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Screening of finger millet (*Eleusine coracana*) genotypes for resistance to Blast (*Pyricularia grisea*) disease

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Abstract
The field experiment was conducted during *Kharif* 2021 at Shaheed Gundadhur College of Agriculture and Research Station, Jagdalpur, IGKV, Raipur (CG), to identify the resistant sources for blast disease (*Magnaporthe grisea*). Under the initial varietal trial twenty six genotypes evaluated with one resistant (GE4449) and susceptible (*Udru mallige*). Among them none of the genotypes were found to be resistant for leaf blast. However, genotypes IIMR-FM-7028, IIMR-FM-7835, DHFM-78-33, DPLM-3, BR-9, KMR-711, KOPN-1056 and VL-410 are exhibit the immune reaction against neck blast. In case of finger blast, it was ranged from 3.68% (IIMR-FM-7028) to 30.84% (DHFM-78-33), whereas the incidence was 15.39% in check. The mean of all location revealed that only four entries found to be promising for leaf blast resistant. The incidence ranged from 9.38 to 32.40 and 7.41 to 27.83 percent in finger blast and neck blast respectively.

Keywords: Finger millet, screening, blast disease, resistant, susceptible

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, R.S. *et al.*, 2014). Finger millet (*Eleusine coracana*) is one of the major staple food as well as feed and fodder for cattle in tribal region of the rural community of Bastar, Chhattisgarh. It is commonly known as bird foot, madia, 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) [7]. 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) [9]. 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) [10]. 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, M. *et al*., 2013) [4]. Blast disease appears on leaf lamina with typical spindle shaped spots and pathogen attack all aerial part of finger millet plant causing leaf, neck and finger blast and often resulting in >50% yield loss (Esele., 2002) [3]

Material and method
An initial varietal trial of finger millet genotypes were screened under field condition against the finger millet blast cause by *Pyricularia grisea* during *kharif* 2021 at Shaheed Gundadhur College of Agriculture and Research Station, Jagdalpur, IGKV, Raipur (CG), Twenty six 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 (CG) during *Kharif* season 2021. These genotypes 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) [1] (Table 1). Neck blast (%) and finger blast (%) was calculated by using the following formula.

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

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

Table 1: Standard Operating Principle (SOP) 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
3	A typical blast lesion elliptical, 5-10 mm long, 1-5% of leaf area affected	MR
5	A typical blast lesion elliptical, 1-2 cm long, 6-25% of leaf area affected	MS
7	26-50% leaf area affected	S
9	More than 50% of leaf area affected with coalescing lesions	HS

Result and Discussion

26 found genotypes were evaluated in *Kharif* 2021 with one susceptible local check (*Udru mallige*) and one resistant check (GE 4449) under Initial varietal trial (IVT). All genotypes were show leaf blast range from 3.6-7.1G, neck blast ranged 0 to 46.99%, finger blast 2.46 to 30.84%. Entry IIMR-FM-7028, IIMR-FM-7202, DHFM-78-33, DPLM-3, BR-9, KMR-711, KOPN-1056 and VL 410 found highly resistant and CFMV-2 (9.7%), VL-376 (7.2%) was recorded promising resistant for neck blast. For finger blast entries VR 1152, IIMR-FM-7028, IIMR-FM-7202, DPLM-2, DPLM-3, BR-14-28, VL-410, PR 202, KOPN-1055 and CFMV-1 recorded promising for resistant. Nine entries (VR 1152, WN 566, IIMR-FM-7202, DPLM-2, KMR-710, TNEC 1335, TNEC 1338, KOPN-1056 and PR 202 were found highly resistant for banded blight.

The mean of nine location revealed that no entries were found to resistant against leaf blast. The minimum severity percentage of neck blast was recorded in IIMR-FM-7028 (8.07%), WN 566 (8.84%), KOPN-1056 (8.84%) respectively and in finger blast VL 410 (11.59%) followed by CFMV-2 (11.65%), IIMR-FM-7028 (11.80%) and maximum percentage of disease severity of neck blast was recorded in genotype TNEC-1335 (27.83%) and in finger blast genotype TNEC 1335 (32.40) show maximum percentage of disease severity.

Patro *et al.* (2016) [7] and Nagaraja *et al.* (2016) [5] 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) [2] screened 10 genotypes were evaluated for resistance to blast none genotype were found free from disease incidence. Minimum percentage of neck blast severity was recorded in VL 379 (14.82), while the minimum finger blast severity (13.70%) was recorded in GPU-45. Netam *et al.* (2022) [11] evaluated 27 genotype of finger millet and found that all genotypes were promising for leaf blast range between 1.67 to 3.67 G, whereas neck blast incidence between 0 to 34.60% and genotypes OEB 610 (7.56%), PPR 1096 (9.44%), KMR 702 (4.95%) found promising to resistant neck blast, all genotype found resistant for finger blast.

Table 2: Screening of finger millet genotypes for blast diseases under Initial Varietal Trial (IVT)

S. No.	Genotype	Jagdalpur Centre			Mean of Nine centre		
		LB (G)	FB (%)	NB (%)	LB (G)	FB (%)	NB (%)
1	VR 1152	6.47	7.38	46.99	5.0	14.27	16.61
2	VR 1149	3.6	20.27	32.42	4.2	27.95	22.16
3	WN 566	5.07	13.78	12.5	4.03	12.68	8.84
4	IIMR-FM-7066	5.8	14.21	33.33	5.19	26.91	25.65
5	IIMR-FM-7028	4.67	3.68	0.0	4.33	11.8	8.07
6	IIMR-FM-7202	5.13	5.37	0.0	4.7	13.21	11.15
7	IIMR-FM-7835	6.6	13.79	18.81	4.82	25.2	22.3
8	WN 572	5.07	9.97	17.35	4.04	13.42	11.69
9	DHFM-13-6	6.27	15.43	10.93	4.57	13.95	12.16
10	DHFM-78-33	6.73	30.84	0.0	5.43	17.11	9.83
11	DPLM-2	4.53	2.46	13.35	3.77	18.24	13.63
12	DPLM-3	6.53	3.97	0.0	4.71	14.78	10
13	KMR 710	5.13	20.99	12.5	4.7	18.35	13.59
14	BR-9	6.27	18.19	0.0	4.68	17.44	9.44
15	BR-14-28	7.07	7.07	16.06	5.21	16.79	14.85
16	GPU-67	6.47	13.36	31.35	4.78	21.14	19.76
17	TNEC 1335	5.67	17.61	12.26	4.23	32.40	27.83
18	TNEC 1338	5.27	16.28	22.06	4.19	17.67	18.48
19	KMR-711	6.13	11.97	0.0	4.22	14.6	9.26
20	KOPN-1056	6.07	24.46	0.0	4.06	13.73	8.84
21	VL-410	4.87	5.93	0.0	3.33	11.59	7.41
22	PR-202	6.73	5.53	12.08	5.04	15.79	14.06
23	CFMV-2	6.8	12.06	9.71	4.32	11.65	9.55
24	KOPN-1055	6.0	7.77	17.65	4.59	13.24	15.11

25	CFMV-1	3.67	4.13	11.96	2.85	14.65	14.13
26	VL-376	4.0	10.37	7.22	3.84	13.71	14.29
27	GE4449(Resistant)	3.87	4.6	5.81	2.7	9.38	7.36
28	*Udru Millage* (Susceptible)	5.87	15.39	34.09	6.43	31.3	31.43
	Local Mean	5.58	12.03	14.02	4.43	17.25	14.57
	C.D. (5%)	1.13	4.55	8.69	1.0	7.89	8.58
	C.V. (%)	12.38	23.08	37.83	24.25	49.25	62.68

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