Influence of Mycorrhiza on Chickpea Fusarium Wilt

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Vesicular arbuscular mycorrhizal (VAM) fungi are known to interact with soilborne pathogens and reduce disease incidence (Dehne and Schönbeck 1979). A pot experiment was conducted in the greenhouse at ICRISAT Center, Patancheru, October-December 1977, to see if VAM had any influence on fusarium wilt (*Fusarium oxysporum* f.sp *ciceri*) in chickpea. Three chickpea genotypes representing susceptible (JG 62), tolerant (K 850), and resistant (WR 315) types, and a mixture of three species of VAM (*Glomus mosseae, G. constrictum,* and *G. monosporum*) were used in the study. VAM was multiplied on cenchrus grass, and the wilt fungus was multiplied on a medium of sand and chickpea flour (90 g sand + 10 g chickpea flour + 20 to 25 mL distilled water).

The three chickpea genotypes were sown in soils inoculated with *Fusarium* alone, VAM alone, and a *Fusarium* + VAM mixture. Sterilized soil without any inoculum served as a control. In the *Fusarium* alone and VAM alone treatments, 100 g of inoculum was mixed separately with 2 kg sterilized soil. In the mixture, 100 g of each inoculum was mixed with 2 kg soil. A split-plot experimental design was followed, with genotypes as main plots and inoculations as subplots. Each treatment was replicated 4 times, a 15-cm plastic pot with 5 seedlings forming a replication. The soil in the pots was lightly irrigated after the inoculum was incorporated. Sowing was done 4 days later, to allow establishment of the fungi. The fungal population in the soil was estimated before sowing. The VAM population in both VAM alone and *Fusarium* + VAM mixture treatments was 150 cells g^{-1} soil. The *Fusarium* populations were: with *Fusarium* alone, 3620 (g soil)$^{-1}$; with the *Fusarium* + VAM mixture, 3343 (g soil)$^{-1}$.

The seeds of chickpea were surface-sterilized by soaking in a 2.5% aqueous solution of sodium hypochlorite for 3 minutes before sowing. The observations on wilt incidence were recorded 21 days after sowing. The temperature in the greenhouse ranged from 13-16 to 30-33°C.

Simultaneous inoculation of chickpea with VAM and *Fusarium* had no effect on wilt incidence in the susceptible (JG 62) and resistant (WR 315) genotypes (Table 1). However, the wilt-tolerant genotype, K 850, showed significantly less (25%) wilt incidence in soil with *Fusarium* + VAM than in the soil with *Fusarium* alone (35%). It appears that VAM provides protection against wilt but the extent of protection is not sufficient to prevent wilt in the case of a highly susceptible cultivar such as JG 62. It will be interesting to study the effect of inoculating VAM prior to *Fusarium* inoculation and at different levels of *Fusarium* population.

Table 1. Influence of vesicular arbuscular mycorrhiza (VAM) on fusarium wilt in chickpea in pot experiments at ICRISAT Center, 1977.

Soil treatment	Percent of plants wilted		
	JG 62	K 850	WR 315
Fusarium[1] alone	100 (90)[2]	35 (36)	0
VAM alone	0	0	0
Fusarium + VAM	100 (90)	25 (26)	0
Control (sterilized soil)	0	0	0
SE of genotypes mean		±(1.6)	
SE of inoculation methods		±(1.6)	
SE of genotypes x inoculation methods		±(2.9)	
CV (%)		(27.5)	

1. *Fusarium oxysporum* f. sp *ciceri.*
2. The figures in parentheses are after angular transformation.

Reference

Dehne, H.W., and **Schönbeck, F.** 1979. Investigation on the influence of endotrophic mycorrhiza on plant diseases. I. Colonization of tomato plants by *Fusarium oxysporum* f.sp. *lycopersici.* Phytopathologische Zeitschrift 95:105-110.

Nematology

Kabuli Chickpea Mutants Resistant to Root-Knot Nematode, *Meloidogyne javanica*

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Inducing mutations was tried in locally well-adapted kabuli chickpea varieties, Baroda Dhakri Local (BDL, small-seeded) and L 550 (medium-bold seeded) using