

Wild rice (*Oryza nivara*) as a potential source for brown plant hopper resistance

Madurangi S.A.P.¹, Ratnasekera Disna¹, Senanayake S.G.J.N.¹, Samarasinghe W.L.G.², Hemachandra P.V.² and Rajapakse R.H.S.¹

¹ Faculty of Agriculture, University of Ruhuna, Mapalana, Kamburupitiya, Sri Lanka

² Rice research and Development Institute, Bathalagoda, Sri Lanka

Brown plant hopper (BPH) is the most serious rice pest in Sri Lanka. The most effective way of BPH management is considered as a host-plant resistance. Hence, continuous identification of genetic resources having a broad-based and durable resistance to BPH is important to face against resistance breakdown of existing BPH-resistant rice varieties by incorporation of the new BPH-resistant genes into modern rice cultivars. The present study evaluated the basis of BPH resistance in wild rice (*Oryza nivara*) accessions WRAC 01, 02, 04, 07, 11, 12, 14, 19, 21, 22, 24, 25, 35, 41, 46, 62 and 9864, with cultivated varieties Ptb 33, Bg 380 and Bg 379/2 as check varieties, by screening for resistance and gene characterization by molecular techniques. The BPH populations collected from Bathalagoda and Bombuwala regions of the country were reared on Bg 380 and a virulent BPH population collected from rice fields in Kegalle area and reared on Bg 379/2 were used. Response of test accessions to feeding by BPH was assessed by using Standard Seed Box Screening test (SSBS) and standard honeydew test. The antibiosis, antixenosis and oviposition responses of BPH on test accessions were investigated using standard techniques. Molecular screening for BPH resistance was carried out using specific molecular markers for *bph2*, *Bph10*, *Bph13*, *Bph 3* and *Bph18(t)* genes. Results of different bioassay tests confirmed resistance to moderate resistance in the majority of *O. nivara* accessions studied. Among all, WRAC 35, WRAC 21, WRAC 02 and WRAC 01 showed the best performances over Ptb 33, indicating their superior level of resistance to available BPH populations in Sri Lanka and the potential of using these accessions to upgrade cultivated rice varieties in future. Molecular screening for BPH resistance revealed positive results with WRAC 02, 04, 25, 07 and 21 accessions for *Bph 2* gene and with WRAC 46 for *Bph10* gene. However, none of the *O. nivara* accession were recorded as positive for *Bph3* and *bph18(t)* genes. Although, *O. nivara* accessions excluding 9864, showed positive results for *Bph13* gene, this work confirms the virulence of Sri Lankan BPH against *Bph13* gene as Bg 380 (Susceptible check) was positive for the marker (AJ 096). Thus, the high level of resistance observed in WRAC 35 and WRAC 01 could be due to the presence of other known or new genes. Hence, further investigations for other known genes and exploiting them to widen the genetic base of cultivated rice varieties needs to be continued.

Keywords: Brown planthopper, *Oryza nivara*, molecular Screening, bioassay