THE EFFECTS OF VARIATIONS IN THE YIELDS OF BARLEY UPON THE AMOUNT AND DISTRIBUTION OF THE RESIDUAL SOIL MOISTURE

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The residual moisture in the soil, its amount, availability, and vertical distribution at the cessation of the growth of one crop determines in no small degree, especially under conditions of deficient water supply, the moisture available to grow the succeeding crop. Because of the greater amount of transpiration from the greater leaf area, other conditions being the same, a larger crop would use more water than a smaller one from the same sized area. In consequence, the residual moisture under the larger crop would be expected to be less than under the smaller one.

In connection with some other studies to be reported elsewhere, experimental plats with approximately equal initial moisture contents were planted to barley following milo. The subsequent treatments given resulted in marked differences in yield at maturity. Increases in yield were induced by the application of nitrate of soda, while decreases were brought about by the application of varying amounts of sucrose. These plats gave an unusually wide variation in production, the weight of total crop of the highest being slightly more than nine times that of the lowest. An excellent opportunity was thus afforded to study the effect of variations in yield upon the amount and especially the vertical distribution of the residual soil moisture.

CULTURE OF THE CROP

Relatively large plats of soil in 1934 were devoted to variety, spacing, and irrigation trials with grain sorghums. After harvest, the whole series of plats was pre-irrigated to make up for the use of water by the Dwarf Yellow (D) milo and Double Dwarf (D.D.) milo crops, particularly in anticipation of a predicted dry year which, however, turned out to be one of slightly more than normal rainfall. Atlas barley was drilled across the former treatments, late in February, with a 6-foot horse-drawn drill, alternate drill holes being plugged to give rows 1 foot apart. As soon as the rows were easily distinguishable by the growth of the young plants, small replicated plats each 6 feet by 18 feet (each plat representing a longitudinal section of the complete 6-foot drill width) were laid out, and on March 22, 1935, sucrose dissolved in water was applied with a sprinkling can to the appropriate plats. Because of rain, the application of the nitrate (likewise dissolved in water and put on with a sprinkling can) was delayed until March 26. At maturity the four center rows of the plat were harvested separately, allowed to dry, weighed for the total crop, threshed, and the grain weighed for the grain yields. The crop yields were computed on an acre basis from the weight of these four rows.

1Contribution from the Division of Agronomy, University of California, Davis, Calif. Laboratory facilities for much of this study were kindly furnished by the Division of Irrigation Investigations and Practice. Received for publication November 2, 1936.

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3Reference by number is to "Literature Cited", p. 152.