

Deteksi Gen Ketahanan Hawar Daun Bakteri *Xa1*, *Xa4* dan *Xa23* pada Tiga Kultivar Lokal Padi Hitam (*Oryza Sativa L.*) di Yogyakarta

Siti Roswiyah Yulyani

12/334320/BI/08982

Dosen Pembimbing: Dr. Yekti Asih Purwestri, M.Si

INTISARI

Beras hitam mulai populer dikonsumsi oleh masyarakat sebagai bahan pangan fungsional seiring dengan peningkatan kebutuhan pangan dan peningkatan kesadaran masyarakat akan pentingnya mengkonsumsi pangan penunjang kesehatan. Tetapi, terdapat faktor pembatas produksi padi yaitu penyakit hawar daun bakteri yang disebabkan oleh *Xanthomonas oryzae* pv. *Oryzae* (*Xoo*). Penggunaan varietas tahan yang memiliki gen ketahanan *Xa* dinilai efektif untuk menanggulangi masalah penurunan hasil padi. Gen *Xa* ini antara lain terdiri dari gen *Xa1*, *Xa4*, dan *Xa23*. Gen *Xa1* memainkan peranan penting dalam *pathogen recognition*. Gen *Xa4* merupakan salah satu dari gen ketahanan yang paling banyak dimanfaatkan dalam program pemuliaan padi di Asia dan memberikan efek resistensi yang tahan lama di banyak kultivar padi komersial dan tahan terhadap *Xoo* patotipe III. Adapun gen *Xa23* memiliki ketahanan terhadap semua *Xoo* patotipe Filipina dan beberapa patotipe China serta Jepang. Penelitian ini bertujuan untuk mengetahui keberadaan tiga gen ketahanan hawar daun bakteri *Xa1*, *Xa4* dan *Xa23* pada tiga kultivar lokal padi hitam di Yogyakarta. Metode penelitian meliputi isolasi genom padi, pengecekan hasil isolasi DNA dengan elektroforesis gel agarosa (0,8%), pengukuran konsentrasi dan kemurnian DNA, amplifikasi DNA, dan analisis data. Hasil penelitian ini mendeteksi keberadaan gen *Xa1* dengan ukuran pita 552bp pada ‘Cempo Ireng’, ‘Melik’ dan ‘Pari Ireng’. Adapun gen *Xa4* terdeteksi dengan ukuran pita yang bervariasi yaitu 120bp (‘Cempo Ireng’), 150bp (‘Melik’) dan 136bp (‘Pari Ireng’) dan gen *Xa23* yang teramplifikasi pada ukuran pita 346bp pada ketiga kultivar padi hitam. Dengan ini dapat disimpulkan bahwa ‘Cempo Ireng’ memiliki gen *Xa1* (sifat tahan), *Xa4* dan *Xa23* dengan sifat rentan, ‘Melik’ memiliki gen *Xa1* dan *Xa4* dengan sifat tahan dan *Xa23* (sifat rentan). ‘Pari Ireng’ memiliki gen *Xa1* (sifat tahan), gen *Xa4*, dan *Xa23* (sifat rentan).

Katakunci : Gen *Xa1*, gen *Xa4*, gen *Xa23*, penyakit hawar daun bakteri, ‘Cempo Ireng’, ‘Melik’, ‘Pari Ireng’

Detection of Bacterial Leaf Blight Resistance Genes *Xa1*, *Xa4* and *Xa23* in Three Local Cultivars of Black Rice (*Oryza sativa L.*) in Yogyakarta

Siti Roswiyah Yuyani
12/334320/BI/08982

Supervisor: Dr. Yekti Asih Purwestri, M.Si.

ABSTRACT

Black rice become popular consumed by the public as a functional food along with increased of population and public awareness about the importance of consuming healthy food. However, productivity of black rice is decreased by bacterial leaf blight caused by *Xanthomonas oryzae* pv. *oryzae* (*Xoo*). Resistant varieties of black rice have resistance gene *Xa* is effective to against bacterial leaf blight disease. Some of *Xa* genes are *Xa1*, *Xa4*, and *Xa23* gene. *Xa1* has important role in common signaling pathways leading defense again pathogen invasion. *Xa4* is one of the most widely exploited resistance gene in many Asian rice breeding programs and conferred durable resistance in many commercial rice cultivars. Amongst all the known resistance genes to bacterial leaf blight, *Xa23*, a single completely dominant resistance gene effective at all growth stages and was found to be highly resistant to twenty races of bacterial leaf blight (all of Philippines races and some of Chinese races and Japanese races. This study aims to detect the presence of gene *Xa1*, *Xa4* and *Xa23* on three local cultivars of black rice: 'Cempo Ireng', 'Melik' dan 'Pari Ireng'. The methods of this study are DNA Isolation, measure of the genomic DNA concentration with spectrophotometer, amplification with specific primer, visualitation with gel agarose 2% and data analysis. In this study, three black rices possess the 552bp band corresponding to *Xa1* gene. *Xa4* gene detected on various band that are 120bp ('Cempo Ireng'), 150bp ('Melik') and 136bp ('Pari Ireng'). Three black rices possess the 346bp band corresponding to *Xa23* susceptible band. Because of that, can be concluded that 'Cempo Ireng' possess *Xa1* resistant genes also *Xa4* and *Xa23* susceptible genes, 'Melik' possess *Xa1* and *Xa4* resistant genes also *Xa23* susceptible gene, and 'Pari Ireng' possess *Xa1* resistant gene, *Xa4* gene also *Xa23* susceptible gene.

Keywords : *Xa1* gene, *Xa4* gene, *Xa23* gene, Bacterial leaf blight, 'Cempo Ireng', 'Melik', 'Pari Ireng'