CIHEAM - Options Mediterraneennes

Atelier : Protection des cultures

Verticillium dahliae and cultural practices studies

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Cotton acreage in Iran was about 300,00 hectares several years ago, of which about 70 per cent was cultivated in the northern regions along the Caspian sea, where the region is hardly infected by Verticillium dahliae.

Verticillium dahliae, has been known in Caspian sea regions since 1953 and it caused considerable damage to the cotton crop ten years later.

In 1963, an American variety, Coker 100 wilt, was introduced and its certified seeds were distributed in the northern part of Iran by the Seed and Plant improvement Institute. This variety having high yield capacity, suitable adaptability to different climatological conditions, and good lint quality, due to its sensivity to the Verticillium dahliae, and suitable Northern conditions for fungi development, was highly infected by the Verticillium dahliae and in some oases, 80 per cent of the plants were infected.

Agronomical experimentations and studies on the cultural practices such as spacing, rotation, fertilizing and soil solarisation, have been conducted showing very interesting results which are recommendable to the farmers.

Cotton rotation with lucern has best effects against Verticillium dahliae and reduces the degree of infection, as showed in the table n° 1. The degree of infection of cotton plants sowed after lucern is reduced, up to 0/9 grade.

Table 1 : Rotation - Degree of infection

Grade / Rotation	0	1	2	3	4	Total plants	Degree of infection
Check (cotton)	10	20	31	24	15	100	2.14
Cotton (sowing after lucern)	38	40	16	6	-	100	0/90

Experimental method

An experimental programme was conducted in Kordkouy station 35 km of Gorgan city of west of Caspian sea. Soil analysis showed that the soil of the station contains 21% Caco and PH 7.8 and very infested to *Verticillium dahliae*, cotton seeds (Sahel, and Coker 100 W varieties) were treated with Brasical 78 (PCNB) and were planted in rows 20 m long.

The spacing between the plants was 25 cm and between rows 80 cm. These experiments conduced in dry farming conditions because the high level of water in the soil.

Agronomical experimentations and studies such as spacing, date of sowing late planting, rotation, and study of fertilizer and also soil solarisation have shown very interesting results which are recommendable to the farmers.

Results and discussions

Agronomical experimental programs conducted in the Kordkouy station are as following :

A. Date of sowing delay in late planting for reducing cotton diseases.

As shown in the table n° 2, the percentage of healthy plants increased due to the warmer weather, but the yield decreased because of shorter growing period.

Table 2 : Date of sowing - Coker 100 W

Average		3rd year		2nd year		1st year		Treatment dates of sowing
kg/ha	% sick plants	kg/ha	% sick plants	kg/ha	% sick plants	kg/ha	% sick plants	
1 516	55	1 430 k	62 %	1 470 k	58 %	1 650 k	45 %	1 May
1 390	48	1 350	54 %	1 300	50 %	1 400	40 %	10 May
1 210	39	1 150	48 %	1 280	37 %	1 200	32 %	20 May
940	24	870	25 %	1 100	28 %	950	20 %	30 May

B. Rotation

Experiments conducted in Kordkouy experimental station, in recent years and during a period of 12 years, have shown that cotton in rotation with different crops has best effect against *Verticillium dahliae* and the disease damage is reduced, up to 60 per cent.

As showed in the table n° 3, the percentage of healthy plants was increased in rotation program due to the two following points :

1. To obtain best results of cotton rotation program in decreasing the disease infections, we should sow cotton alternatively after a period of two years, covering the field by other crops, like wheat and oil plants. One year rotation is not so effective and if we want to reduce the effect of diseases, it is recommended to have a rotation in which cotton is sowed every two years.

2. Introducing the lucern (Alfa-Alfa) in rotation is very effective and best results are obtained with this rotation.

It seems that lucern may increase the population of fungi : *chamigun antagoniste*, *champigus aspergilus*.

These fungii have a reaction against *V. dahliae*, so increasing their population could decrease the wilt activity and reduce the disease effect.

Table 3 : Rotation - Coker 100 W

4th year				3rd year	2nd year	1st year
		kg/ha				
Degree of infection	% sick plants					
2/3	68 %	1 230 kg	cotton	cotton	cotton	cotton
2/-	54 %	1 420 kg	cotton	cotton	cotton	cotton
1/4	30 %	1 980	cotton	cotton	cotton	cotton
1/8	44 %	1 490	cotton	cotton	cotton	cotton
1/2	26 %	2 050	cotton	cotton	cotton	cotton
1/9	49 %	1 390	cotton	cotton	cotton	cotton
1/3	38 %	1 870	cotton	cotton	cotton	cotton
0/9	22 %	2 260	cotton	cotton	cotton	cotton