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Diseases reaction of donor screening nursery (DSN) of Proso 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, and Acharya N. G. Ranga Agricultural University, to identify the resistant sources for *Rhizoctonia solani* which causes banded blight disease in Proso millet. Results revealed that none of the genotypes was found free from sheath blight incidence. However, TNPM 298 was found to be moderately resistant to moderately susceptible. Whereas, Co-5 (local check) was recorded 94.67%.

Keywords: proso millet, banded blight, screening, *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) [3] 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 miliaceum* 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) [4]. 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.

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 millet genotypes resistant to banded blight disease.

Material and Methods

Eleven varieties of proso 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*, 2017 for selection of resistant genotypes with recommended agronomic practices. 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:

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

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Results and Discussion

Eleven varieties proso 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, TNPm 298 was found to be moderately resistant to moderately susceptible. Whereas, Co-5 (local check) was recorded 94.67% (Table 2).

Patro *et al.*, (2015) [9] 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) [11] 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) [8] and Nagaraja *et al* (2016) [5] 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 [16], Patro *et al.*, 2013 and Patro *et al.*, 2016 [10]. These genotypes would be of immense value to the breeders involved in developing high yielding resistant genotypes of little millet.

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

S. No.	Entry	Vizianagaram
1	TNPm 298	56.00
2	TNPm 299	76.00
3	TNPm 300	84.00
4	TNPm 301	80.00
5	TNPm 302	72.00
6	TNPm 303	84.00
7	TNPm 304	74.67
8	TNPm 305	82.67
9	TNPm 306	81.33
10	TNPm 307	81.33
11	Co-5	94.67
	Mean	78.79
	CD (5%)	13.73
	CV	10.23

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