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Additional Sources of Resistance to Wilt and Root Rots in Chickpea

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Several sources of resistance to fusarium wilt [*Fusarium oxysporum* Schlecht. emend Snyd. & Hans. f.sp *ciceri* (Padwick) Snyd. & Hans.] of chickpea are available (Nene and Reddy 1987). Good progress has also been made in the development of wilt-resistant and high-yielding varieties (Singh 1987). A few lines resistant to wilt and root rots [mainly *Rhizoctonia bataticola* (Taub.) Butler] have also been reported (Haware and Nene 1980; Haware et al. 1981, Nene et al. In press). In this note, we report the results of evaluation of 1283 new germplasm accessions collected mainly from Madhya Pradesh and Rajasthan states of India, and Bangladesh that were evaluated in the wilt and root rots nursery at ICRISAT Center, Patancheru, during the past four postrainy seasons (1985/86 to 1988/89). Seed yield of the resistant accessions was also evaluated in the wilt and root rots nursery itself during the 1988/89 postrainy season. In this trial, a wilt-resistant, high-yielding, and short-duration cultivar Annigeri was used as a control entry.

During 1985/86, 428, germplasm accessions, in 1986/87, 395 accessions, and in 1986/87, 460 accessions were evaluated. Fifty seeds of each accession were sown in 4-m long ridges that were 60-cm apart. Lines with less than 20% mortality were selected for further testing. The seeds collected from such accessions after eliminating susceptible plants were sown in the next year in two 4-m long rows replicated twice in a randomized-block design. The accessions with less than 10% mortality in the 2nd year were considered resistant. A wilt-susceptible cultivar JG 62 was sown after every two test rows for monitoring the disease. The population of *Fusarium* spp was 3300 (g of soil)$^{-1}$, and that of *Rhizoctonia bataticola* was 28 (g of soil)$^{-1}$ at the time of sowing. Isolations were made from the dead plants at pod-filling stage.

The final observations on mortality because of wilt and root rots were recorded at pod-filling stage. The susceptible cultivar JG 62 showed 100% mortality in all the 3 years of evaluation. The frequency of *F. oxysporum* f.sp *ciceri* was 77%, *R. bataticola* 9%, and *F. solani* 5% when isolated from dead plants. Several lines that showed resistance to wilt succumbed to dry root rot, late in the season. The lines that showed <10% mortality were uprooted and examined for the extent of root necrosis because of dry root rot and all of them were found to have extensive root necrosis and can only be considered field tolerant. Out of 1283 accessions evaluated, 117 accessions (23 in 1985/86, 3 in 1986/87, and 92 in 1987/88) showed less than 20% mortality in the 1st year of screening and of these 40 accessions showed less than 10% mortality in the 2nd year of screening. The extent of mortality in these 40 accessions in different seasons and information on seed yield and some other agronomic characteristics is given in Table 1. Most of the resistant accessions showed higher yield potential than the resistant, high-yielding, and short-duration control cv. Annigeri. Most of the test entries flowered later than Annigeri and it appears that the 1988/89 postrainy season has favored the late-maturing types. All of them however had smaller seed mass than Annigeri. In addition to the lines reported resistant earlier, these lines can be used as additional sources of resistance to wilt and tolerance to dry root rot.

Table 1. Chickpea germplasm accessions resistant to fusarium wilt and root rots at ICRISAT Center, Patancheru, India.

Germplasm accession	Mortality due to wilt and root rots (%)		Time to 50% flowering (days)	100-seed mass (g)	Yield during 1988/89 (kg ha^{-1})
	1987/88	1988/89			
ICC 12969[1]	7	10	54	18.0	566
ICC 12989[1]	9	6	51	14.9	728
ICC 13024[1]	12	6	54	12.1	661
ICC 14303	0	NT[2]	72	17.6	NT[2]
ICC 14516	20	6	54	13.9	619
ICC 14528[3]	17	8	56	14.4	552
ICC 14532	16	4	58	13.6	819
ICC 14619	9	4	51	14.5	981
ICC 14631	7	10	47	14.1	817
ICC 14671	18	5	56	17.1	596
ICC 14680	2	7	43	17.5	429
ICC 14681	2	8	41	17.4	435
ICC 14691	11	5	45	14.9	688
ICC 14734	20	4	55	17.0	427
ICC 14735	0	9	48	13.4	858
ICC 14762	2	7	45	15.8	467
ICC 14764	17	8	42	16.6	752
ICC 14795	0	9	60	12.7	496
ICC 15023	8	4	75	12.8	229
ICC 15075	17	9	44	17.2	752
ICC 15081	10	8	43	17.4	433
ICC 15090	0	6	41	19.0	644
ICC 15094	15	9	41	18.3	590
ICC 15105	11	7	43	17.4	588
ICC 15108	19	9	41	17.9	658
ICC 15125	11	6	45	15.3	1013
ICC 15127	0	9	49	14.8	415
ICC 15133	11	5	39	17.5	748
ICC 15135	18	7	56	18.9	725
ICC 15140	6	6	45	17.1	477
ICC 15146	0	7	45	18.3	669
ICC 15166	5	7	46	18.1	502
ICC 15168	9	8	47	18.4	504
ICC 15178	15	9	76	12.1	227
ICC 15228	20	4	53	15.6	531

Continued.

Table 1. *Continued.*

Germplasm accession	Mortality due to wilt and root rots (%) 1987/88	1988/89	Time to 50% flowering (days)	100-seed mass (g)	Yield during 1988/89 (kg ha^{-1})
ICC 15230	16	7	51	16.0	588
ICC 15233	0	5	49	15.6	823
ICC 15236	0	6	52	15.3	346
Controls					
Annigeri1 (resistant)	1	20	35	20.2	301
JG 62 (susceptible)	100	100	-	-	0
SE ±	9.6	15.7	-	-	185.5
CV (%)	102.4	77.2	-	-	40.4

1. These were also tested during 1985/86 and 1986/87 and showed <20% mortality.
2. Not tested.
3. Kabuli.

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Occurrence of Chickpea Foot Rot Disease in Rajasthan, India

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While traveling in Rajasthan during the 1st week of March 1989, a wilt-like disease was observed in chickpea trial and multiplication plots at Agricultural Research substation (Rajasthan Agricultural University), Diggi, located about 70 km south of Jaipur in Tonk district. The farm has sandy soils and grows several winter crops, including chickpea, under totally rainfed (408 mm in July-September;