SHORT COMMUNICATION OPEN ACCESS

Evaluation of Gene Pyramided Rice Cultures Against Bacterial Leaf Blight Disease of Rice

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Bacterial leaf blight (BLB) caused by *Xanthomonas oryzae* pv. *oryza*e is becoming a major disease on rice throughout the country. In Tamil Nadu, severe incidence of BLB has been observed both in *kharif* (June – Sep.) and *rabi* (Sep. – Dec.) seasons in the recent years. Most of the ruling rice varieties are found to be susceptible to the disease. Under ICAR – All India Coordinated Rice Improvement Project, gene pyramided rice cultures were screened for their resistance against BLB disease in the field conditions at Tamil Nadu Rice Research Institute, Aduthurai from 2012-13 to 2014-15. Rice cultures with one, two and three gene pyramids in the background of IR 64 were developed at CRRI, Cuttack (Anonymous, 2009). The rice cultures consisted lines with resistant genes *Xa4, Xa5, Xa13* and *Xa21* individually as well as in combination of *Xa5* + *Xa13*, *Xa5* + *Xa21*, *Xa13* + *Xa21* and *Xa5* + *Xa13* + *Xa21*. Screening trial was conducted during 2012-2015 in *rabi* season along with checks and two local check varieties ADT 38 and CR 1009.

The gene pyramided cultures were artificially screened against bacterial leaf blight pathogen *Xanthomonas oryzae pv. oryzae* by clip inoculation method with pure culture. The disease grade / reaction was assessed as per the IRRI-SES scale (1996) for bacterial leaf blight as given below.

Disease score chart

Score	Description (affected lesion area)
1	1-5%
3	6-12%
5	13-25%
7	26-50%
9	51-100%

The results revealed that the cultures IRRB 53 (*Xa5* + *Xa13*), IRBB 56 (*Xa4* + *Xa5* + *Xa13*) and IRBB – 60 (*Xa4* + *Xa5* + *Xa13* + *Xa21*) were found to be resistant to the disease with grade 3 (Table 1). Similar results were reported by Karthikeyan and Chandrasekaran (2005).

References

Anonymous 2009. ICAR – AICRIP Progress Report, Directorate of Rice Research, Hyderabad . p 350.

Karthikeyan, A. and B. Chandrasekaran, 2005. Field testing of gene pyramided rice cultures for resistance against bacterial leaf blight disease of rice**.** Paper presented in "National Seminar on Emerging Trends in Plant Pathology and their social relevance" held at Annamalai University, Annamalai Nagar on 7th - 8th, March, 2005. P. 8

Table 1. Evaluation of gene pyramided cultures against BLB pathogen under field conditions

Sl. No.	Lines / Differential	Gene Combination	Reaction (SES 0-9 scale)		
			2012-13	2013-14	2014-15
1	IRBB - 1	*Xa1*	5	5	9
2	IRBB - 3	*Xa3*	7	8	9
3	IRBB - 4	*Xa4*	7	7	9
4	IRBB - 5	*Xa5*	7	7	9
5	IRBB - 7	*Xa7*	5	5	9
6	IRBB - 8	*Xa8*	5	5	9

Sl. No.	Lines / Differential	Gene Combination	Reaction (SES 0-9 scale)		
			2012-13	2013-14	2014-15
7	IRBB - 10	*Xa10*	7	5	8
8	IRBB - 11	*Xa11*	7	7	8
9	IRBB - 13	*Xa13*	5	5	9
10	IRBB - 14	*Xa14*	7	5	9
11	IRBB - 21	*Xa21*	5	5	9
12	IRBB - 50	*Xa4 + Xa5*	4	4	9
13	IRBB - 51	*Xa4 + Xa13*	5	5	9
14	IRBB - 52	*Xa4 + Xa21*	4	4	9
15	IRBB – 53	*Xa5 + Xa13*	3	3	9
16	IRBB - 54	*Xa5 + Xa21*	4	4	9
17	IRBB - 55	*Xa13 + Xa21*	5	5	9
18	IRBB - 56	*Xa4 + Xa5 + Xa13*	3	3	9
19	IRBB - 57	*Xa4 + Xa5 + Xa21*	4	4	9
20	IRBB - 58	*Xa4 + Xa13 + Xa21*	3	3	8
21	IRBB - 59	*Xa5 + Xa13 + Xa21*	3	--	9
22	IRBB - 60	*Xa4 + Xa5 + Xa13 + Xa21*	3	--	9
23	DV - 85		7	--	9
24	Ajaya		5	--	8
25	TN - 1		9	--	8