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Field Screening of Castor (*Ricinus communis* L.) Germplasm Against Botrytis Grey Rot

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ABSTRACT

Field trial was conducted to evaluate 160 germplasm accessions with Krathi as susceptible check and Haritha as resistant check. Germplasm accessions were sown in single row with 5m length with at 90X45cm spacing. Resistant and susceptible checks were sown after every 10 test entries. Out of 160 accessions screened, only six accessions *viz*., RG-2289, 2353, 2356, 2363, 3141, 3151 were exhibited resistant reaction (< 10% capsule infection.

Key words : Castor, *Botrytis ricini,* Germplasm Screening.

Castor is the third important oilseed crop of Andhra Pradesh in terms of acreage and economy after Groundnut and Sunflower. The crop is mostly restricted to Southern Telangana agro-climatic zone of the state, in which Mahaboobnagar and Nalgonda districts account to 80% of total castor area of A.P. Castor is the most preferred crop in these areas as it has excellent rejuvenating capacity and genetic potential to give some yields in adverse conditions. This crop is grown mostly under rainfed conditions and poor management. Castor is and affected by *Fusarium* wilt and Botrytis grey rot, which are major diseases of castor as they can cause 80-100% crop damage in India.

Botrytis grey rot (BGR) caused by *Botrytis ricini* Godfrey is one of the major diseases of castor in Andhra Pradesh. The first epidemic of the disease appeared in A.P. during Kharif 1987 (Moses and Reddy, 1998). BGR appears during cyclonic weather conditions causing severe yield losses. Under congenial conditions of high humidity and low temperatures the pathogen infects the flowers and capsules and converts them into grey fungal mass of mycelium and spores. BGR is important in A.P. and Tamilnadu, where it has virtually threatened castor cultivation. During the last 12 years, epidemic of BGR was reported in 4 years and in the remaining years the losses range from 10 to 80 %. As cyclonic depressions predispose the onset and spread of the disease, the disease incidence varies between the years (Janila *et al.,* 2006). The Etiology, epidemiology and management of the disease is thoroughly reviewed by Raoof and Yasmeen (2006).

No measures are fully effective at controlling this disease. Cultivars resistant to this fungi would be the most practical way to control this disease. One can look for genes resistant to biotic stresses in germplasm collections which can be done by systematic screening of available castor germplasm. The present study was undertaken to identify source of resistance in castor germplasm for Botrytis grey rot.

MATERIAL AND METHODS

Field screening was conducted during 2005-06 at Regional Agricultural Research Station, Southern Telangana Zone (STZ) of Andhara Pradesh, Palem, Mahaboobnagar district. Diversified types of castor germplasm accessions obtained from Directorate of Oilseeds Research (DOR), Rajendranagar, Hyderabad. A total of 160 germplasm accessions were evaluated with Krathi as susceptible check and Haritha as resistant check. Germplasm accessions were sown in single row with 5m length at 90X45cm spacing. Resistant and susceptible checks were sown after every 10 test entries. Entries were sown in the second fortnight of July so that spike formation coincides with high rainfall days. Scoring of Botrytis incidence was recorded on primary, secondary and tertiary spikes using 0-9 scale as follows.

Table 1. Screening of castor germplasm for Botrytis grey mold (2005-06).

S. No.	Accession	Grey mold grade (0-9 scale)	S. No.	Accession	Grey mold grade (0-9 scale)
1	RG-2124	9	44	2357	7
2	2125	9	45	2358	7
3	2126	9	46	2359	9
4	2127	7	47	2360	9
5	2129	7	48	2362	7
6	2131	9	49	2363	3
7	2132	9	50	2364	5
8	2133	9	51	2365	5
9	2135	9	52	2366	9
10	2136	7	53	2367	9
11	2139	7	54	2368	9
12	2140	7	55	2369	9
13	2142	5	56	2370	7
14	2217	9	57	2371	7
15	2267	9	58	2372	5
16	2268	9	59	2373	7
17	2270	7	60	2374	5
18	2275	7	61	2375	5
19	2277	7	62	2376	7
20	2281	7	63	2377	7
21	2283	7	64	2378	7
22	2286	9	65	2379	7
23	2289	3	66	2380	7
24	2297	5	67	2381	7
25	2323	9	68	2382	9
26	2338	9	69	2383	9
27	2340	9	70	2384	9
28	2341	9	71	2385	9
29	2342	7	72	2386	9
30	2343	7	73	2387	5
31	2344	5	74	2388	9
32	2345	9	75	2390	5
33	2346	7	76	2391	7
34	2347	7	77	2392	7
35	2348	5	78	2393	7
36	2349	9	79	2394	5
37	2350	9	80	2395	5
38	2351	7	81	2396	5
39	2352	7	82	2397	9
40	2353	3	83	2398	9
41	2354	5	84	2398	9
42	2355	5	85	2803	9
43	2356	3	86	2846	9

Table 1. cont.....

S. No.	Accession	Grey mold grade (0-9 scale)	S. No.	Accession	Grey mold grade (0-9 scale)
87	2862	9	125	3136	5
88	2863	9	126	3137	—
89	2864	9	127	3138	7
90	2865	9	128	3139	7
91	2866	9	129	3140	5
92	2867	5	130	3141	3
93	2868	5	131	3142	5
94	2869	7	132	3143	5
95	2871	7	131	3144	5
96	2872	7	132	3145	7
97	2873	7	133	3146	5
98	2874	5	134	3147	7
99	2875	7	135	3148	5
100	2876	5	136	3149	9
101	2877	7	137	3150	10
102	2878	9	138	3151	3
103	2758	5	139	3152	9
104	2787	9	140	3153	9
105	2836	9	141	3154	5
106	2980	9	142	3156	—
107	2995	9	143	3157	9
108	3006	9	144	3158	9
109	3008	5	145	3159	9
110	3034	9	146	3160	5
111	3054	—-	147	3161	5
112	3058	5	148	3162	7
113	3124	7	149	3163	7
114	3125	5	150	3164	7
115	3126	5	151	3165	9
116	3127	5	152	3166	9
117	3128	9	153	3167	—
118	3129	9	154	3168	9
119	3130	9	155	3169	—
120	3131	9	156	3170	7
121	3132	9	157	3171	9
122	3133	9	158	3172	9
123	3134	5	159	Haritha	5
124	3135	5	160	Kranthi	9

Scale: 0: No incidence
1:1% of capsules infected
3: 10% of capsule infected
5: 11 – 25% of capsules infected
7: 26 – 50% of capsules infected
9: > 50% of capsules infected

0: No incidence
1: 1% capsule infected
3: 10 % capsule infected
5: 11-25% capsule infected
7: 26-50% capsule infected
9: >50% capsule infected

Germplasm accessions showing <10% capsule infection were categorized as resistant and others as susceptible to this disease.

RESULTS AND DISCUSSION

Out of 160 accessions screened, only six germplasm accessions viz., RG-2289, 2353, 2356, 2363, 3141, 3151 (Table-1) were found to be resistant. Grey rot incidence ranged from 10-90% on primary spikes of all entries was observed due to excess rain fall during the season and continuous high relative humidity from July to October. Grey rot incidence in these six accessions ranged from 0-3 (<10% capsule infection) where as in the susceptible check Kranti it was 93% capsule infection and 25% capsule infection in the resistant check Haritha and all remaining accessions showed more than 26-50% and more than 50% capsule infection and categorized as susceptible to this disease.

This disease causes 100% yield loss if prolonged wet weather prevails during flowering and capsule development. Similarly Anjani *et al*., (2004) screened 145 castor germplasm accessions against grey mold under artificial epiphytotics conditions at Directorate of Oilseeds Research, Hyderabad and reported six accessions were found to be moderately resistant.

From the above results it can be concluded that intensive screening of castor germplasm has enabled to identify sources of resistance to Botrytis grey rot. These resistant germplasm accessions can be used extensively in castor improvement programmes for the development of Botrytis grey rot resistant varieties and need to further evaluate for their stable resistant reaction and yield parameters.

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