



## Research Article

# EVALUATION OF KODO MILLET (*Paspalum scrobiculatum*) GENOTYPES AGAINST BANDED BLIGHT DISEASE (*Rhizoctonia solani* Kuhn) RESISTANCE UNDER BASTAR PLATEAU AGROECOLOGY

NETAM P.S.<sup>1\*</sup>, KUMAR P.<sup>2</sup>, NAG N.<sup>3</sup> AND SALAM D.C.<sup>1</sup>

<sup>1</sup>Department of Plant Pathology, College of Agriculture and Research Station, Jagdalpur, 494005, Indira Gandhi Krishi Vishwavidyalaya, Raipur, 492012, Chhattisgarh, India

<sup>2</sup>Department of Genetics and Plant Breeding, College of Agriculture and Research Station, Jagdalpur, 494005, Indira Gandhi Krishi Vishwavidyalaya, Raipur, 492012, Chhattisgarh, India

<sup>3</sup>Department of Agronomy, College of Agriculture and Research Station, Jagdalpur, 494005, Indira Gandhi Krishi Vishwavidyalaya, Raipur, 492012, Chhattisgarh, India

\*Corresponding Author: Email - prahlad.netam@gmail.com

Received: January 03, 2023; Revised: January 26, 2023; Accepted: January 28, 2023; Published: January 30, 2023

**Abstract:** The field experiment was conducted during Kharif 2021-22 at Saheed Gundadhar College of Agriculture and Research Station, Jagdalpur, IGKV, Raipur (CG), to evaluate the kodo millet resistant genotypes for banded blight disease (*Rhizoctonia solani* Kuhn). Nineteen genotypes evaluated with one susceptible check (JK78) and one resistant check (RK 390-25) under an initial advanced varietal trial were revealed that all genotypes were promising resistance for head smut and where showed the banded blight range between 0 to 63.58%. Genotype KMV 557 (0.0%) found immune reaction and IIMR KM 4 (27.2%) found promising for moderately resistant against the banded blight. In resistance check the disease incidence was observed 15.4%.

**Keywords:** Kodo millet, Screening, Banded blight disease, Resistant, Susceptible

**Citation:** Netam P.S., et al., (2023) Evaluation of Kodo Millet (*Paspalum scrobiculatum*) Genotypes Against Banded Blight Disease (*Rhizoctonia solani* Kuhn) Resistance under Bastar Plateau Agroecology. International Journal of Agriculture Sciences, ISSN: 0975-3710 & E-ISSN: 0975-9107, Volume 15, Issue 1, pp.- 12172-12173.

**Copyright:** Copyright©2023 Netam P.S., et al., This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

**Academic Editor / Reviewer:** Kishan Kumar Patel

## 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]. Kodo millet (*Paspalum scrobiculatum*) is the one of the hardiest crops which are grown in Madhya Pradesh, Maharashtra, and Uttar Pradesh and various other parts of India. Kodo is also described as nutritious millet crop and has received far less research and development attention than other crops with regard to crop improvement and utilization [2]. Banded blight of kodo millet incited by *Rhizoctonia solani* (Kuhn.) (Basidial stage: *Thanatephorus cucumeris* (Fr.) Donk) is one of the emerging malady in its successful cultivation. The pathogen overwinters as soil-borne sclerotia and mycelium in plant debris; these constitute the primary inoculums. The disease is characterized by oval to irregular, light grey to dark brown lesions on the lower leaf sheath. In early stages, the lesions expand rapidly and coalesce to cover large area of the sheath and leaf lamina. At this stage, the disease symptom is look like a series of copper or brown color bands across the leaves giving a very characteristic banded appearance [3].

## Material and method

Nineteen genotypes evaluated with one local check (JK 76) and one resistant check (RK 390-25) under initial advanced 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 202-22. 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 Banded blight disease of Kodo millet. The recommended agronomic practices were adopted at the time of crop growth. Banded blight [4] was recorded by using 0 to 9 scale [Table-1]. The percent disease index (PDI) was calculated by using the following formula:

$$PDI \% = \frac{\text{Sum of all the numerical ratings}}{(\text{Number of observations} \times \text{Maximum disease grade})} \times 100$$

## Result and discussion

In kodo millet cultivation in Bastar Plateau zone the head smut is major problem constraint, beside this leaf blight, banded blight is also affecting the crop production to some extent. The total 19 genotypes with one susceptible check (JK 76) and one resistant (RK 390-25) for banded blight and head smut were evaluated in Kharif 2021-22, the disease incidence of head smut was not recorded in any given entries whereas banded blight incidence was recorded between 0-63.58%. Genotype KMV 557 (0.0%) was found highly resistant, whereas genotype IIMR KM 4 (27.0%) promising for moderately resistant against the banded blight. Patro et al. (2017) [5] evaluated 10 kodo millet entries and observed 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 banded blight. Patro et al. (2020) [6] evaluated 15 varieties and revealed that none of the test lines or varieties was immune or highly resistant. RPS 1005 (57.7) and RPS 1007 (59.7) which were recorded as susceptible. Varieties BK 6 (85.3) and GPLM 273 (85.0) recorded highest disease severity, JK-76 (95.7) (local) as highly susceptible. Percent disease severity ranged from 57.7% (RPS 1005) to 85.3% (BK 6) whereas it was 95.7% in susceptible check and it was 23.7% in resistant check. Patro et al. (2018) [7] revealed that none of the test lines or varieties was immune or highly resistant. TNAU 86 (53.33%) and BK 48(53.33%) was recorded as moderately susceptible. Varieties BK 36 (80.00%) and RK 64 (80.00%) recorded highest disease severity. Nagaraja et al. (2016) [8] reported that all the small millet crops were found infected with banded blight disease, whereas in the screening of little millet LAVT 19 and LAVT 14 were found as resistant against the *Rhizoctonia solani*. These genotypes would be of immense value to the breeders involved in developing high yielding resistant genotypes of little millet. Patro et al. (2014) [9] reported sixteen genotypes of foxtail millet screened against sheath blight maximum percentage of disease severity was recorded in VFMC-391(88.16%) and the minimum percentage of disease severity was recorded in SiA 2863 (2.14%) [10].

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

Table-2 Evaluation of genotype of Kodo millet resistance against the banded blight disease

SN	KIAVT Genotype	Banded Blight (PDI%)	Reaction
1	IIMR KM 4	27.2	MR
2	KMV 557	0.0	HR
3	TNPSC 35	40.1	MS
4	TNPSC 313	35.2	MS
5	BK-36	35.8	MS
6	DHKM 450-6	53.1	S
7	DHKM 350-7	53.7	S
8	TNAU-86	60.5	S
9	RK 390-25	45.1	MS
10	RPS 1005 (KMU-561)	63.6	S
11	TNPSC 321	46.3	S
12	RPS-716 (KMU-567)	61.7	S
13	IIMR-KM-1	48.2	S
14	TNPSC 325	63.6	S
15	KM NDL-5	48.1	S
16	KMV 568	40.1	MS
17	BK 20	33.3	MS
18	DK 151	60.5	S
19	IIMR-KM 2	51.2	S
20	RK 390-25 (Res- BB & HS)	15.4	R
21	JK 76 (Sus-BB & HS)	58.0	S
	Mean	44.14	
	CD(P≤0.05)	9.4	
	C.V. (%)	12.6	

**Application of research:** Present research will provide the resistance genotypes of Kodo millet for banded blight

**Research Category:** Agroecology

**Acknowledgement / Funding:** Authors are thankful to All India Coordinated Research Project on Small Millets (AICRP- SM), ICAR-GKVK, Bengaluru to provide financial support for research. Authors are also thankful to Department of Plant Pathology; Department of Genetics and Plant Breeding; Department of Agronomy, College of Agriculture and Research Station, Kumbhwarand, Jagdalpur, 494005, Indira Gandhi Krishi Vishwavidyalaya, Raipur, 492012, India

**\*\*Principal Investigator or Chairperson of research:** Prahlad Singh Netam  
University: Indira Gandhi Krishi Vishwavidyalaya, Raipur, 492012, India  
Research project name or number: All India Coordinated Research Project on small Millet

**Author Contributions:** All authors equally contributed

**Author statement:** All authors read, reviewed, agreed and approved the final manuscript. Note-All authors agreed that- Written informed consent was obtained from all participants prior to publish / enrolment

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

**Cultivar / Variety / Breed name:** Kodo millet (*Paspalum scrobiculatum*)

**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

## References

- [1] Netam R.S., Tiwari R.K.S., Singh D.P. and Patel D.P. (2014) *International Journal of Research in formal, Applied & Natural science*, 01-05.
- [2] Yadav N., Chaudhary K., Singh A., Gupta A. (2013) *losr Journal of Pharmacy*, 3(2), 14-20.
- [3] Patro TSSK, Meena A., Divya M. and Anuradha N. (2018) *Journal of Pharmacognosy and Phytochemistry*, 7(4), 3172-3173.
- [4] Standard evaluation system for rice (1996) *International Rice Research Institute Report, Philippines*, 1996.
- [5] Patro TSSK, Divya M., Sandhya Rani Y., Triveni U., Anuradha N. (2017) *Frontiers in Crop Improvement*, 5(1), 78-79.
- [6] Patro TSSK, Georgia K.E., Raj S.K., Anuradha N., Rani S.Y., Triveni U. and Jogarao P. (2020) *Journal of Pharmacognosy and Phytochemistry*, 9(5), 1268-1270.
- [7] Patro TSSK, Meena A., Divya M. and Anuradha N. (2018) *Journal of Pharmacognosy and Phytochemistry*, 7(4), 168-3171.
- [8] Nagaraja A., Bijendra Kumar, Jain A.K., Patro TSSK, Nageswar Rao T.G. (2016) *Indian Phytopathological Society. New Delhi*, 295-371.
- [9] Patro TSSK, Madhuri J. (2014) *International Journal of Plant Sciences*, 3(2), 159-162.
- [10] Patro TSSK, Anuradha N., Madhuri J., Suma Y., Soujanya A. (2013) *National seminar on Recent Advances of Varietal Improvement in Small Millets*, 5-6.