



Grafting Manual:

How to Produce Grafted Vegetable Plants

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Chapter 2.5

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Synopsis:

After healing, grafted vegetable plants need to be prepared for transplanting to the growing area. This is especially important when planting in open fields. Best practices will vary with conditions.

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Transplanting Grafted Plants

Acclimatization of grafted plants to the production environment

Following successful graft healing, grafted vegetable plants need to be acclimatized to prepare them for transplanting to growing conditions. If the grafted plants are produced in a different climate region from where they will be grown, or if they are to be grown in an open field environment, acclimatization is especially important. If grafted plants are to be grown in protected culture systems such as greenhouses or high tunnels, acclimatization may not be as critical because the growing environment is more stable and plants are unlikely to be exposed to extreme temperatures, rainfall, solar radiation, and high wind.

To acclimatize the plants for open field production, place them in an outside protected area for up to 3 days where they will be somewhat exposed to the outside environment. An open-ended high tunnel or an open shade structure can work well for this purpose. During this time, plants should be protected from heavy rains and direct sunlight but exposed to diurnal temperature patterns similar to the open field environment. Water plants lightly to further prepare them for transplanting. Adjust the amount of time and the acclimatization environment as needed based on your environmental conditions so that plants are not stressed when they are placed in the field. To acclimatize plants to a greenhouse or high tunnel, place the trays of plants on the floor of the structure overnight.

Transplanting grafted plants

Plants are ready to transplant when they are 6-10 inches tall and ideally do not have any flower buds, flowers, or fruits. Keep the graft union above the soil line when planting (Fig. 1) so the scion will not root into the soil and ne-

gate any advantages of disease resistance that would have been provided by the rootstock. When the rootstock is selected solely for vigor and not for soil-borne disease, deep-planting is acceptable.

For open field production in temperate climates, transplant after the last frost danger has passed. Soil temperature should be between 70-90°F (21-32°C) for planting most fruiting vegetable crops. Plastic mulch will help warm the soil if needed. Some rootstocks (such as interspecific squash rootstock for cucurbit crops) are known to be cold-tolerant (King et al, 2010) and grafted plants can establish when the soil temperature is lower than optimal. If conditions are breezy, leave the grafting clip and small plastic stick (optional) on the plant for a week or so to provide support. Do not transplant grafted seedlings under extremely windy conditions.

Whether transplanting in the open field or in protected culture, consider transplanting in the late afternoon so that plants are not immediately exposed to strong solar radiation. Solar radiation can cause plants to wilt, and

this stress may slightly delay establishment. Planting density, and irrigation and nutrient management practices may be adjusted to maximize grafting benefits and economic returns (Djidonou et al., 2013; 2015). Optimal practices may vary for each rootstock-scion combination and production system, and growers are encouraged to experiment to find the best practices for their conditions.

Field maintenance of grafted plants

Most silicone grafting clips (commonly called tubes) used for solanaceous crops will fall off as the stem increases in diameter (Fig. 2), and therefore removal of grafting clips may not be needed. Spring plastic clips commonly used for cucurbit crops may not fall off, and if they are not removed they will severely restrict plant growth. For both solanaceous and cucurbit crops, remove any remaining grafting clips 2 weeks after transplanting. Grafting clips are typically re-usable after appropriate sanitation (e.g., washing in 10% hypochlorite solution and rinsing in water).



Figure 1. Grafted watermelon transplanted in the field with graft union well above the soil line. (Photo by Xin Zhao)



Figure 2. Silicone Grafting clip falls off the graft union as the grafted tomato plant grows in the field. (Photo by Xin Zhao)

Many commercial rootstocks are extremely vigorous and may generate regrowth (suckers) after grafting (Fig. 3). For solanaceous crops, suckers may develop from adventitious buds on the stem; or if the plant is grafted above the rootstock cotyledons, suckers will grow from the axil of the cotyledon. For cucurbit crops, the meristem tissue at the base (axil) of the cotyledons may not be completely removed at the

time of grafting and regrowth can occur at this point. Rootstock suckers can quickly overtake the scion variety and reduce fruit yield (Fig. 4). Within 1-4 weeks after transplanting, check grafted plants once a week for rootstock regrowth. Remove rootstock suckers immediately; suckers can reoccur on the same plant, so it will be necessary to keep checking all plants regularly.



Figure 3. 'Brandywine' tomato grafted onto 'Maxifort' rootstock above the rootstock cotyledons (left; *photo by Xin Zhao*). 'Crimson Sweet' watermelon grafted onto 'Emphasis' (right; *photo by Carol Miles*).



Figure 4. Growth of tomato scion plant (left) and watermelon (right) is suppressed by rootstock suckers which were overlooked earlier in the season. (*Photos by Xin Zhao and Carol Miles, respectively*)

References

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