

Thesis Title	Genotypic Screening of Brown Planthopper (<i>Bph</i>) Resistance Genes and Evaluation of BPH Resistance in Upland Rice Varieties
Author	Kittiya Kanngan
Degree	Master of Science (Biological Science)
Advisor	Asst. Prof. Somrudee Nilthong, Ph. D.
Co-Advisor	Khanobporn Tangtrakulwanich, Ph. D.

ABSTRACT

Brow planthopper (*Nilaparvata lugens*; BPH) is the most dangerous pest in rice cultivation, which reduces crop yields. The use of BPH-resistant rice varieties has been used as an economical and environmentally friendly approach to BPH control. Upland rice varieties are an interesting source for developing BPH-resistant rice varieties. In this study, 143 upland rice varieties were genotyped for the presence of the five major *Bph* resistance genes (*bph2*, *Bph3*, *Bph14*, *Bph15*, and *Bph17*). The result showed that 139 varieties have at least one to five resistance genes. Five varieties, IR70175-51-2-1-1-2, Lai Chan, Beu Hmeu Mae La, Pi Ai Kor, and Khao Nieow Kla have all resistance genes. The allele frequencies of the *R* genes ranged from 33.57% to 61.54%. The Polymorphism information content value (PIC) ranged from 0.4460 (IN76-2) to 0.4984 (RM16626) with an average value of 0.47437, indicating that the markers were moderately informative for identifying genetic diversity of BPH resistance. Cluster analysis merged 143 upland rice varieties into two main clusters. The population structure was also examined, which divided the upland rice into the SP1 and SP2 subpopulations. 92% of the variation was identified within the subpopulations, according to analysis of molecular variance (AMOVA), indicating that there was a significant gene

exchange between the two subpopulations. Additionally, an expression of BPH resistance in upland rice was evaluated using a six-level scoring system. The result showed that 11.19% moderately resistance, 29.37% moderately susceptible, 13.99% susceptible and 45.45% highly susceptible. The correlation shows that *Bph3* gene and BPH resistance are negatively correlated which could be implied that indicating that the *Bph3* gene is highly effective against BPH infestation. This study provides useful information about the BPH resistance varieties that can be useful in the breeding programs for the development of BPH resistance in rice.

Keywords: BPH, BPH Resistance Genes, Brown Planthopper, *Nilaparvata lugens*, Upland Rice

