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Short Note

Evaluation of host resistance against common rust, Fusarium stalk rot and charcoal rot of maize

Akhilesh Singh
CSK Himachal Pradesh Krishi Vishvavidyalaya
Hill Agricultural Research and Extension Centre, Dhaulakuan-173 001, India.

In India, maize is traditionally grown during the summer season. Cultivation of winter maize was started in mid sixties. Interestingly, during this season average grain yield of 6-8t/ha has been realized against <2t/ha obtained during summer season (Singh, 1998) . Hence, winter maize with its high productivity potential has opened up a viable alternative for diversification of crop production leading to the sustainable agriculture in the country (Singh, 1998). However, among various constraints, diseases like common rust (*Puccinia sorghi*), Fusarium stalk rot (*Fusarium moliniformae*) and charcoal rot (*Marcrophomina phaseolina*) take a heavy toll of this crop. Though these diseases can be managed by the use of fungitoxicants (Sharma *et al.* 1993) but the resource starved farmers can not afford to apply costly biocides. Hence, the cultivation of resistant varieties is economically recommended. Composites and hybrids of *rabi* maize are susceptible to common rust, Fusarium stalk rot and charcoal rot. The present studies were carried out to find out suitable sources of multiple resistance for maize diseases like common rust. Fusarium stalk rot and charcoal rot.

The materials consisted of 205 hybrid and composite entries of maize, received from Directorate of Maize Research, New Delhi. Each entry was planted in 4 row plot of 5 meter length in first week of November during rabi 2004-05 and 2005-06 using recommended package of practices (Anon, 2002). For creating the epiphytotics inoculum of locally available isolate of *Puccinia sorghi* was sprayed starting from second week of February at weekly interval. The data were recorded on disease reaction based on 0-5scale (Gupta, 1983).

Two rows in each entry were inoculated with 15 days old culture of *Fusarium moliniformae* and remaining two rows with *Marcrophomina phaseolina* 150 days after sowing. The data were recorded 21 days after inoculations on both stalk rots reaction following the scale of Payak and Sharma (1981).

Thirteen, 41 and 27 genotypes were found highly resistant to common rust, Fusarium stalk rot and charcoal rot, respectively. Seventy three, 34 and 39 genotypes were resistant to common rust, Fusarium stalk rot and charcoal rot, respectively (Table 1). Twenty four genotypes *viz*; AH - 1415, BISCO 1084, BIO - 22069, -22027, DMH-888, FH-3276, GSC-710,-721, KHH-1203, JKMH-82, -93, -462, MON-22, -24, PRO-311, PHS-90 (W), PM-101, PARBHAT, Comp.R -9903, Seed Tech- 2324, -2064,-3036,ZMH-1614,-1415 showed resistant reaction against all three diseases. Cultivars possessing resistance against Fusarium stalk rot and common rust are available in the most of the countries (Sharma *et al.* 1993; Singh *et al.* 2000). Interestingly, Novjort, Parbhat and Deccan-103 are recommended cultivars of *rabi* maize (Singh, 1998). Sources of resistance against common rust have also been reported in India (Kumar *et al.* 1989; Singh and Kumar, 2006).

It is evident from the present studies that diversity for resistance against common rust, Fusarium stalk rot and charcoal rot are present in the present day advanced breeding material in India. They may be exploited in the disease prone areas.

Table 1 List of maize hybrids and composites resistant to common rust , Fusarium stalk rot and Charcoal rot (2004-05 and 2005-06)

Disease	Highly resistant	Resistant
Common rust (*P. sorghi*)	AH-24009, -24067, -48002, -48004, BISCO-Bumper, DMH-869, JH-7983, MON-21, MH06-1,-4, Seed Tech-2203, -2204, X-1363Y	AH-41403, -41404, -41411,- 4507, 48006,-45018, -24010, -24033, BIO-210, -9681,-2074,- 22069,-2084, -02, BISCO -1074, DMH-879,-849, FH- 3239, GWC-9306, GSC-733, HQPM-4, HKH-1200, -1215, -1188, -1189, -1201,-1237,-1203,JH-8114;-8185,-8099,-8077, -8165. -7934,-7946,-7995,-8017,-7475, JC1490,-493, JKMH-51,-62,-1701,-810,-1200, KH510, Kiran, Kaveri-2009. -2010, MON-05,- 25,-26, MH06-2, -3, -5, MHQPM-06-1,-2, POLO, PHS-90(W), PM-105, -106, QPM-601, Seed Tech-1054, -1064, -2324,-2054, -3054,-940,SMH-3304, VC 2005, V-32,WL-SYN-1
Fusarium stalk rot (*F. moliniformae*)	AH-41404, -41406, -24003, BQPMH-102, BIO9681, -201, BISCO1074, -3084, BH3165, DMH-879, -849,GHC-733, HKH-1200, JANAK, JKMH-702,-1512, -62,-810, JH8142,-7946,-7995, -8005, -8016. -8017, -7154, JC1490, -1492, -1493, PHS-45 (Y), PAC-74033, PM 105, -106, SMH-3304, Seed Tech- 1054,-1064, -3054, -2203, -2204, V-37, X-1363 Y , -24059	AH1404, -24008, BQPM-108, BIO-31001, BISCO-2074, -3074, -bumper, DMH-69, EC3122, GSC-711, HKH-1215, -1188, JKMH-51, -1701, JH-7943, -7475, 7654, -7233, KH-510, Kiran , Kaveri-2009, - 2010, MON-21 -23, -05, Navjot, PM-01, -02, 3342 (Y), V-36,X-5042, -24056,-1280M, ZMH-1921
Charcoal rot (*M. phaseolina*)	AH-41403, BQPMH-102,-108, BISCO -2074, BH-3165, DMH-849,-879, GSC-711, -733, HKH-1200,-1188,-1200, -1237, JH-8142, -7934,-7943,-7946, -7995, -8005, -8017, JKMH-1512, JC-1490,-1492, PM-01,-105, SMH 3304, Seed Tech-940, -1054, V-37, X-24059, ZMH-1921	AH-41404,-41406,-41411,-1408,-24008,-24003, BISCO-1074,-2084, -3078,-3084, BIO9681, BH-3051, EC-3122, FH-3239, HKH-1215, JH-8016,-7154, -475, Janak, JKMH-702,-51,-62, -810, KH 510, Kiran, Kaveri 2009, -2010, MON-23,-21, -05, PHS-45(Y), PAC-74033, PM-106, Seed Tech -2054,-1064,-3054, X-1363 Y,-5042, -24056

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