

An improved agar growth medium for *Ascochyta rabiei* (Pass.) Labr.

During an attempt to isolate *Ascochyta rabiei* from chickpea seeds heavily infested with species belonging to genera, *Alternaria*, *Aspergillus*, *Chaetomium* and *Pencillium*, little success could be achieved when some conventional agar growth media (chickpea seed meal agar medium; Richard's agar medium) were used. However, on a new medium (chickpea seed meal 20 g; Ca (NO₃)₂ 0.4 g; MgSO₄ 0.15 g; KH₂PO₄ 0.15 g; KCl 0.06 g; dextrose 15 g; yeast extract 0.5 g; agar 20 g; water 1000 mL), better colony growth of *Ascochyta rabiei* was obtained. A comparison of growth rate, pycnidial zone and pycnidial density of *A. rabiei* on media tested in this study are given in Table 1.

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Screening of chickpea genotypes for resistance to six races of blight

The best way to control chickpea blight caused by *Ascochyta rabiei* (Pass.) Lab. is through the use of resistant cultivars. The cultivars of chickpea released earlier as resistant to blight became susceptible during the epidemic years probably due to the existence of *A. rabiei* races. At International Center for Agricultural Research in the Dry Areas (ICARDA), Syria, six races of the fungus have been identified (Anonymous, 1982/83), and these are prevalent in the farmers' fields as well as at the experiment stations. Due to the presence of races, it is important to identify good stable sources of resistance. Chickpea lines showing resistance/tolerance to blight during the previous screenings at ICARDA were selected with the objective of finding out the chickpea lines resistant to each of the six races of the fungus.

Forty-six chickpea genotypes and one local susceptible check, ILC 1929, were sown in iron trays of 40 x 32 x 7 cm

Table 1. Comparison of different media for *Ascochyta rabiei* growth.

	Conventional chickpea seed meal agar medium	Richard's Medium	New Medium
Colony diameter (cm day ⁻¹)	0.36±0.04	0.17±0.02	0.46±0.01
Pycnidial zone diameter (cm) at day 10	5.32±0.18	3.62±0.22	5.86±0.25
Pycnidial density/ 1.25 cm ²	19.00±8.42	58.00±15.17	35.00±7.15
Pycnidium size (um)			
Average	315	109	220
Range	179.48-512.82	51.28-153.84	128.20-282.05

Table 1. Disease reaction of some chickpea lines to six races of *Ascochyta rabiei* at Tel Hadya, Syria.

Disease reaction¹

Lines	Race 1	Race 2	Race 3	Race 4	Race 5	Race 6
ICC 3840	8.5	9.0	9.0	8.5	8.0	7.5
ICC 3969	7.5	6.0	7.5	5.5	7.5	7.5
ICC 3996	5.5	4.0	6.5	6.0	6.0	5.5
ICC 4324	7.0	4.5	6.5	5.5	8.0	8.0
ICC 4475	8.0	4.0	7.5	6.5	9.0	6.5
ICC 6981	6.0	4.5	7.0	6.0	6.0	5.5
ICC 6988	6.5	5.5	6.0	5.5	6.0	6.5
ILC 182	8.5	6.5	7.5	5.0	6.5	7.5
ILC 193	7.0	8.0	8.0	7.5	8.0	7.5
ILC 195	7.5	8.0	7.0	7.0	7.0	6.5
ILC 202	5.5	6.0	7.0	5.5	6.5	6.0
ILC 969	9.0	9.0	9.0	9.0	9.0	9.0
ILC 1890	9.0	9.0	9.0	9.0	8.5	9.0
ILC 1894	8.5	9.0	8.0	8.5	8.5	8.5
ILC 1929	9.0	9.0	9.0	8.5	9.0	8.5
ILC 1986	9.0	9.0	9.0	9.0	9.0	9.0
ILC 2121	7.5	9.0	9.0	8.5	9.0	8.0
ILC 2214	9.0	9.0	9.0	8.5	6.0	6.0
ILC 2380	7.0	7.5	7.0	5.0	7.0	5.5
ILC 2381	9.0	8.5	8.0	7.5	8.5	8.5
ILC 2467	9.0	8.5	7.0	7.5	7.0	5.5
ILC 2469	9.0	9.0	8.0	8.0	8.0	4.5
ILC 2492	9.0	8.0	-	8.0	6.0	7.5
ILC 2496	8.0	7.5	8.0	7.0	6.0	7.5
ILC 2506	5.5	6.5	7.5	7.0	8.5	8.5
ILC 2574	7.5	9.0	9.0	8.5	8.0	7.5
ILC 2575	7.0	8.0	7.0	7.0	6.5	8.0
ILC 2577	6.5	9.0	9.0	9.0	9.0	9.0
ILC 2578	6.5	9.0	9.0	9.0	7.5	7.0
ILC 2633	8.0	9.0	8.5	7.5	7.5	7.5
ILC 2960	8.0	8.5	8.5	8.0	9.0	8.0
ILC 3120	8.0	8.5	8.5	7.5	8.0	6.5
ILC 3139	8.0	9.0	9.0	8.5	9.0	7.0
ILC 3140	8.0	8.0	6.5	8.0	7.5	7.0
ILC 3219	7.5	8.5	7.0	9.0	8.0	7.5
ILC 3226	6.5	9.0	9.0	9.0	9.0	8.5
ILC 3267	8.0	6.5	7.5	6.5	6.5	7.0
ILC 3272	7.0	6.5	7.5	6.5	6.5	7.0
ILC 3342	4.5	9.0	8.0	7.5	9.0	7.5
ILC 3343	5.5	8.5	8.0	7.5	7.5	6.0
ILC 3714	8.0	9.0	9.0	8.5	8.5	8.0
ILC 3864	5.0	7.5	6.5	7.5	6.5	6.5
ILC 3870	5.5	7.5	7.0	6.0	7.5	7.0
ILC 4421	4.5	7.5	7.5	6.5	6.5	4.5
ILC 4424	5.0	7.5	7.5	6.0	8.0	7.0
NEC 138-2	7.5	8.0	7.5	5.5	8.0	7.0
ILC 1929(check)	9.0	9.0	9.0	9.0	9.0	9.0

¹Data taken 30 days after inoculation.

LSD (0.05) for race	= 0.49	CV for genotypes	= 10.23
LSD (0.05) for genotypes	= 0.88	SE for race	= +0.19
CV for races	= 3.69	SE for genotypes	= +0.39

filled with autoclaved soil. Each line was sown in a single row 10-cm long with 10 plants per row, 3-cm apart with two replications in randomized complete block design. The sowing was done on 25 March 1985 in a plastic house. A set of two trays containing 47 lines in two replications was planted separately for testing each race. When the seedlings were 2-week old, a spore suspension (200000 spores mL⁻¹) of each race of A. rabiei prepared from 12-day-old culture (culture of each race was grown on 2% chickpea seed-meal broth in 250 mL conical flask in the laboratory), was sprayed separately on the seedlings and these were covered with plastic cages for 2 weeks to create high humidity for infection. Disease severity was measured 30 days after inoculation on a 1-9 scale developed by Singh et al. 1981.

The summary of the results showing the blight scores recorded 30 days after inoculation is presented in Table 1. Statistically significant effect of races and genotypes and the disease reaction was observed. Majority of the lines tested showed susceptible to highly-susceptible disease reaction (6-9) against all the races. Not a single line was rated between 1 and 3 against any of the six races (Table 2), however, 2,5,7 and 6 lines were rated between 4-5 against the races 1,2,4 and 6, respectively. The lines showing the ratings of 4 and 5 are considered

tolerant; these were ICC 3996, ICC 4324, ICC 4475, ICC 6981, ICC 6988, ILC 202, ILC 2380, ILC 2467, ILC 2469, ILC 4421, and NEC 138-2. Statistically, the overall effect of the races 1,2,3,4, and 5 on disease reaction was the same but different from race 6. Race 3 and 5 showed more virulent reaction when compared to other races, as all the lines proved susceptible to these two races. Some of the lines; ICC 4324, ICC 4475, ICC 6981, ILC 182, and ILC 4421 showed differential reactions against the races. The present study not only indicates the tolerant sources of chickpea to blight but it also points out the lines that may be used as differentials for the identification of A. rabiei.

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Table 2: Grouping of chickpea genotypes on the basis of disease (Ascochyta rabiei) scores.

Disease score	No. of entries					
	Race 1	Race 2	Race 3	Race 4	Race 5	Race 6
1-3 (Resistant)	0	0	0	0	0	0
4-5 (Tolerant)	2	5	0	7	0	6
6-9 (Susceptible)	45	42	47	40	47	41