



BIOEKOLOGI PENYAKIT VIRUS YANG DITULARKAN WERENG BATANG PADA TANAMAN PADI

INTISARI

Ledakan hama wereng batang pada tanaman padi sering diikuti oleh adanya serangan penyakit virus. *Rice Ragged Stunt Virus* (RRSV) dan *Rice Grassy Stunt Virus* (RGSV) adalah virus padi yang umum ditemukan setelah ledakan wereng batang cokelat (WBC) menyebabkan kerugian yang lebih serius. Tujuan dari penelitian ini adalah untuk mengidentifikasi virus penyebab penyakit yang ditularkan oleh wereng batang serta keragaman molekulernya, mengetahui pola pemencaran penyakit, mengetahui efektivitas WBC resisten pestisida sebagai penular virus, mengetahui karakteristik penularan virus secara individual ataupun multivirus, mengetahui efektivitas stadium tanaman sebagai sumber inokulum virus, mengetahui inang alternatif virus dan efektivitasnya sebagai sumber inokulum, dan mengetahui ketahanan beberapa varietas padi terhadap virus dan efektivitasnya sebagai sumber inokulum. Deteksi dan identifikasi penyakit dilakukan melalui: gejala, penularan, TEM, RT-PCR, dan sekuensing. Penelitian pola sebaran temporal dan spasial dilakukan di lahan petani. Penelitian karakteristik penularan oleh WBC dilakukan dengan tiga tahap: penularan harian, penularan virus oleh WBC resisten dan non resisten pestisida, dan karakteristik penularan secara individual dan multi virus. Penelitian efektivitas inang sumber inokulum dilakukan dengan tiga tahap: sumber inokulum berupa stadium tanaman padi, spesies gulma sebagai sumber inokulum, dan varietas/plasmanutfah padi sebagai sumber inokulum. Hasil penelitian menunjukkan bahwa virus yang menyerang pertanaman padi pada beberapa daerah yang terserang wereng batang ada 3 macam, yaitu: RRSV, RGSV, dan SRBSDV. Berdasarkan sekuen nukleotida isolat RRSV dan RGSV menunjukkan persentase kesamaan yang tinggi. Penyakit kerdil kuning padi mempunyai pola agihan gradasi rata dan model perkembangan penyakit monomolekuler. RRSV mempunyai masa laten 5 hari, dan retensi sampai 34 hari, sedangkan RGSV mempunyai masa laten 6 hari, dan masa retensi 33 hari. WBC tahan insektisida imidakloprid mempunyai kemampuan menularkan virus lebih efektif dibandingkan yang rentan. Tingkat keberadaan penyakit dan indeks penyakit lebih tinggi ketika WBC mendapatkan RGSV terlebih dahulu, kemudian mendapatkan RRSV. Tanaman sakit pada stadium bibit dan singgang merupakan sumber inokulum yang efektif bagi penularan kedua virus. Spesies gulma *Eleusine indica* dan *Echinochloa colona* merupakan spesies yang mempunyai efektivitas tinggi sebagai sumber inokulum kedua penyakit virus. Varietas padi Mentik Wangi dan Utri Merah mempunyai respons tahan terhadap RRSV dan RGSV, Tetep dan Swarnalata tahan terhadap RRSV, Rojolele dan *Oryza nivara* menunjukkan respons tahan RGSV. Varietas Tetep cukup rendah sebagai sumber inokulum RRSV, sedangkan Varietas Situ Bagendit, Inpari 13, dan Mentik Wangi mempunyai efektivitas yang cukup rendah sebagai sumber inokulum kedua virus.

Kata kunci: bioekologi, virus, ditularkan, wereng batang, padi



BIOECOLOGY OF VIRUS DISEASES TRANSMITTED BY THE PLANTHOPPERS IN RICE

ABSTRACT

Outbreaks of the rice planthoppers in Indonesia has often been followed by virus damage. *Rice ragged stunt virus* (RRSV) and *Rice grassy stunt virus* (RGSV) are viruses commonly found after an outbreak of the rice brown planthopper (BPH). The aims of this research were to identify the disease-causing virus and to determine its molecular diversity, to ascertain the distribution pattern of the disease, to examine the effectiveness of pesticide-resistant BPH as a virus transmitter, to study the characteristics of virus transmission by a single virus or multivirally, to examine the effectiveness of plant stages as a source of virus inoculums, to document alternative hosts of virus and them effectiveness as a source of inoculum, and to determine the resistance level of several varieties to virus. Detection and identification of disease were done through the symptoms, transmission, TEM, RT-PCR, and sequencing. The research on temporal and spatial distribution was conducted on the farmers' land. Research on the transmission characteristics of BPH was done in three experiments: daily transmission; transmission of virus by imidachlopid-resistant and nonresistant BPH; and the characteristics of individual and multi-virus transmission. Research on the effectiveness of the host as a source of inoculum was conducted in three experiments: a source of inoculum in the form of a stage of rice crop; species of weeds as sources of inocula, and 15 accessions of variety/germplasm of rice as sources of inocula. Three viruses namely RRSV, RGSV, and SRBSDV were found in several rice damaged by the planthoppers. The nucleotide sequence of RRSV and RGSV showed a high percentage of similarity. Yellowing syndrome had a distribution pattern of flat gradation and the model of disease development followed the monomolecular. The RRSV had a latency period of five days with a retention period until 34 days, whereas RGSV had a latency period of six days, and a retention period of 33 days. The imidaclopid-resistant BPH had the ability to transmit RRSV and RGSV more effectively than the susceptible BPH. The disease incidence and disease index were more severe when BPH received RGSV first followed by RRSV. Diseased plants at the seedling and ratoon stages were effective sources of inocula for the transmission of the two viruses. *Eleusine indica* and *Echinochloa colona* were weed species highly effective as sources of inocula of the two virus diseases. Menthik Wangi and Utri Merah varieties had a resistant response to RRSV and RGSV, Tetep and Swarnalata varieties were resistant to RRSV, Rojolele and *Oryza nivara* showed a resistant response to RGSV. Tetep variety was low as a source of RRSV inoculum, whereas Situ Bagendit, Inpari 13, and Menthik Wangi varieties had low effectiveness as sources of inocula of both viruses.

Keywords: bioecology, virus, transmitted, planthopper, rice