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Fusarium Wilt is caused by the fungus *Fusarium oxysporum* f. sp. *Lycopersicae*, and affects only tomatoes. Starting low on a mature or maturing plant, the infection rapidly progresses upward causing wilting and yellowing of foliage leading ultimately to complete plant collapse and death. Fusarium can survive in the soil for several years and can only be eliminated by costly soil sterilization. Cooler growing conditions normally restrict development of the disease. Warm greenhouse conditions, however, generally encourage or promote growth and persistence of fusarium.

A less expensive, more constructive alternative to total soil sterilization now employed by increasing numbers of growers in response to significant disease-related plant losses—and resultant drop in marketable production—is the technique of grafting a non-resistant greenhouse tomato variety (called “scion” in this article) onto a disease-resistant root stock. Grafting can improve production and overall crop health and vigor, reduce plant mortality rate resulting from disease, reduce or eliminate the need for pesticide use, lengthen harvest duration, and significantly increase net income. The entire process from sowing of rootstock and scion varieties to final transplanting of grafted plants into greenhouse soil or soilless media normally takes from 7 to 9 weeks. One of several popular grafting methods—*apical*—is described below.

Tools & Materials:

- A single-edge razor blade; very finely-sharpened, thin-bladed knife; or utility knife to make necessary cuts in rootstock and scion material.
- A chlorine bleach solution (1:9) to sanitize working surface, containers, labels, and cutting tool to prevent any chance of spreading disease organisms.
- Labeling materials and pencil or waterproof marking pen (9350).
- Grafting clips (9031, 9032, 9844, and 9847), one per graft, or non-porous surgical tape (clips are faster and more efficient).

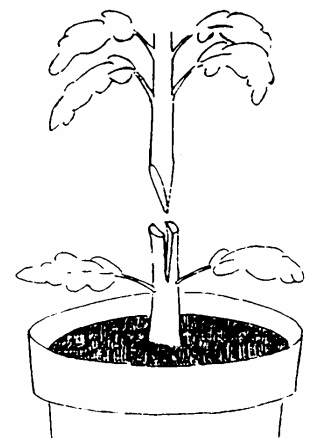
Preparation: Approximately 8 weeks before anticipated final transplant time of finished graft, sow seeds of both root and scion and grow until plants reach approx. 5” or 6” in height with 4 or 5 well-developed leaves.

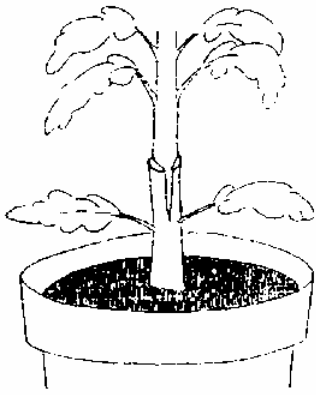
Sanitation: Rogue out any seedling showing signs of disease or deformity. When ready to do your grafting, thoroughly sanitize all working surfaces and tools with 1:9 chlorine solution, wash hands with soap and water, and be careful not to come in contact with old, potentially contaminated production materials or plant residues while actually grafting. Rinse knife or razor blade in chlorine—then plain water—between each completed graft.

The Top Graft: Simply cut the scion and rootstock stems at 45° angles and hold them together with a grafting clip.

The Apical Graft: Select rootstock and scion plants that are as close to the same stem diameter as possible, since the cambium (growth) layers of each plant must match exactly for best results. Prune the top of the rootstock to approximately 3” above the soil surface, cutting horizontally (straight) across the stem. Discard the removed tip. Allow a leaf or two to remain below the cut. Carefully cut a ½-inch deep “v” notch down into the end of its stem, making sure that each cut is as straight and flat as possible to avoid air spaces and misalignment.

Now select a same-stem-size scion plant, removing and saving 2” to 3” of the growing tip with leaves—cutting at a point that closely matches rootstock stem diameter. Using a clean blade, cut a wedge-shape in the base so it matches the “v” notch in the rootstock. Avoid touching cut surfaces with your hands.

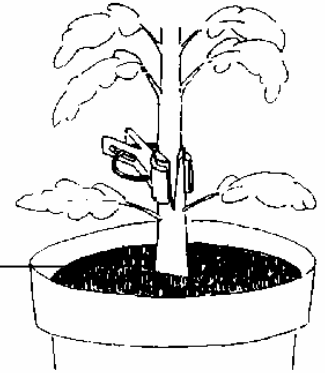




Join the scion to the rootstock gently but firmly so the cambium layers match, lightly “pinch” the joint to expel air pockets and to ensure close surface contact, then hold the freshly-positioned graft with a grafting clip or non-porous surgical tape.

It may be necessary to support each grafted scion with a small stake and ties. Place finished grafts in a location protected from strong air movement and wide fluctuations in temperature, and maintain elevated humidity by occasional misting. Use shade cloth to protect against direct sunlight during the healing process. Healing should be complete within 10 to 15 days, at which time clips (or tape) should be carefully removed. Remove—and continue to remove—all lateral shoot formation below the graft union, allowing only the scion to remain and grow.

The grafted plants may now be transferred to their final greenhouse location. Scout each grafted plant for the formation of adventitious roots above the graft, and remove them if and as they form.



An Alternative Method — Side-Grafting: In this method, both plants — root stock and scion parent — are transplanted side-by-side into the same container. Each plant must be carefully labeled to avoid later confusion. Graft when both plants have attained approximately seven inches in height with five or six leaves. At about 4” from the soil surface, carefully and accurately cut a “Λ” shape pointing upward in the **root stock**, discarding the removed tip. Now, at a point slightly closer to the soil surface, cut a matching upward “Λ” about half way through the **scion plant** so the cuts in each plant closely match in size and shape.

Carefully bend and insert the root stock tip into the matching notch in the scion plant, aligning edges. Gently press the union to eliminate any air spaces. Tape or clip the union to hold it in place until the graft “takes” and place the container in a high-humidity (80% is recommended), shaded, and protected area of the greenhouse for ten to twelve days. Occasional misting is beneficial to prevent drying of the union.

When it can be determined that the graft has succeeded, the scion plant stem is cut below the graft to isolate it from the soil. It might be wise to temporarily support this now-grafted plant with a small stake and tie. Remove the remnants of the scion plant root and lower stem so it will not attempt to re-grow.

