

*Johnny's
Educational
Webinar
Series*

Fundamentals of Tomato Grafting



January 7, 2021

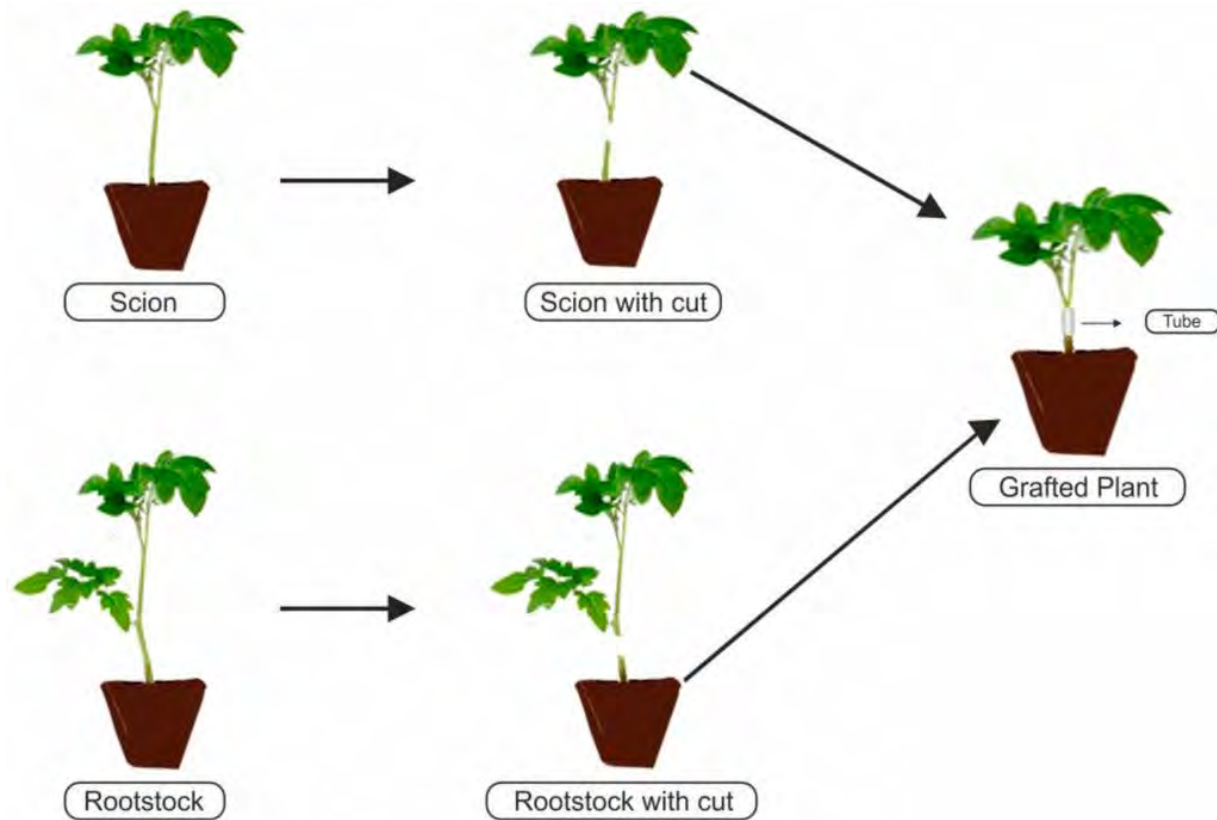


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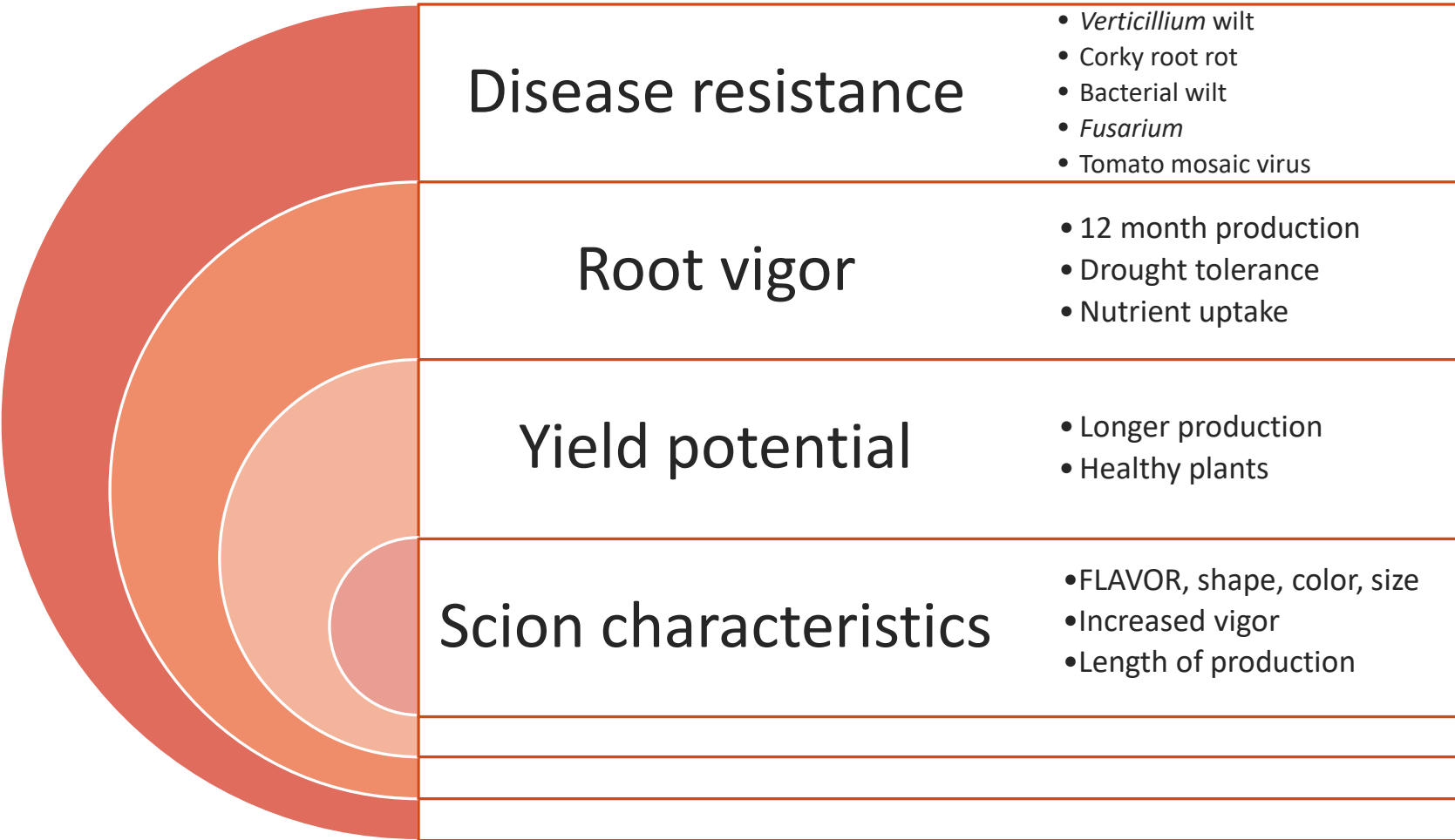


Johnny's mission is helping families, friends, and communities to feed one another by providing superior seeds, tools, information, and service.

What is Grafting?



Why Graft Tomatoes?





Important Considerations

- * Grafting does not necessarily improve tomato performance
- * Special cultural management
 - Pruning/training
 - Fertility to match growth
- * Cost
 - Set up
 - Time
 - Management

Rootstock Selection

- **Soil diseases**
 - *Anything specific?*
- **Crop duration = Vigor**
 - *Short = 3-4 months*
 - *Medium = 4-5 months*
 - *Long = 6+ months*
- **Balancing plant habits**
 - *Vegetative*
 - *Generative*

	Disease	Crop Duration	Habit Balance	Germination
Maxifort	Fusarium Wilt 1 & 2 Fusarium Crown & Root Rot Verticillium Wilt 1 & 2 Corky Root Rot Root Knot Nematodes Tomato Mosaic Virus	Long	Vegetative steering	Can be uneven
DRO141TX	Same as Maxifort	Medium – Long	Vegetative steering but easier to balance	Fairly uniform, faster
Estamino (organic)	Same as Maxifort plus... Fusarium Wilt 3 Tomato Spotted Wilt Virus	Short – Medium	Generative steering	Fairly uniform, slower

Conduct your own trials!

Preparation is key!

Prepare for Sowing

- Timing of sowings
- Ideal germination
- Practice round
- Successions and Overseeding
- Monitor growth 3-4 weeks prior to grafting

Prepare for Grafting

- Supplies on-hand and cleaned
- Sanitize work area
- Deep water beforehand



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Maxifort Rootstock Tomato: Steps to Optimize Seed Germination Rate and Seeding Uniformity

933 Berlin Ave., Windsor, ME 04093 • Phone: 1-877-556-6907 • Fax: 1-800-735-8234
Email: seeds@johnnysseeds.com • Web Site: johnnysseeds.com

As is the case with most tomato rootstock varieties bred for the US, Maxifort is an interspecific cross — the product of traditional plant breeding crosses between a domesticated tomato plant and a wild tomato parent. This particular type of wild cross can create a beneficial/undesired characteristic: on the one hand significantly increasing hybrid offspring vigor, while on the other decreasing seed germination percentage and seeding uniformity.

To increase germination rate and uniformity, all of our tomato rootstock seeds are pre-germinated. The process of pre-germinating involves hydrating seeds in a solution within a controlled environment, allowing the initial phase of germination to take place, then arresting the process at a certain point, at which time the seeds are dried down to maintain seeds conducive to storage.

While pre-germinating greatly improves seed performance, it can also substantially reduce seed shelf life. To achieve optimal germination rate of your Maxifort seed and resulting seeding uniformity, we recommend considering the following measures:

SEED GERMINATION

- Clean seed up to 25% higher than your desired number of plants based on your grafting experience. This buffer will account for potential losses during both seedling production and the grafting healing phase.
- Sow seeds into a high-quality seed-starting medium, as you would for any tomato crop.
- Using a germination chamber to maintain appropriate temperature and humidity may help improve your germination success on high-value seeds. Research suggests:
 - First 3 days: Keep tomato seed trays in a dark location, ideally at 70°F (21°C), with a relative humidity of 90-95%.
 - After 3 days: Move seed trays to propagation area or greenhouse, ideally at 78°F (25°C).
- We recommend avoiding heat mats with tomato rootstocks, as they can cause uneven heating and drying of the starting medium, especially when you are starting seeds very early in the season, when temperatures are likely to drop to a lower extreme. To the extent possible, it's preferable to maintain the environment surrounding the plants at the optimal temperature and humidity, rather than to add heat mats in a space that is perhaps not as warm as it should be.

SEED STORAGE

- Because pre-germinated seeds are sold in a germination-ready state, we recommend purchasing only sufficient pre-germinated seeds for your current growing cycle and using within one year of purchase if possible.
- Any extra pre-germinated seeds should be stored in your most optimal seed storage conditions: preferably cool (35-40°F / 5-4°C) and dry (in a Ziploc bag or glass jar) to ensure optimal seed life.

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Top Grafting Tomatoes

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Email: seeds@johnnysseeds.com • Web Site: johnnysseeds.com

Grafting desirable fruiting varieties to vigorous, disease-resistant tomato rootstocks has become a cost-effective method for growers to overcome many disease and production related issues. Grafting tomatoes can improve production, overall root health, reduce or eliminate the need for pesticide use, shorten 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 outdoors usually takes 6-8 weeks.

Materials:

- Seeds of a rootstock variety.
- Seeds of a scion variety.
- Your preferred growing medium.
- Plug trays of your desired cell size.
- Shallow resealable trays.
- A disinfectant, such as Vicksalol or a 1:10 bleach solution.
- An old-fashioned, double-edged razor blade, the Mini-Cut Grafting Knife, or a spare blade of the Mini-Cut Grafting Knife.
- A spray bottle.
- Humidity domes or a humidor.



This 4 size of plastic top-grafting pipe Johnny's offers all accommodate stem diameters from as small as 1.5 mm to as large as 3.0 mm. The best strategy is to have clips of various sizes on hand in case the stems of your plants grow larger than you intend them to.

CHOOSING THE RIGHT ROOTSTOCK

Rootstocks fall into 2 broad categories: generative and vegetative. Generative rootstocks are less vigorous than vegetative rootstocks, but they devote a higher proportion of their energy to the reproductive parts of the plant, which means they put more of their energy into flowers and fruit. Vegetative rootstocks put more of their energy into the leaves and stems.

Usually, tomato plants are tolerant, putting energy into growing the plant and the fruits at the same time. Making the right rootstock means choosing the one that is most likely to tolerate the plant under the anticipated growing conditions. A well-balanced parent means that energy is going to going to growing up while also continuing to grow the vine.

A plant that is too generative is putting too much energy into growing and opening fruits at the expense of plant growth. A plant that is unduly vegetative in a generative direction has a thin, weak-based base of the plant, and the developing flower trusses can be small and curled. You may notice that the vegetative parts of the plant don't seem to be growing very fast. Internodes tend to be shorter so the top flower cluster is closer to the head.

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Top Grafting Demo

- Splice Graft
- Cleft Graft
- Staking



Healing Chamber Conditions

Create a space for plants to survive for 3 to 4 days **WITHOUT ROOTS** while they heal

High Humidity

85-95%

Humid,
not wet

Steady Temperature

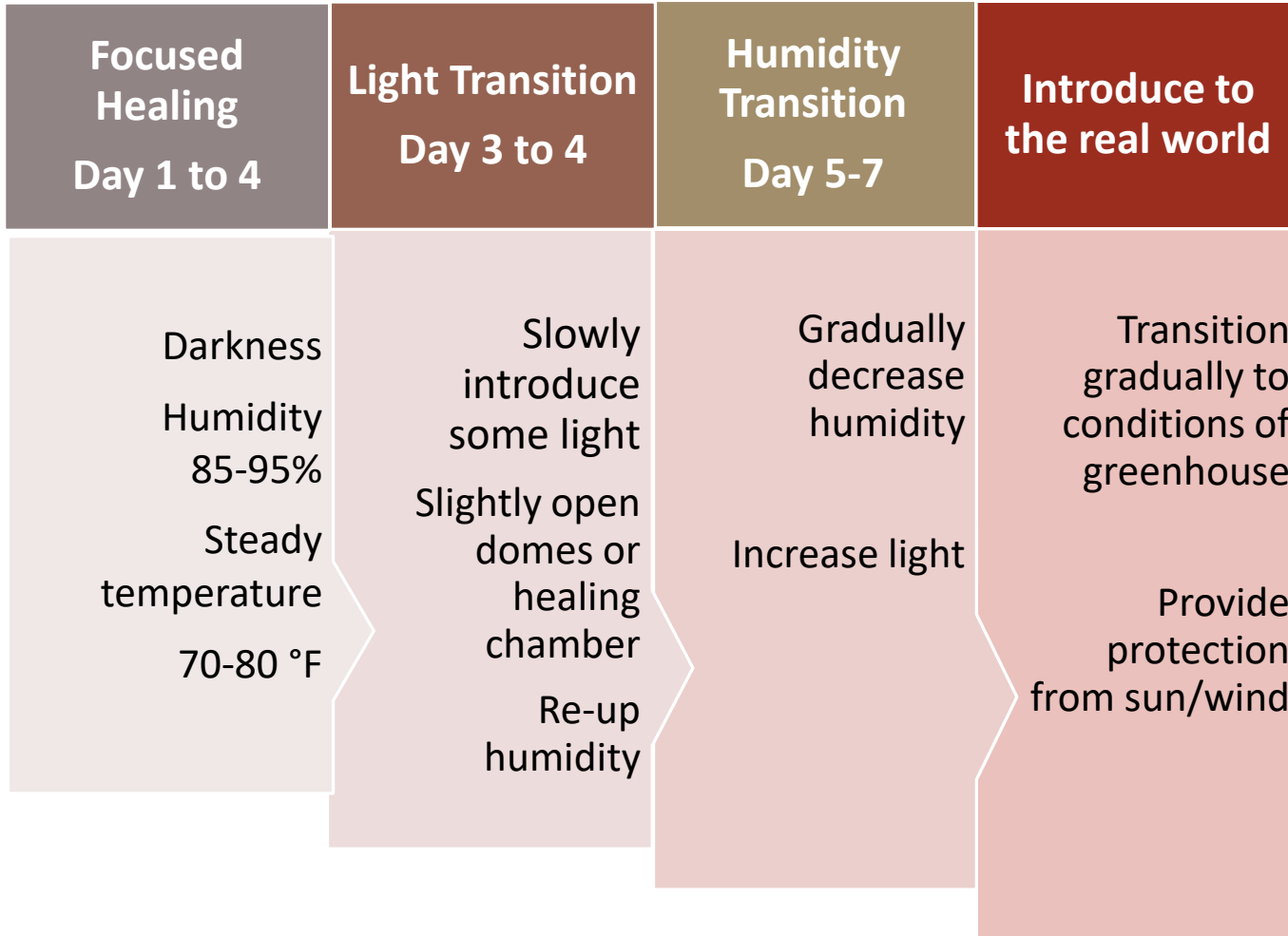
70-80°F

Reduce stress

Darkness

Prevent
photosynthesis

Healing Process



Gradually increase light, slowly decrease humidity

Requires:

- * Regular monitoring
- * Adjustments
- * Fiddling & more fiddling



Photo credit: Skip Paul



Johnny's Healing Chamber



Healing Chamber Options from Johnny's



Humidity Domes:
7" Clear or NanoDome



Humidity Tent &
Compact Seedling Light Cart



Lighthouse
Grow Tent

[Johnny's grafting supplies](#)

VIDEOS:

Grower Experiences

Skip Paul

Wishing Stone Farm

Little Compton, RI



Andre Cantelmo

Heron Pond Farm

South Hampton, NH





Fundamentals of Top-Grafting Tomatoes

1. Choose rootstocks wisely
2. Design healing chamber
3. Test germination and growth rates
4. Prepare plants prior to grafting
5. Choose similar stem diameters for best match
6. Monitor healing process carefully for first week post-graft
7. Carefully transition newly healed plants back to real-world conditions

We wish you success!

Resources

JOHNNY'S EDUCATIONAL WEBINAR RESOURCES • Fundamentals of Tomato Grafting

<https://www.johnnyseeds.com/growers-library/webinar-series-resources-fundamentals-of-tomato-grafting.html>

ADDITIONAL RECOMMENDED RESOURCES

Manuals & Guides

- **USDA-SCRI Vegetable Grafting Project, Grafting Manual:** <http://www.vegetablegrafting.org/resources/grafting-manual/>
- **Ohio State University Extension Grafting Guide (3rd Ed., Bulletin 950):** <https://u.osu.edu/vegprolab/grafting-guide/>
- **University of California at Davis Guide to Cleft Grafting:**
https://horticulture.ucdavis.edu/sites/g/files/dgvnsk1816/files/extension_material_files/tomato_grafting_guide.pdf

Tutorial Videos

- **K-State Associate Professor & Extension Specialist Cary Rivard**
 - Tomato Grafting Overview: <https://www.youtube.com/watch?v=h0YjIHyywE>
 - Grafting process: <https://www.youtube.com/watch?v=zhgsPkeZEbk>
 - Healing Chamber: <https://www.youtube.com/watch?v=9Mxy0HfgpKY>
- **Grafting Demos**
 - How to Graft Tomatoes, by Wenjing Guan: <https://www.youtube.com/watch?app=desktop&v=7Ufx66l88>
 - How to Graft Greenhouse Tomatoes (UVM/JSS); <https://www.youtube.com/watch?v=WSwTCwlhFgo>

SUPPLIES: <https://www.johnnyseeds.com/tools-supplies/seed-starting-supplies/grafting-supplies/>