

Survey of Thrips Species and Plant-Infecting Tospoviruses in Tomato, Pepper and Cucurbit Production Fields in Thailand

Channarong Seepiban¹, Anjana Bhunchoth², Mallika Kumpoosiri¹, Saengsoon Charoenvilaisiri¹, Sirinee Poonchaisri³, Ittipon Bannakan³, Orawan Chatchawankanphanich² and Oraprapai Gajandana¹

¹ Monoclonal Antibody Production Laboratory, Agricultural Biotechnology Research Unit, National Center for Genetic Engineering and Biotechnology, Thailand Science Park, Pathum Thani

² Plant Research Laboratory, Agricultural Biotechnology Research Unit, National Center for Genetic Engineering and Biotechnology, Kamphaeng Saen, Nakhon Pathom

³ Entomology and Zoology Division, Plant Protection Research and Development Office, Department of Agriculture, Bangkok



Tospoviruses cause severe damage on various economically important crops, such as pepper, tomato, peanut, watermelon, cantaloupe and cucumber in Thailand. So far, members of four tospovirus species including Tomato necrotic ringspot virus (TNRV), Capsicum chlorosis virus (CaCV), Watermelon silver mottle virus (WSMoV) and Melon yellow spot virus (MYSV) have been reported in Thailand. Tospoviruses are naturally transmitted by at least eleven species of thrips (*Thysanoptera: Thripidae*) in a persistent propagative manner. Due to the recent widespread of tospoviruses in several economically important crops in Thailand, it is important to understand the virus-vector interaction. The ability to elucidate the relationships between tospoviruses and thrips is essential for understanding of epidemiology and the strategies for controlling the tospoviruses spread. In this study, we conducted a survey to identify thrips species and plant-infecting tospoviruses in tomato, pepper and cucurbit production fields in seven provinces of Thailand including Kanchanaburi, Suphanburi, Nakhon Pathom, Khon Kaen, Nong Khai, Chiang Mai and Tak during September 2011 to June 2012. Plate trapped antigen enzyme linked immunosorbent assay (PTA-ELISA) was used for screening of tospovirus infection in the infected plants. Reverse transcription polymerase chain reaction was then performed in ELISA-positive samples to identify tospovirus species. Nucleocapsid protein gene sequencing was conducted in some samples for

confirmation. Thrips collected from each production field were identified based on morphological characteristics. Our results showed that tospoviruses were widespread in Thailand. TNRV were the major tospovirus (97%) detected in pepper while *Scirtothrips dorsalis* Hood and *Thrips palmi* Karny were the major thrips species found in pepper fields. The distribution between these two major thrips species found in pepper fields was varied in each location. TNRV (49.2%) was the major tospoviruses detected in tomato followed by CaCV (18%). Mixed infection of tospoviruses (32.8%) were also detected in tomato. All thrips found in tomato fields were identified to be *Ceratothripoides claratris* Shumsher. MYSV was the major tospovirus detected in cucumber (96%) and watermelon (55%), while *Thrips palmi* Karny were the major thrips species found in cucurbit fields. Mixed infection of tospoviruses was also found in cucurbits. Moreover, the capability of the identified thrips as vectors of four tospoviruses found in Thailand (TNRV, CaCV, WSMoV and MYSV) is now under investigation.

