COMPOSITION OF BARK AND INNER PART OF ROOTS OF THE COTTON PLANT

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THE Division of Soil Fertility Investigations, Bureau of Plant Industry, has studied for a number of years the relation of crop residues, tillage, and crop management to production of cotton under root-rot conditions in the Blackland prairie section of Texas. Correlated laboratory studies have been made of the composition of the cotton plant as influenced by the stage of development and by fertilizer treatment.

Root-rot of cotton is caused by a root-infecting fungus, *Phytophthora omnivorum* (Shear) Duggar. Evidence of chemical action, by secretions of the fungus, as a factor of entry into the host plant centers attention on the composition of the root tissue which would serve as the nutrient medium for the growth of the fungus. In previous publications (2, 3), results were presented showing the changes in concentration of certain electrodialyzable and carbohydrate fractions of the roots and tops of the cotton plant at successive stages of growth. The results demonstrated, among other facts, that the nitrogenous fractions of the plant reflected soil conditions, fertilizer treatments, and seasonal variations better than the total nitrogen. The carbohydrates of the cotton plant were also influenced by soil fertilization, but the effects on the nitrogen and phosphorus contents were even more pronounced. The roots contained comparatively high concentrations of carbohydrates.

Additional data (4, 11) concerning the composition of whole cotton plants grown on two soils indicate that there are fairly definite changes in certain nitrogenous and carbohydrate fractions accompanying each stage of growth, namely, the seedling, early squaring, boll set, and boll-opening periods. The composition of the whole plant, however, was not as good a measure of fertilizer effects as that of the tops or roots analyzed separately (2, 3). This was particularly true for the effect of fertilizers on the concentrations of the carbohydrate fractions.

Field tests (7) have shown that high-phosphate fertilizers tend to increase root-rot on both the Wilson fine sandy loam and Houston black clay soils, while high-nitrogen fertilizers tend to decrease the amount of root-rot. The reduction was not significant on the heavier and more calcareous soil. Correlated laboratory studies (11) showed that the composition of the cotton plants was affected by the fertilizers used.

This report deals with the composition of root segregates, i.e., the bark and inner portion, stele, at different dates of sampling during the 1936 season and under varied fertilizer treatment.

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3Numbers in parenthesis refer to "Literature Cited", p. 539.