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Identification of Kodomillet varieties resistant sources against banded blight (BB) disease incited by *Rhizoctonia solani* Kuhn

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Abstract

A total of 19 Kodo 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 or highly resistant. DK 159 (33.33), which was recorded as moderately susceptible. Varieties TNPS 262 (90.00) and BK 20 (89.33) recorded highest disease severity, JK-76 (96.00) (local) as highly susceptible. Percent disease severity ranged from 54.00% (RPS 1005) to 90.00% (TNPS 262) whereas it was 96.00% in susceptible check and it was 21.00% in resistant check.

Keywords: Kodo millet, screening, resistant, susceptible, banded blight

Introduction

Kodo millet (*Paspalum scrobiculatum*) is one of the hardiest crops grown in Madhya Pradesh, Maharashtra, and Uttar Pradesh and various other parts of India. Minor millets like kodo is also described as nutritious millet and has received far less research and development attention than other crops with regard to crop improvement and utilization. It is the main source of protein and minerals in the daily diets of tribal and weaker section living in remote rural areas. Millets are nutritionally superior than other cereals. The millet contains a high proportion of complex carbohydrate and dietary fiber which helps in prevention of constipation and slow release of glucose to the blood stream. Glycemic index is an important tool used in treating people with diabetes, cardiovascular disease management and weight regulation programs. Millets including Kodo contain water soluble fiber and this property may be utilized for maintaining or lowering blood glucose response among diabetic and CVD patients. Glycemic load (GL) representing both quality and quantity of carbohydrate in a food and allows comparison of the likely glycemic effect of realistic portion of the different foods (Neelam, *et al.* 2013) [3].

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.

Material and Methods

Nineteen entries kodo millet initial advanced varieties were evaluated at Agricultural Research Station, Vizianagaram. These entries were evaluated in two rows of 3 m length sown at 22.5×10cm spacing in infector row method using JK-76 as a susceptible check so as to ensure the availability of sufficient inoculum during *kharif* 2019-20. 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

Data was taken and expressed in percentage. The Percent Disease Index (PDI) was calculated by using the following formula

$$PDI = \frac{\text{Sum of individual disease ratings}}{\text{No. of observations assessed} \times \text{maximum disease rating}} \times 100$$

Results and Discussion

Nineteen entries were evaluated during *kharif* 2019-20 in kodo millet initial advanced variety trial (KIAVT). The screening revealed that none of the test lines or varieties was immune or highly resistant. However, DK 159 (33.33), which was recorded as moderately susceptible. Varieties TNPS 262 (90.00) and BK 20 (89.33) recorded highest disease severity, JK-76 (96.00) (local) as highly susceptible. Percent disease severity ranged from 54.00% (RPS 1005) to 90.00% (TNPS 262) whereas it was 96.00% in susceptible check and it was 21.00% in resistant check. (Table 2).

Patro *et al.* (2017) ^[10] screened 10 kodo millet entries and the disease intensity ranged from 78.00% (DPS-118) to 98.67% (RK-64) in which it was 97.33% in the check. However, Kodo millet varieties KAVT 5, KAVT 20 and KAVT 22 were found as resistant genotype. Patro *et al.* (2016) ^[8, 9] screened

six varieties in which RK 390-25 (20.5) was found to be highly resistant. However, DPS 118 (21.7) was recorded as resistant, TNAU 86 (63.6) and RK 153 (64.4) as susceptible, GPUK 3 (70.2) and TNAU 26 (87.4) was found to be highly susceptible. The mean performance of six centres as revealed that RK 390-25 (8.8), DPS 118 (17.1) as highly resistant, GPUK 3 (21.0), RK 156 (23.0) and TNAU 86 (30.0) as resistant varieties. Patro *et al.* (2016) ^[8, 9] evaluated 27 genotypes DHKM 3 (24.0) and BK 20 (25.5) showed less severity of banded blight as compared to control TNAU 26, where hundred percent disease severity was recorded in similar way hundred percent disease severity was recorded in DHKM 3-3, BK 10 and DHKM 3 genotypes. Patro *et al.* (2014) ^[6, 7] and Nagaraja *et al.* (2016) ^[12] reported that all the small millet crops were found infected with *R. solani*. Similar research was also done in other small millet crops by Neeraja *et al.* 2016 ^[4], Patro *et al.* 2013 ^[5] and Patro *et al.* 2016 ^[8, 9]. Eleven entries were evaluated against banded blight and reported that TNAU 86 (53.33) and BK 48(53.33) was recorded as moderately susceptible varieties by Patro *et al.* 2018 ^[11]. These genotypes would be of immense value to the breeders involved in developing high yielding resistant genotypes of Kodo millet.

Table 2: Reaction of Kodo millet varieties to banded blight

S. No.	Entry	Banded blight (%)
1	TNPS 262	90.0
2	KMNDL-1	65.0
3	GKM 458	85.3
4	GAK-3	82.3
5	KMNDL-2	79.7
6	KMNDL-3	78.7
7	BK 20	89.3
8	BK 46	82.3
9	TNPSC 310	83.7
10	TNPSC 313	74.3
11	DK 151	88.3
12	DK 159	33.3
13	RPS 1005	54.0
14	RPS 1009	75.0
15	DPS-8	70.0
16	TNAU 86	70.7
17	RK 390-25	74.7
18	R(K 390-25)	21.0
19	S(JK-76)	96.5
	LOC. MEAN	73.4
	C.D. (1%)	8.2
	C.V. (%)	6.1

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