PREDICTING YIELDS OF SPRING WHEAT IN
THE GREAT PLAINS

(Abstract)

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This paper presents a method of predicting spring wheat yields at the time of seeding or shortly thereafter. The quantity of available moisture in the soil at that time, and the average rainfall from seeding to harvest time, constitute the bases upon which the predictions rest.

Investigations previously reported in United States Department of Agriculture Bulletin No. 1004 show that the quantity of water used by the wheat crop is of preponderant influence in determining the yield. The yield, however, is not directly proportional to the quantity of water used. A certain quantity of water is required before a yield of grain is produced. After the initial requirement has been met each additional unit of water results in a unit increase of yield.

Both the initial requirement and the quantity of water necessary for each additional bushel of yield vary with the climate and are higher as one goes toward the south in the Great Plains, except as the distance south is modified by altitude.

The initial requirement and the quantity of water necessary to each additional bushel of yield are expressed by formulae obtained by means of the linear regression equation. At the Bellefourche (South Dakota) station, the formula is \( M = 5.69 + 0.34e \). This means that 5.69 inches of water are used before a yield of grain is secured, and that each additional 0.34 of an inch of water produces a bushel of wheat to the acre. Yields computed from the water used agree closely with those determined by threshing.

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