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TSSK Patro
Acharya NG. Ranga Agricultural University, Agricultural Research Station, Vizianagaram, Andhra Pradesh, India

KE Georgia
Acharya NG. Ranga Agricultural University, Agricultural Research Station, Vizianagaram, Andhra Pradesh, India

S Raj Kumar
Acharya NG. Ranga Agricultural University, Agricultural Research Station, Vizianagaram, Andhra Pradesh, India

N Anuradha
Acharya NG. Ranga Agricultural University, Agricultural Research Station, Vizianagaram, Andhra Pradesh, India

Y Sandhya Rani
Acharya NG. Ranga Agricultural University, Agricultural Research Station, Vizianagaram, Andhra Pradesh, India

U Triveni
Acharya NG. Ranga Agricultural University, Agricultural Research Station, Vizianagaram, Andhra Pradesh, India

P Jogarao
Acharya NG. Ranga Agricultural University, Agricultural Research Station, Vizianagaram, Andhra Pradesh, India

Corresponding Author:
TSSK Patro
Acharya NG. Ranga Agricultural University, Agricultural Research Station, Vizianagaram, Andhra Pradesh, India

Evaluation of resistant sources of proso millet varieties against *Rhizoctonia solani* Kuhn. Inciting banded blight (BB) disease

TSSK Patro, KE Georgia, S Raj Kumar, N Anuradha, Y Sandhya Rani, U Triveni and P Jogarao

Abstract
A total of 20 proso millet varieties including check were evaluated for resistance to banded blight at Agricultural Research Station, Vizianagaram during *kharif*, 2019-20. The experiment was conducted under field condition. The screening revealed that none of the test lines or varieties was immune, highly resistant or resistant. All the varieties were susceptible. However, RAUP 13 was reported as moderately susceptible with 40.00% disease incidence. The disease ranged from 40.00% (RAUP 13) to 97.20% (Nilavoor Local (local check)). The disease intensity was less in RAUP 13 (40.00) followed by TNAU 164 (55.60) and was highest in GPUP 27 (94.30) followed by PMNDL-2 (94.00).

Keywords: Proso millet, banded blight, *Rhizoctonia solani*, resistant, susceptible

Introduction
Small millet crops belonging to Poaceae have a long history of cultivation of more than 5000 years and grown in many states (Gowda *et al*. 2006) [2] due to their unique adaptation properties for poor degraded lands and ability to tolerate abiotic stress besides being high quality fodder crops and high nutritive value. In India, the antiquity of proso millet (*Panicum milliaceum* L.) is not clear. The crop is cultivated in sporadic patches from the Himalayas in the north and to Tamil Nadu in the south (Nagaraja *et al*. 2007) [3]. It is grown in Madhya Pradesh, Andhra Pradesh, Karnataka, Tamil Nadu, Maharashtra, Bihar, Uttar Pradesh and Uttarakhand (Sinha and Upadhyay 1997) [12]. Incidentally, proso millet is known to be affected by several diseases.
As it is a low value crop doesn't offer much scope for additional cash inputs like fungicides and chemical methods of control are generally not advisable, hence growing resistant varieties is the best option. Very little efforts have been made to identify the resistant sources of foxtail millet against banded leaf blight disease. So an attempt was made to identify the sheath blight resistant lines.

Materials and methods
Twenty entries of proso millet initial advanced varieties were evaluated at Vizianagaram falling under different agro climatic situations. These entries were evaluated in two rows of 3 m length sown at 22.5 × 10 cm spacing in infector row method using Nilavoor Local as a susceptible check so as to ensure the availability of sufficient inoculum during *kharif* 2019. Banded blight (BB) was recorded by using 0 to 9 scale (Anon, 1996) [1].

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

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

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

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

Results and Discussion

Twenty entries were evaluated during *kharif* 2019-20 in Proso millet initial advanced variety trial (PIAVT). The screening revealed that none of the test lines or varieties was immune, highly resistant or resistant. All the varieties were susceptible. However, RAUP 13 was reported as moderately susceptible with 40.00% disease incidence. The disease ranged from 40.00% (RAUP 13) to 97.20% (Nilavoor Local (local check)). The disease intensity was less in RAUP 13 (40.00) followed by TNAU 164 (55.60) and was highest in GPUP 27 (94.30) followed by PMNDL-2 (94.00) (Table 2).

Patro *et al.,* (2015) [10] screened 18 proso millet genotypes and reported resistant to moderately resistant genotypes in DhPrMv 2164 (29.23%) and DhPrMv 2769 (28.90%). Patro *et al.,* (2017) [9] screened eleven varieties and reported that minimum disease severity (64.00%) was recorded in TNAU 145 whereas it was 90.67 % in check. Patro *et al.* (2014) [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 [5], 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. Patro *et al.,* (2019) reported that the disease intensity was less in TNPm 247 (64.00) followed by GPUP 21 (68.00) and was highest in TNAU 151 (81.33) followed by GPUP (76.00) when screened 8 proso millet entries against *R. solani.*

Table 2: Evaluation of proso millet genotypes against sheath blight

S. No.	Entry	Banded blight (%)	Reaction
1	PMU 444	89.0	HS
2	PMNDL-1	83.7	HS
3	HB-1	75.0	HS
4	GPUP 27	94.3	HS
5	GPUP 28	62.3	S
6	PMU 451	70.0	HS
7	PMNDL-2	94.0	HS
8	PMNDL-3	76.0	HS
9	TNPM 264	90.3	HS
10	TNPM 267	72.3	HS
11	IIM 225	78.7	HS
12	IIMR 163	60.3	S
13	GPUP 30	62.0	S
14	GPUP 32	76.0	HS
15	RAUP 13	40.0	MS
16	TNAU 164	55.6	S
17	TNAU 230	87.7	HS
18	TNAU 202	55.7	S
19	R (TNPM 230)	17.5	R
20	S (Nilavoor Local)	97.2	HS
	LOC. MEAN	71.9	
	C.D. (5%)	16.2	
	C.D. (1%)	21.7	
	C.V. (%)	16.3	

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