



Research Article

PRELIMINARY FIELD EVALUATION OF FINGER MILLET (*Eleusine coracana*) GENOTYPES AGAINST BLAST DISEASE (*Magnaporthe grisea*) RESISTANCE UNDER BASTAR PLATEAU AGROECOLOGICAL

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Abstract: The field experiment was conducted during *Kharif* 2020 at Saheed Gundadhar College of Agriculture and Research Station, Jagdalpur, IGKV, Raipur (CG), to identify the resistant genotypes for blast disease (*Magnaporthe grisea*). Under an initial varietal trial were twenty-seven genotypes evaluated with one resistant (GE4449) and susceptible (*Udru mallige*) check varieties and found that all genotypes were promising for leaf blast resistant where show the leaf blast range between 1.67 to 3.67 G. Genotype PR1731 found highly resistant and OEB 610 (7.24%), GPU 103 (7.56%), PPR 1096 (9.44%) and KMR 702 (4.95%) was recorded promising to resistant for neck blast and maximum severity was observed in RAUF-25 (34.60%). For finger blast all the genotype were found to be resistant and severity range between 1.04 to 6.81%. This experiment was carried out in seven different location of India and the mean of all seven-location revealed that the incidence ranged from 2.72 to 5.03 G in leaf blast and 13.01 to 34.4% and 7 to 21.23 % for neck blast and finger blast respectively. All the entries were show resistant to moderately resistant for leaf blast, neck blast and finger blast only IIMR-FM 3001 susceptible for finger blast.

Keywords: Finger millet, Screening, Blast disease, Resistant, Susceptible

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Introduction

Small millets are the traditional crops, which are easily grown in less fertile soils. The most important small millet crops are finger millet, kodo millet, little millet, foxtail millet, barnyard millet and proso millets which are grown in India [1]. 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, mada, ragi in different place of India. Finger millet is also known as ragi, African millet and bird's foot millet and an important staple food crop in part of easter and central Africa and India [2].

Finger millet (*Eleusine coracana*) is one of the important cereal crops, originated in East Africa, belonging to the family poaceae. Finger millet contributes to about 10 percent of the total area (34.6 m ha) planted to millets [3]. 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 [4].

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 [5]. Blast disease is more destructive in finger millet due to blast pathogen aggressiveness. Finger millet blast is caused by the fungus pathogen *Magnaporthe grisea* (anamorph *Piricularia grisea*). The pathogen attacks all stages of crop development (vegetative and productive stages) [6].

Material and methods

Twenty-seven entries evaluated with one local susceptible check (*Udru mallige*) and one resistant check (GE 4449) under an initial varietal trial were conducted at New Upland Research Station cum Instructional Farm, Lamker under SG College of Agriculture and Research Station, Jagdalpur (CG) during *Kharif* season 2020. These entries were sown under randomized block design (RBD) with three

replications in two rows of 3 meters length with 22.5 cm row to row × 10 cm plant to plant spacing, to find out the resistant genotypes 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 9 scale [7] [Table-1]. Neck blast (%) and finger blast (%) incidence was calculated by using the following formula:

Neck blast (%) = (No. of infected panicles) / (Total number of panicle) × 100

Finger blast (%) = (No. of infected finger) / (Average no. of finger × total number of panicle) × 100

Result and discussion

Twenty-seven found entries were evaluated in *Kharif* 2020 with one susceptible check (*Udru mallige*) and one resistant check (GE 4449) under IVT. All genotypes were show leaf blast range from 2-3G, neck blast ranged 0 to 34.60%, finger blast 1.04 to 6.8. Genotype PR1731 found highly resistant and OEB 610 (7.24%), GPU 103 (7.56%), PPR 1096 (9.44%) and KMR 702 (4.95%) was recorded promising to resistant for neck blast. All genotypes were found promising for resistant for finger blast. Experiment was conducted in 7 centers under different ecological conditions and the mean of all centers revealed that all entries were found to be resistant and entries IIMR-FM 3001 & BR 14-1.

Conclusion

Nagaraja et al. (2016) [8] evaluated 12 elite finger millets cultivars and reported that GE 4449 and GPU 28 found resistant for leaf blast and GE 4449 and GPU 28 was moderately resistant for neck and finger blast.

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

Score	Description	Reaction
1	Small, brown, pinhead size specks without sporulating centre	Highly Resistant (HR)
2	Small (1-2mm) roundish to elongated, necrotic grey spots with a distinct brown margin covering up to 5% leaf area	Resistant (R)
3	Typical blast lesions (≥ 3 mm) with sporulating center, covering 6-10% of the leaf area	Resistant (R)
4	Blast lesions covering 11-20% leaf area	Moderately Resistant (MR)
5	Blast lesions covering 21-30% leaf area	Moderately Resistant (MR)
6	Blast lesions covering 31-40% leaf area	Susceptible (S)
7	Blast lesions covering 41-50% leaf area	Susceptible (S)
8	Blast lesions covering 51-75% leaf area	Highly Susceptible (HS)
9	Blast lesions covering >75% leaf area & plant dead	Highly Susceptible (HS)

Table-2 Evaluation of finger millets initial varietal trial genotypes for resistance to blast disease

SNo	Entries	Jagdalpur centre			Mean of seven Centre		
		LB (G)	FB (%)	NB (%)	LB (G)	FB (%)	NB (%)
1	IIMR- FM-3002	2	3.21	19.69	3.12	12.33	15.18
2	BR 14-1	3.33	5.83	14.16	5.03	15.8	18.59
3	VL 408	2.33	6.71	27.78	3.72	11.83	15.71
4	TNEc 1326	2.67	6.14	10.37	4.6	17.77	14.23
5	IIMR- FM -3126	2.33	2.35	17.85	4.97	21.23	17.93
6	OEB 610	2.33	5.31	7.24	3.29	13.04	13.08
7	RAUF 25	2.67	5.26	34.59	4.28	18.31	22.08
8	GPU 103	2.33	2.87	7.56	3.84	12.75	11.22
9	IIMR- FM- 3003	2	3.09	27.34	3.3	11.18	17.48
10	BR-IAR 6	2.33	7.02	18.28	2.72	10.53	14.83
11	BR-IAR 5	3	4.98	14.42	4.41	12.15	15.73
12	PPR 1096	2.67	6.81	9.44	4.56	12.42	14.5
13	VR 1131	2	2.32	28.19	3.83	16.27	23.15
14	VR 1130	1.67	4.34	20.61	2.78	10.08	15.42
15	TNEc 1323	2	3.05	13.1	4.38	15.51	16.8
16	PR 1731	2.67	2.38	0	4.53	7	13.01
17	VL 407	2.33	2.51	11.13	2.92	12.14	14.7
18	KMR 656	3	3.41	10.81	3.61	14.21	15.56
19	PR 1433	2.33	1.73	26.65	4.76	19.14	21.97
20	IIMR-FM-3001	3.67	5.14	18.85	5.52	19.04	34.43
21	OEB 633	2.67	3.14	13.46	3.73	11.38	14.23
22	GPU 104	3	5.58	18.28	4.9	9.92	16.45
23	KMR 702	3.33	3.47	7.42	3.7	7.03	13.32
24	GPU 67	3	5.37	24.07	3.8	18.17	22.02
25	VL 376	2	2.7	32.4	2.84	12.69	18.84
26	PR 202	2.33	2.88	21.69	4.36	15.52	19.36
27	GPU 45	2.33	3.04	16.62	3.04	13.03	18.29
28	GE 4449 (Resistant)	2.33	1.56	13.1	2.57	9.9	11.6
29	Udru mallige (Susceptible)	3.67	7.52	34.82	6.83	34.61	46.48
Loc. Mean		2.56	4.16	18.7	4	14.31	18.17
C.D. (5%)		1.09	1.17	6.01	1.33	8.46	9.38
C.V. (%)		26.05	17.13	19.19	31.64	56.05	48.78

Divya *et al.* (2017) [9] screened 10 genotypes were evaluated of finger millets for blast disease and found all genotypes were free from blast disease incidence and recorded minimum percentage of neck blast severity in VL 379 (14.82%) and minimum finger blast severity in GPU 45 (19.70%). Patro *et al.* (2013) [10] evaluated 16 pre released and released varieties of finger millets and reported that nine varieties were resistant to all three forks of blast diseases.

Application of research: Present research will provide the resistance genotypes of finger millet for blast disease

Research Category: Plant Pathology

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Study area / Sample Collection: New Upland Research Station cum Instructional Farm, Lamker

Cultivar / Variety / Breed name: Finger Millet (*Eleusine coracana*)

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.
Ethical Committee Approval Number: Nil

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