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Performance of promising hybrids and varieties of pearl millet against blast (*Pyricularia grisea*)

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Abstract

Pearl millet (*Pennisetum glaucum*) is an important nutri-cereal for human as well as a forage/fodder crop for livestock. Blast incited by *Pyricularia grisea* (Cooke) Sacc. has occupied a key position among the pearl millet diseases resulting severe losses in high yield potential hybrids/ varieties particularly cultivated for fodder purpose. The disease can be best managed through host plant resistance. A total of Fifty promising pearl millet hybrids and varieties were evaluated in two replications at research farm of agriculture college of Gwalior during *Kharif* 2017 against blast under favourable condition. The tested entries showed a great variation in response to blast as their blast PDI range from 0.0 to 99.99% .Three entries viz. GHB538,MPMH17 and NHB5061 were absolutely free from the disease. In respect of blast reaction these three entries were significantly superior over rest of the 47 entries. The maximum blast PDI (99.9%) was recorded in the susceptible check ICMB95444.

Keywords: Pearl millet, screening, disease severity, varieties

Introduction

Pearl millet [*Pennisetum glaucum* (L) R. Br.] also known as bajra is an important grain and forage cereal of India. In addition to its grain consumption it is also used as green fodder, Athwal and Gupta (1966) [1] carried out detailed analysis of green fodder and reported that its protein content ranged from 8.0-13.7 per cent in varieties and 5.0-14.6 percent in inbred lines in India. Pearl millet fodder when fed green to the animals has easy digestibility. Among several diseases that affect pearl millet, downy mildew caused by *Sclerospora graminicola* has already been a major problem of pearl millet hybrids. Now blast, also known as leaf spot caused by *Pyricularia grisea* (teleomorph: *Magnaporthe grisea*) has emerged as another serious disease affecting both forage and grain production in pearl millet. The disease appears as grayish, water-soaked foliar lesions that enlarge and become necrotic, resulting in extensive chlorosis and premature drying of leaves. (Wilson *et al.* 1989) [3]. Due to the destructive nature of the disease, careful selection of pearl millet genotype. A variety would be popular only if it is high yielding, fertilizer responsive and disease resistant. The economic loss of farmers can be minimized by providing disease resistant varieties. The present investigation therefore was undertaken to evaluate elite pearl millet promising hybrids and varieties to identify resistance to blast.

Materials and Methods

The field experiment was conducted to determine the resistance levels in promising hybrids and varieties at Research farm of Department of Plant Pathology, Gwalior during *kharif* 2017-18 . Fifty entries including checks were evaluated for their reaction against *Pyricularia grisea* planted in 4 m single row length with fertilizer dose 60 N, 40 P₂O₅, 20 K₂O Kg/ha . Disease severity was recorded at the hard dough stage using a 1-9 progressive scale developed at International Rice Research Institute (IRRI), Philippines for blast on the 5 randomly selected and tagged plants of each line. The variation of different entries in response to severity were tested for significance by using randomized block design with two replications.

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Table 1: Evaluation of hybrids varieties, locally collected and other pearl millet material against blast

S. no.	Lines	PDI (Mean)	S.no.	Lines	PDI (Mean)
1.	Krishna 9119	44.44 (41.70)	26.	JBV-2	42.15 (40.48)
2.	Kaveri super boss	35.50 (36.46)	27.	JBV-3	59.95 (50.84)
3.	krishna 7207	34.40 (35.89)	28.	JBV-4	51.05 (45.66)
4.	proagro 9444	59.95 (50.73)	29.	Bhind local	22.15 (27.93)
5.	Pioneer 86M88	33.30 (35.05)	30.	Dhanshakti	83.25 (65.93)
6.	Pioneer 86M86	48.87 (44.29)	31.	ICMB01333	38.85 (38.47)
7.	Pioneer 86M84	46.60 (42.95)	32.	ICMB02444	77.70 (62.59)
8.	Dhaanya 7888	54.35 (47.61)	33.	ICMB07111	8.89 (17.18)
9.	Dhaanya 7792	29.90 (32.79)	34.	ICMB92777	73.25 (38.12)
10.	HHB 272	31.05 (33.83)	35.	ICMB93333	15.50 (23.14)
11.	MPMH21	8.86 (17.13)	36.	ICMB97222-P1	43.30 (41.15)
12.	HHB226	25.50 (30.29)	37.	ICMR02222	49.95 (45.07)
13.	RHB177	13.31 (21.33)	38.	ICMR06444	25.50 (30.33)
14.	GHB538	0.00 (0.00)	39.	ICMR11003	53.25 (46.97)
15.	HHB67 Imp	25.52 (30.33)	40.	ICMR07888	96.60 (79.52)
16.	MPMH17	0.00 (0.00)	41.	ICMR11333	62.15 (52.07)
17.	RHB173	29.95 (33.12)	42.	GHB905	15.51 (22.98)
18.	HHB197	36.60 (37.21)	43.	Pratap	61.05 (51.40)
19.	GHB558	13.31 (21.33)	44.	Nandi61	42.15 (40.48)
20.	GHB744	24.40 (29.58)	45.	Nandi65	52.15 (46.34)
21.	HHB223	16.60 (24.00)	46.	RAJ 171	47.70 (43.78)
22.	KBH108	24.40 (29.58)	47.	RAJ 179	81.05 (64.28)
23.	GHB732	53.30 (46.88)	48.	ICMV 221	52.15 (46.34)
24.	NHB5767	25.50 (30.28)	49.	Pusa Co. 383	75.50 (60.32)
25.	NHB5061	0.00 (0.00)	50.	ICMB95444 (Check)	99.90 (84.53)
SE(m) 4.11					
C.D (at 5%) 11.69					

Results and discussion

A total of Fifty entries of pearl millet consisting of hybrids and varieties were screened exposed that, a great variation found in response to their PDI range from 0.0 to 99.99%. Three entries viz. GHB538, MPMH17 and NHB5061 were absolutely free from the disease. Two hybrids /varieties viz., MPMH21 and ICMBB111 exhibited up to 10% PDI. Five entries were fall in the category of 10.1-20% PDI, 9 showed the disease incidence between 20.1% to 30% and remaining thirty four entries showed >30% blast incidence. In respect of blast reaction three entries viz. GHB538, MPMH17 and NHB5061 were significantly superior over rest of the 47

entries. The maximum blast PDI (99.9%) was recorded in the susceptible check ICMB95444 and due to severe blast this entry could not produce ear head and dried prematurely. ICMB95444 showed significantly higher disease the rest of the other 49 tested entries. Yadav *et al.* (2013) [4] evaluated twenty five promising pearl millet hybrids and varieties against blast. The minimum severity of 7.5% was recorded in PB 106, GHB-744, and GHB-732, while its maximum severity (32.50%) was recorded in B-2301, PB 106, GHB 744 and GHB-732. One thirty five pearl millet lines were evaluated against blast at Gwalior and reported blast severity in the range of 0 - 47.5%. The result reveals that only one entry MH 1541 remained completely free from blast while its maximum severity i.e. 47.5% was recorded in MH 1513. Devda (2009) [2].

Conclusion

It can be concluded that three entries viz. GHB538, MPMH17 and NHB5061 tested from field trial were found resistant to leaf and neck blast. Thus, these promising lines were confirmed and exploited for breeding programme.

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