The Effect of Advance in Generation and Age of Stand on Bacterial Wilt Reaction of Atlantic Alfalfa

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The current increased interest in use of improved alfalfa varieties has created certain problems. Demand for the new varieties has far exceeded the seed supply. It has been necessary to establish extensive programs (1) for the increase and distribution of seed without complete information as to the effect of such programs on varietal characteristics. It is known that natural selection and gene recombination may alter the nature of a genetically variable population. There are few published data as to the rapidity and extent of this action in alfalfa (3).

Smith and Graber (2) compared the performance of Ranger alfalfa seed lots produced both within and without the variety’s primary area of adaptation. They concluded that a tendency toward loss of winterhardiness was shown by southern-grown material, but that the tendency was adequately controlled by existing seed-production regulations. They noted no apparent effect on wilt resistance of the material.

This paper presents an investigation of bacterial wilt disease of several seed lots of Atlantic alfalfa produced under various environmental conditions of synthesis and ages of stand.

MATERIALS AND METHODS

Atlantic alfalfa is the product of a program of maternal line selection, and the following brief description of the characteristics of the Atlantic variety indicates the nature of the seed lots tested. More than 100 alfalfa strains from Europe, Asia and the United States were blended in the breeding nurseries over a period of 15 years. In 1937, seed of 58 of the nursery was bulked in various combinations to form three synthetic varieties (A65, A66 and A67). In 1940, seed of these three synthetics was bulked to form the Atlantic variety, and the next generation product of this bulking was seeded in western states for increase purposes. The breeding materials were selected primarily for high forage yield and for persistence under eastern conditions. Many of the original strains carried a high degree of natural wilt resistance, and a few had been specifically selected for this character. The resultant material thus contained a considerable number of genes for resistance, although these had not been concentrated by a formal program of inoculation and selection.

Material available for the study consisted of year-old plants from the following seed lots:

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