

RESEARCH ARTICLE

Bacterial blight of paddy in Tungabadra project area of Karnataka: An emerging threat to paddy cultivation

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ABSTRACT

To assess the bacterial blight intensity on paddy, rowing survey was carried out for two seasons during *Kharif* 2011 and summer 2012 in different rice growing areas of Raichur, Bellary and Koppal districts. The survey was taken up on farmers paddy fields. A total of 135 fields belonging to 17 villages were covered. Standing paddy crop fields were visited and observations on disease incidence was drawn on randomly selected 10 plants in each field. Disease intensity was calculated using 0-9 scale (Anonymous, 1996). The results revealed that during *Kharif* 2011, the disease on leaf (irrespective of the district) ranged between 25.95-57.25 PDI with highest per cent disease index of 57.25 in Sirwar village of Bellary taluka, while lowest intensity was recorded in Moka (25.95) village of Bellary taluka. During summer 2012, the average PDI ranged from 38.50-62.75 with highest per cent disease intensity of 62.75 was recorded in Vijayanagar camp of Raichur district and the lowest intensity (38.50 PDI) was recorded from Kurugod village of Bellary taluka.

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INTRODUCTION

Rice (*Oryza sativa* L.) is one of the most widely cultivated food crops of the world and its production is reducing by many diseases caused by fungi, bacteria and viruses. Among all the disease infecting rice, bacterial leaf blight (BLB) or bacterial blight (BB) caused by *Xanthomonas oryzae* pv. *oryzae* (Swings *et al.*, 1990) is one of the most destructive diseases of rice in both irrigated and rainfed ecosystem (Mew, 1987). The disease occurs worldwide and can cause 30-50 per cent yield loss under epiphytotic conditions (Adhikari *et al.*, 1994).

Maximum bacterial blight occurrence was at Raichur (61.70%) (Thimmegowda, 2006). (Shivalingaiah and Umesh, 2011) took the field survey for two consecutive years (2009 and 2010) in major rice growing regions of Karnataka and reported that, disease intensity ranged from 12 to 37 per cent with highest disease incidence of 37 per cent noticed on cultivar Jyothi in

Davanagere district. Despite many factors conducive for high bacterial blight severity, excess dosage of nitrogenous fertilizers were found to favour the disease development quickly (Mondal and Latif, 1996). This might be the probable reason accompanied with susceptible rice cultivator (BPT 5204) under vast area for the rampant spread of bacterial blight in Tungabadra project area (TBP) of Karnataka resulting in huge yield losses. This drawn on attention of the current study to know the present status of bacterial blight incidence on paddy in Tungabadra project area, so as to design the appropriate management practices to curb the disease effectively.

MATERIAL AND METHODS

An intensive rowing survey was conducted for two seasons, once during October (*Kharif* 2011) and another during March (summer 2012) to assess the magnitude of bacterial leaf blight intensity on paddy. The survey was taken up in

farmer's field of Raichur, Koppal and Bellary districts. In Raichur, villages belonging to Sindhanur, Manvi and Raichur talukas were covered, where as in Bellary district, the potential paddy bowls such as Siruguppa and Bellary talukas were surveyed. Koppal and Gangavati talukas were selected for survey in Koppal district. A total of 135 fields belonging to 17 villages were covered during the survey. Farmers standing paddy crop fields were visited and observations were drawn for the disease incidence on randomly selected 10 plants in each field by following 0-9 scale (Anonymous, 1996).

Grade	Per cent leaf area infection
0	0.00
1	1-5
3	6-12
5	13-25
7	26-50
9	51-100

Per cent disease index (PDI) was calculated by using the following formula (Padmanabhan, 1983) :

$$PDI = \frac{\text{Sum of all the disease ratings}}{\text{Total number of leaves examined}} \times \frac{100}{\text{Max. disease grade}}$$

RESULTS AND DISCUSSION

The results of the study revealed that during *Kharif* 2011 (Table 1), average per cent disease index on leaf (irrespective of the district) ranged from 25.95 to 57.25 with

highest per cent disease index of 57.25 recorded in Sirwar village of Raichur taluka followed by 56.87 PDI in Neermanvi (Manvi), 53.25 PDI in Vijayanagar camp (Raichur) and 51.50 in Bichalli camp (Raichur), while the lowest intensity was recorded at Moka (25.95) village of Bellary taluka. The disease intensity was found moderate in Kurgod, Ibrahampur and Dhadesugur villages. Taluka wise mean intensity revealed the highest PDI of 57.06 in Manvi taluka and lowest PDI of 29.91 was observed in Bellary taluka. Comparison among the districts indicated the highest disease intensity of 52.98 PDI in Raichur and lowest in Bellary as 33.91 PDI. The variation of bacterial blight intensity in different locations was attributed mainly to the prevailed environmental conditions and cultivation practices by the farmers of that particular location.

The survey report during summer (Table 2) revealed the highest disease intensity (62.75 PDI) in Vijayanagar camp followed by 59.68 and 58.50 PDI in Kasabe camp and Gillesugur village of Raichur district, respectively. The average minimum disease intensity of 44.10 PDI was reported from Bellary district. The moderate disease intensity ranged between 52.65 to 54.50 PDI, which was found in Anegundi, Bandibasappa camp, Sunnadgudi and Aerur villages of Koppal district (Kumar *et al.*, 1999) took the survey of bacterial blight of rice in Kirnapur block of Balaghat region of Madhya Pradesh and has reported that the disease severity ranged between 15-45 per cent on predominantly grown susceptible varieties (IR-36 and Kranti) during *Kharif* season. The maximum disease intensity of 61.27 PDI and lowest intensity of 35.82 PDI was recorded in Raichur and Siruguppa talukas, respectively

Table 1 : Survey on the disease intensity of bacterial leaf blight of paddy caused by *Xanthomonas oryzae* pv. *oryzae* in major affected areas of North Eastern Karnataka during *Kharif* 2011

Sr. No.	District	Taluk	Village	No. of fields	Mean PDI of villages	Mean PDI of talukas	Mean PDI of districts
1.	Bellary	Bellary	Moka	10	25.95	29.91	33.91
			Kurgod	10	33.87		
		Siruguppa	Ibrahampur	10	37.78	37.92	
			Dhadesugur	10	38.07		
2.	Koppal	Koppal	Anegundi	10	46.66	46.13	46.07
			Bandibasappa camp	10	44.29		
		Gangavati	Sunnadgudi	10	42.81	46.03	
			Aerur	10	47.55		
			Kasabe camp	5	50.15		
Raichur	Vijayanagar camp	5	53.25				
	Gillesugur	5	50.12				
	Bichalli camp	5	51.50				
3.	Raichur	Manvi	Neermanvi	10	56.87	57.06	
			Sirwar	10	57.25		
		Sindhanur	Roadkunda	5	50.12	50.64	
			Mukunda	5	51.50		
			Somalapur	5	50.30		

Table 2 : Survey on the disease intensity of bacterial leaf blight of paddy caused by *Xanthomonas oryzae* pv. *oryzae* in major affected areas of North Eastern Karnataka during summer 2012

Sr. No.	District	Taluk	Village	No. of fields	Mean PDI of villages	Mean PDI of talukas	Mean PDI of districts	
1.	Bellary	Bellary	Moka	10	46.12	42.31	44.10	
			Kurgod	10	38.50			
		Siruguppa	Ibrahampur	10	46.75			45.90
			Dhadesugur	10	45.06			
2.	Koppal	Koppal	Anegundi	10	52.65	52.72	53.79	
			Bandibasappa camp	10	52.97			
		Gangavati	Sunnadgudi	10	55.25			54.87
			Aerur	10	54.50			
3.	Raichur	Raichur	Kasabe camp	5	59.68	59.45	57.29	
			Vijayanagar camp	5	62.75			
			Gillesugur	5	58.50			
			Bichalli camp	5	56.87			
			Manvi	10	55.93			55.15
		Sindhanur	Sirvar	10	54.37			
			Roadkunda	5	58.43			57.27
			Mukunda	5	56.06			
			Somalapur	5	57.31			

(Thimmegowda, 2006). The survey report by Shivalingaiah and Umesh (2011) revealed the highest disease incidence of 37 per cent in Davanagere district on cultivar Jyothi and least disease intensity of 1.60 PDI in Madikeri district on cultivar Doddi.

The wide spread occurrence of the disease was mainly due to cultivation of high yielding and highly susceptible semi-dwarf cultivars such as BPT-5204, TN1 (Thimmegowda, 2006). Padmanabhan (1983) reported that, excessive application of nitrogenous fertilizers is one among the several factors associated with bacterial blight development. Similar results were obtained by Mondal and Latif (1996) attributing excessive nitrogen as a major factor. The results of the present survey work are in agreement with the results obtained by the earlier workers, that the susceptible cv. BPT-5204 is being widely grown in all the three districts surveyed and farmers are invariably using high dosage of nitrogenous fertilizers to exploit the higher yields. The susceptible cultivars accompanied with luxurious plant growth favoured by the heavy nitrogenous nutrients might have predisposed the crop for the attack by bacterial blight pathogen. Hence, there is a long range in the bacterial blight intensity in different surveyed areas depending on the type of variety, prevailed environmental conditions during the season and plant nutrients given by the farmers.

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