

Chutima Arlai 2014: Instability of Resistance to *Papaya Ringspot Virus* in R<sub>5</sub> Transgenic Papaya. Master of Science (Agricultural Biotechnology), Major Field: Agricultural Biotechnology, Interdisciplinary Graduate Program. Thesis Advisor: Professor Supat Attathom, Ph.D. 72 pages.

R<sub>5</sub> transgenic papayas line A44 were analyzed for the inheritance of transgene. The virus resistant transgene was constructed from PRSV-CP gene linked with inverted repeat of CP gene (CP-IR). This gene construct was transformed to papaya genome by *Agrobacterium*-mediated transformation. Seedlings of R<sub>5</sub> transgenic papaya were obtained from seeds collected from R<sub>0</sub> generation to R<sub>5</sub> generation of greenhouse grown plants. Transgenic plants containing CP-IR gene were challenge-inoculated with PRSV to screen for virus resistance. Results from PCR analysis showed that 99.5% of tested plants (378 of 380) contained CP-IR transgene. Virus resistance in transgenic papayas was on average of 51.4% as determined by ELISA and symptom expression. The selected transgenic plants of R<sub>5</sub> generation showed two copies number of transgene in their genome as determined by Southern blot hybridization. No PRSV coat protein was detected in all transgenic plants as analyzed by western blotting. It is concluded that CP-IR transgene inherited in the fifth generation of transgenic papayas with two copies number in its genome without an expression of PRSV-CP gene. However, resistance to PRSV was significantly decreased as the generation progressed to the fifth generation.

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Thesis Advisor's signature