Original Research Article

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Screening of Finger Millet (*Eleusine coracana*) Varieties for Resistant to Blast (*Magnaporthe grisea*) Disease in Bastar District, Chhattisgarh, India

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ABSTRACT

Keywords

Finger millet, Screening, Blast disease, Resistant, Susceptible

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The field experiment was conducted during Kharif 2018 at Saheed Gundadhar College of Agriculture and Research Station, Jagdalpur, IGKV, Raipur (CG), to identify the resistant sources for blast disease (*Magnaporthe grisea*). Result revealed that none of the varieties was found resistant against leaf blast. However, variety GPU 99 (0.0%) was found resistant against neck blast and variety GPU 98 (2.41) and GSMC-1 (1.13) was promising for finger blast resistant. The mean of all location revealed that none of the entries were show resistant for leaf last. The incidence ranged from 9.15 to 23.56, and 7.74 to 18.30 in neck blast and finger blast respectively.

Introduction

Small millets are the traditional crops, agronomically more adapted to less fertile soils. The important small millets grown in India are finger millet, kodo millet, little millet, foxtail millet, barnyard millet and proso millets (Netam *et al.*, 2014). Finger millet (*Eleusine coracana*) is one of the major staple foods in tribal region of the rural

community of Bastar, Chhattisgarh. It is commonly known as bird foot, maida, ragi in different place of India. Finger millet contributes to about 10 percent of the total area (34.6 m ha) planted to millets (Patro *et al.*, 2018). In India, finger millet ranks next to pearl millet and is cultivated on 2.6 m ha area with a production of about 3.0 mt and accounts for 81% of the minor millets produced (Shastri, 1989). A number of

constraints limit finger millet production and productivity. In India, blast is one of the major diseases causing recurring yield losses in all the state (Seetharam, 1983). Blast is the most destructive disease of finger millet because of its aggressiveness. Finger millet blast is caused by the fungus *Magnaporthe grisea* (anamorph *Pyricularia grisea*). The pathogen attacks all stages of crop development (vegetative and productive stages) (Mgonja *et al.*, 2013).

Materials and Methods

Twenty four entries with one local check (*udru millage*) and one resistant check (GE 4449) under an initial varietal trail were conducted at New Upland Research Station cum Instructional Farm, Lamker under SG College of Agriculture and Research Station, Jagdalpur, Bastar (CG) during *Kharif* season 2018.

These entries were sown in two rows of 3 meter length and 22.5 cm × 10 cm spacing with to find out resistant sources against blast disease of finger millet. The recommended agronomic practices were adopted at the time

of crop growth. Infected plants were examined for lesion development and disease severity was assessed on the basis of lesion length by using 0 to 5 scale (Anonymous, 1995) (Table 1) Neck blast (%) and finger blast (%) was calculated by using the following formula:

$$\text{Neck blast (\%)} = \frac{\text{No. of infected panicles}}{\text{Total number of panicle}} \times 100$$

$$\text{Finger blast (\%)} = \frac{\text{No. of infected finger}}{\text{Average no.of finger} \times \text{total number of panicle}} \times 100$$

Results and Discussion

Twenty four entries were tested during *Kharif* 2018-19 with one local check (*Udru mallige*) and one resistant check (GE 4449) under Initial Varietal Trial. Disease incidence was recorded in 1 to 4 Grade (G) for leaf blast, Neck blast 0.0 to 45.83% and Finger blast 1.13 to 25.17%. Entry GPU 99 (0.0%) shows tolerant against neck blast and entry, GPU 98 (2.41%) and GSMC-1 (1.13%) was found promising for finger blast resistant in Chhattisgarh state (Table 2).

Table.1 Standard Evaluation System (SES) scale for leaf blast disease

Score	Description	Reaction
0	No lesion/ symptoms on leaves	No disease/HR
1	Small brown specks of pinhead to slightly elongate, necrotic grey spots with a brown margin, less than 1% area affected	R
2	A typical blast lesion elliptical, 5-10 mm long, 1-5% of leaf area affected	MR
3	A typical blast lesion elliptical, 1-2 cm long, 6-25% of leaf area affected	MS
4	26-50% leaf area affected	S
5	More than 50% of leaf area affected with coalescing lesions	HS

Table.2 Disease reaction of finger millet entries in Initial varietal trial against blast

S.NO	Entry	Bastar			Mean of Eight centers		
		LB(G)	FB (%)	NB (%)	LB(G)	FB (%)	NB (%)
1	WN 562	2.00	7.89	15.87	3.38	12.09	12.20
2	GPU 99	2.33	7.00	0.00	3.20	14.51	14.19
3	GPU 67	2.67	20.68	45.83	3.58	15.12	18.36
4	KMR 652	3.67	8.52	19.20	4.13	14.84	19.75
5	VR1117	2.00	8.16	13.70	3.33	11.86	12.85
6	VL 394	2.00	11.88	13.43	3.42	14.04	16.60
7	GPU 45	1.67	11.38	12.02	3.00	13.44	14.25
8	HR-13	1.67	25.17	12.75	3.13	16.20	14.20
9	KMR 650	1.33	17.40	23.33	2.62	7.74	9.15
10	RAUF 17	2.00	8.25	35.26	2.91	8.02	15.20
11	TNEc 1299	3.33	17.25	24.22	4.21	16.73	21.87
12	WN 591	2.33	11.29	8.37	3.17	14.44	14.86
13	VL 376	1.67	10.59	16.56	2.79	12.30	11.48
14	VR 1110	3.00	11.39	28.59	3.67	11.92	17.69
15	VL 382	2.00	6.39	31.31	3.63	13.22	19.06
16	BR-14-27	3.00	6.43	24.19	4.00	15.74	18.34
17	PR 202	3.33	14.06	38.73	3.63	18.30	19.82
18	TNEc 1297	3.67	12.65	34.60	3.46	17.65	23.48
19	GPU 98	2.00	2.41	13.75	3.21	11.70	13.75
20	OEB 604	2.33	11.83	14.29	3.54	9.83	11.13
21	PR 1639	3.33	16.24	9.03	3.67	15.59	14.86
22	IIMRFM-8023-17	3.33	9.56	27.21	4.50	16.85	23.56
23	IIMRFM-8011-17	1.33	3.92	24.38	3.08	11.21	13.21
24	GSMC-1	1.67	1.13	5.66	3.21	10.89	10.80
25	Resistant (GE 4449)	2.33	6.58	13.10	2.02	5.27	4.92
26	Local (Udru mallige)	3.33	15.96	35.73	5.67	31.48	34.86
	SEm±	2.44	11.07	21.94	3.49	14.66	17.55
	C.D.(5%)	0.81	2.57	6.13	1.11	7.66	11.91
	C.V. (%)	20.15	14.06	16.58	32.02	44.81	51.04

LB-Leaf blast, NB- Neck blast, FB- Finger blast

The mean of eight locations over all India revealed that no entries were found resistant against leaf blast. The minimum severity percentage of neck blast (9.15%) and in finger blast (7.74%) was recorded in entry KMR 650 and maximum percentage of disease severity

of neck blast was recorded in IIMRFM-8023-17(23.56%),TNEc1297 (23.48%) and TNEc 1299 (21.87%) respectively and in finger blast entry PR 202 (18.30%) show maximum percentage of disease severity. Patro *et al.*, (2016) and Nagaraja *et al.*, (2016) Screened

12 elite finger millet cultivars among them, GE 4449 and GPU 28 were reported to be resistance to leaf blast and GE 4440, E 4449 and GPU 28 were moderate resistance/susceptible to neck blast and finger blast.

Divya *et al.*, (2017) screened 10 genotype were evaluated for resistance to blast none genotype were found free from disease incidence.

Minimum percentages of neck blast severity was recorded in VL 379 (14.82), while the minimum finger blast severity (13.70%), was recorded in GPU-45.

Screening the twenty four varieties of initial varietal trial of finger millets with one resistant and one susceptible check. Variety GPU 99 (0.0%) was found resistant against neck blast and, entry GPU 98 (2.41%) and GSMC-1 (1.13%) was promising for finger blast resistant during one year experimentation.

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