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SCREENING OF CUMIN VARIETIES FOR RESISTANCE AGAINST *ALTERNARIA BURNSII* AND *FUSARIUM OXYSPORUM* F.SP. *CUMINI*

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Cumin (*Cuminum cyminum* L.) is affected by a number of diseases, but heavy losses are sustained due to blight incited by *Alternaria burnsii* and wilt caused by *Fusarium oxysporum* f.s.p. *cumini.* Twenty five cumin varities we re screened for their resistance to blight and wilt diseases in natural conditions. None of the varieties found totally resistant to either blight or wilt. Maximum resistance to blight was observed in variety UC-310, EC-279081, CMB-90 and JC-2000-22. Maximum suceptibility to blight was observed in variety RZ-209, UC-223 and UC-342. Maximum resistance to wilt was shown by variety UC-220, EC-232684 and UC-63 and susceptibility was shown by variety RZ-19, UC-90, UC-231, JC-2000-72, CMB-134 and Jobner local.

Keywords : *Alternaria burnsii*; Cumin; *Fusarium oxysporum;* Resistance.

Cumin (*Cuminum cyminum* L.) is extensively grown in Rajasthan and it occupies a significant place as a spice crop of India[1]. Cumin is affected by a number of diseases, but heavy losses are sustained due to blight incited by *Alternaria burnsii* and wilt caused by *Fusarium oxysporum* f.s.p. *cumini.* The blight disease involves all the aerial parts of the plant particularly the succulent leaves and blossom, which become completely blighted. When the infection occurs in the seed, the seeds are poorly formed, dark brown to black in colour, resulting in poor germination. The wilt affected plants turn yellow and latter show characterstics wilted symptoms. A comprehensive account of blight, wilt and powdery mildew of cumin is available[2]. Field tolerance has been found in selection UC-198, and MC-43 and GC-1 in Gujarat to blight[5]. Out of forty cumin varieties collection, none were found free from the disease. The lowest CODEX was observed in variety/ collection GC-1 followed by MC-43[6]. The cumin variety UC-220 and UC-231 showed maximum resitance to wilt and variety UC-310 to blight[7]. In the present investigation twenty five available cumin varieties/collection were screened for their resistance to blight and wilt disease by artificial inoculation.

Twenty five varieties were screened during crop season 2002-2003 and 2003-2004. The varieties were sown in natural condition with and without added inoculum. Seeds of twenty five cumin varieties/collection were obtained from the Department of Breeding, S.K.N. Agriculture College, Jobner. These varieties are as follows, Jobner local, UC-345, EC-279081, UC-310, UC-217, JC-2000-21, UC-220, UC-342, CMB-134, EC-232684, UC-344, JC-2000-22, UC-343, UC-231, JC-2000-72, CMB-90, CMB-79, UC-341, RZ-19, JC-2000-27, UC-198, UC-223, RZ-209, UC-63 and UC-90.

The culture of *Alternaria burnsii* and *Fusarium oxysporum* f.sp. *cumini* were raised on sterilized sorghum seeds in 250ml flasks for seven days. The inoculum was mixed with soil before sowing the seeds in pots (9inch diameter). Twenty five available cumin varieties were screened for their disease resistance and susceptiblility in terms of severity of disease symptoms. Three replicates of 10 seeds each, were sown in pots. The seeds sown in pots, in which inoculum was not added served as control. The data on disease appearance and progress was recorded at 5 day interval for the entire duration of crop.

Results are presented in table 1. Out of twenty five varieties screened none were found totally resistant to either blight or wilt. Maximum resistance to blight was observed in variety UC-310, EC-279081, CMB-90 and JC-2002-22. Maximum suceptibility to blight was observed in varieties RZ-209, UC-223 and UC-342 and varieties RZ-19, EC-232684, UC-344 were moderately susceptible. Rest of the varieties were fairly resistant to moderately suscetible. Maximum resitance to wilt was shown by variety UC-220, EC-220, EC-232684 and UC-63. Maximum susceptibility to wilt was shown by variety RZ-19, UC-231, JC-2000-72, CMB-134 and Jobner local. Varieties RZ-209, UC-223 were found moderately susceptible to highly susceptible. Rest of the varieties were moderately susceptible to moderately resistant.

In our present investigation none of the varieties showed complete resistance to either blight or wilt disease of cumin. These findings are in conformity with the previous findings[4,6,7].

Table 1. Reaction of different cumin varieties to blight and wilt causal organisms inoculated in pots.

S. No.	Variety	Control Incidence of blight	Incidence of wilt	Soil with *Alternaria* severity of blight and age of plant when symptoms appeared	Susceptible/ Resistante to blight	Soil with *Fusarium* severity of wilt and age of plant when symptoms appeared	Susceptible/ Resistant to wilt
1.	J. Local	-	-	a-75 days b-85 days	++/+++	A-55 days, B-65 days C-80 days	+
2.	UC-345	-	-	a-75 days, b-85 days, c-90 days	+/++	A-65 days, B-75 days	++
3.	EC-279081	-	-	a-85 days	++++	A-60 days, B-75 days	++
4.	JC-2000-72	-	-	a-75 days, b-90 days	++/+++	A-55 days, B-70 days C-75 days	+
5.	JC-2000-21	-	-	a-75 days, b-85 days	++	A-65 days, B-75 days	++/+++
6.	UC-342	-	-	a-65 days, b-85 days, c-90 days	+	A-60 days, B-75 days	+/++
7.	CMB-134	-	-	a-70 days, b-95 days	++/+++	A-55 days, B-65 days C-70 days	+
8.	EC-232684	-	-	a-65 days, b-75 days	++	A-65 days	++++
9.	UC-344	-	-	a-70 days, b-85 days	++	A-65 dyas, B-80 days	++
10.	JC-2000-22	-	-	a-90 days	++++	A-60 days, B-75 days	++/+++
11.	UC-343	-	-	a-75 days, b-90 days	++	A-65 days, B-75 days	++
12.	UC-341	-	-	a-70 days, b-95 days	++/+++	A-65 days, B-75 days	+++
13.	JC-2000-27	-	-	a-75 days, b-90 days	++/+++	A-70 days, B-85 days	+++
14.	CMB-90	-	-	a-75 days	++++	A-65 days, B-75 days	++
15.	CMB-79	-	-	a-75 days, b-85 days	++/+++	A-60 days, B-85 days	++/+++
16.	UC-220	-	-	a-75 days	++	A-65 days, B-75 days	++++
17.	UC-217	-	-	a-75 days, b-85 days	++	A-65 days, B-70 days C-75 days	++
18.	UC-198	-	-	a-75 days, b-90 days	++	A-65 days, B-75 days	++
19.	UC-231	-	-	a-75 days, b-85 days	++	A-52 days, B-75 days	+
20.	UC-90	-	-	a-75 days, b-85 days	++	A-50 days, B-65 days	+
21.	UC-310	-	-	a-75 days, b-85 days	++++	A-65 days, B-70 days	++
22.	UC-63	-	-	a-75 days, b-85 days	++	A-80 days	++++
23.	UC-223	-	-	a-75 days, b-85 days, c-90 days	+	A-55 days, B-60 days	++/+
24.	RZ-209	-	-	a-75 days, b-85 days, c-90 days	+	A-65 days, B-75 days	++
25.	RZ-19	-	-	a-75 days, b-85 days	++	A-67 days, B-75 days	+

Severity of blight

(a) Blight initiation-leaf tip becomes white
(b) Mild blight symptoms-leaf turns violet and tip turns black.
(c) Severe blight symptoms-leaf turns black with occasional sports on stem, fruit also turns black
(d) Mortality due to blight.

Severity of wilt

(A) Wilt initiation - yellowing of lower leaves.
(B) Mild infection - yellowing of all leaves, stem turns yellow
(C) Severe infection-drying of entire plants starts.
(D) Mortality due to wilt.

Degree of susceptibility/Resistnace

\+ Highly susceptible
++ Moderately susceptible
+++ Fairly resistant
++++ Highly resistant

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