INHERITANCE OF RESISTANCE TO ROOT ROT IN TOBACCO CAUSED BY THIELAVIA BASICOLA

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URING the past several years the West Virginia Agricultural Experiment Station, in cooperation with the Division of Tobacco and Plant Nutrition, Bureau of Plant Industry, U. S. Dept. of Agriculture, has had under way a project to produce by hybridization and selection a strain of Burley tobacco resistant to root rot caused by Thielavia basicola. Incidental to this investigation certain data pertaining to inheritance of disease resistance was obtained. The purpose of this paper is to present these data, together with a brief discussion of them.

Studies by Johnson and Hartman (1) and by Johnson (2,3) have shown the importance of various environmental factors in the development of root rot in tobacco as well as the feasibility of breeding tobacco resistant to this disease.

MATERIALS AND METHODS

The parent resistant to root rot used in the present investigation and designated by the number 10 Ba, was derived from seed of hybrid origin obtained from Dr. James Johnson of the Wisconsin Agricultural Experiment Station. The seed obtained from Dr. Johnson was borne on F₄ plants descended from a cross between pure lines of a drooping leaf, resistant Burley and Judy's Pride Standup Burley. The individual plant used as the resistant parent of the crosses reported below was in the F₄ generation obtained through successive hand pollinations and was of the standup Burley type. The susceptible Burley parent used was Kelly, an individual plant of a variety capable of yielding high-quality tobacco. The progenies resulting from crossing, backcrossing, and subsequent selfing the resistant and susceptible parents were grown in a seedbed known to be free from Thielavia basicola and set out in a heavily limed field known to contain this organism from previous crops of tobacco. Infested soil was obtained through the courtesy of Dr. W. D. Valleau of the Kentucky Agricultural Experiment Station. When the plants were set out their roots were dipped into a heavy soil suspension containing the root rot organism.

Each strain was grown in single-row plats replicated four times, with 25 plants per plat. The rows were 3 feet apart and the plants spaced 18 inches along the row. The field on which the plants were grown is located on first bottom along the Ohio River and is mapped as Huntington silt loam. The fertilizer used on the tobacco in 1933 and in 1934 consisted of 400 pounds per acre of a 4-10-6.