DETECTION OF *RICE TUNGRO BACILLIFORM VIRUS* AND *RICE TUNGRO SPHERICAL VIRUS* FROM WEST JAVA AND SOUTH SULAWESI

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ABSTRAK

INDAH AZHRI SETYASTININGRUM PRATISNO. Deteksi *Rice tungro bacilliform virus* dan *Rice tungro spherical virus* dari Jawa Barat dan Sulawesi Selatan. Dibimbing oleh SARI NURULITA dan ANI WIDARTI.

Penyakit tungro dapat disebabkan oleh infeksi dari *Rice tungro bacilliform virus* (RTBV) dan *Rice tungro spherical virus* (RTSV). Di alam, baik RTBV maupun RTSV ditularkan oleh vektor serangga, yaitu wereng daun hijau (*Nephotettix virescens*) secara semi-persistent. Tanaman yang terinfeksi menunjukkan gejala khas, seperti daun menguning dan kerdil. Hingga saat ini, tungro masih dianggap sebagai salah satu penyakit padi paling merusak di Indonesia dan Asia Tenggara karena infeksinya menyebabkan kehilangan hasil yang signifikan. Oleh karena itu, tujuan dari penelitian ini adalah mendeteksi RTBV dan RTSV dari beberapa lokasi di Indonesia. Survei lapangan dan pengumpulan sampel dilakukan pada dua lokasi di Provinsi Jawa Barat (Kabupaten Bogor dan Subang). Sampel tambahan diperoleh dari koleksi Balai Besar Peramalan Organisme Pengganggu Tumbuhan pada tahun 2023, yang berasal dari Provinsi Jawa Barat (Kabupaten Purwakarta dan Sukabumi), dan Sulawesi Selatan (Kabupaten Sidenreng Rappang). Insiden penyakit tungro bervariasi di setiap daerah, yaitu 5% di Purwakarta dan Sukabumi, 81% di Subang, 62% di Bogor, dan 40% di Sidenreng Rappang. Distribusi penyakit tergantung pada keberadaan vektornya. Deteksi molekuler dilakukan dengan PCR menggunakan pasangan primer spesifik RTBV (RTBV ORF2-F/ RTBV ORF2-R) dan RT-PCR untuk RTSV (RTSV-F2/ RTSV-R2). Semua sampel yang diuji positif RTBV dan RTSV dengan ukuran masing-masing 430 pb dan 787 pb. Variasi genetik berdasarkan analisis urutan nukleotida menunjukkan adanya variasi *strain* di antara isolat. Sampel RTBV dan RTSV termasuk dalam kelompok Asia Tenggara dan terpisah dengan kelompok Asia Selatan. Penelitian epidemiologi lebih lanjut diperlukan untuk mengantisipasi wabah penyakit tungro di Indonesia.

Kata kunci: epidemiologi, *Nephottetix virescens*, PCR, RTBV, RTSV

ABSTRACT

INDAH AZHRI SETYASTININGRUM PRATISNO. Detection of *Rice tungro bacilliform virus* and *Rice tungro spherical virus* from West Java and South Sulawesi. Supervised by SARI NURULITA and ANI WIDARTI.

Tungro disease was caused by double infection of *Rice tungro bacilliform virus* (RTBV) and *Rice tungro spherical virus* (RTSV). In nature, both RTBV and RTSV are transmitted by insect vector, green leafhopper (*Nephotettix virescens*) in semi-persistent manner. Infected plant displayed typical symptoms, such as yellowing leaf and stunting. To date, tungro is still considered as one of the most devastating rice diseases in Indonesia and Southeast Asia due to its infection causes significant yield loss. Therefore, the aims of this study is to detect of RTBV and RTSV from several locations. Field survey and sample collection were conducted in two locations in West Java Province (Bogor and Subang Regencies). Additional samples were obtained from collection of Forecasting Centre for Plant Pest Organisms in 2023, which originated from West Java Province (Purwakarta and Sukabumi Regencies), and South Sulawesi (Sidenreng Rappang Regency). Disease incidence of tungro disease varied among the regions, i.e., 5% in Purwakarta and Sukabumi, 81% in Subang, 62% in Bogor, and 40% in Sidenreng Rappang. The distribution of the disease depends on the presence of its vector. Molecular detection was done by PCR using specific primer pairs of RTBV (RTBV ORF2-F/ RTBV ORF2-R) and RT-PCR for RTSV (RTSV-F2/ RTSV-R2). All the samples were tested positive for both RTBV and RTSV at 430 bp and 787 bp in size, respectively. Genetic variation based on nucleotide sequence analysis indicates the presence of strain variation among isolates. Both RTBV and RTSV samples belong to Southeast Asian group and separated with South Asian group cluster. Further epidemiological research is needed to anticipate the outbreak of tungro disease in Indonesia.

Keywords: epidemiology, *Nephottetix virescens*, PCR, RTBV, RTSV

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PREFACE

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Hopefully this undergraduated thesis can be useful for further research and the advancement of knowledge.

Bogor, August 2024

Indah Azhri Setyastiningrum Pratisno

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