



INCIDENCE AND DETECTION OF *Citrus tristeza virus* INFECTING CITRUS IN WEST JAVA

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**DEPARTMENT OF PLANT PROTECTION
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ABSTRAK

KHASANAH PUSPITANINGTYAS. Insidensi dan Deteksi *Citrus tristeza virus* yang Menginfeksi Tanaman Jeruk di Jawa Barat. Dibimbing oleh SARI NURULITA dan SRI HENDRASTUTI HIDAYAT.

Jeruk merupakan komoditas hortikultura penting secara ekonomi di Indonesia, namun produksi nasional masih belum optimal. Penyakit tristeza yang disebabkan oleh *Citrus tristeza virus* (genus *Closterovirus* famili *Closteroviridae*) merupakan salah satu penyakit penting pada tanaman jeruk dan berpotensi menyebabkan kehilangan hasil yang besar. Penelitian ini dilakukan untuk mengidentifikasi dan mengetahui penyebaran penyakit tristeza di beberapa daerah penanaman jeruk di Provinsi Jawa Barat. Penelitian diawali dengan survei pengambilan sampel tanaman jeruk di empat kabupaten, yaitu Bogor, Bandung, Bandung Barat, dan Garut. Gejala klorosis di lapangan diamati untuk menentukan intensitas penyakit. Sampel kemudian dikumpulkan dari daun yang bergejala dan tidak bergejala untuk deteksi virus secara serologi menggunakan metode *double antibody sandwich enzyme-linked immunosorbent assay* (DAS-ELISA). Konfirmasi lebih lanjut menggunakan deteksi molekuler dengan metode *one-step reverse transcription polymerase chain reaction* (*one-step* RT-PCR) menggunakan primer spesifik CTV, yaitu RBP 23-F/RBP 23-R. Pengamatan di lapangan menunjukkan adanya variasi kondisi pertanaman dan varietas jeruk. Gejala spesifik infeksi CTV menunjukkan *vein clearing* dan *chlorotic spot, leaf cupping, vein corking* dan klorosis. Intensitas penyakit di lapangan tergolong sedang hingga sangat berat. Deteksi dengan DAS-ELISA dan RT-PCR menunjukkan terdapat infeksi CTV di seluruh lokasi pengamatan kecuali di Kebun KJ Dayat asal Bandung. Analisis sekuen nukleotida menunjukkan bahwa isolat CTV asal Jawa Barat memiliki empat varian virus yaitu T68, VT, HA16-5, dan T30. Perlu penelitian lebih lanjut untuk mengetahui daerah sebar masing-masing varian di Indonesia.

Kata kunci: analisis sekuens, DAS-ELISA, primer spesifik, RT-PCR, varian virus

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ABSTRACT

KHASANAH PUSPITANINGTYAS. Incidence and Detection of *Citrus tristeza virus* Infecting Citrus in West Java. Supervised by SARI NURULITA and SRI HENDRASTUTI HIDAYAT.

Citrus is one of the economically important horticultural commodities in Indonesia, but its national production is still not optimal. Tristeza disease caused by *Citrus tristeza virus* (genus *Closterovirus* family *Closteroviridae*) is an important disease in citrus plants and has the potential to cause significant yield losses. This study was conducted to identify and determine the spread of tristeza disease in several citrus-growing areas in West Java Province. The study began with field surveys to citrus farms in four regencies, i.e. Bogor, Bandung, West Bandung, and Garut. Chlorosis symptoms on the farm were observed to determine disease intensity. Samples were then collected from symptomatic and asymptomatic leaves for serological detection by double antibody sandwich enzyme-linked immunosorbent assay (DAS-ELISA) method. Further confirmation through molecular detection was carried out by one-step reverse transcription polymerase chain reaction (one-step RT-PCR) method using CTV-specific primers, i.e. RBP 23-F/RBP 23-R. Field observations showed the variations in citrus cropping conditions and varieties at each observation site. Specific symptoms of CTV infection found involved vein clearing and chlorotic spot, leaf cupping, vein corking, and chlorosis. Disease intensity in the field was classified as moderate to very severe. DAS-ELISA and RT-PCR detection confirmed the distribution of the virus in citrus growing centers in West Java except at KJ Dayat Farm in Bandung. Nucleotide sequence analysis showed that CTV isolates from West Java consist of four virus variants, namely T68, VT, HA16-5, and T30. Further research is needed to determine the distribution area of each variant in Indonesia.

Keywords: DAS-ELISA, RT-PCR, sequence analysis, specific primers, virus variant



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INCIDENCE AND DETECTION OF *Citrus tristeza virus* INFECTING CITRUS IN WEST JAVA

KHASANAH PUSPITANINGTYAS

Undergraduate thesis
In partial fulfillment of the requirements for the degree of
Bachelor of Agriculture
at the
Department of Plant Protection

**DEPARTMENT OF PLANT PROTECTION
FACULTY OF AGRICULTURE
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PREFACE

All praise and gratitude to Allah *subhanaahu wa ta'ala* for all His blessings on the completion of my undergraduate thesis entitled “Incidence and Detection of *Citrus tristeza virus* Infecting Citrus in West Java”.

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The author hopes this undergraduate thesis can be useful for further research and the advancement of knowledge.

Bogor, July 2024

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