Paniti Pornbungkerd 2012: Gene Stacking for Virus Resistance in Transgenic Tomatoes. Master of Science (Agricultural Biotechnology), Major Field: Agricultural Biotechnology, Interdisciplinary Graduate Program. Thesis Advisor: Professor Supat Attathom, Ph.D. 82 pages.

Virus diseases are one of the important limiting factors in tomato production. Genetically modified tomatoes can be used to effectively control viral infections. However resistance in transgenic tomato is shown to be virus specific. Gene stacking is an alternative approach to develop tomato lines with multiple viral resistance. This study was aimed to stack two genes, the CMV replicase and CaCV nucleocapsid protein conferring resistance to CMV and CaCV, respectively, into cultivated tomato. These two genes were previously transformed to Seedathip 3 and Seedathip 4 varieties, respectively, by *Agrobacterium*. Reciprocal crossing between transgenic Seedathip 3 and Seedathip 4 tomatoes resulted in transgenic segregation in progeny seedlings as detected by polymerase chain reaction (PCR) using specific primers for both genes. Out of 685 tomato lines (F_1) derived from crossing, 247 lines (36.06%) contained both transgenes, 172 lines (25.11%) contained single transgene and 266 lines (38.83%) were without transgene. This study showed that stacking of transgenes in tomatoes can be successfully accomplished by reciprocal crossing. Tomato lines with stacking genes showed no significance difference on horticultural characters as compared with singly transformed lines and original parental lines.

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