



Field Screening of Different Paddy Advanced Cultures against Brown Planthopper, *Nilaparvata lugens* (Stal.)

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ABSTRACT

Twenty eight advanced rice cultures were tested for resistance against the brown planthopper, *Nilaparvata lugens* under field conditions at Agricultural College Farm, Bapatla during *kharif* 2015. The resistance for cultures was assessed based on the 0-9 damage score as per Standard Evaluation System. Among the various cultures screened, four cultures were *viz.*, BPT 2789, BPT 2703, BPT 2787 and BPT 2688 found to be resistant and recorded a damage score of '3'. The remaining 24 cultures were found to be moderately resistant with a damage score of '5'.

Key words: *Field screening, paddy, planthopper.*

Rice being major food crop in world posses largest germplasm collections in the world. Human selection and adaptation to diverse environments have crested a large number of cultivars and it is estimated that about 1,20,000 varieties of rice exist in the world (Khush, 1997). One of the major constraints of rice production in India is the occurrence of insect pests at various stages of crop growth. More than 100 species of insects attack rice, of them 20 are designated as major pests (Pathak and Dhaliwal, 1981). Among them, brown planthoppers is the most important group causing substantial yield losses and considered as economically important insect pest of rice (Heinrichs, 1994). Both nymphs and adults suck sap from basal portion of the plant clustering at the base of rice clump which may results in drying up of leaves and wilting of tillers resulting in a condition called "hopper burn". (Sogawa, 1982). For managing the pest, farmers are mostly rely on chemical insecticides. However, due to misuse and overuse of insecticides there is a development of pest resistance, pest resurgence, secondary pest outbreak and environmental pollution (Cuong et al., 1997, Heinrich 1994). Hence, the use of resistant varieties is logical and the most effective method of combating insect pest. The resistance to pest is inherited in plants it involves no extra cost to the farmers, nor does it impair the quality of the environment. Considering the importance of resistant varieties and of diverse resistant sources for controlling BPH, the present investigation was

undertaken with the objective to screen the advanced rice cultures against brown planthopper

MATERIAL AND METHODS

A total of 28 advanced rice cultures procured from Rice Research Unit (RRU), Bapatla along with resistant check BM 71 and susceptible check TN 1 were evaluated against BPH in Agricultural College Farm, Bapatla during *kharif* 2015. The experiment was laid out in a simple Randomised Block Design (RBD) which was replicated thrice. Each entry was transplanted in two rows of five metre length with a spacing of 30 cm between each entry. Each plot was separated with a gap of 30 cm which were used as irrigation channels. One month old seedlings were transplanted in the field with a spacing of 20 X 15 cm @ 2 seedlings per hill.

The extent of damage was assessed from ten randomly selected hills in each entry. Observations were recorded from 30 days after transplanting at week days intervals. Each entry was rated on 0-9 scale as per Standard Evaluation System (SES) for rice developed by International Rice Research Institute (IRRI) to categorize the cultures in different categories of resistance in response to BPH. (IRRI 2002)

RESULTS AND DISCUSSION

A total 28 rice cultures of Rice Research Unit (RRU) were screened under field conditions during *kharif* 2015. The results of screening trails

Table 1. Standard Evaluation System for resistance against brown planthopper.

Damage score	No. of BPH/hill	Level of resistance
0	0	Immune (I)
1	1-5	Highly resistance (HR)
3	5.1-10	Resistance (R)
5	10.1-20	Moderately resistance (MR)
7	20.1-40	Moderately susceptible (MS)
9	>40	Susceptible (S)

Table 2. Field reaction of different rice cultures against Brown planthopper during *kharif* 2015.

S.No	Rice culture name	Mean population/hill	Damage scoring	Status
1	BPT 2702	14.35	5	MR
2	BPT 2703	9.59	3	R
3	BPT 2717	13.60	5	MR
4	BPT 2719	15.31	5	MR
5	BPT 2741	15.89	5	MR
6	BPT 2766	14.59	5	MR
7	BPT 2768	14.14	5	MR
8	BPT 2769	13.54	5	MR
9	BPT 2678	13.78	5	MR
10	BPT 2677	13.41	5	MR
11	BPT 2680	13.93	5	MR
12	BPT 2688	9.76	3	R
13	BPT 2780	13.92	5	MR
14	BPT 2781	13.31	5	MR
15	BPT 2782	13.59	5	MR
16	BPT 2783	13.87	5	MR
17	BPT 2784	13.64	5	MR
18	BPT 2786	13.25	5	MR
19	BPT 2787	9.74	3	R
20	BPT 2788	13.70	5	MR
21	BPT 2789	9.11	3	R
22	BPT 2790	13.60	5	MR
23	BPT 2791	13.51	5	MR
24	BPT 2793	13.06	5	MR
25	BPT 2795	12.19	5	MR
26	BPT 2796	13.49	5	MR
27	BPT 2797	13.04	5	MR
28	BPT 2798	13.73	5	MR
29	TN-1 Susceptible check	36.26	9	S
30	BM-71 Resistant check	7.59	3	R
	SEm	0.218		
	Fcal	Sig		
	CD (0.05)	0.6		
	CV (%)	10.26		

Sig – Significant, R- Resistant and MR – Moderately Resistant

showed that the cultures *viz.*, BPT 2789, BPT 2703, BPT 2787 and BPT 2688 recorded with 9.11, 9.59, 9.79 and 9.76 mean BPH population per hill respectively and were found resistant (R) with a damage score of '3'. All other 24 cultures *viz.*, BPT 2702, 2717, 2719, 2741, 2766, 2768, 2769, 2678, 2677, 2680, 2780, 2781, 2782, 2783, 2784, 2786, 2788, 2790, 2791, 2793, 2795, 2796, 2797 and 2798 were rated as moderately resistant (MR) with a damage score of '5'. BPT 2741 recorded highest mean pest population per hill among the screened entries *i.e.*, 15.89 per hill. In case of susceptible check (TN 1) 36.26 mean population per hill was recorded and scored 9 in the scale. BM 71, resistant check scored 3 and found with 7.59 mean population per hill. (Table 2).

The results were in accordance with Bhatt and Tiwari (2015) who screened 120 rice genotypes against BPH and among all RP 2068-18-3 and CR3006-8-2 were found to be resistant while 10 other entries were recorded as moderately resistant. This results were also in conformity with Krishnaveni *et al.*, 2011 who reported that Bhavapuri sannalu (BPT 2270) has exhibited moderate resistance to BPH. The four promising entries of rice CR 2711-149, KAUM 179-1, KAUM 179-2 and KAUM 182-1 showed consistent resistance reaction against planthoppers (IIRR, 2015).

CONCLUSION

Among the screened rice cultures, four cultures exhibited resistant to BPH *viz.*, BPT 2789, BPT 2703, BPT 2787 and BPT 2688 while other cultures were moderately resistant. The susceptible check TN 1 has recorded the highest mean population per hill (36.26) and the resistant check BM 71 recorded the lowest mean population per hill (7.59) compared to the screened cultures. The rice cultures exhibiting resistance may helpful in further crossing programmes to develop the resistant varieties which is used as a component in IPM programmes.

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