P006 Grafting-transmitted gene silencing in tomato

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It has been hypothesized that antisense gene silencing and post-transcriptional (sense) gene silencing (PTGS) are mechanistically linked. Both of them can be inhibited by the same viral suppressors and are associated with small interfering RNAs (siRNAs). However it has been reported that PTGS can be systemically transmitted to scions, whereas antisense silencing cannot. In an effort to understand more the nature of these two types of silencing, we investigated the ability of ACC oxidase (ACO1)-silenced tomato rootstocks to induce silencing in grafted scions. Two weeks after grafting, silencing was observed in the scions grafted to the sense-silencing rootstocks but not in the scions grafted to the antisense rootstocks. However at 10 weeks after grafting, systemic silencing was also being observed in the scions grafted to the antisense rootstocks. SiRNAs were detected in all the grafted plants but the siRNA level was higher in the sense-silencing grafted plants. Taken together, these results suggest that the delayed systemic silencing manifestation in antisense-silencing grafted plants was due to the low production of siRNAs. Additionally, we found that a high level of target mRNAs was required for grafting-transmitted gene silencing.