J. Mycopathol. Res. ***57(3)*** *: 185-187, 2019;* (ISSN 0971-3719)

SHORT COMMUNICATION

Identification of reistance sources against Root rot [*Macrophomina phaseolina* (Tassi) Goid] disease of Castor

H.V. PARMAR*, H.J. KAPADIYA AND C.M. BHALIYA

Department of Plant Pathology, College of Agriculture, Junagarh Agricultural Uuniversity, Junagadh 362001, Gujarat

Received : 14.06.2019 Accepted : 14.08.2019 Published : 31.10.2019

Castor (*Ricinus communis* L.) root rot caused by *Macrophomina Phaseolina* is one of the most destructive disease and causes severe losses inyield. therefore, the present investigation was undertasken to screen different genotypes/varities for their resistance to root rot which can be used in cultivar improvement. Thirty-two genotypes/varities of castor were evaluate3d for locating new and better sources of resistance against root rot under sick plot conditions. Out of that, four genotypes JI-357(4.95%), JHB-1022(6.66%),JHB-1013 (17.62%) and SHB-982 (17.62%) regarded as resistant. While seventeen genotypes found moderately resistance with 32.72 % to 21.11% disease incidence. None of the entries were completely free from root rot infection and all the genotypes were more or less affected by the disease. The genotypes identified as resistant are of great value and mamy be exploited in the breeding program for developing high yielding resistant varieties.

Key words: Castor, germplasm, *Macrophomina phaseolina,* resistance, root rot

Castor (*Ricinus communis* L.) is an important non-edible industrial oilseed crop. Its oil contains more than 80% ricinoleic acid which confers distinctive industrial properties to the oil (Anjani *et al.* 2014). Castor grows as an indetermINate annual or perennial crop depending on climate and soil types in tropical , sub-tropical and warm temperature regions in the world. Castor is cultivated on a commercial scale in 30 countries;India, China, Brazil, USSR are the major castor growing countries in the world (Damodaram and hegde, 2010).

Root rot caused by *Macrophomina phaseolina* (Tassi) Goid is the most devastating disease of castor reported in several castor growing countries. The estimated yield loss due to the disease has been reported from 20% to 60%. This disease appears at different growth stages of crops and hence, it is named differently as named as spike blight, stem blight, twig blight, collar rot and root rot. The first symptom is yellowing and sudden drying of the plants. The taproot becomes dark brown quite brittle in dry soil and shows extensive rotting resulting in the loss of lateral roots. The lower portion of the taproot is often left in the soil when the plant is uprooted. Eventually, as the entire plant dries up, it Can be easily pulled up leaving behind its root in the soil. mangement of disease is difficult to achieve, as the pathogen is soil-borne and surviving through the resitant structure (sclerotia) in soil in the absens of the host. soil applications of fungicides ar costly and lead to indiscriminajte killing of beneficial soil microflora.

The most ideal and economical way of controling disease is the use of host resistance which can be determined by different germplasm screening techniques. Therefore, the identification of the resistance source is a basic need in breeding for disease resistance. Hence, the present investigation is proposed to find out the resistant sources against root rot of castor.

The study was conducted under field conditions in sick plot of root rot disease at Main oilseeds Research station, Junagadh. castor root rot infected plants were collected from the field and the isolations were made from roots showing characteristics symptoms of the disease. The purified culture of *M.phaseolina* was maintained on PDA slants for screening the germplasm line. The fungus was then multiplied in sand + maize medium by inoculating with 10mm PDA disc of

*Corresponding author : harshilprmr@gmail.com

Table 1: Disease reaction categories based on disease incidence

Score	Scale (%)	Disease reaction
0	0.00	High resistant
1	0.1 to 20.0	Resistant
2	20.1 to 40.00	Moderately resistance
3	40.1 to 50.00	Moderately susceptible
4	50.1 to 75	Susceptible
5	Above 75	Highly susceptible

Table 2: Screening of castor genotypes/varieties against root rot disease

Genotype/ variety	Disease incidence (%)	Disease reaction
JI-357	4.95	R
JHB-1022	6.66	R
JHB-1013	17.62	R
SHB-982	17.62	R
JI-429	21.11	MR
SKI-380	21.76	MR
JI-423	22.76	MR
SHB-1004	23.64	MR
SKI-387	24.64	MR
SHB-974	28.75	MR
JHB-1018	32.22	MR
JI-422	32.22	MR
SKI-388	32.41	MR
JHB-1027	32.52	MR
SHB-960	32.72	MR
JHB-1048	32.77	MR
SHB-970	33.00	MR
JHB-1042	34.25	MR
SHB-991	35.00	MR
SHB-994	35.00	MR
JHB-1049	38.29	MR
JHB-1050	41.77	MS
SKI-393	42.85	MS
SHB-1014	45.25	MS
SHB-1002	47.00	MS
SHB-966	49.17	MS
SHB-1006	53.33	S
GCH-4	53.47	S
JI-426	56.00	S
JHB-1038	68.75	S
SKI-390	72.33	S
SHB-1011	74.75	S

M.phaseolina at 28^{0}C for 15 days. In order to create an epidemic of the disease, the pathogen inoculum was applied in furrows at the time of sowing of castor seeds.

Isolation from dry root rot plants were taken from time to time to check the causal organism. The genotypes/varieties were grouped in different categories on the basis of root rot disease reaction as following suggested by Anjani *et at.* (2014) for castor germplasm for Fusarium wilt (*Fusori um oxysponrm* f. sp. *ricini*) which was used for castor root rot (Table 1).

Out of 32 genotypes/varieties screened, 04 exhibited resistant reactions' 17 showed moderate resistances, 05 showed moderate susceptible, 06 found susceptible while none of the entries showed a high resistance or susceptible reaction (Table 2).

Root rot incidence had ranged from 4.95 Yo to 17.62 Yo among the four resistant genotypes/ varieties while it was 53.33 % to 74.75 % among six susceptible genotypes/varieties. Four genotypes viz.; Jl-357 (4.95 %), JHB-1022 (6.66 %), JHB-1013 (17.62%) and SHB-982 (17.62%) regarded as resistant. while six genotypes viz.; SHB-1006 (53.33%),GCH-4(53.47%),JI-426 (56.00%),JHB-1038 (68.75%),SKI-390(72,33%) and SHB-1011 (74.75 %) showed susceptible reaction.

Genotypes viz,; Jl-429 (21.11%), SKL-380 (21. 76%l, Jl-423 (22.76 %), SHB-1004 (23.64%) SKI-387 (24.64%), SHB-9741 (28.75 %), JHB-1018 (32.22%), Jl-422 (32.22 %)', SKl-388 (32.41%) JHB-1027 (32.52%), SHB-960 (32.72%), JHB.1048 (32.77 %),SHB-970 (33.00 %)JHB- 1042 (34.25 %), SHB-991 (35.00 %), SHB-994 (35.00 %) and JHB-1049 (38.29 %) found moderately resistance. Genotypes viz.; JHB-1050 (41.77 %), SKI-393 (42.85 %), SHB-1014 (45.25 %) SHB-100 2 (47.00 %) and SHB-966 (49.17 %) found moderately susceptible. None of the entries were completely free from root rot and all the genotypes were more or less affected by the disease.Similar findings have been reported earlier where it was observed that 19 germplasm of castor were resistant toward the root rot diseases. The disease incidence in this germplasm was ranged from 0 to15%.Castor genotypes have been screened and identified as resistant to root rot and wilt by various workers on the basis of the field experiment.

Use of resistant varieties is the best method of avoiding the occurrence of the disease. Looking at the importance of this method, thirty-two

genotypes/varieties of castor were screened against root rot disease. out of these, four genotypes viz.; Jl-357 (4.95 %), JHB- 1022 (6.66 %), JHB-1013 (17.62%) and SHB-982 (17.62 %) regarded as resistant which would Serve as donors of root rot resistance in castor resistance for breeding purpose.

REFERENCES

Anjani, K., Raoof, M. A. and Desai, A. G. 2014. Evaluation Of castor germplasm for resistance to Fusarium wilt. *Europeon Journal of Plant Pathology*. **139:**567-578.

Damodaram,T.,and Hegde,D.M. 2010. *Oitseeds situation :A statistical compendium*. Hyderabad: Directorate of Oilseeds Research.