

Grafting Techniques for Watermelon¹

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Grafting of watermelon scions on squash, pumpkin, or bottle gourd (*Lagernaria spp.*) rootstocks is practiced in many of the major watermelon production regions of the world (Choi et al. 2002; Lee 1994, 2003). The primary reason for grafting of vine crops is to provide protection against soil-borne diseases (Edelstein et al. 1999; Paplomatas et al. 2002), but some rootstocks have the added advantage of being resistant to nematodes, especially the root-knot nematode *Meloidogyne spp.* Additional benefits include the potential for increased yield, increased fruit quality—especially flesh firmness, more vigorous plant growth and lower plant populations (Core 2005; Yetisir 2003). Disadvantages included increased production cost and the possibility of altered horticultural characteristics of cultivars used as scions. Mechanical grafting aids are widely used in Korea and Japan and have the potential to greatly reduce costs (Lee 1994, 2003).

There is interest in Florida in exploring the use of grafted watermelon plants for commercial production. Growers are concerned about replacing proven practices with new and costly technology, but seed companies and transplant production facilities are currently experimenting with grafted plants under Florida conditions. The following is a brief description, with images, of four grafting techniques used for vine crops and a summary of the advantages and disadvantages of each.

References

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1. This document is HS1075, one of a series of the Horticultural Sciences Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL 32611. Publication: October 3, 2006. Please visit the EDIS Website at <http://edis.ifas.ufl.edu>. Reviewed December 2009.

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Splice Graft

Rootstock seedlings should have at least one true leaf, and scion seedlings should have one or two true leaves (Fig. 1a).

With a single angled cut, remove one cotyledon with the growing point attached (Fig 1b). It is important to remove the growing point and the cotyledon together so that the rootstock seedling is not able to grow a new shoot of its own after being grafted. This is one of the advantages of using this type of graft. It's also important, when removing the cotyledon and growing point together, not to remove too much tissue because the remaining cotyledon must be well attached to the stem of the seedling.

Cut the scion and match the two cut surfaces, rootstock and scion (Fig 1c). Hold in place with a grafting clip (Figs. 1d and 1e). Place the grafted seedling in a chamber with high humidity at about 77°F and discard the unused parts.

Advantages:

- 1) Simple technique, almost anyone can do this type of graft.
- 2) The only task after grafting is to remove the clip. There is no trimming of unwanted plant parts after healing of the graft union.

Disadvantages:

- 1) Requires careful control of humidity, light, and temperature after grafting. Can experience high losses due to poor environmental control and possible disease under high humidity conditions.



Side Graft

Rootstock seedlings should have at least one true leaf, and scion seedlings should have one or two true leaves (Fig. 2a).

With a sharp knife or razor blade, cut a slit all the way through the stem of the rootstock (Fig 2b). The cut doesn't need to be too long, just long enough to insert the scion.

Cut the scion at an angle and insert into the slit of the rootstock (Fig 2c). Hold in place with a grafting clip (Fig. 2d). Place the grafted seedling in a chamber with high humidity at about 77°F and discard the unused parts.

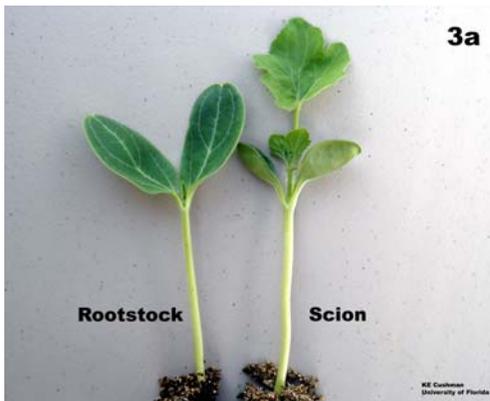
Advantages:

1) Simple technique.

Disadvantages:

1) Requires careful control of humidity, light, and temperature after grafting. Can experience high losses due to poor environmental control and possible disease under high humidity conditions.

2) After healing of graft union, requires removal of top portion of rootstock. This requires additional time and labor but allows scion alone to establish plant canopy.



Approach Graft

Rootstock and scion seedlings should have one or two true leaves (Fig. 3a).

With a sharp knife or razor blade, cut an angled slit halfway through the stem of the rootstock and an oppositely angled slit halfway through the stem of the scion (Fig 3b). Match the slits so that they overlap and then seal with aluminum foil or specialty materials available for this purpose (Figs. 3c and 3d).

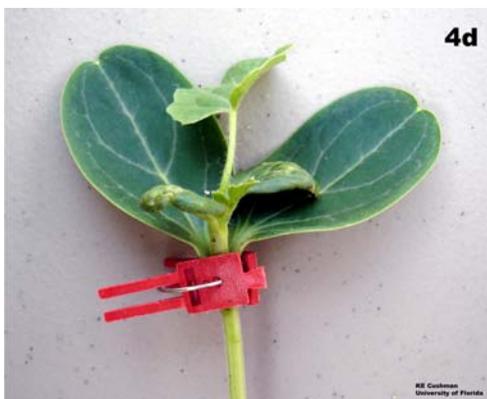
Place the grafted seedlings in a seedling tray with larger cell size than what they were grown in. Place root balls of both rootstock and scion together in the same cell and add potting media if needed to fill the larger cell. Return to greenhouse or other growing area. High humidity and low light is not necessary to ensure success with this type of graft.

Advantages:

- 1) Relatively simple technique.
- 2) High humidity and low light environment not required for successful healing of the graft union. A normal greenhouse environment is sufficient.

Disadvantages:

- 1) After healing of graft union, requires removal of top portion of rootstock about nine days after making graft. Also requires severing of scion roots after an additional two or three days. (Can then be planted to field in about three more days.)



Hole Insertion Graft

Rootstock seedlings should have one small true leaf and scion seedlings should have one or two true leaves (Fig. 4a).

With a pointed probe, remove from the rootstock the true leaf along with the growing point (Fig 4b). It is important to remove all of the growing point to prevent future shoot growth of the rootstock. This is one of the advantages of this type of graft.

Use the probe to open a slit along one side on the upper portion of the rootstock's stem, where the stem connects to the cotyledons. Cut the scion and insert into the rootstock (Fig 4c). Hold in place with a grafting clip (Fig. 4d). Place the grafted seedling in a chamber with high humidity at about 77°F and discard the unused parts.

Advantages:

1) The only task after grafting is to remove the clip. There is no trimming of unwanted plant parts after healing of the graft union.

Disadvantages:

1) Requires slightly more skill than most other grafting techniques.

2) Requires careful control of humidity, light, and temperature after grafting. Can experience high losses due to poor environmental control and possible disease under high humidity conditions.