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EVALUATION OF BROWN PLANT HOPPER *NILAPARVATA LUGENS* (STAL.) RESISTANCE

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ABSTRACT

This study is on the laboratory evaluation of resistance to brown plant hopper (BPH) *Nilaparvata lugens* done at the National Rice Research Institute with their released rice varieties. Ninety-nine varieties were screened along with resistant (PTB 33 and Salkathi) and susceptible check (TN1) during 2019-20. Results revealed that only Lunishree (2.92) and Luna Sampad (3.00) exhibited the least damage score, while others were susceptible (7.00 to 9.00). Interestingly both these had been released to check salinity stress. Further to ensure the resistance level, ten resistant accessions with different *Bph* genes viz., ASD 7 (*bph 2*), IR 36 (*bph 2*), Babawee (*bph 4*), Chinsaba (*bph 8*), IR 65482-7-216-1-2-B (*Bph 18*), PTB 33 (*bph 2+Bph 3*), Rathuheenati (*Bph 3+ Bph 17*), RP-2068-18-3-5 (*Bph 33*), Swarnalatha (*Bph 6*) and T12 (*Bph 7*) were screened. Of these only PTB 33 and RP-2068-18-3-5 showed resistance.

Key words: *Nilaparvata lugens*, rice genotypes, resistance, susceptible, evaluation, BPH genes, saline resistance, PTB 33, Salkathi, TN1, Lunishree, Luna Sampad

Rice (*Oryza sativa* L.) is the essential cereal crop, and especially in Asian countries rice is principal source of energy (Fitzgerald et al., 2009). In terms of production, India holds second position in the world. Being a nutrition rich commodity, rice attracts a greater number of insect pests particularly plant hoppers which are serious pests (Jena et al., 2018). Amongst these, the brown plant hoppers (BPH) *Nilaparvata lugens* (Stal.) is the most devastating and regarded as the major phloem sucker causing significant economic losses in Asia (Pandi et al., 2016; Jena et al., 2018). Besides, *N. lugens* also acts as vector to grassy stunt and ragged stunt viral diseases of paddy plants (Li et al., 2014). Management of insect pests with chemicals has associated problems (Mahapatra et al., 2017; Sahu et al., 2019; Pandi et al., 2019), hence host plant resistance is the effective and environmentally friendly way to insect control that also useful to improve the crop performance (Bottrell and Schoenly, 2012; Stout et al., 2014). Resistant varieties might be an efficient strategy to control BPH infestation and also help in conservation of natural enemies, increasing their effectiveness and minimizing the pesticide applications (Jena and Kim, 2010; Du et al., 2020).

Screening rice germplasm and breeding BPH resistant rice varieties were initiated during 1970s, and several resistant varieties have been released for cultivation (Li et al., 2010). However, BPH has been breaking resistant varieties upon introduction to farmers' field and thus demands for identification of new source of resistance. Similarly, resistance status of insect pest varies according to the availability of material in the field; hence it is essential to know the present status of different resistant accession having *Bph* resistance genes. These findings will provide new insights into the host-plant interaction and further, molecular mechanism of BPH resistant genes and exploit the resistance gene in rice breeding. The present study explores this under laboratory and greenhouse conditions.

MATERIALS AND METHODS

The materials consist of 99 National Rice Research Institute (NRRI) released varieties (NRVs) collected from the rice gene bank, NRRI, Cuttack (Odisha). Likewise, resistance gene differential seeds were collected from All India Coordinated Rice Improvement Project (AICRIP) program. The initial BPH populations were collected from rice fields at NRRI, Cuttack (85°55'48"E, 20°26'35"N) and were continuously reared at 25±2°C and 60-80% RH on the susceptible variety TN1 plants under green house condition and thus used for screening. The 99 NRVs were screened using the Standard Seed Box Screening Test (SSST) method with slight modifications (Jena et al., 2015).