



E-ISSN: 2278-4136  
P-ISSN: 2349-8234  
JPP 2018; 7(1): 2239-2241  
Received: 14-11-2017  
Accepted: 15-12-2017

**Rao Yaduman**

Department of Plant Pathology,  
Sam Higginbottom University of  
Agriculture, Technology &  
Sciences, Allahabad, (Uttar  
Pradesh, India

**Abhilasha A Lal**

Department of Plant Pathology,  
Sam Higginbottom University of  
Agriculture, Technology &  
Sciences, Allahabad, (Uttar  
Pradesh, India

**Shivam Singh**

Department of Plant Pathology,  
Sam Higginbottom University of  
Agriculture, Technology &  
Sciences, Allahabad, (Uttar  
Pradesh, India

## Survey and occurrence of sheath blight disease (*Rhizoctonia solani* Kuhn) of rice (*Oryza sativa* L.) in rice growing areas of Allahabad, India

Rao Yaduman, Abhilasha A Lal and Shivam Singh

**Abstract**

A survey was carried out in selected areas of Allahabad (India) to evaluate the incidence of sheath blight disease of rice. Among all blocks surveyed, the highest incidence (42%) was recorded in Bahadurpur block. The incidence ranged between 15-42% in surveyed areas of Allahabad (India). After the survey, the data imply that sheath blight is emerging as one of the major diseases of rice in India.

**Keywords:** occurrence, *Rhizoctonia solani*, *Oryza sativa* L

**Introduction**

Rice (*Oryza sativa* L.) being a staple food crop of India, play significant role in the food security system. The crop is an important integral part of Indian dietary and staple food of more than 60 per cent and its cultivation has spread too many parts of the world due to its versatility (Koutu and Rao, 2008; Mishra *et al.*, 2005) [6, 8]. This crop is attacked by a number of diseases which are of fungal, bacterial and viral origin. Among different fungal diseases, sheath blight caused by *Rhizoctonia solani* Kuhn is gaining importance day by day because of its soil borne nature which is a little difficult to control. The disease causes about 11.1- 58 % losses in yield depending on the disease severity and varieties (Chahal *et al.*, 2003) [2].

Rice sheath blight was reported from Japan and since then it became established in many oriental countries, and is often referred to as oriental leaf and sheath blight. The rice disease survey conducted by IRRI in 2001 has shown that a production loss of 0.9 per cent and 0.8 per cent was observed due to sheath blight in Japan and Korea respectively. It is considered as economically important disease of rice in the world. Due to this rice sheath blight is regarded as an internationally important disease, particularly with the advent of high yielding varieties in the 1960s (Lee *et al.*, 1983) [7].

In India, it was first reported from Gurdaspur in Punjab, and later from Uttar Pradesh. Further, the disease was reported from Tamil Nadu, Kerala, Andhra Pradesh and Kashmir (Reddy and Reddy, 1986) [16]. In order to understand the spread of sheath blight of rice disease in the country, data was collected over the past twenty five years (1990-2015) from production oriented survey (POS) reports of AICRP on rice. Results revealed that disease has spread widely in terms of both occurrence and intensity over the past twelve years (Prakasam *et al.*, 2013) [14].

In the present work, a random survey has been done to evaluate the variation in incidence of this disease in some selected rice growing areas of Allahabad district of Uttar Pradesh state.

**Materials and Methods**

Roving method of survey was followed to check the incidence of sheath blight disease of rice (Balai, *et al.*, 2013) [1]. Total five Blocks of Allahabad district were surveyed during October, 2014. In each Block, ten to fifteen villages were randomly surveyed. In each village, two to ten, one square meter areas were selected in fields of rice at the stage of tillering to maturity (Shivalingaiah and Umesha, 2011) [19]. For assessing the disease incidence (DI), the number of infected plants and total number of plants in each field were recorded. The DI was calculated by using following formula:

$$\text{Disease Incidence (DI)} = \frac{\text{Number of infected plants}}{\text{Total number of plants}} \times 100$$

(Pal *et al.*, 2015 and Parshuram *et al.*, 2017) [10, 12]

**Correspondence****Rao Yaduman**

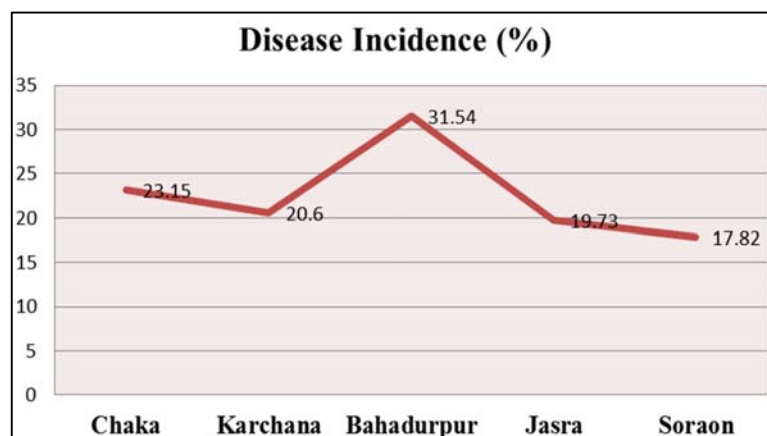
Department of Plant Pathology,  
Sam Higginbottom University of  
Agriculture, Technology &  
Sciences, Allahabad, (Uttar  
Pradesh, India

The specimens were collected from different location and the collected samples were wrapped in cellophane paper and brought to the laboratory for their identification (Soosairaj *et*

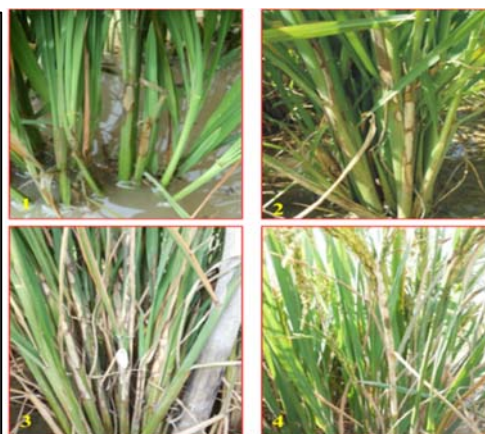
*al.*, 2012) [20]. The data are presented as range and mean (Table 1).

**Table 1:** Disease incidence (%) of *Rhizoctonia solani* in different rice growing areas of Allahabad, India

Name of Blocks	Villages surveyed	D. I. (%)	Rice variety	Crop stage	Villages surveyed	D. I. (%)	Rice variety	Crop stage	D. I. Range (%)	Mean (%)
Chaka	Chaka	30	5251-NK	Tillering	Bongi	26	PHB-71	Tillering	18-30	23.15
	Amiliya	28	6444	Tillering	Hathigan	21	7029	Tillering		
	Baswar	21	2129	Tillering	Sandwan Kalan	19	PBH-71	Flowering		
	Purwa Khas	26	3325	Booting	Mahewa	21	PB-1	Booting		
	Dandi	18	6444	Booting	Naini	22	1509	Booting		
	Deori	27	1121	Booting	Indalpur	19	7029	Tillering		
	Ubhari	26	Dhanya	Tillering	SHUATS CRF	22	SHIATS DHAN-1	Tillering		
Dabhar	21	6444 Gold	Tillering	SHUATS KVK	23	1509	Booting	18-26	20.60	
Karchana	Karchana	22	PBH-71	Booting	Bashi	19	1509			Tillering
	Ghorhat	26	6444	Tillering	Avai	21	3525			Tillering
	Mungari	18	1121	Tillering	Naraina	18	7029			Flowering
	Ghatwa	19	PB-1	Flowering	Purani	20	Basmati Bhog			Tillering
	Baghera	20	1121	Tillering	Kaithiabhunda	23	Pant Gold	Tillering	27-42	31.54
Bahadurpur	Bahadurpur I	21	C R Dhan-701	Tillering	Naika	31	5251	Booting		
	Andawa	38	7029	Tillering	Leelapur Kalan	42	1121	Booting		
	Bahadurpur II	34	Dhanya 748	Tillering	Raheempur	30	PB-1	Tillering		
	Gotawan	28	Basmati 501	Booting	Sahson	29	Menka	Tillering		
	Jhusi	35	3325	Booting	Leelapur Khurd	32	5251	Tillering		
	Kandhi	27	6129	Tillering				Tillering	15-24	19.73
Jasra	Jasra	19	Sugandh	Tillering	Ojhapatti	22	3525	Booting		
	Dauna	20	Basmati 370	Tillering	Kachara	21	Narendra Dhan 3112	Booting		
	Mahera	18	PHB-71	Tillering	Hardi	24	7029	Flowering		
	Amreha	17	1509	Tillering	Bhita	19	Basmati-1	Tillering		
	Kundi	21	Basmati Kasturi	Booting	Piprawan	21	1509	Tillering		
	Tatarganj	15	1121	Flowering				Tillering	15-20	17.82
Soraon	Soraon	18	6444	Booting	Sersa	18	Basmati	Tillering		
	Pandila	15	3525	Tillering	Bankat	19	Dhanya 748 Desi	Booting		
	Jallupur	16	6444 Gold	Booting	Goura	17	Basmati 501	Booting		
	Bhardari	17	Dhanya	Tillering	Vari	18	MPU 7029	Tillering		
	Kurgaon	19	7029	Tillering	Bigahiya	19	Unnat Halana	Tillering		
	Lohra	20	Sugandh	Tillering				Tillering		



**Fig 1:** Mean disease incidence (%) of *Rhizoctonia solani* in different rice growing areas of Allahabad, India



**Fig 2:** Symptoms of sheath blight of rice

## Results and Discussion

A survey on the incidence of sheath blight disease of rice in Allahabad, India during October, 2014, revealed that the incidence varied widely from one place to another place. The incidence was ranged between 15% and 42%, causing a substantial reduction in grain yield. Maximum disease

incidence was recorded in Bahadurpur block followed by Chaka block.

Among the villages, maximum disease incidence (42%) was recorded in Leelapur Kalan followed by Andawa (38%) in Bahadurpur block and minimum disease incidence (15%) was recorded in Tatarganj village of Jasra block and Pandila village of Soraon block.

These results were in the accordance of Kapse *et al.* (2012)<sup>[5]</sup>; Pal *et al.* (2015)<sup>[10]</sup>; Thakur *et al.* (2017)<sup>[21]</sup> and Parshuram *et al.* (2017)<sup>[12]</sup>. QiYuan *et al.*, (2007)<sup>[15]</sup> reported that plant variety and nitrogenous fertilizers are the major factors influencing sheath blight disease and concomitant yield losses in rice, both during wet and dry seasons. Relative humidity and temperature are considered to be the critical factors for sheath blight infection and therefore the disease is more common in wet season than in the dry season (Pasalu *et al.*, 2005)<sup>[13]</sup>.

Whereas some other workers were found different growth stages susceptible for infection. Shahjahan *et al.*, (1990)<sup>[17]</sup> reported panicle initiation to booting; Chang and Dath (1996)<sup>[3]</sup> flowering; Cu *et al.*, (1996)<sup>[4]</sup> panicle initiation, flowering and booting; Vanitha *et al.*, (1996)<sup>[22]</sup> found booting and flowering stage; Sharma and Teng (1996)<sup>[4, 18]</sup> flowering and panicle initiation stage; Munshi and Singh (2000)<sup>[9]</sup> flowering and Pal *et al.*, (2016)<sup>[11]</sup> found grain filling stage as most susceptible for sheath blight disease to occur.

## References

- Balai LP, Singh RB, Yadav SM. Survey for the disease status intensity of Alternaria blight of pigeonpea in eastern part of Uttar Pradesh and adjoining districts of western Bihar. *The Bioscan*. 2013; 8(1):63-66.
- Chahal KS, Sokhi SS, Rattan GS. Investigations on sheath blight of rice in Punjab. *Indian Phytopathol*. 2003; 56:22-26.
- Chang SJ, Dath P. Effect of the growth stage of rice plant on the severity of sheath blight as assessed by different parameter. *Oryza*. 1996; 33:149-152.
- Cu RM, Mew TW, Cassman KG, Teng PS. Effect of sheath blight on yield in tropical, intensive rice production system. *Pl. Dis*. 1996; 80:1103-1108.
- Kapse VV, Bhale MS, Jogi MJ. Status, distribution and epidemiology of rice diseases in Jabalpur region. *Internat. J. Plant Sci*. 2012; 7(1):185-189.
- Koutu GK, Rao SK. Hybrid rice JRH (5) seed production technology. In: National Seed Congress, 2009; 91. University of Agricultural Science, Bangalore, 2008.
- Lee FN, Rush MC. Rice sheath blight: a major rice disease. *Pl. Dis*. 1983; 67:829-832.
- Mishra B, Rao LVS, Rani NS, Ahmad MI. Inter project linkage-crop improvement review and suggestions for seed research in rice. XX Annual Group Meeting of NSP (crops) Coimbatore, 2005.
- Munshi GD, Singh M. Development of sheath blight of rice in relation to plant growth stages. *Pl. Dis. Res*. 2000; 15:182-185.
- Pal R, Biswas MK, Mandal D, Seni A, Naik BS. Prevalence of sheath blight disease of rice in west central table land zone of Odisha. *Intl. J. Bio-Res. Environ. Agrl. Sci*. 2015; 1(3):103-107.
- Pal R, Mandal D, Biswas MK. Effect of different sowing dates on the development and spread of sheath blight disease in rice. *J. Crop Weed*. 2016; 12(1):116-119.
- Parshuram R, Yadav SC, Awadhiya GK, Prasad MS, Prakasam V. Survey and Occurrence of Sheath Blight of Rice in Major Rice Growing Areas of Chhattisgarh, *Int. J. Pure App. Biosci*. 2017; 5(4):838-845.
- Pasalu IC, Katti G, Krishnamurthy P, Subba Rao LV, Reddy CS, Subbaiah SV, *et al.* Integrated pest management in rice. Technical bulletin no. 15. Directorate of rice research, Rajendranagar, Hyderabad, AP, India. 2005; 53.
- Prakasam V, Ladhakshmi D, Laha GS, Krishnaveni D, Sheshu Madhav M, Badri J, Prasad MS, Viraktamath BC. Sheath blight of rice and its management. Technical Bullitine No. 72, Directorate of Rice Research (ICAR), Rajendranagar, Hyderabad-500030, T.S., India. 2013; pp. 58.
- QiYuan T, ShaoBing P, Buresh RJ, YingBin Z, Castilla NP, Mew TW, XuHua Z. Rice varietal difference in sheath blight development and its association with yield loss at different levels of N fertilization. *Field Crops Research*. 2007; 102(3):219-227.
- Reddy APK, Reddy CS. Present status of sheath blight disease and its control. In Diamond Jubilee Souvenir, 1925-1985. ARS, Maruteru (APAU). 1986; 118-127.
- Shahjahan AKM, Ahmed HU, Sharma NR, Miah SA. Epidemiological studies of sheath blight of rice caused by *Rhizoctonia solani* Kuhn (in Bangladesh), Bangladesh Agricultural Research Council, 1990.
- Sharma NR, Teng PS. Rice sheath blight: Effect of crop growth stage on sheath blight disease development and yield loss. *IRRI News Letter*. 1996; 15(6):19-20.
- Shivalingaiah, Umesha S. Characterization of *Xanthomonas oryzae* pv. *oryzae* from major rice growing regions of Karnataka. *The Bioscan*. 2011; 6(1):5-10.
- Soosairaj S, Raja P, Kala A, Kalaingeraj P. Survey of macroscopic fungi from a few districts of Tamil Nadu. *The Bioscan*. 2012; 7(4):669-671.
- Thakur L, Lakpale N, Tiwari PK, Pradhan A. Epidemiological studies on sheath blight disease of rice in Chhattisgarh Plains Agroclimatic Zone of Chhattisgarh, India. *Int. J. Curr. Microbiol. App. Sci*. 2017; 6(11):1351-1361.
- Vanitha S, Thangamani G, Narayanaswamy. Influence of age and infection in relation to sheath blight susceptibility in rice. *J. Madras Agri*. 1996; 83: 63-64.