

Some Factors Affecting Growth and Fruiting of COTTON In Southern Arizona

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Cotton growers in southwestern Arizona have experienced considerable difficulty with rank cotton. In the Wellton-Mohawk District, they reported that tall cotton, in some cases 7 to 9 feet high, lodged and was difficult to pick. Also, yields were considered below normal.

Field Survey Made

University and U.S.D.A. scientists made surveys, obtaining detailed information and soil samples from 18 widely distributed fields. Cultural treatment data from growers and field data were obtained from 10 sites each for short, medium, and tall cotton plants within each field. These were:

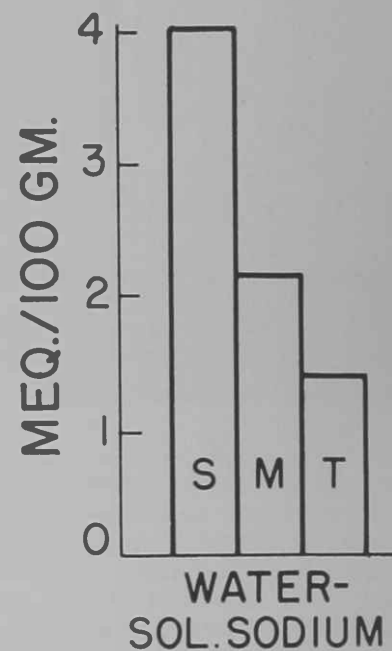
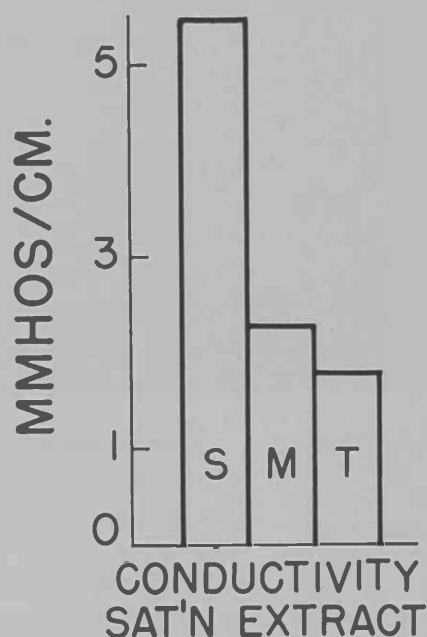
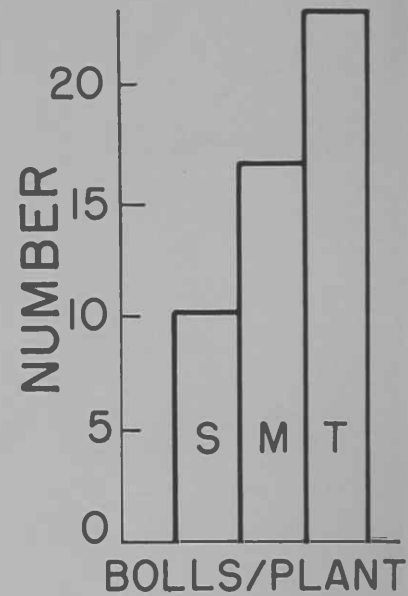
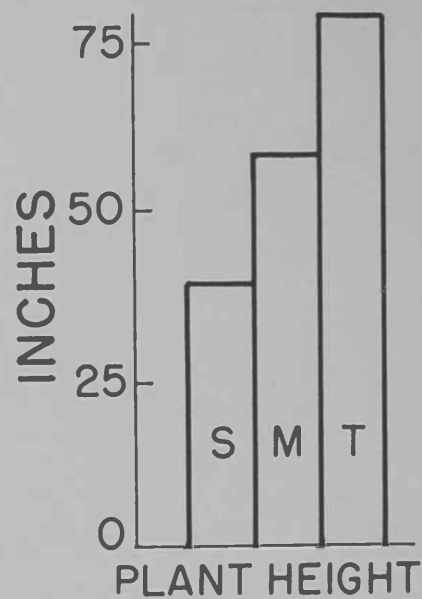
1. Location of short, medium, and tall plants to determine if position in the irrigation run was important.
2. Individual heights of the 10 cotton plants in each category.
3. Number of bolls per plant. Since much of the cotton had been harvested, any estimate of yield could be made only by counting empty burrs.
4. Position of boll-set on the stalk — bottom, middle, top, or general.
5. Soil samples were obtained to a depth of 12 inches, 4 to 8 inches from each selected plant. All 10 samples within a given field were composited for each plant height.
6. Six soil profiles in each field were sampled to 36 inches for observational purposes.

Ten separate chemical determinations were made on each of the 54 soil samples, plus mechanical analyses (sand, silt, and clay) on representative samples.

Note Significant Correlations

Data in the bar graphs are averages for the 18 cotton fields. Values varied somewhat among different soils, but trends were consistent. Bolls per plant were related to plant height, with the greater number on taller plants. Cattle had grazed one field, making a reliable boll estimate difficult. In two or three others some early bolls had been snapped. For all fields, however, a strong correlation existed between plant height and boll number. Immature or abnormally small bolls were not counted. Actual cotton yields are unknown since there may have been some difference in boll size between short, medium, and tall cotton. Boll position for all heights was comparable in a given field. Plant height was not related to location in the irrigation run.

The bar graphs indicate that large amounts of salt or water-soluble sodium are associated with shorter cotton and fewer bolls. It is believed that salt and/or sodium were the factors which limited plant growth and number of bolls.



COMPARISONS of plant height, conductivity, bolls per plant and presence of water-soluble sodium. The key letters S-M-T mean, of course, of short, medium and tall cotton plants, respectively.

Results Are Variable

Results are too variable to tell if percent sodium saturation, exchangeable sodium, or water-soluble potassium influenced cotton growth or yield. It does appear that exchangeable potassium, percent potassium saturation, pH of soil paste, pH of a 1:5 soil:water suspension, and base-exchange capacity did not affect plant height or bolls per plant. In soils selected for mechanical analyses no consistent trends could be correlated with plant growth.

A chemical survey of a soil from one field of tall cotton in question detected an over-supply of nitrate nitrogen. A discussion of irrigation practices with growers points to the probable contribution of excess nitrogen and water in excessively tall cotton. Too much nitrogen encourages plant growth, whereas heavy irrigation removes salt and water-soluble sodium. Additional research in irrigation and fertilization, and their influence on cotton physiology should lead to a better understanding of how to obtain the desired control of plant height and fruiting.

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