. An early, unnamed hybrid selection from the cross Kanred X Hard Federation (C.I. 10092) was included during the years 1936 to 1938, inclusive.

Each variety was grown in 12 plots each year. Six of the plots were treated with 16% superphosphate fertilizer at the rate of 200 pounds per acre applied in the row with the seed, while the other six plots were untreated. While the actual arrangement of plots varied slightly from year to year, analysis was possible on the basis of six blocks in which a block contained each variety in treated and untreated plots. Briefly then, the experiment consisted of three or four varieties grown in six replications with two treatments in each of eight years.

The plots were grown on different blocks of land each year on soil now classified as Geary silt loam. This soil, as described by Metzger (5), is a moderately leached soil developed under a grass cover, with dark to very dark brown, loose,