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**EVALUATION OF RICE VARIETIES FOR RESISTANCE AGAINST BACTERIAL
BLIGHT UNDER CHHATTISGARH CONDITIONS**

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ABSTRACT

To obtain genetic resources of resistance to bacterial blight of rice caused by *Xanthomonas oryzae* pv. *oryzae* in Chhattisgarh, 24 Chhattisgarh varieties were tested for the resistance to virulent isolate of Chhattisgarh. This state is very rich in rice germplasm and large numbers of indigenous collection are still maintained by the tribal farmers of the state because of their additional value also. Bacterial blight of rice caused *Xanthomonas oryzae* pv. *oryzae* is one of the most extensively studied disease with particular emphasis on resistant cultivars, their nature of resistance, explicitness of gene pyramiding for resistance, incorporation of wild source of resistance etc. The gene expression also depends up on largely on the climatic conditions of that region, also on the pathogen virulence spectrum and to some extent the management practices adopted. Among the 24 varieties observed, minimum disease severity was recorded in Danteshwari (11.03 %), Indira Sona (12.00 %); Chandrahasini (18.38 %); Madhuri (20.67 %) and MTU 1010 (20.69 %) and maximum per cent disease severity was recorded in HMT during both the years.

Key words: Rice, Bacterial Blight, *Xanthomonas oryzae* pv. *oryzae*, Resistance, Phenotype

INTRODUCTION

Rice is grown in more than 114 countries across the world on roughly 150 million ha. and also accounts for 11 per cent of the worlds cultivated area. Consumption wise estimates also reveals that Asia produces predominantly more rice and also consumes 90 per cent of the production, because, it holds about 60 per cent of the earth's population. In India rice alone is cultivated in about 40 million ha. with an estimated production of 90 million tonnes [1].

Chhattisgarh (a part of the eastern zone) is traditionally a rice cultivated state that accounts for 3.78 million ha. with a present production of 1.31 million tonnes [2]. This state is very rich in rice germplasm and large numbers of indigenous collection are still maintained by the tribal farmers of the state because of their additional value also. The cultivation of rice goes in this state to very old age times and accordingly the evolution of this species might have occurred leading to large germplasm existence.

Bacterial blight of rice caused by *Xanthomonas oryzae* pv. *oryzae* is one of the most extensively studied disease with particular emphasis on resistant cultivars, their nature of resistance, explicit of gene pyramiding for resistance, incorporation of wild source of resistance etc. The gene expression also depends up on largely on the climatic conditions of that region, also on the pathogen virulence spectrum and to some extent the management practices adopted. Most virulent isolates are reported to be prevalent in this region [3-4]. It becomes very useful to know the performance of different resistant genes under the Chhattisgarh condition for better planning of the strategies for resistant breeding against this important disease.

MATERIALS AND METHODS

Comparative performances of popular varieties mostly grown under Chhattisgarh condition were assessed for their response against bacterial blight during *Kharif* season in the two years i.e. 2007-08 and 2008-09.

RESULTS

The varieties were observed under natural conditions and disease severity was evaluated as per International Standard Evaluation System (SES), [5]

The varieties assessed were: MTU 1010, Chandrahasini, Indira Sugandhit Dhan-1, Indira Sona (Hybrid), Mahamaya, Kranti, Vijeta (MTU 1010), Bamleshwari, Swarna, Sarfi-17, Karma Masuri, Madhuri, IR-36, IR-62, Samleshwari, Purnima, Danteshwari, Chinnor, PKV-HMT, Shymala, HMT, Pragati/ Phalgun, Pant-4 and Ajaya.

The overall mean average per cent disease severity was 27.25 %, with the range of (Danteshwari) 11.03 % to (HMT) 44.86 % during two years mean data. The mean minimum per cent disease severity was recorded in Danteshwari (11.03 %), Indira

Sona (12.00 %); Chandrahasini (18.38 %); Madhuri (20.67 %) and MTU 1010 (20.69 %). While, mean maximum per cent disease severity was found in HMT. It was susceptible among all the varieties. 2 varieties recorded moderately resistant, 7 moderately susceptible and 15 susceptible.

Table 1: International Standard Evaluation System

Score	Percentage of infected leaf area	Reaction
0	0	Highly Resistant (HR) / Immune (I)
1	1-5	Resistant (R)
3	6-12	Moderately Resistant (MR)
5	13-25	Moderately Susceptible (MS)
7	26-50	Susceptible (S)
9	>50	Highly susceptible (HS)

Table 2: Bacterial Blight Score in Cultivars Grown

S.No.	Designation	Parentage	Duration	*Disease Severity (%)			Score	Remarks
				2007-08	2008-09	Mean		
1	MTU-1010	Krishnaveni x IR 64	E	21.25	20.12	20.69	5	MS
				27.45	26.65	27.05		
2	Chandahasini	Abhaya x Phalguna	M	17.24	19.52	18.38	5	MS
				24.53	26.22	25.39		
3	Indira Sugandhit Dhan-1	Madhuri x Surekha	M	30.51	32.41	31.46	7	S
				33.53	34.70	34.12		
4	Indira Sona (Hybrid)	IR-58025A x R-710	M	12.11	11.89	12.00	3	MR
				20.36	20.17	20.27		
5	Mahamaya	Asha x Kranti	M	32.11	35.42	33.77	7	S
				34.52	36.52	35.53		
6	Kranti	Cross 116 x IR 8	M	21.45	23.42	22.44	5	MS
				27.59	28.94	28.27		
7	Vijeta MTU 1010	MTU 5249 x Mtu 7014	M	26.59	29.58	28.09	7	S
				31.04	32.95	32.00		
8	Bamleshwari	RP-2151-40-1 x IR-9828-23	M	30.19	28.53	29.36	7	S
				33.33	32.29	32.81		
9	Swarna	Vaisishtha x Mahsuri	L	22.78	24.64	23.71	5	MS
				28.51	29.76	29.14		
10	Safri-17	Selection from Safri	L	25.64	30.78	28.21	7	S
				30.42	33.70	32.08		

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11	Karma Masuri	Mahsuar x R 296-260	M	33.52 35.38	35.64 36.65	34.58 36.02	7	S
12	Madhuri	Jaya x Dubraj	M	19.88 26.48	21.45 27.59	20.67 27.04	5	MS
13	IR-36	37 x CR 94-14	E	33.54 35.39	35.69 36.68	34.62 36.04	7	S
14	IR-62	Indigenous	M	23.98 29.32	26.86 31.21	25.42 30.27	5	MS
15	Samleshwari	R 310-37 x R308-6	E	32.29 34.63	31.22 33.97	31.76 34.30	7	S
16	Purnima	Poorva x IR 8608-298	M	32.87 34.98	37.08 37.51	34.98 36.26	7	S
17	Danteshwari	Samridhi x IR 8608-298	E	11.24 19.59	10.82 19.20	11.03 19.40	3	MR
18	Chinnor	Indigenous	L	30.48 33.51	31.86 34.36	31.17 33.94	7	S
19	PKV-HMT	Selection from HMT	M	26.73 31.13	28.00 31.95	27.37 31.54	7	S
20	Shyamala	R 60-2713 x R 238-6	M	29.58 32.95	32.56 34.79	31.07 33.88	7	S
21	HMT	Indigenous	M	43.23 41.11	46.49 42.99	44.86 42.05	7	S
22	Pragati / Phalguna	Jaya x S 317	M	26.51 30.99	27.85 31.85	27.18 31.42	7	S

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23	Pant -4	Indigenous	E	32.33 30.99	36.59 31.85	34.46 31.42	7	S
24	Ajaya	IET 4141 x CR 98-7216	M	15.84 2.45	17.58 24.79	16.71 24.13	5	MS
General Mean				26.33 23.45	28.17 24.79	27.25 24.13		
SEm ±				0.53	0.41	0.33		
CD (P = 0.05)				1.51	1.15	0.94		

Italic values represents arc sine transformed values Average of five plants

DISCUSSION

Among the varieties observed, minimum disease severity was recorded in Danteshwari (11.03 %), Indira Sona (12.00 %); Chandrahasini (18.38 %); Madhuri (20.67 %) and MTU 1010 (20.69 %) and maximum per cent disease severity was recorded in HMT during both the years. [6, 7, 8] also evaluated the rice entries/cultivars against the bacterial blight disease variation in disease severity was also reported during the last 20 years on some popularly grown varieties in this state [9].

In conclusion, on the field performance of resistant / tolerant varieties reported at one

or other place, the mean minimum disease severity was recorded in Danteshwari (11.03 %), Indira Sona (12.00 %); Chandrahasini (18.38 %); Madhuri (20.67 %) and MTU 1010 (20.69 %) under Chhattisgarh natural evaluation conditions. While, mean maximum disease severity was found in HMT. Out of the 24 varieties studies, 2 recorded moderately resistant, 7 moderately susceptible and 15 susceptible reactions clearly indicating the presence of virulent isolate(s) in this region.

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