Population Build-up of Brown Planthoppers on *DB1* Transgenic and Non-Transgenic Rice Cultivars

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Abstract

Brown planthopper (BPH) is well-known as the major pest in rice cultivation in Indonesia. Development of BPH resistant rice cultivar is the ideal option for economic and effective management of BPH. Db1 gene (mannose-binding lectin family gene), isolated from Dioscorea batatas, is proven to be effective against some sup-sucking insects. This gene has been transferred to rice cv. Taichung-65 and currently homozygous transgenic rice line has been selected. The experiment was aimed to study obtain transgenic Db1 rice lines and non-transgenic rice lines that resistance to BPH. Genotypes used were transgenic rice cultivar of Taichung-65 with Db1 insertion, non-transgenic rice cultivars i.e. Taichung-65, PTB-33, Rathu Heenati, Babawee, IR-64, IR-42, Ciherang, and Cisadane. Two colonies of brown planthopper i.e. colony Sukamandi (suspected a mixture of biotype 3 and 4) and colony North Sumatera (biotype 3) were used in this study. Number of BPH population was recorded from 1st to 7th observation. Results showed that cv. PTB-33 could reduce development of BPH population from 1st to 7th observation (the last observation). From 3rd to the last observation, BPH population on transgenic rice line (Taichung-65 with Db1) tended to increase. Number of BPH adults on cv. PTB-33 was the least amount of BPH adults, except for colony Sukamandi. Furthermore, in this colony, the least number of adult winged BPH (Macroptera) was found on cv. IR-42. It is concluded that population build-up of BPH is not depended on cultivar reaction.

Keywords: brown planthopper, DB1 transgene, population build-up.

Introduction

Brown planthopper (BPH) has been known as a main pest for rice crop cultivated around the world since for a long time ago. In most cases, large scale infection of BPH has caused significant loss of rice production that effecting danger of famine, therefore need an effort to protect rice plant against BPH attack. Development of BPH resistant rice cultivar has been the ideal option for economic and effective management of BPH (Jena *et al.*, 2009), safety for people and environment, and compatible with another current pest management practices.

In addition, BPH is vectors for some viral diseases in rice such as stunt virus and ragged stunt virus (Nagadhara *et al.*, 2004) may cause reduced rice yield for more than 50% and even 100% yield loss. Due to this important issue, developing rice plant resistant to BPH would be highly desired which could be achieved by genetic engineering technology. The application of transfer genetic technology has been recognized as the economical and