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学 位 論 文 の 内 容 の 要 約

氏　　名	Fariha Wilisiani
学位の種類	博士（農学）
学府又は研究科・専攻	大学院連合農学研究科生物生産科学専攻
指導を受けた大学	宇都宮大学
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【論文の内容の要約】

Begomoviruses cause many serious cucurbit viral diseases in the world. The members of begomovirus can be either bipartite (two circular, single-stranded DNA components known as DNA-A and DNA-B) or monopartite (single component homologous to the DNA-A of bipartite begomoviruses). The DNA-A component contains six open reading frames (ORFs), while DNA-B has only two ORFs.

Melon (*Cucumis melo*) is one of the important cucurbit crops cultivated in Indonesia. During the field survey in Indonesia, the severe symptoms of begomovirus infection were observed on melon fields. A begomovirus, *Tomato leaf curl New Delhi virus* (ToLCNDV-[ID:YG:Mel:15]), was identified from melon plants in Yogyakarta, Indonesia. The virus has a bipartite genome (DNA-A and DNA-B), and both DNAs showed highest identity to other ToLCNDV isolates, however, there was some variability in the ORFs in the viral sense of DNA-A. Recombination analyses revealed that ToLCNDV-[ID:YG:Mel:15] was a new recombinant between ToLCNDV and *Squash leaf curl China virus* (SLCCNV). The infectivity of the recombinant ToLCNDV-[ID:YG:Mel:15] isolate was confirmed by biolistic inoculation with partial tandem repeats of DNA-A and DNA-B clones. The assembled DNAs of begomovirus genomes were identified from symptomatic melon plants by next generation sequencing (NGS) analysis, showing the novel occurrence of mixture of ToLCNDV and SLCCNV DNA molecules on melon plants. This research may indicate the evolution of begomovirus to adapt melon plants by recombination and genome mutation strategies.

A rapid and simple detection assay for begomoviruses under field conditions for routine sampling of plants is needed. LAMP assays using a portable fluorometer with a toothpick method successfully detected begomoviruses in infected melon, pepper, and eggplant samples. LAMP assays conducted during a field survey for detection of the three begomoviruses on fresh leaves indicated that most of the samples were positive; the results were confirmed by PCR using universal primers of begomoviruses as a common detection method. These results demonstrate that this simple and rapid LAMP assay using a fluorometer portable device can be used to achieve real-time detection of begomoviruses under field conditions.