Inheritance of Resistance in Alfalfa to Bacterial Wilt

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BACTERIAL wilt caused by Corynebacterium insidiosum (McCull.) Jensen, has become the most serious disease of alfalfa in California and in this country. It annually destroys hundreds of thousands of acres of alfalfa (9) and resistant varieties appear to be the only effective means of control. In the search for resistant strains seed collections from all over the world were tested at the Kansas, Nebraska, Wisconsin, and California agricultural experiment stations in cooperation with the Division of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Dept. of Agriculture (1,3,7,10). Hairy Peruvian and California Common, the principal varieties grown in California, as well as most of the other American varieties, including Grimm, Baltic, Hardigan, Canadian Variegated, and the Common group, were susceptible. Cossack, Ladak, and American Turkestan were partially resistant. Seed lots from Turkestan and part of those from other regions of Asia contained resistance, though the amount varied. Alfalfa from the rest of the world was for the most part susceptible. Selection has resulted in the new varieties Hardistan, Orestan, Kaw, Ranger, and Buffalo which possess resistance (4,5,7).

Resistance to bacterial wilt is inherited, but selected plants differ greatly in their ability to transmit resistance to their selfed progeny. Progenies range from those with only a few to those with all healthy plants (1,3,10). No true-breeding resistant plants have been identified. Brink, Jones, and Albrecht (1), after selfing Hardistan plants, concluded that the genetic basis for resistance was complex. They also observed segregation in the F2 of crosses between resistant and susceptible plants, but a factorial interpretation was impossible.

All the varieties and strains containing resistance are winter dormant, which is objectionable in California because growth is retarded early in the fall and delayed in the spring. These genetic studies were undertaken to provide the basis for utilizing this resistant material in breeding a suitable alfalfa for California. Artificial inoculation was used throughout. Data are presented for the selfed progeny of a few resistant plants and for crosses between these plants and the susceptible California Common.

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3Figures in parenthesis refer to "Literature Cited", p. 582.