

FIELD EPIDEMIOLOGICAL PATTERNS OF YELLOW MOSAIC VIRAL DISEASE OF CUCUMBER IN BOGOR REGENCY

ROSITA



DEPARTMENT OF PLANT PROTECTION
FACULTY OF AGRICULTURE
BOGOR AGRICULTURAL UNIVERSITY
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Rosita
A3401221050



ABSTRAK

ROSITA. Pola Epidemiologi Lapangan Penyakit Virus Mosaik Kuning dari Mentimun di Kabupaten Bogor. Dibimbing oleh SARI NURULITA dan KIKIN HAMZAH MUTAQIN.

Penyakit mosaik kuning merupakan salah satu kendala penting dalam usaha tani mentimun (*Cucumis sativus* L.) di Kabupaten Bogor. Penelitian bertujuan mengidentifikasi virus penyebab dan menganalisis faktor epidemiologi penyakit mosaik kuning mentimun di Kabupaten Bogor. Perkembangan penyakit selama lima minggu ketika tanaman berumur 3-7 minggu diamati saat musim kemarau di Dramaga dan musim hujan di Rancabungur. Data faktor cuaca diperoleh dari Badan Meterologi, Klimatologi, dan Geofisika (BMKG). Pengambilan contoh tanaman sakit dan imago kutukebul dilakukan untuk deteksi virus dan identifikasi serangga. Virus tanaman dideteksi dengan *polymerase chain reaction* (PCR) menggunakan primer universal begomovirus (SPG1/SPG2), sedangkan serangga diidentifikasi secara morfologi. Hasil PCR mengonfirmasi bahwa virus kuning mosaik mentimun adalah begomovirus, sedangkan serangganya adalah *Bemisia tabaci* yang diketahui sebagai vektor begomovirus. Identifikasi berdasarkan analisis peruntutan nukleotida menunjukkan bahwa spesies begomovirus tersebut adalah tomato leaf curl New Delhi virus (ToLCNDV) dan berkerabat dekat dengan isolat ToLCNDV asal Indonesia (GenBank nomor akses PQ539479.1). Analisis spasial dengan uji Run menunjukkan pola sebaran penyakit di kedua lokasi bersifat acak, sedangkan uji Doublet menunjukkan sifat mengelompok pada pertanaman berumur 7 minggu petak 1 di Dramaga serta umur tanaman 6-7 minggu di Rancabungur. Berdasarkan analisis temporal dan nilai area di bawah kurva perkembangan penyakit (AUDPC) berdasarkan insidensi (SP) dan severitas (SP) penyakit mosaik di Rancabungur lebih besar (AUDPC-IP = 1792, AUDPC-SP = 594) daripada Dramaga (AUDPC-IP = 1549, AUDPC-SP = 547). Analisis hubungan antara faktor cuaca dengan laju severitas penyakit menunjukkan bahwa di Dramaga, suhu dan curah hujan berkorelasi positif dan kelembapan berkorelasi negatif, sebaliknya di Rancabungur suhu berkorelasi negatif serta kelembapan dan curah hujan berkorelasi positif.

Kata kunci: begomovirus, faktor cuaca, kutukebul, PCR-sekuensing, spasial-temporal



ABSTRACT

ROSITA. Field Epidemiological Pattern of Yellow Mosaic Viral Disease of Cucumber in Bogor Regency. Supervised by SARI NURULITA and KIKIN HAMZAH MUTAQIN.

Yellow mosaic disease is one of the important constraints in cucumber farming (*Cucurbitaceae*) in Bogor Regency. The study aimed to identify the causative virus and analyze the epidemiological factors of cucumber yellow mosaic disease in Bogor Regency. Disease progression over five weeks when plants were 3-7 weeks old was observed during the dry season in Dramaga and the rainy season in Rancabungur. Weather data was obtained from the Meteorology, Climatology, and Geophysics Agency (BMKG). Sampling of diseased plants and whitefly adults was carried out for virus detection and insect identification. Plant viruses were detected using *polymerase chain reaction* (PCR) using universal begomovirus primers (SPG1/SPG2), while the insects were identified morphologically. PCR results confirmed that the cucumber yellow mosaic virus is a begomovirus, while the insects are *Bemisia tabaci* known as a begomovirus vector. Nucleotide sequence analysis identified the begomovirus as tomato leaf curl New Delhi virus (ToLCNDV), which is closely related to the ToLCNDV Indonesian isolate (GenBank accession no. PQ539479.1). Spatial analysis using the Run Test showed a random distribution pattern of the disease in both locations, while the Doublet Test showed a clustered distribution in 7-week-old plot 1 plants in Dramaga and 6-7 weeks old plants in Rancabungur. Based on temporal analysis and the area under the disease progression curve (AUDPC) based on the incidence (DI) and severity (DS) of mosaic disease in Rancabungur was greater (AUDPC-DI = 1792, AUDPC-DS = 594) than Dramaga (AUDPC-DI = 1549, AUDPC-DS = 547). Analysis of the relationship between weather factors and the rate of disease severity showed that in Dramaga, temperature and rainfall were positively correlated and humidity was negatively correlated with the disease, conversely in Rancabungur, temperature was negatively correlated and humidity and rainfall were positively correlated with the disease.

Keywords: begomovirus, PCR-sequencing, spatial temporal, weather factors, whiteflies

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FIELD EPIDEMIOLOGICAL PATTERNS OF YELLOW MOSAIC VIRAL DISEASE OF CUCUMBER IN BOGOR REGENCY

ROSITA

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

**DEPARTMENT OF PLANT PROTECTION
FACULTY OF AGRICULTURE
BOGOR AGRICULTURAL UNIVERSITY
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2026**



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Examiner of the thesis:
Prof. Dr. Ir. Dadang, M.Sc.



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Title : Field Epidemiological Pattern of Yellow Mosaic Viral Disease
of Cucumber in Bogor Regency
Name : Rosita
NIM : A3401221050

Approved by

Principal Supervisor:

Dr. Sari Nurulita, S.P., M.Si.

Co-Supervisor:

Dr. Ir. Kikin Hamzah Mutaqin, M.Si.

Acknowledge by

Head of Department of Plant Protection:

Dr. Ir. Giyanto, M.Si.

NIP. 196707091993031002

Examination Date: 29 July 2026

Conferral Date:

05 AUG 2026

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PREFACE

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It is hoped that this research will contribute to the advancement of plant protection science, particularly in the field of epidemiology, through the analysis of spatial and temporal disease distribution patterns, and support the development of more effective disease management strategies.

Bogor, August 2026

Rosita



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