Hydroponic *Solanum lycopersicum* (Tomato) Grafting©

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My propagation project is based upon the asexual method of grafting. This project was carried out at Cabrillo College, where I attend as a student and where I am also employed as a Student Assistant. The subjects for this project were various heirloom tomato (*Solanum lycopersicum*) seedlings as well as two tomatillo cultivars leftover from the College's annual Mother's Day plant sale. The majority of the project took place in the hydroponic hoophouse.

The purpose of this experiment was to see how some of the heirloom cultivars would perform in our hydroponic tomato setup and, more importantly, to see if the grafts would take more quickly in our hoophouse than normal. We had reason to believe that they would take quicker simply because all the tomato plants growing in the house were growing at least twice as fast as tomatoes growing in soil. The project would also illustrate how well certain cultivars performed as rootstocks for future grafting projects.

Following propagation in the main greenhouse, the seedlings were moved into the hoophouse to spend some time on our ebb and flood table (automated sub-irrigation) with the other seedlings before moving to their final destination. Then, in early June, they were transplanted into 2-gal containers onto one of our main growing tables. The containers were in two rows, with six containers in each row. Each container held two plants and the container in the opposing row contained the same two plants. The plan was to use one of each rootstock on either row. For example, the two containers at the back both had a *S. lycopersicum* 'Tigerella' plant and a 'Cherokee Purple' plant and, for the graft, I used the rootstock from the 'Cherokee Purple' on one side and the 'Tigerella' as the rootstock on the other. The cultivars grafted together were as follows: 'Sungold' with 'Small Yellow Pear' (both cherries), 'Pineapple' with 'Stupice', 'Marvel Stripe' with 'Brandywine', 'German Green' with 'Jelly Bean Grape', 'Tigerella' with 'Cherokee Purple', and *Physalis* 'Purple Tomatillo' with *P.* 'Green Tomatillo'.

Prior to grafting, the plants had to be trained. Due to their high planting density (24 plants on a 4 × 8 ft table), the plants had to be grown single-stemmed, which required removing all branches that formed. They also required support, which was provided with plastic clips secured to strings hanging from support pipes above, alternately wrapping the string around the plant.

The tools I used to graft were a sharp, sterilized grafting knife, Parafilm® to cover up the finished grafts, and, most importantly, a thumb protector made out of a paper towel and duct tape. On 10 July, I made the grafts. The style of graft used was an approach graft using tongues that fit together. This was accomplished by cutting an opposing slot into both the scion and the rootstock, creating the tongues that would be grafted together. The Parafilm was then wrapped around the cut area and clips were secured to limit movement.

Within 3 days, roots had formed underneath the Parafilm on the grafts. After 3 weeks, I severed the scions' root systems. Out of the 12 grafts, three failed. One was the 'Pineapple'. The scion matched with the 'Stupice' rootstock, but the scion immediately wilted following the severing of the rootstock. Upon examination,

it was obvious that the graft just did not take. Another failure was the 'Purple Tomatillo'/'Green Tomatillo' combination. Even though the graft took, it did not appear that the thinner, less vigorous 'Green Tomatillo' rootstock could support the 'Purple Tomatillo' scion. The third that did not make it despite the graft taking was the 'Cherokee Purple' and 'Tigerella'. Two weeks after severing the scion the plant started dying from the bottom up. I think that this may have been a disease caused by the roots from the scion rotting.

In conclusion, the grafting project went well. Some of the plants are doing very well, especially the 'Sungold' and 'Small Yellow Pear' plants using both rootstocks. Using the 'Purple Tomatillo' as a rootstock with the 'Green Tomatillo' worked out well too, as the plants never skipped a beat. As for the next time I attempt this, I would like to try using a disease-resistant rootstock to try with some of these cultivars. I would also like to try doing the grafting when the plants are smaller, as any chance of rotting roots is diminished.