

Ornubol Chomdej 2008: Screening for Tomato Yellow Leaf Curl Virus Resistance in Several Tomato Lines and Marker-Assisted Selection for Resistant to TYLCTHV-[2]. Doctor of Philosophy (Agricultural Biotechnology), Major Field: Agricultural Biotechnology, Interdisciplinary Graduate Program. Thesis Advisor: Assistant Professor Julapark Chunwongse, Ph.D. 88 pages.

Tomato yellow leaf curl disease is caused by the *Tomato Yellow Leaf Curl Virus* (TYLCV). Disease is distributed by whitefly (*Bermesia tabaci*) transmission and plants infected can result in 100% production losses. The purpose of this study was to improve commercial tomato cultivars and using molecular markers in breeding selection for resistance to TYLCV, Thailand isolate (TYLCTHV-[2]).

TYLCV resistant tomatoes from 20 breeding accessions at The World Vegetable Center (AVRDC) in Taiwan were crossed with Seedathip3. Parents and their F₁ progenies were screened for TYLCTHV-[2] resistance using 3-week-old tomato plants and subjected to viruliferous whiteflies. Symptom observations were made each week for a month and plants were analyzed for viral accumulation using Enzyme-Linked Immunosorbent Assay (ELISA) at 2 and 4 weeks after inoculation. Results indicated that all F₁ progenies from each cross showed intermediate results between parents and the AVRDC-parent line; H24 expressed the best resistant genotype. Backcrossing to Seedathip3 utilized molecular markers TG393, S20 and *Ty-2* on chromosome 11 in each generation. Determination of the effects of the virus was confirmed by ELISA in BC₄ and proved that the molecular markers correlated to the characteristics of the resistance.

Wild tomato *Solanum habrochaites* accession no. L06112 crossed to Seedathip3 and the resulting F₁ were backcrossed (BC) to Seedathip3 to generate BC₁F₁. All generations were tested with whitefly inoculation to select the best TYLCTHV-[2] resistant line using cuttings as replicates. Plants were evaluated for disease susceptibility by ELISA technique at 45 days post-inoculation. Results indicated *S. habrochaites* is completely resistant as both visual and ELISA evaluations were negative for the disease. F₁ and BC₁F₁ showed segregated response to TYLCTHV-[2] due to the heterozygosity of the male parent. Results showed that 4 lines (04T105-7, 04T105-1, 04T105-10 and 04T105-5) out of 6 in BC₁F₁ derived from line 04T105 at F₁ generation have characteristics that are resistant to TYLCTHV-[2].

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