(5) MURAVIOV, V. P., ed. Mosaic diseases of the sugar beet. Kiev: Union Sugar Concern, Plant Breeding Dept., 286+(1) pp. 1930. (In Russian Abstract in Expt. Sta. Record 68: 57-60)

(6) RAWLINS, T. E., and C. M. TOMPKINS. Studies on the effect of carborundum as an abrasive in plant virus inoculations. Phytopath. 26: 578-587.

(7) ROBBINS, W. W. Mosaic disease of sugar beets. Phytopath. 11: 349-365. 1921.

(8) SCHAFFNIT, E. Der gegenwaertige Stand der Forschung ueber Viruskrankheiten. Beitraege zur Pflanzenzucht. Neuntes Heft. pp. 25-41. 1927. a/

(9) SMITH, KENNETH M. The mosaic disease of sugar-beet and related plants. Jour. Min. Agr. (Gt. Brit.) 41: 269-274. 1934.

RELATION OF 8-INCH AND 16-INCH SPACING TO CURLY-TOP INFECTION AND PERFORMANCES OF CERTAIN CURLY-TOP-RESISTANT SUGAR BEET VARIETIES
(Abstract)

By A. M. Murphy, Junior Pathologist, Division of Sugar Plant Investigations, Bureau of Plant Industry, United States Department of Agriculture.

Studies were made on the relation of 8-inch and 16-inch spacing to curly-top infection and performance of six economically acceptable curly-top resistant sugar beet varieties. The varieties varied in resistance to curly top from intermediate to highly resistant. Two dates of planting were made, the first on April 21 and the second on May 8. The varieties were planted in a 6x6 Latin square, each plot 80 feet long and four rows wide. One-half of each plot was thinned to 8 inches and the other half to 16 inches.

Under the conditions of the test it was found that by midseason there was approximately 50 percent more obvious curly top in the 16-inch spaced beets than in the 8-inch spaced beets. It was also found that the less resistant varieties gave better yield in the closer spacing.

VERTICILLIUM WILT OF SUGAR BEET
(Abstract)

John O. Gaskill and W. A. Kreutzer
Division of Sugar Plant Investigations, Bureau of Plant Industry
and Colorado Agricultural Experiment Station.

In the latter part of August 1939 an unusual wilt of the sugar beet (Beta vulgaris L.) was observed in fields in the vicinity of Ault, Colorado. The malady was characterized by a wilting and dying of the outer leaves which was soon followed by distortion and occasional loss of turgidity of the inner leaves. An examination of the interior of the tap root of any given plant showing such aerial symptoms generally revealed a discoloration of a few of the vascular bundles. The lateral roots usually showed a greater amount of this vascular necrosis than did the tap root. Rotting of the infected tap roots was seldom observed; the parenchymatous tissues being apparently un-

---

a/ English translation by H. A. Kuyper, Division of Sugar Plant Investigations, Bureau of Plant Industry, U. S. Dept. of Agriculture.

affected. Isolations from the necrotic vascular tissues yielded a species of Verticillium, which when introduced into steamed soil in which stecklings had been transplanted, induced the symptoms characteristic of the disease. Isolations from these plants yielded cultures which were identical with those obtained from field specimens. The morphology of the casual organism resembles closely the descriptions of Verticillium alboatrum.

In order to obtain an indication of the prevalence of Verticillium wilt, 11 fields representing the Fort Collins, Loveland, Kersey, Lucerne and Ault areas were examined. A trace of the disease was found in six fields in the latter three districts, and approximately 1 per cent infection was evident in one field near Ault.

In paired comparisons of lots of diseased roots with comparable lots of apparently unaffected roots, the average sucrose percentages were 11.50 and 15.86, respectively, the difference being highly significant. In addition, the average gross-and indicated-available sucrose per root, and the average coefficient of apparent purity, were significantly lower in the case of the diseased plants. The average weight of the latter class of roots was less than that of the controls, but the difference was not significant.

(Complete paper will be submitted to Phytopathology)

BLACK ROOT OF SUGAR BEETS IN THE PUGET SOUND DISTRICT OF WASHINGTON[1]

By Leo Campbell

Black root of sugar beets has increased in importance in the Puget Sound district of Washington for the past twelve or thirteen years, or since a few years after the inception of the sugar beet industry there. During the last few years the seriousness of the disease has increased until it is one of the prime factors in limiting the sugar beet production in this district.

During investigations of the past three seasons, black root has been found in all the fields examined, ranging from a trace to 95 per cent, and losses due to the disease have varied accordingly, or from a little or no losses to losses so heavy that fields were abandoned.

Numerous fungi have been isolated from cultures of black root beets, but the only organism found to be pathogenic was a Phoma identical with that from seed of German origin and identified as Phoma betae.

From data collected during the growing seasons of the past three years, it is evident that black root can be controlled by the proper system of crop rotation. Where beets are grown for two or more years in succession, black root in serious proportions is inevitable, at least on the better beet soils. The object in crop rotation is to prevent the accumulation, or to rid the soil of the black-root organisms, and to maintain the fertility of the soil. To prevent the accumulation of the black-root organisms or to rid the soil of

---

[1] Published as Scientific Paper No. 439, College of Agriculture and Agricultural Experiment Station, State College of Washington, Pullman, Washington.