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Identification of resistant sources in donor screening nursery (DSN) of little millet against *Rhizoctonia solani*, the cause of Sheath blight

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Abstract

A field experiment was conducted during *kharif*, 2017 at the Agricultural Research Station, Vizianagaram, Acharya N. G. Ranga Agricultural University, to identify the resistant sources for *Rhizoctonia solani* which causes banded blight disease in little millet. Results revealed that none of the genotypes was found free from sheath blight incidence. However, five varieties were moderately resistant to moderately susceptible. The mean of four centers revealed that seven varieties *viz.*, TNAU 178 (33.50), TNAU 176 (28.43), DLM 95 (31.78), GPUL 3 (35.01), TNPSu 201 (39.71), TNPSu 204 (34.33) and TNPSu 205 (38.80) were found to be resistant. These genotypes may be directly utilized for cultivation or for breeding varieties with inbuilt resistance against banded blight.

Keywords: Little millet, banded blight, screening, *Rhizoctonia solani*, resistant, susceptible

1. Introduction

Little millet known as Sama in Telugu, saamai in Tamil, Kutki in Hindi, saame in Kannada & chama in Malayalam is a wonderful millet which is suitable for people of all age groups. It helps to prevent constipation & heals all the problems related to stomach. Its high fiber helps to reduce the fat depositions in the body. Little Millets seeds are smaller than other millets, like foxtail millet, it is also high in iron content, high in fibre like Kodo and has high antioxidant activity. It helps in diabetes and diseases related stomach. By any nutritional parameter millets are miles ahead of rice and wheat in terms of their mineral content compared to rice and wheat (Gopalan *et al.* 2007) [2]. Staggered use of chemicals for the management of crop disease is often associated with problems such as pollution hazards and residual toxicity. Of course the diseases can effectively be controlled by application of fungicides. However, the poor farmers required only varieties with resistance to the diseases. A genotype with resistance to banded blight offered scope in breeding programme to evolve multiple disease resistant variety combined with good yield potential. Hence, the study was undertaken to identify the little millet genotypes resistant to banded blight disease.

2. Material and Methods

Thirteen varieties of little millet collected from GKVK, Bangalore were screened against *R. solani*, the cause of banded blight at Agricultural Research Station, Vizianagaram. The genotypes were screened under field conditions during *kharif*, 2014 for selection of resistant genotypes with recommended agronomic practices. And the same trial was also carried out at four centers *viz.*, Ranichauri, Athyandal and Rewa including Vizianagaram. Infected plants were examined for lesion development and disease severity was assessed on the basis of lesion length by using 0 to 5 scale (Anon, 1996) [1] (Table 1).

Table 1: Standard Evaluation System (SES) scale for sheath blight disease

Score	Description	Reaction
0	No incidence	Immune
1	Vertical spread of the lesions up to 20% of plant height	HR
2	Vertical spread of the lesions up to 21-30% of plant height	R
3	Vertical spread of the lesions up to 31-45% of plant height	MR/MS
4	Vertical spread of the lesions up to 46-65% of plant height	S
5	Vertical spread of the lesions up to 66-100% of plant height	HS

Percent Disease Index (PDI) was calculated by using the formula

$$\text{PDI for severity} = \frac{\text{Sum of all disease ratings}}{\text{Total no. of ratings} \times \text{Maximum disease grade}} \times 100$$

3. Results and Discussion

Twenty six little millet varieties were screened for banded blight reaction. Among those, no variety was found to be immune to *R. solani* also none found to be resistant. However, five varieties TNPSu 201 (54.67), TNPSu 204 (54.67), TNAU 178 (49.33), GPUL 3 (49.33) and DLM 95 (54.67) as moderately resistant to moderately susceptible. BL 8 (88.0) and JK 8 (86.67) was found to be as susceptible. Whereas, OLM 203 (resistant check) was recorded 76.00% and Acc. No. 115 (susceptible check) was recorded 73.33% (Table 2).

The mean of four centers revealed that seven varieties viz., TNAU 178 (33.50), TNAU 176 (28.43), DLM 95 (31.78), GPUL 3 (35.01), TNPSu 201 (39.71), TNPSu 204 (34.33) and TNPSu 205 (38.80) were found to be resistant. However, OLM 203 (resistant check) was recorded 53.04% and Acc. No. 115 (susceptible check) was recorded 51.22%.

Patro and Madhuri (2014) [6] screened 19 little millet genotypes of different maturity groups and reported that RLM 43 as resistant genotype and JK 8 as susceptible genotype. Patro *et al.* (2014) [6, 7] and Nagaraja *et al.* (2016) [3] reported that all the small millet crops were found infected with *R. solani*, whereas in the screening of little millet LAVT 19 and LAVT 14 were found as resistant genotypes. Similar research was also done in other small millet crops by Neeraja *et al.*, 2016 [4, 8], Patro *et al.*, 2013 [5] and Patro *et al.*, 2016 [8]. These genotypes would be of immense value to the breeders involved in developing high yielding resistant genotypes of little millet.

Table 2: Evaluation of little millet donor screening nursery (DSN)

S. No.	Entry	Vizianagaram	Mean over four centers
1	TNPSu 201	54.67	39.71
2	TNPSu 202	82.67	50.87
3	TNPSu 203	70.67	46.38
4	TNPSu 204	54.67	34.33
5	TNPSu 205	76.00	38.80
6	TNPSu 206	74.67	47.32
7	TNPSu 207	81.33	52.82
8	TNPSu 208	81.33	48.40
9	TNPSu 209	76.00	47.78
10	BL 6	73.33	37.11
11	BL 8	88.00	41.17
12	BL 150	81.33	41.25
13	TNAU 176	62.67	28.43
14	TNAU 178	49.33	33.50
15	GPUL 3	49.33	35.01
16	DHLM 28-4	64.00	40.62
17	RLM 208	74.67	50.08
18	RLM 209	84.00	44.47
19	RLM 224	84.00	44.63
20	Acc. NO. 60	76.00	51.07
21	Acc. NO. 148	69.33	41.30
22	DLM 95	54.67	31.78
23	DLM 103	81.33	41.96
24	OLM 203 (resistant check)	76.00	53.04
25	JK 8	86.67	52.19
26	Acc. NO. 115 (susceptible check)	73.33	51.22
	Mean	72.31	42.51
	CD (5%)	12.15	20.42
	CV	11.06	29.12

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