EVALUATION AND ANALYSIS OF MOLECULAR MARKERS FOR CHILI RESISTANCE TO YELLOW LEAF CURL DISEASE

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ABSTRAK

VANESA KRISNA WIDYA PUTRI. Evaluasi dan Analisis Marka Molekuler Ketahanan Cabai terhadap Penyakit Daun Keriting Kuning. Dibimbing oleh SRI HENDRASTUTI HIDAYAT dan YASHANTI BERLINDA PARADISA.

Cabai merupakan tanaman penting bagi masyarakat Indonesia dan memiliki nilai ekonomi yang tinggi. Penyakit daun keriting kuning merupakan penyakit penting. Penyakit tersebut disebabkan oleh *Pepper yellow leaf curl* Indonesia *virus* (PepYLCIV), anggota genus *Begomovirus* famili Geminiviridae. Salah satu cara pengendalian yang direkomendasikan adalah pengendalian serangga vektor, yaitu kutukebul *Bemisia tabaci* (Hemiptera: Aleyrodidae) dan penggunaan varietas tahan. Sayangnya, ketersediaan varietas komersial yang tahan terhadap PepYLCIV masih terbatas. Program pemuliaan tanaman yang didasarkan pada marka molekuler merupakan strategi yang dapat mempercepat eksplorasi sumber ketahanan terhadap penyakit. Penelitian ini bertujuan untuk menganalisis hubungan marka *simple sequence repeat* (SSR) dengan respons genotipe cabai terhadap PepYLCIV. Evaluasi genotipe cabai dilakukan menggunakan rancangan acak kelompok (RAK) dengan genotipe cabai (12 genotipe) sebagai perlakuan. Konfirmasi infeksi PepYLCIV dilakukan dengan metode *polymerase chain reaction* menggunakan primer universal dan spesifik *Begomovirus*. Respons genotipe dibedakan menjadi dua kategori yaitu tahan (’Iggo tavi’, ’Sios tavi,’ ’Imperial ijo’, ’Sigma’, IPB C12, dan ’Anies’) dan agak tahan (’Matador’, ’Warrior’, ’Bara’, IPB C3, ’Pesona’,dan ’Neno’). Sebanyak 13 marka SSR yang dievaluasi dapat digunakan dalam analisis variasi genetik dengan nilai PIC ≥ 0.7. Walaupun demikian, primer SSR yang digunakan dalam penelitian ini tidak berasosiasi dengan sifat ketahanan cabai terhadap PepYLCIV.

Kata kunci: *Begomovirus*, kutukebul, marka SSR, *Pepper yellow leaf curl* Indonesia *virus*, *polymerase chain reaction*

ABSTRACT

VANESA KRISNA WIDYA PUTRI. Evaluation and Analysis of Molecular Markers for Chili Resitance to Yellow Leaf Curl Disease. Supervised by SRI HENDRASTUTI HIDAYAT and YASHANTI BERLINDA PARADISA.

Chili is an important crop for the people of Indonesia and has a high economic value. Yellow leaf curl disease is an important disease. The disease is caused by *Pepper yellow leaf curl* Indonesia *virus* (PepYLCIV), a member of the genus *Begomovirus* family Geminiviridae. Disease management can be done by controlling insect vector, i.e., whitefly *Bemisia tabaci* (Hemiptera: Aleyrodidae) and the use of resistant varieties. Unfortunately, the availability of commercial varieties resistant to PepYLCIV is limited. Plant breeding programs based on molecular markers are a strategy that can accelerate the exploration of resistance sources. This study aimed to analyze the relationship of simple sequence repeat (SSR) markers with the response of chili genotypes to PepYLCIV. Evaluation of chili genotypes was carried out using a randomized group design with chili genotypes (12 genotypes) as treatments. Confirmation of PepYLCIV infection was carried out by polymerase chain reaction method using universal and *Begomovirus*-specific primers. The response of chili genotypes were divided into two categories, i.e., resistant (‘Iggo tavi’, ‘Sios tavi,’ 'Imperial ijo', ‘Sigma’, IPB C12, and ‘Anies’) and moderately resistant (‘Matador’, ‘Warrior’, ‘Bara’, IPB C3, ‘Pesona’, and ‘Neno’). A total of 13 SSR markers evaluated could be used in the analysis of genetic variation with PIC values ≥ 0.7. However, the SSR primers used in this study were not associated with chili pepper resistance to PepYLCIV.

Keywords: *Begomovirus*, *Pepper yellow leaf curl* Indonesia *virus*, *polymerase chain reaction*, whitefly, SSR markers

EVALUATION AND ANALYSIS OF MOLECULAR MARKERS FOR CHILI RESISTANCE TO YELLOW LEAF CURL DISEASE

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PREFACE

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The author is aware that this research has several limitations; therefore, constructive criticism and suggestions are sincerely welcomed for its improvement. It is also hoped that the results of this research will contribute to the development of science and provide benefits to readers, future researchers, and all who have supported this work.

Bogor, August 2025

Vanesa Krisna Widya Putri

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