

The Identification of Transgenic Papaya Plants Resistant to Papaya Ring Spot Virus by PCR Analysis

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ABSTRACT

The transgenic papaya resistant to papaya ring spot virus (PRSV) has been developed in Taiwan. In order to commercialize the disease-resistant papaya, experiments were set to develop a fast and efficient method to differentiate the transgenic plants from the traditional (non-transgenic) ones. The traditional papaya varieties used in this research included Mai Tai Kua, Red Lady, Red-in-Ear, Sunrise, Thailand, and Tainung Nos.1, 2, 5, and 6, while the transgenic lines were 16-0-1, 17-0-5 and 18-2-4. The PCR (polymerase chain reaction) analysis was applied throughout this study. The first step was to identify the transgenic papaya lines based on the primer sets designed to detect the 35S promoter gene, the kanamycin selection marker gene *npt II*, and the *nos* terminator gene. Experimental results indicated the existence of specific bands of 870, 126, and 810 bp only in the transgenic lines but not in the traditional varieties. This was followed by the method of gene specific detection. A primer set was designed to detect the PRSV coat protein gene of transgenic lines. The specific PCR product of 820 bp can be found in transgenic papaya. The final step was to detect the specificity in construction between the 35S promoter and PRSV coat protein gene. The three-step method described above can be used successfully to differentiate the transgenic papaya from the traditional varieties.

Keywords transgenic papaya, PRSV, identification

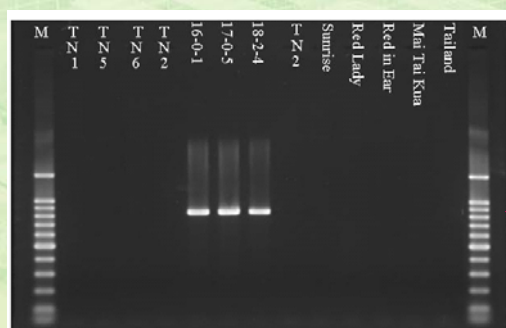


Fig. 1. PCR analysis with 35S promoter-based primer sets showed that only transgenic papaya lines possess the unique band of 870 bp. M: 100 bp DNA ladder.

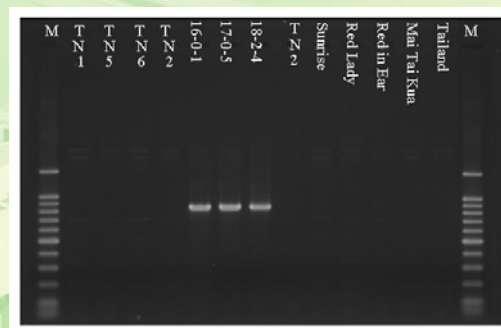


Fig. 2. PCR analysis with the primer sets based on kanamycin selection marker gene *nptII* showed that only transgenic papaya lines possess the unique band of 810 bp. M: 100 bp DNA ladder

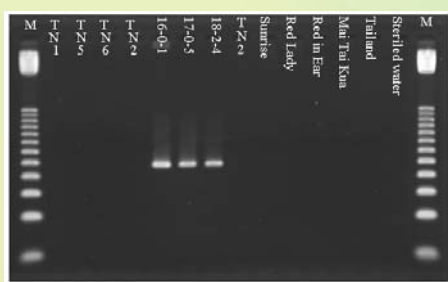


Fig. 3. PCR analysis with *nos* terminator-based primer sets showed that only transgenic papaya lines possess the unique band of 126 bp. M: 25 bp DNA ladder.

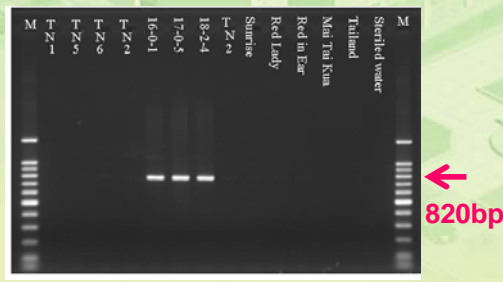


Fig. 4. PCR analysis with the primer sets based on PRSV coat protein gene showed that only transgenic papaya lines possess the unique band of 820 bp. M: 100 bp DNA ladder.

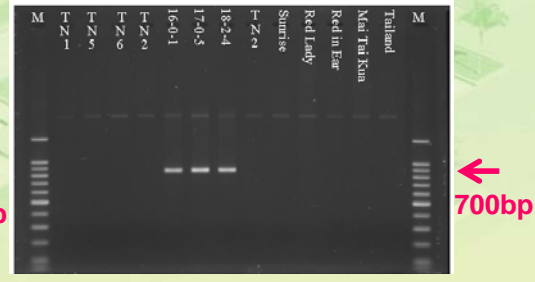


Fig. 5. PCR analysis with (35S+PRSV) region-based primer sets showed that only transgenic papaya lines possess the unique band of 700 bp. M: 100 bp DNA ladder.

