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VERTICILLIUM WILT OF COTTON

P. J. Lyerly, Superintendent
El Paso Valley Experiment Station, Ysleta, Texas

This report has been prepared in response to numerous requests for information concerning Verticillium wilt of cotton which was unusually severe in the El Paso Valley in 1949. The following observations and generalizations from the literature may be helpful in lessening damage from the disease. Most of the suggested control measures listed do not represent the results of research at the El Paso Valley Experiment Station, and they should not be considered conclusive. This station has directed its research toward the development of cotton varieties resistant to the disease.

Cotton wilt is caused by the fungus *Verticillium albo-atrum* and is known as Verticillium wilt. Although the symptoms are somewhat similar, Verticillium wilt is different from Fusarium wilt which is common in the eastern part of the cotton belt. The fungus lives in the soil and enters the plant through the roots. The growth of the fungus within the water-conducting tissues of the roots and stems causes stunting, wilting and loss of leaves. The invading fungus brings about the ill effects possibly by the secretion of toxins, or by partly plugging the water-conducting tissues, or by a combination of both. The disease can be readily identified by cutting the stem which will show discoloration when the disease is present. Severe infestations result in considerable loss both in yield and the quality of fiber. Spinning tests have shown that yarns from lint of severely-wilted plants may produce eight times as many neps as lint from healthy plants.

The severity of wilt varies considerably from year to year, depending on weather conditions. Severe wilt infestation occurs in years during which there are frequent showers, cloudy weather and temperatures below normal during July and August. Wilt is less severe in years when these months are unusually hot and dry. The spread of wilt is not too clearly understood, although it is known that the disease is carried to different parts of the same field and to different fields by transporting small amounts of soil on plows and other implements. The disease is also spread by the blowing of leaves and small stems from diseased plants.

Unfortunately, no practical methods of completely controlling this disease under field conditions are known. The fungus responsible for wilt attacks and produces disease in over 100 other agricultural plants. Potatoes, eggplants, tomatoes, cantaloupes, beans, okra, peppers and many similar plants are susceptible, although the damage may not be nearly as severe as in cotton. This makes rotation for the purpose of disease control difficult. Grass crops, however, such as corn, sorghum, wheat, oats, barley, Sudan grass and millet are immune to the disease. The severity of the

disease may be reduced by growing these crops several years in the rotation. Many of the common weeds are attacked and must be controlled in such a rotation. Rotation with grasses may not be feasible in the El Paso Valley, however, because of the low return from these crops. Wilt is usually less severe in ground the first year out of alfalfa, but may become very severe by the third year. Rotations in which the soil is left fallow during the summer, and the dry soil stirred frequently and exposed to the sun and dry atmosphere may aid in killing the fungus.

Deep cultivation may result in more severe wilt by injuring the roots and providing wounds for the fungus to gain easier entrance to the plant. Care should be taken to cultivate as shallow as possible on wilt-infested soils.

The disease is frequently more severe in parts of the field which are not well drained, or in low areas that become over-irrigated. Over-irrigation should be avoided. High beds on heavy soils may aid in reducing the disease, but should not be used on light soils.

Numerous instances have been observed where applications of manure or other organic matter have resulted in severe infestations of wilt. Applications of commercial fertilizers have not been observed to result in any control of this disease. The application of fertilizers where needed may result in larger yields, however, by providing larger plants and a heavier set of bolls before damage from wilt occurs. Thick planting offers some help in controlling the disease as not all of the plants in a row are ordinarily diseased.

Steaming and soil sterilization by such chemicals as formaldehyde and chloropicrin are used to control this disease in greenhouses but these are not practical under field conditions.

Considerable progress is being made in developing varieties tolerant to this disease, and such varieties should be available in future years.