

Harris Seeds Tomato Grafting Guide

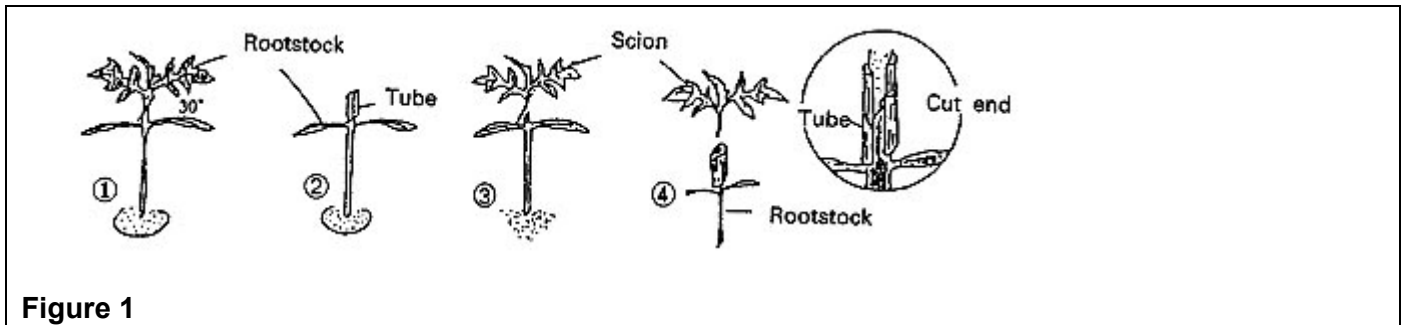
Tomato Grafting has been utilized worldwide in Asia and Europe for greenhouse and high tunnel production and is gaining popularity in the United States. Typically, rootstocks are selected for their ability to resist infection by certain soil borne pathogens or their ability to increase vigor and fruit yield. The scion of the grafted tomato represents the upper portion of the plant and is selected for its fruit quality characteristics. There are several methods for grafting tomatoes and they have certain advantages and disadvantages. Once the grafts are made, the plants are moved into a chamber or environment with high relative humidity (>90%) and low light levels to reduce water stress in the scion while the graft union forms.

Tomato Grafting Methods:

Tube grafting is the most common commercial technique for grafting tomatoes. Tube grafting takes place when the scion and rootstock are severed as seedlings and reattached with a small, silicone tube or clip. This technique has been highly effective as it can be carried out when plants are very small, thereby eliminating the need for large healing chambers while increasing the output. Tube grafting has been adopted as the primary method for vegetable grafting on the farm as it can be easily carried out with small healing chambers with typical success rates ranging from 85 to 90 percent.

For Tube Grafting (see Figure 1) sow seed for the rootstock 1-2 days prior to seed for the scion. Because smaller plants are used in tube grafting, you should be able to graft plants two or three times faster than with the more conventional cleft method. Also, the smaller plants take up less room during the healing and acclimation process. The optimum growth stage for grafting varies according to the kind of plug tray used and your ability to handle the small plants. Also note that plants in small cells must be grafted at an earlier growth stage, and require tubes with a smaller inside diameter.

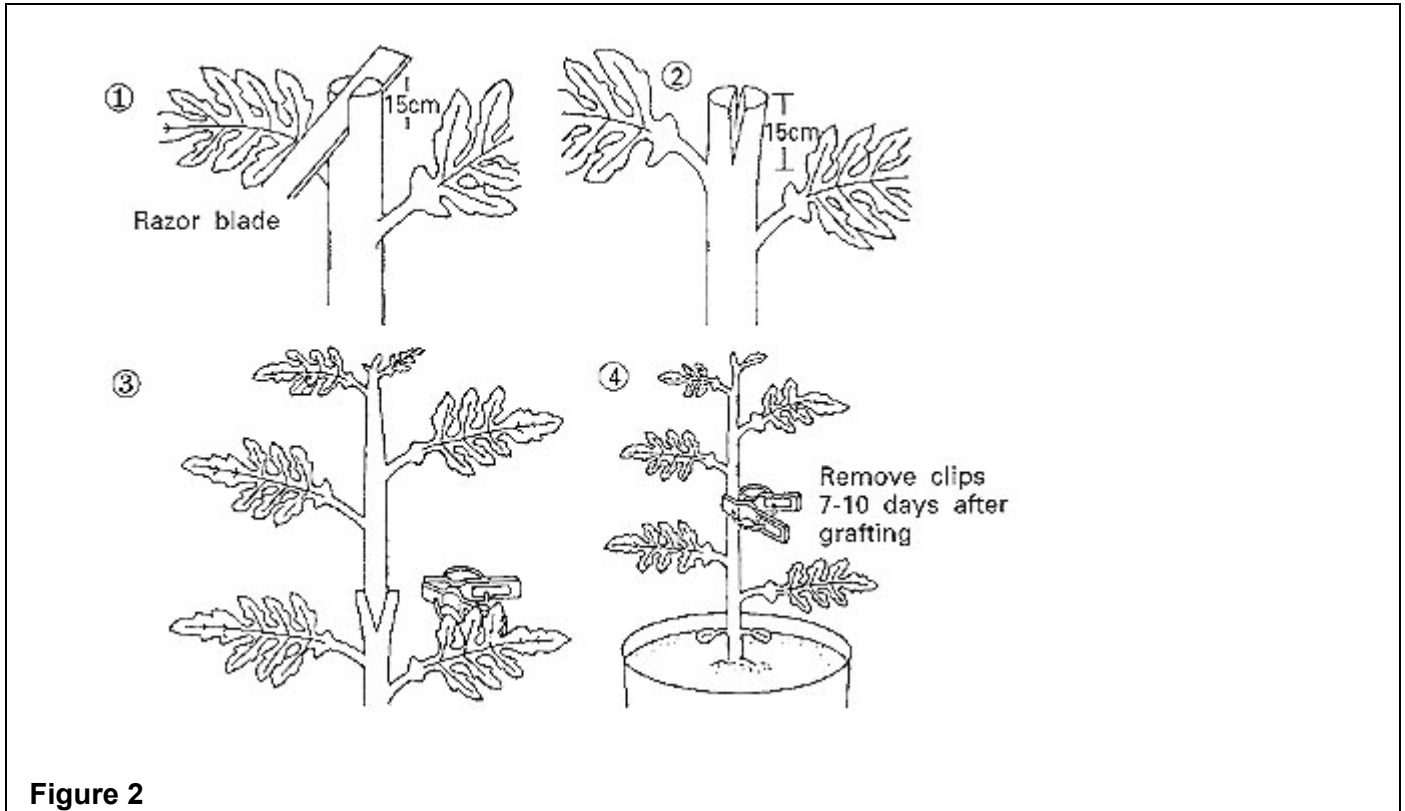
The steps shown below are used for tube grafting. First, the rootstock is cut at a slant. You can also use a blunt cut but the slant allows more surface contact on the graft. The scion is cut in the same way. Place the two cut ends in direct contact and use a small clip to hold the cut surfaces together.



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Cleft grafting occurs when a V-shape is cut into the rootstock and a complementing wedge-shaped scion is inserted. The graft is then held with a small clip until healing occurs.

For Cleft Grafting (see Figure 2) sow seed for the rootstock 5-7 days prior to seed for the scion. When the plants reach the four to five leaf stage, cut the stem for both the scion and the rootstock at right angles, each with 2-3 leaves remaining on the stem. Next the stem of the scion is cut in a wedge, and the tapered end fitted into a cleft cut in the end of the rootstock. The graft is then held firm with a plastic clip.

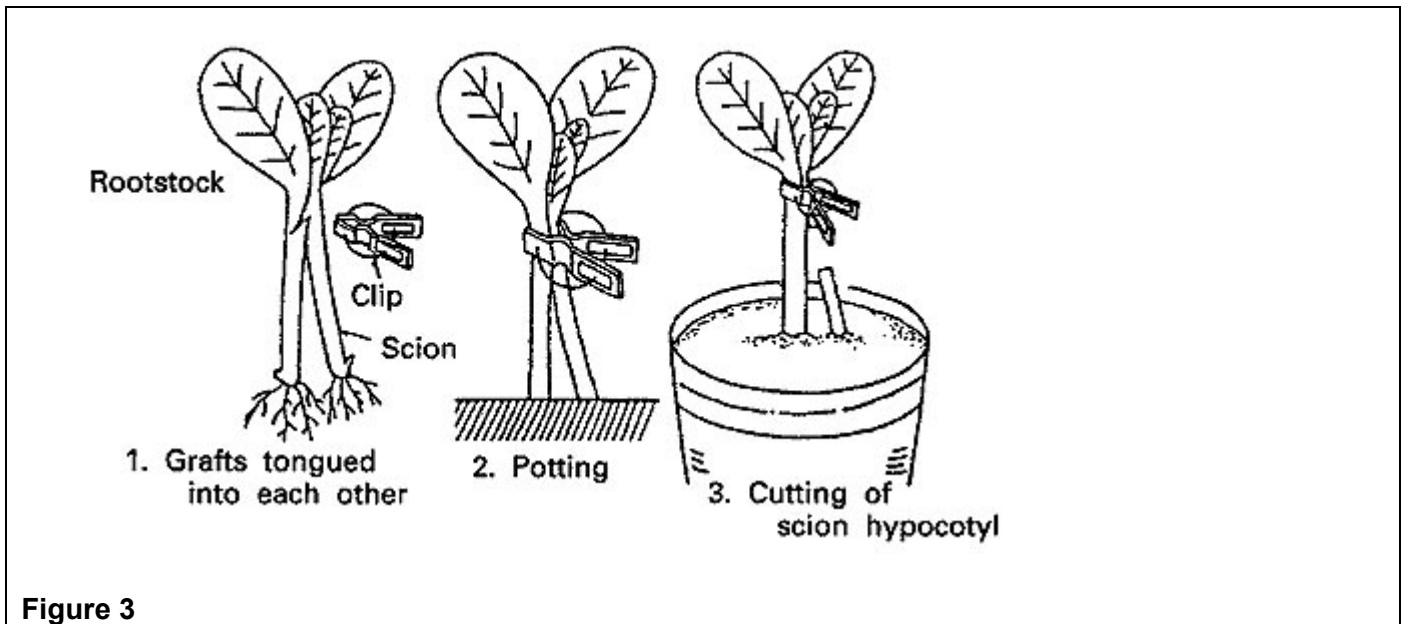


Approach grafting involves notching opposing sides of the stems of the rootstock and scion, and then using a clip to hold the stems together while they fuse. Once the graft has healed, the original scion is then cut off of the desired rootstock and the unused rootstock is detached from the scion.

Approach Grafting (see Figure 3) is a technique that allows the scion donor plant to remain on its own rootstock until the graft heals. This method is commonly used on members of the Cucurbit family (melons, pumpkins, squash and cucumbers) because it produces a higher survival rate. Some growers also prefer this technique for tomatoes, especially when greenhouse conditions for healing and acclimation are less than ideal for successful tube grafting. This is because the root portion of the scion plant remains intact until the graft union has healed. With this method, larger plants are used and seedlings of tomatoes are 14 to 21 days old, 10 to 13 days for cucumbers and melons, and 7 to 10 days old for pumpkins to ensure sufficient stem diameter to perform the graft. First, the top of the rootstock is removed so that the shoot cannot grow. Next, the stems of both the scion and rootstock are cut in such a way that they tongue into each other, and the graft is secured with a large clip. The roots of the scion are

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left intact for 3 to 4 days while the graft union heals and then the stem of the scion-donor is crushed between the fingers or partially cut below the graft. This step is used to wean the scion off of its own roots. Finally, the stem is completely cut off with a razor blade three or four days after being crushed.



General Grafting Tips: Expose plants to full sun and some water stress in the days before grafting to keep the plants short and to increase tolerance to water stress. Immediately before starting to graft, make sure plants have been watered and are not wilted. If you do your grafting in the greenhouse, do it early or late in the day to avoid undue water stress and drying of the cut plants. Ideally, grafting should be done in a shady place, such as a work area out of the greenhouse that is sheltered from the wind and bright sun.

When grafting, cut both the shoots scion plants and the rootstock plants on the same angle with a razor. Do not cut more plants than you can graft together in a few minutes since it is very important that you do not let the cut surfaces dry out or the scion wilt. Next match the scion with a rootstock of equal stem diameter and place the cut surfaces together in tight contact before clipping in place. The objective is to maximize the chances for the vascular bundles of the scion to come into contact with the respective vascular tissues of the rootstock.

Healing & Acclimatization: Proper healing and acclimatization are very important for grafted plants to survive. After the grafts are made, the plants must be protected from wilting until the cut ends heal together. Keep the grafted plants at about 86°F and with more than 95% relative humidity for 3-5 days while the cut ends heal together. This can be accomplished by placing the grafted plants under a heavily shaded area with fog or mist. Alternatively for small scale operations, the newly grafted plants can be placed under an opaque plastic tent or a humidity dome covered with an opaque plastic or even newspaper to reduce light levels. Plants under the tent or dome should be misted once or twice a day during this period. A small hand-held pressurized sprayer works well for small scale misting.

After healing, the plants must be re-acclimated to the full-sun conditions of the greenhouse environment. Do this gradually over a period of 3 to 4 days. Start increasing the light exposure by removing the opaque plastic sheeting. Start by cracking open the tent or domes a few hours in the early or late part of

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the day and increase the interval each day. Continue to mist as needed to avoid wilting. After a few days, move the plants completely into the greenhouse but continue to mist as needed to avoid wilt.

Finally, when you plant the grafted plants it is important to keep the graft union above the soil line. Tomatoes tend to root easily and if the scion roots into the soil, the plant will be susceptible to soil-borne diseases and you will have lost some of the benefits of the graft.

Grafting Supplies:

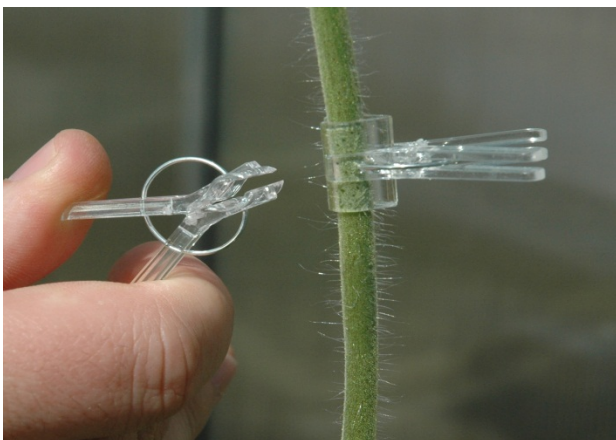
Grafting Clips

Combine heirloom eating quality and hybrid disease resistance!

These flexible silicone grafting clips come in two diameter sizes - 1.5 mm and 2.0 mm - and are approximately 1/2" long. Simply place the clip over the graft, and it will hold the joined stems in place. As the plant grows, the clip simply falls off. Each bag contains 100 clips; buy in quantity and save.

40861-900 Grafting Clips 1.5 mm
100ct Bag \$6.95; 2-4 @ \$6.50 ea.;
5 or more \$6.25 ea.

40862-900 Grafting Clips 2 mm
100ct Bag \$7.50; 2-4 @ \$7.00 ea.; 5
or more \$6.75 ea.



Spring Loaded Grafting Clips

Great for grafting larger stock!

These spring loaded clips are great for larger stems 1/8" to 1/4" in diameter and for grafting items like watermelon and cucumbers. Each bag contains 100 clips; buy in quantity and save.

**40863-900 \$10.95; 2-4 @ \$9.95 ea.; 5
or more \$8.95 ea.**