THE RELATIONS TO YIELD OF CERTAIN PLANT CHARACTERS OF WINTER WHEAT AS INFLUENCED BY DIFFERENT TILLAGE AND SEQUENCE TREATMENTS

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MANY years of experimental work in the Great Plains have demonstrated that tillage treatments and crop sequences materially affect yields of winter wheat, but the manner in which these yield differences are related to the development of the wheat plant has received very little attention. The study reported herein was made to obtain information as to these relations. Yield records in the crop rotation and tillage experiments at Woodward, Okla., had shown that differences in winter wheat yields could be expected from given differences in cultural treatment and crop sequence.

It was definitely known, for example, that on continuously cropped wheat land, average yields were higher where cultivation for the succeeding crop was started shortly after harvest than where it was delayed until fall; that average yields were higher on corn ground and cowpea ground than on milo or kafir ground; and that average yields on fallowed land were higher than on land where a crop had been grown. Differences in the quantity of water available for the crop under the different treatments were known to be sufficient to account for most of these differences in yield; but how the plant populations or the individual plants were affected was not known.

The purpose of the experiment described here was to obtain information on this point. A study of sampling methods and of forecasting yields was not in mind when these investigations were undertaken, although some of the results appear to have an incidental relation thereto.

MATERIALS AND METHODS

The studies reported herein were made at the Southern Great Plains Field Station, Woodward, Okla., from 1929 to 1934. The plots on which the observations were made are 1/10 acre in size and are located in a field used for the study of the effect of rotation and tillage methods on crop yields. The plots where wheat was grown continuously by different tillage methods were the same from year to year. The results from each row crop or fallow rotation are from two plots on which wheat is grown in alternate years. Turkey winter wheat was planted in late September or early October in all years, the seeding for all plots being on about the same date and at the same rate. The same drill, also, was used on all plots except those where wheat followed sorghums. In some years when wheat was seeded before the sorghums were harvested, seeding was done with a disk drill narrow enough to pass between the sorghum rows. No winterkilling, stem rust, or other unusual disease or weather losses occurred during the period of study.

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