ISSN 0258-7122
Bangladesh J. Agril. Res. 37(2): 349-353, June 2012 **Short Communication**

IDENTIFICATION OF RICE GERMPLASM WITH RESISTANCE TO BACTERIAL LEAF BLIGHT *(Xanthomonas oryzae pv. oryzae)*

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Keywords: Rice, resistance, bacterial leaf blight, *Xanthomonas oryzae pv. oryzae.*

Rice is the staple food of almost half of the world's population. Bacterial leaf blight (BLB) caused by *Xanthomonas oryzae* pv. *oryzae* is a serious disease of the crop causing yield loss of 20-30% (Ou, 1985), more seriously from 80% (Singh *et al.*, 1997) to 100% (Zhai and Zhu, 1999). Use of host plant resistance is considered to be the most effective, economical and environmentally safe option for management of the disease (Khush *et al.,* 1989). Resistance genes have been used in breeding resistant cultivars and many useful cultivars have been released (Chen *et al.,* 2002). However, durability of the resistant cultivars is short due to evolution of new races of pathogen. So, it is imperative to search for the new sources of resistance. The present investigation was carried out to identify BLB resistant donor after screening the collected indigenous and exotic rice genotypes against isolates of X. *oryzae* pv. *oryzae.*

A total of thirty germplasm of cultivated rice were obtained from the Crop Research Centre, G.B. Pant University of Ag. & Tech., Pantnagar, India. Each of the germplasm was transplanted as a single row of 3 m length maintaining a distance of 60 cm x 20 cm between rows and hill, respectively. Recommended agronomic practices were followed to grow the crop. Infected rice leaves with light green or yellow lesions were collected from BLB susceptible T(N)1 plants. The leaf with old and brown lesions was discarded and the rest of it was cut into - small pieces of about 3 mm sizes. The cut leaves were put in a beaker and just enough water was poured to submerge them. After 20 minutes of soaking, leaf pieces were removed and the resultant suspension was used as the inoculum. All the rice germplasm were inoculated with the bacterial suspension within two hours of preparation at the maximum tillering stage by the clip inoculation method (Kauffman *et al.,* 1973), during the second fortnight of August, as weather conditions are most conducive to disease development. In clip inoculation method, the clipper is dipped in freshly prepared inoculums before cutting the leaf tips. Five inoculated plants were selected from each line for data collection. The observations were made at 14 days after inoculation by taking the length of the entire leaf and length of the lesion produced by the pathogen. The disease severity was expressed as percentage of leaf length covered by the BLB lesion (Lesion length + leaf length x 100). Standard evaluation system advocated

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by IRRI (1996) was used for grading the germplasm based on percentage of leaf length covered by lesion where, 0 = Immune, 1-5% = Resistant (R), 6-12% = Moderately Resistant (MR), 13-25% = Moderately susceptible (MS), 26-50% = Susceptible (S) and 51-100% = Highly susceptible (HS).

Data on percent leaf length infected and disease reaction of thirty lines are presented in Table 1. The results revealed that line UPR 2869-98-121 was immune to BLB infection. Immune reaction of UPR 2869-98-121 (PD-4/IRBLB 13) inherited its resistance from IRBLB 13 which possess single recessive gene *xa* 13.

Four lines showed resistant reaction and another four lines showed moderately resistant reaction. The resistant lines were AC-19-1-1, BJ 1, CAMOR and IR 22082-41-2. Entries BR 4661-21-4-2-5, IR 22, IR 20, and JET 8585 showed moderately resistant reaction to the pathogen.

Table 1. Thirty rice germplasm with their origin and reaction of bacterial leaf blight (BLB) of rice caused by *Xanthomonas oryzae pv. oryzae*.

Germplasm	Parentage	Origin	Percentage of leaf length infected by BLB	Disease reaction
BR. 4661-21-4-2-5	BR 4661-21-4-2-5	Bangladesh	6.20	MR
SUWEON-290/ HANGFG. CHABYE	IR 2061-464 / KR 51-28-5-1	Korea	22.42	MS
IR 8	PETA DEF-GEO-WOO-GEN	IRRI	24.00	MS
MILYANG 42	Tongil IR 946-52//IR 1317-392 IR 539 YR 675	Korea	29.48	S
NIGERIA 5	NIGERIA 5		4.30	R.
AC 19-1-1	AC 19-1-1	Bangladesh	4.54	R
BJ 1	BJ 1	India	16.90	MS
YN 2482-503-8	MNTK / IR 1442-46-3/MNTK		19.98	MS
Java 14	Java 14	Indonesia	50.72	HS
MILYANG 23	SUWEON 232/ IR 24	Korea	24.38	MS
IR 22	PETA/DEE-GE0-WOO-GEN// TADUKAM	IRRI	8.32	MR
CISADANTE	BELITA1-1/IR 789-98-2-3/ IR 2157-3		27.96	S

Germplasm	Parentage	Origin	Percentage of leaf length infected by BLB	Disease reaction
KOGYOKO	SHLROSENBON / SHOBEI	Japan	14.46	MS
BR 802-118-4-2	BI 90-2 / BR 51-46-5	Bangladesh	60.24	HS
IR 59606-119-3	IR 44592-62-1-3-3-2 / IR 28239-94-2-3-6-2	IRRI	47.52	S
IR 1545-339-2-2	IR 24 / DZ 192	IRRI	53.48	HS
IR. 69745-25-1-2-2-1-1	IR 60842-102-3-1-1-2-5/ IR 65912-100-2-4-2-4	IRRI	15.90	MS
IR 54055-1';2-2-1-2-3	TOX 896-R-R-R-102/IR3 7870-53-3-3-3// IR 28224-3-2-3-2	IRRI	63.53	HS
CAMOR	CAMOR	Indonesia	5.00	R
DV 85	DV 85		18.20	MS
IR 53942-69-3-1-1-1-1	IR 28224-3-2-3-2 / IR 28222-9-2-2-2-2// IR 28143-51-3-3-1-3	IRRI	34.66	S
IR 68058-71-2-1	IR 44962-161-2-4-4-2 / IR 58185-23-3-3-1	IRRI	25.58	S
IR 54	NAM SAGU 19 / IR 2071-88 // IR 2061-214-3-6-20	IRRI	13.72	MS
IR 20	PETA* 3 / TN 1 // TKM 6	IRRI	11.36	R
UPR 2869-98-121	PD 4 / IRBLB 13	India	0.00	Immune
IET 8585	IR 8 / BJ I / IR 22		10.54	MR
UPR 1799-23-1	PD 4 HKR 46	India	13.26	MS
IR 22082-41-2	IR 54 IR 5657-33-2	IRRI	4.70	R.
UPR 2307-21-1-2	IR 24 PR 110	India	37.28	S
TN 1	DEE-GEO-WOO-GEN / Tsai- Yuan-Chan	Taiwan	74.06	HS

Resistant reaction of IR 22082-41-2 (IR 54 / IR 5657-33-2) inherited its resistance from IR 54 which possess single recessive gene (Sinha and Sahu, 2002). Sharma (1995) reported that monogenic recessive gene present in BJ1 that was allelic to *xa5*. Moderately resistant reaction of IR22 (PETA/DEE-GEO-

WOO-GEN//TADUKAM) inherited its resistance from TADUKAM which possess single dominant gene. Likewise, IR20 (PETA*3/TN1//TKM-6) inherited its resistance from TKM-6 which possess single dominant gene (Xa4) (Endo *et al.*, 1992). Saini *et al.* (1996) reported two dominant independently inherited genes controlled resistance of IET 8585.

Ten lines showed moderately susceptible reaction. Six entries showed susceptible reaction and five showed highly susceptible reaction. These highly susceptible lines are Java 14, BR 802-118-4-2, IR 1545-339-2-2, IR 54055-142-2-1-2-3 and TN (1).

Identification of resistance source and genes are key factors in breeding rice resistant cultivar against BLB disease. In the present investigation, thirty lines were screened against bacterial blight and UPR 2869=98-121 98-121 was recorded as immune and AC 19-1-1, BJ 1, CAMOR, and IR 22082-41-2 as resistant. These four germplasm can be used as a resistant donor for development of resistant cultivars.

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