



Development of Genotypes that are Tolerant to *Verticillium* Wilt in Iran

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ABSTRACT

Verticillium wilt is a serious disease of cotton in northern Iran. It is favoured by cool air and soil conditions. Control measures include cultural practices and the cultivation of regionally adapted tolerant cultivars but the effectiveness of these measures depends on the causal strain of the disease and the inoculum level in the soil. Two of the twenty five cultivars released by the Institute of Cotton Research in Iran are tolerant to the disease. In addition, trials have been conducted over a five year period at the Kordkouy Research Station in northern Iran of eight Mediterranean cultivars from Greece, Bulgaria and France. Zeta 2 proved more tolerant than the control Sahel with Sindos 80 also giving good results.

Introduction

Verticillium wilt was first recorded as a disease of cotton in the Iran in the early decades of the 20th century. It was reported on greenhouse - grown cotton in northern Iran in 1958 and in the field in Gorgah in about 1959. *Verticillium dahliae*, the causative organism, includes several strains that have been designated as populations. These of the soil-borne fungus *V. dahliae* are known to attack more than 160 plant species in 40 different families. The breadth of the host ranges of different strains varies considerably, some being rather host -specific while others attack many species.

At least five strains of *V. dahliae* are known to attack American upland cotton cultivars. The two most commonly encountered in Iran are SS-4 and T-1, belonging to populations P-2 and P-1, respectively. They can be differentiated by several laboratory tests, by disease reactions of several cotton cultivars that differ in *Verticillium* wilt tolerance in the greenhouse and field and by the reaction of several other host species.

Verticillium wilt reduces the lint yield and also lowers the quality of the fiber. Fiber from diseased plants produces yarns that are lower in grade and inferior in appearance. The number of neps (small knots) and the amount of manufacturing waste are increased.

If available, regionally adapted tolerant cultivars should be planted in conjunction with other control measures. Rotation with grass crops and clean fallow has been very effective in some cotton districts in the infested soil and excessive irrigation should be avoided.

Material and Methods

Up to now more than 25 cultivars have been released by the Institute for Cotton Research (I.C.R) of Iran and

currently nine are under cultivation. In addition, the tolerance of cotton mutants to *Verticillium* wilt were tested over three years. Two of these, Sahel and Bakhtcan, both *Gossypium hirsutum*, are tolerant to *Verticillium* wilt. Sahel is under cultivation in the north of Iran and gives good yields and quality with an excellent ginning outturn. It is more tolerant than Bakhtcan, an improved selection under cultivation in southern Iran.

Eight Mediterranean cotton cultivars from Greece, Bulgaria and France were tested over five years at Kordkouy Research Station in northern Iran to determine their adaptability and wilt tolerance with cultivars Sahel and Varamin as wilt tolerant checks. The experimental design was a randomized complete block with five replications, sown in infected soil in the Kordkouy region. Each plot was six rows, 1.1 m long with 80 cm between rows. The number of infected plants in an area of 32 m² were recorded and this area was harvested to provide data for analysis of variance.

The results showed that cultivar Zeta 2 has the most tolerance to *Verticillium* wilt, falling into the same class as Sahel for tolerance and earliness. This was followed by cultivar Sindos 80 that also gave good results. The results of a combined analysis of variance of six cultivars showed them to be similar to the checks Varamin and Sahel. Results with five mutants also placed them in the same class as Sahel.

Table 1. Results of cultivar trials in southern Iran 1995-1997.

Cultivar	Seedcotton yield Kg/ha	GOT %	Earliness	2.5% SL mm	UR %	Micronaire Value	Strength Gm/tex	Elongation %	Pressley Index
Varamin	4233	38.3	42	28.3	45.3	3.70	22.9	8.0	80.9
Tashkent	4510	35.8	45	26.9	45.5	3.65	22.0	8.9	76.3
Zeta 2	4619	35.7	52	26.9	44.7	3.76	21.7	8.0	78.1
Acala SJ1	4465	36.6	43	27.2	46.8	4.20	22.5	8.2	79.5
Sindos 80	4567	36.3	46	27.9	43.4	4.06	21.1	7.6	84.0
Acala SJ2	4566	37.1	36	27.5	46.4	3.96	22.0	7.9	79.0
Bulgaria 433	4474	35.8	51	27.0	47.7	4.19	21.7	8.0	78.6
Sahel	3926	39.9	36	28.1	44.0	3.60	22.4	8.1	78.8