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Screening of elite rice genotypes for brown plant hopper (*Nilaparvata lugens* Stal)

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Abstract
Ninety-four popular elite rice varieties for different ecologies of different states were evaluated for BPH in net house condition. Out of these, eleven varieties are moderately resistant to BPH having score 3. The resistant varieties are Balum-2, Megharice -3, Imp sabaramati, GR-7, Karjat-3, MTU 1061, MTU 1075, RTN-3, R-Suwasini, Pravat, Santepal. Twenty-four varieties are moderately susceptible having score 5, thirty-two varieties are susceptible having score 7 and twenty-seven varieties are highly susceptible to BPH having score 9.

Keywords: Screening, rice varieties, BPH, net house

Introduction
Rice is the primary food crop of India. It occupies 44.6 Mha. areas. To meet the requirement of rice for growing population, it is recommended to use the high yielding varieties and increase the cropping intensity. Rice is infested by more than 100 species of insects and pests. Out of these, 20 are considered most serious pest as they cause significant damage to rice crop (Pathak, 1977) [7]. BPH remain in the secondary crop and occur due to misuse of insecticide. Brown Plant Hopper (BPH) is themost devastating insect of India and causes serious damage to rice crop in certain areas. It is first reported in Kerala during 1973. causing severe damage in rice crop (Nalinikumari and Mammen, 1975) [6]. BPH is monophagous vascular feeder that damages directly sucking the phloem sap from rice leaf sheath and indirectly damage plant by transmitting the plant virus. Jenaand Kim (2010) [5] studied that the resistance of varieties break down due to development of new biotypes in the process of evolution. So evaluation of genotypes and identification 3of new sources of resistance should be continuous process, sothat it could be utilized in varietal development programme. Application of chemical is very expensive and ineffective due to changing weather conditions and biotypes. It also increases the pest incidence by killing the predators, toxicity to natural enemies and human health. The use of resistant varieties is the only alternative and economical method for controlling BPH. It is necessary to identify BPH resistant gene from diverse sources and induce in modern rice cultivars for durable resistance. Efforts are being made to evaluate released rice varieties in net house condition to find out resistant varieties for BPH to be utilized in varietal improvement programme and popularize among the farmers in BPH endemic areas.

Materials and Methods
The experiment was conducted in net house condition during kharif 2018 at National Rice Research Institute, Cuttack. Ninety-four released varieties of different states and for different ecology were screened for BPH. BPH screening was done by modified seed box screening test (MSST) (Heinrichs, 1985) [3]. Pre germinated seeds of each entry (at least 25 seeds /entry) were sown in 3 cm apart in the wooden box including susceptible check TN-1and resistance check PTB-33.12 days after sowing, the seeds were infested with 3-5 nymph per seedling. After infestation the wooden seed boxes with seedling were covered with cages. Three replications for each genotype along with control were maintained. The test plants were daily observed for BPH damage. After 20 days of infestation, hopper burn symptoms appeared due to BPH damage on test lines. When damage rate of 90% was observed in susceptible lines then test lines were scored on 1-9 scale using SES for rice. (IRRI, 1996) [4]. Each accession was scored on individual plant basis as 0(no visible damage), 1 (partial yellow of 1st leaf), 3 (1st and 2nd leaf yellow), 5 (yellow and stunting or half of the plant wilted/dead),

7 (more than half of the plant wilted/dead), 9 (all the plant wilted/dead) (Heinrich *et al*, 1985) [3].

Result and Discussion

Out of 94 varieties, no varieties are having score 1. Eleven varieties are moderately resistant to BPH having score 3. The resistant varieties are Balum-2, Megharice -3, Imp sabaramati, GR-7, Karjat-3, MTU 1061, MTU 1075, RTN-3, R-Suhasini, Pravat, Santpal (table-1). Twenty-four varieties are moderately susceptible having score 5, thirty-two varieties are susceptible having score 7 and twenty-seven varieties are highly susceptible to BPH having score 9. The varieties *viz*., Jaya, PR114, Basmati 370, Govind etcare highly susceptible to BPH having score 9.Similarly, Pusa 33, Pusabasmati 1, GR 103, GR 6, PKV HMT and IR24etcare susceptible having score 7.Timmangouda and Mahaswaran (2017) [8] evaluated 25 rice varieties and reported three varieties resistance namely Kakatharan, BG367-2,Kavuni and Bharathi. Ali *et al*., (2012) [1] evaluated 1767 rice genotypes for six years in Bangladesh and reported only 87 genotypes to be resistant. It showed very narrow source of resistance for BPH. 27 genotypes were evaluated, of these only three varieties showed namely Akhay, Rathuheenathi and BM 71. showed resistance. (Bhogadhi *et al*., 2015) [2].

Table 1: List of rice varieties with their SES score and state released

Sl.no	Varieties	Score	State	Sl.no			State
1	Bhalum-2	3	Meghalaya	49	Pratyasa	7	Kerala
2	Megharice-3	3	Meghalaya	50	Uma	7	Kerala
3	Imp sabaramati	3	Delhi	51	Mokam	7	Kerala
4	GR-7	3	Gujarat	52	Bhadra	7	Kerala
5	Karjat-3	3	Maharashtra	53	Renjim	7	Kerala
6	MTU-1061	3	AP	54	PusaBasmati-1	7	CVRC
7	MTU-1075	3	AP	55	Pusa -33	7	CVRC
8	RTN-3	3	Maharashtra	56	Imp.Pusa Basmati-1	7	CVRC
9	R-Suwasini	3	Bihar	57	JR-503	7	MP
10	Pravata	3	Bihar	58	GR-6	7	Gujarat
11	Santpheal	3	Odisha	59	Dandi	7	Gujarat
12	Bhalum-2	5	Meghalaya	60	GAR-13	7	Gujarat
13	Megha rice-2	5	Meghalaya	61	GR-103	7	Gujarat
14	Sanwal basmati	5	J &K	62	Pravitra	7	Kerala
15	IET-1410	5	J &K	63	PKV-HMT	7	Maharashtra
16	Pusa Sugandha-5	5	CVRC	64	SKL-6	7	Maharashtra
17	Pusa Basmati-1121	5	CVRC	65	PKV-Kissan	7	Maharashtra
18	GR-11	5	Gujarat	66	Pratap	7	Odisha
19	GR-4	5	Gujarat	67	Hiranmayee	7	Odisha
20	Narmada	5	Gujarat	68	Pant Sugandha-21	9	Uttarakhand
21	GAR-2	5	Gujarat	69	Govind	9	CVRC
22	Palghar-2	5	Maharashtra	70	Pantdhan-19	9	Uttarakhand
23	Ratnagiri-1	5	Maharashtra	71	VLdhan-86	9	Uttarakhand
24	Ratnagiri-2	5	Maharashtra	72	VLdhan-206	9	Uttarakhand
25	Karjat-6	5	Maharashtra	73	VLdhan-207	9	Uttarakhand
26	Panvel-2	5	Maharashtra	74	IR-30864	9	Karnataka
27	MTU-2067	5	AP	75	KCP-1	9	Karnataka
28	RTN-4	5	Maharashtra	76	Basmati-370	9	Haryana
29	Vaidehi	5	Bihar	77	PR-116	9	Punjab
30	Pathara	5	Odisha	78	PR-103	9	Punjab
31	Meher	5	Odisha	79	PR-114	9	Punjab
32	Tejswini	5	Odisha	80	Naur-1	9	Gujarat
33	Phuleradha	5	Karnataka	81	Himalaya-799	9	HP
34	MGD-101	5	Karnataka	82	China-988	9	HP
35	Magadha Sugandha	5	Karnataka	83	Himalaya-1	9	HP
36	IR-24	7	Uttarakhand	84	Karthika	9	Kerala
37	Panindra	7	Assam	85	Gouri	9	Odisha
38	Pantdhan-16	7	Uttarakhand	86	Revathy	9	Kerala
39	Pantdhan-18	7	Uttarakhand	87	Panchami	9	Kerala
40	VLdhan-61	7	Uttarakhand	88	Megharice-1	9	Meghalaya
41	VLK-39	7	Uttarakhand	89	Lampneh	9	Meghalaya
42	VLdhan-108	7	Uttarakhand	90	Bhalum-4	9	Meghalaya
43	VLdhan-208	7	Uttarakhand	91	Jaya	9	CVRC
44	VLdhan-87	7	Uttarakhand	92	Bhoi	9	Odisha
45	Thanu	7	Karnataka	93	Gajapati	9	Odisha
46	CTH-3	7	Karnataka	94	Surendra	9	Odisha
47	PR106	7	Punjab	95	TN-1	9	Punjab
48	PR-113	7	Punjab	96	PTB-33	1	Kerala

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References

1. Ali MP, Salem M, Alghamdi MA, Begum ABM, Anwar Uddin, Alam MZ *et al*. Screening of rice genotypes for

resistance to the Brown Plant Hopper (*Nilaparvata lugen* Stal) Cereal Research Communication. 2012, 40(4):502-508.
2. Bhogadhi SC, Bentur JS, Durgarani CV, Teppeta G, Yamini K, Arun N *et al*. Screening of rice genotypes for resistance to Brown Plant Hopper biotypes -4 detection of BPH resistance gene. Int. Journ. Life Sci. Biotech Pharma. Res. 2015; 4(2):90-95.
3. Heinrichs EA, Medrano FG, Rapusas HR. Genetic evaluation for insect resistance in rice International Rice Research Institute, Los Banos, Philippines, 1985, 1-356.
4. IRRI. Standard Evaluation System for rice (4th Edition) International Rice Research Institute, Los Banos, Philippines, 1996.
5. Jena KK, Kim Man Suk. Current status of Brown Plant Hopper (BPH) Resistance and Genetics. Rice. 2010; 3:161-171.
6. Nalinikumari J, Mammen KV. Biology of Brown Plant Hopper (*Nilaparvata lugens*.) Agricultural Research Kerala. 1975; 13:53-54.
7. Pathak MD. Defense of rice crop against insect pests. Annals of New York Academy of Sciences, 1977, 287-295.
8. Timmanagouda SP, Maheswaran M. Phenotypic screening for Brown Plant Hopper (*Nilaparvata lugens* Stal) resistance in rice (*Oryza sativa* L.). Inter. Journ. Curr. Micro. & Applied Sci. 2017; 6(12)858-863.