

# Fundamentals of CUCUMBER GRAFTING



**Johnny's**  
*Selected Seeds*

**50<sup>th</sup>**  
ANNIVERSARY

An aerial photograph of a large agricultural research farm. The scene is dominated by several long, covered walkways (greenhouses) with translucent roofs, arranged in a grid-like pattern. The surrounding fields are lush green, with some areas showing rows of plants. In the background, there is a dense forest of tall trees and a small pond. Various pieces of farm machinery, including tractors and trailers, are visible on a dirt road. The overall atmosphere is bright and sunny, suggesting a clear day.

# Johnny's Research Farm

# JOHNNY'S RESEARCH FARM

Located in Albion, Maine

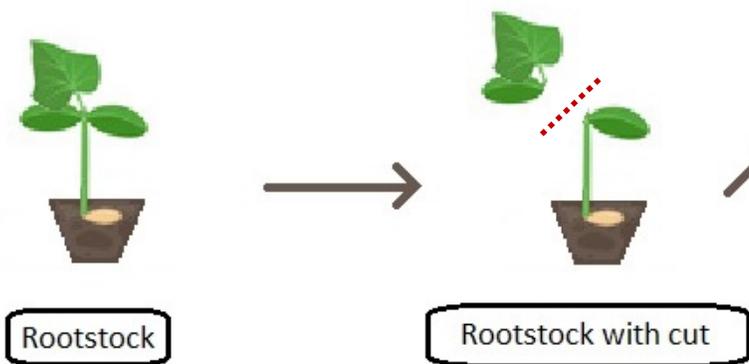
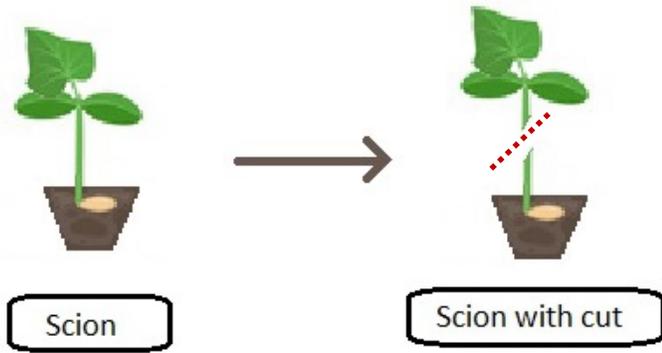
- 200 acres managed
- 25 miles of beds in production
- Emphasis on soil health:
  - Wide production spacing to facilitate crop rotations
  - 50+% of acreage in cover cropping annually
  - Extensive organic mulch inputs



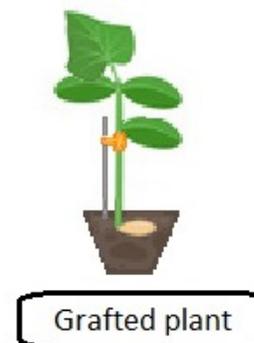
# TRIALING & SELECTION

- **Approx. 3,000 varieties trialed in 2022, resulting in over 100 products added**
- **Year-round effort to select superior new products and substitutions**
- **Includes regional trials across the country with growers, universities, field day events, & more**





# What is Grafting?



# Benefits of Grafting

## Season Extension

- Increased survival rate and improved plant vigor in cold soil
- Improved stress tolerance

## Yield Potential

- Higher yields, particularly early in the season
- Longer production
- Healthy plants



# Benefits of Grafting

## Disease Resistance

- Fusarium resistance the most common
- Root-Knot Nematode
- Verticillium
- Some rootstocks claim improved resistance to foliar diseases such as Powdery Mildew
- Seen remarkable results at JSS with resistance to Spider Mites



# Important Considerations

- **Grafting doesn't necessarily improve all varieties' performance**
  - Important to know when and where it's needed
- **Cost**
  - Set up
  - Added seed cost
  - Time
- **Special cultural management**
  - Pruning/training
  - Fertility to match growth
- **Preparation is key**





# Preparation is Key

## Pre-Grafting Set-Up

### Prepare for Sowing

- Getting the timing right
- Practice round(s)
- Sow successions (at least 2) 1-2 weeks prior to top-grafting
- Ideal germination
- Monitor growth rates

### Prepare for Grafting

- Be ready to go (chamber, tools, supplies)
- Deep water beforehand
- Sanitize work area and tools

# Pre-Grafting Set-Up

## Required Materials

- Scion seed (top or fruiting variety)
- Rootstock seed (bottom or base variety)
- Your preferred growing medium
- Plug trays of your desired cell size
- Shallow leakproof trays
- A disinfectant, such as Virkon® or a 1:10 bleach solution
- An old-fashioned, double-edged razorblade
- Grafting clips
- Narrow plastic straws, or similar, for supporting the grafted seedling
- A spray bottle or hose mister
- 7" Humidity domes and/or a healing chamber

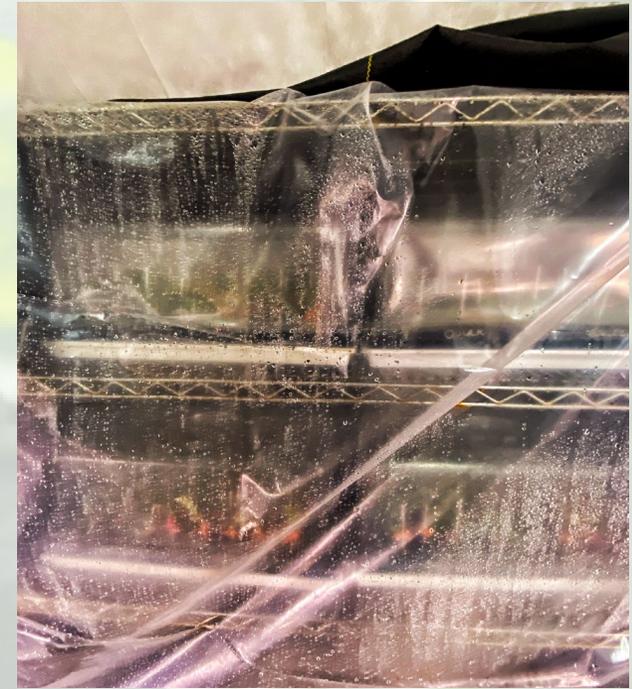
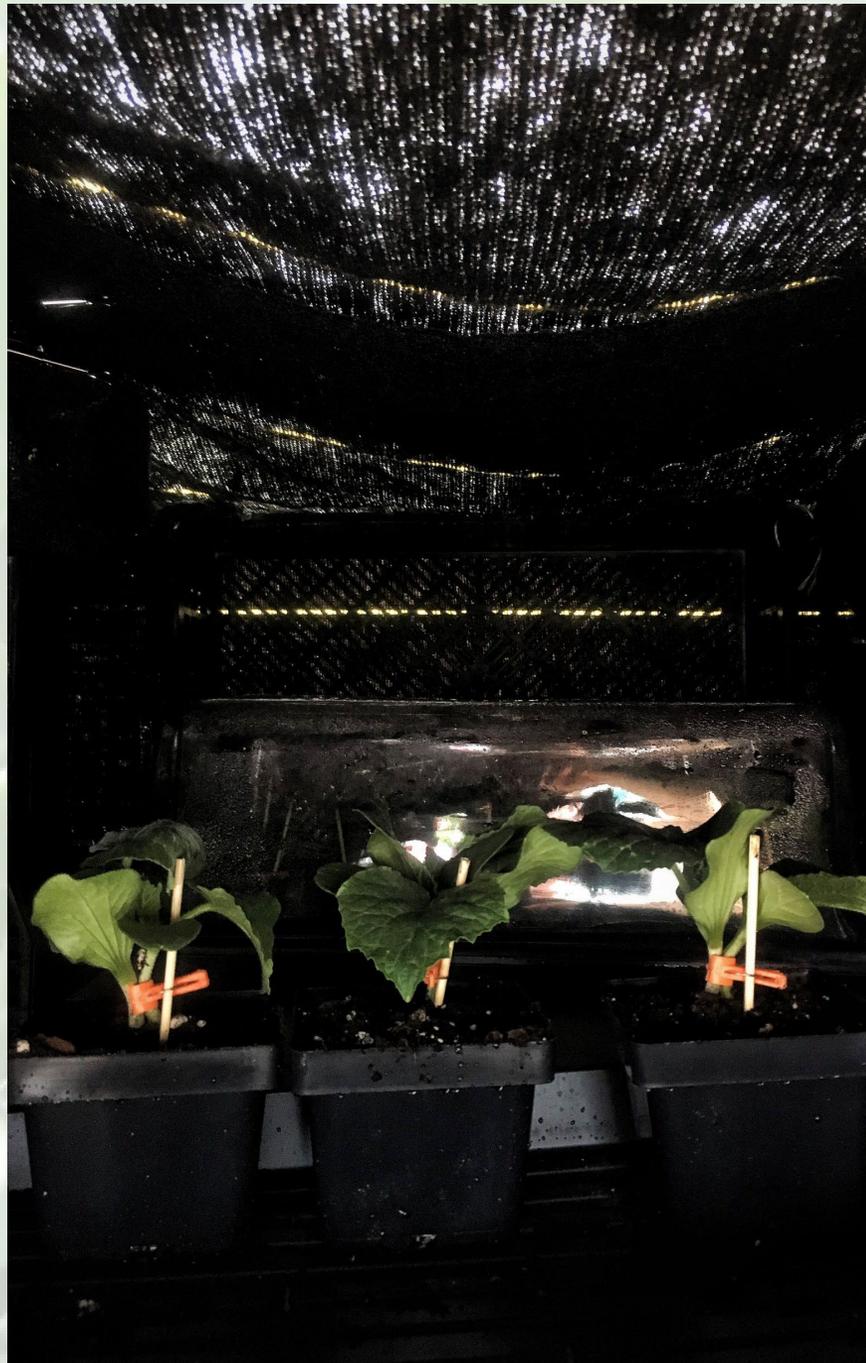


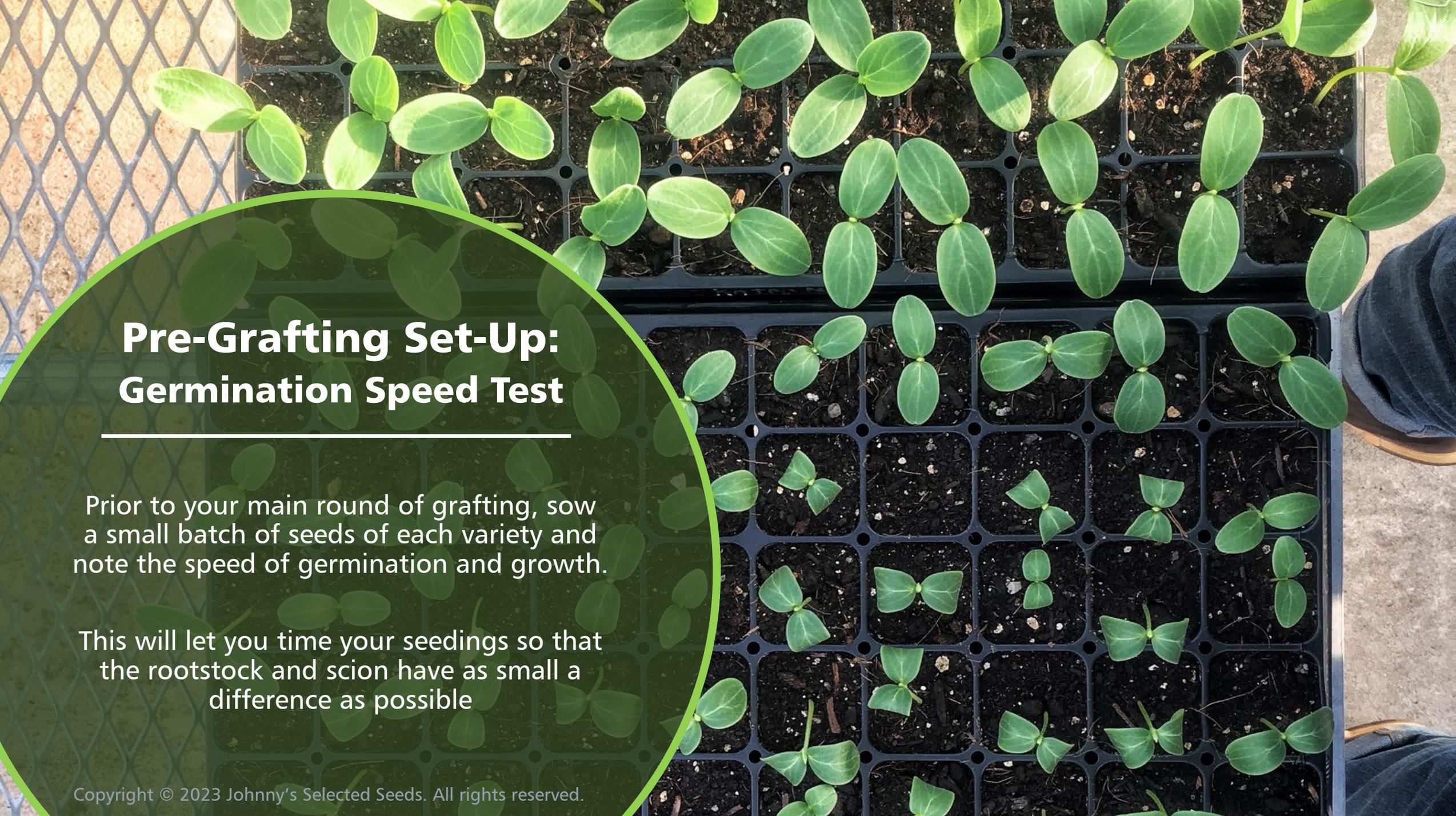
# Pre-Grafting Set-Up

## The Healing Chamber

Create a space for plants to survive for 3 to 4 days without roots while they heal

- High Humidity of 95-100%
- Constant Temperature of 77-89°F
- Controlled Lighting
  - Darkness at first to prevent respiration
  - Light gradually increased as grafted plants heal





## Pre-Grafting Set-Up: Germination Speed Test

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Prior to your main round of grafting, sow a small batch of seeds of each variety and note the speed of germination and growth.

This will let you time your seedlings so that the rootstock and scion have as small a difference as possible

# Pre-Grafting Set-Up

## Seeding Your Scion & Rootstock

- Sow seed about 4–5 weeks before your desired transplant date
- The healing process adds 1–2 weeks to the seedling propagation phase
- It is ideal for stem diameters of the rootstock and scion seedlings to be as closely matched as possible
- Sowing multiple successions and overseeding will raise chances of success
- Plants will be ready to graft approx. 5–7 days after the seedling emerges.
- The ideal time to graft your plants is when the first true leaves on both scion and rootstock have just begun to grow and expand.

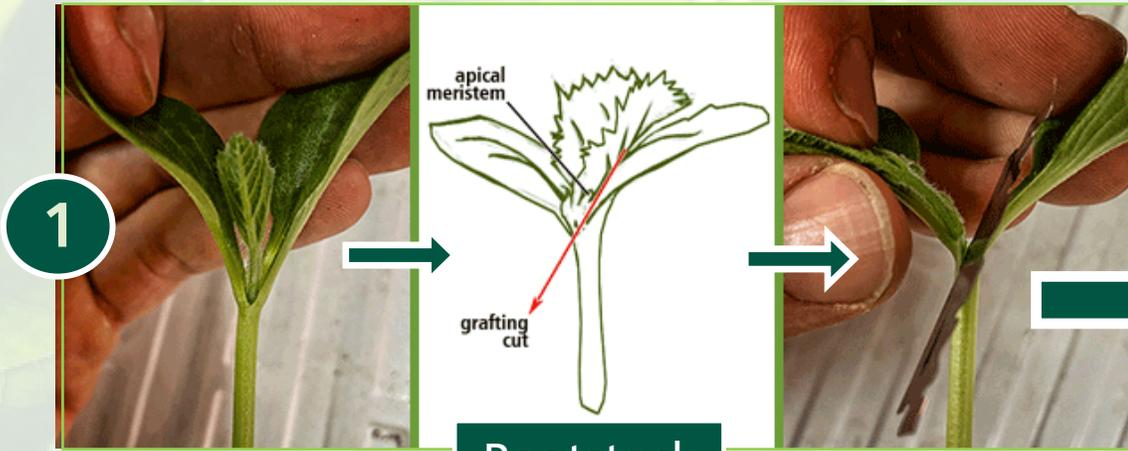


# Grafting Methods

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- There are typically three established methods of cucurbit grafting
  1. Top grafting
  2. Side/Approach grafting
  3. Hole-Insertion grafting
- Each has its pros and cons, but I have personally had the most success with top grafting
  - Simpler/efficient
  - Likely to be more familiar





Rootstock

Left: Correct angle depth Center: Too deep Right: Too shallow



1.5



Scion

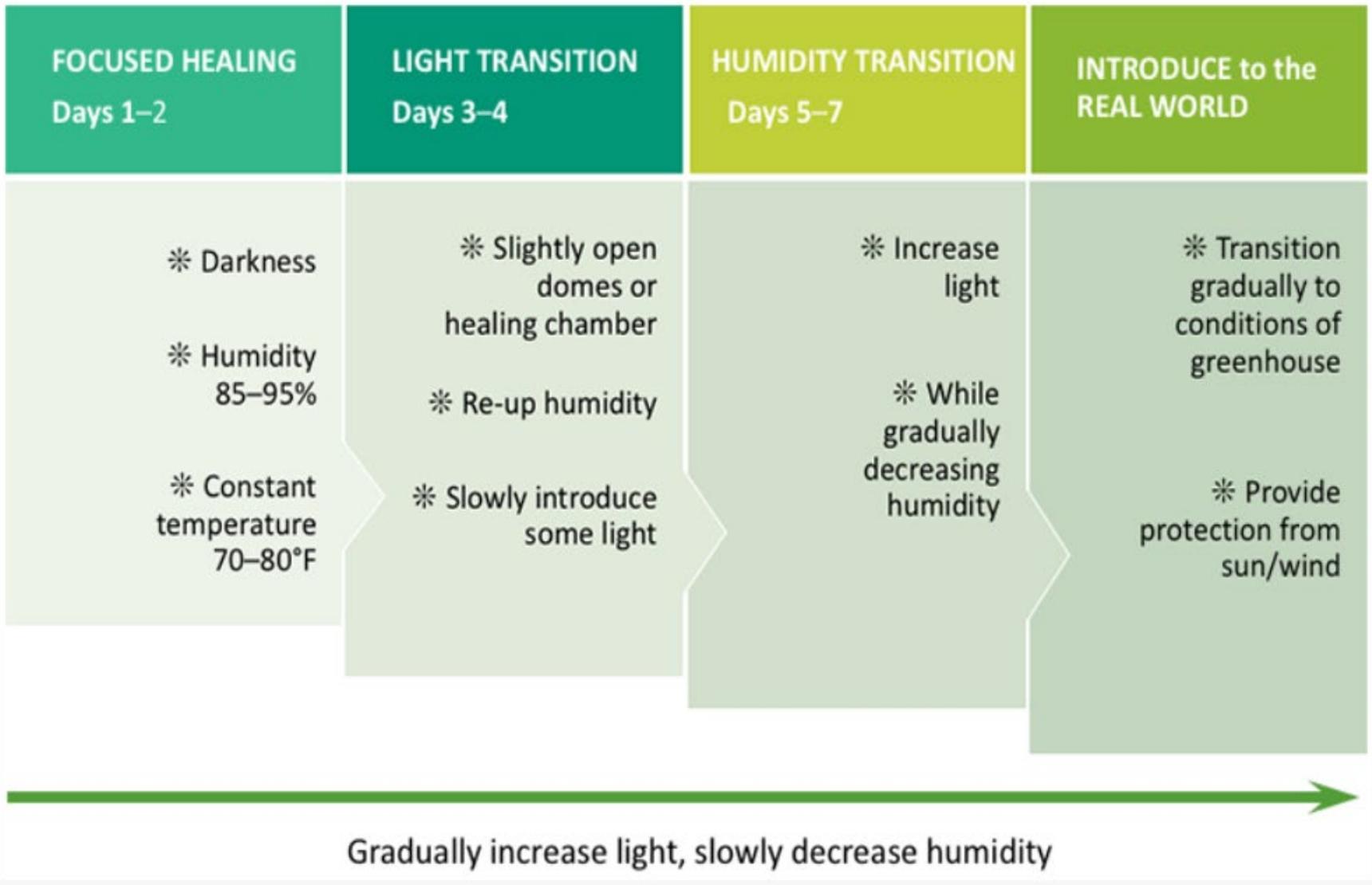


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# Top Grafting Process



Completed Graft



# Healing Process

- Requires:
- Regular monitoring
  - Adjustments
  - Fiddling & more fiddling



**VIDEO**  
**Top Grafting**  
**Demonstration**

# Grafting Technique Comparison

In a 2021 trial at Johnny's, One-Cotyledon Grafting with Rootstock Root Removal was much more successful:

- Higher survival rate
- More vigorous, healthier grafted plants.



Variety Name	Rootstock with Roots Removed % Survival After Grafting	Rootstock with Roots Kept % Survival After Grafting
Corinto	65	60
Nokya	95	60
Poniente	70	45
Unagi	35	20
Katrina	55	25
Picolino	45	30
Excelsior	65	15
Quirk	50	0



# Transplanting

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- Care should be taken when transplanting to keep the graft-union above the surface of the soil.
- If the scion touches the soil, you open the plant up to soil-borne disease

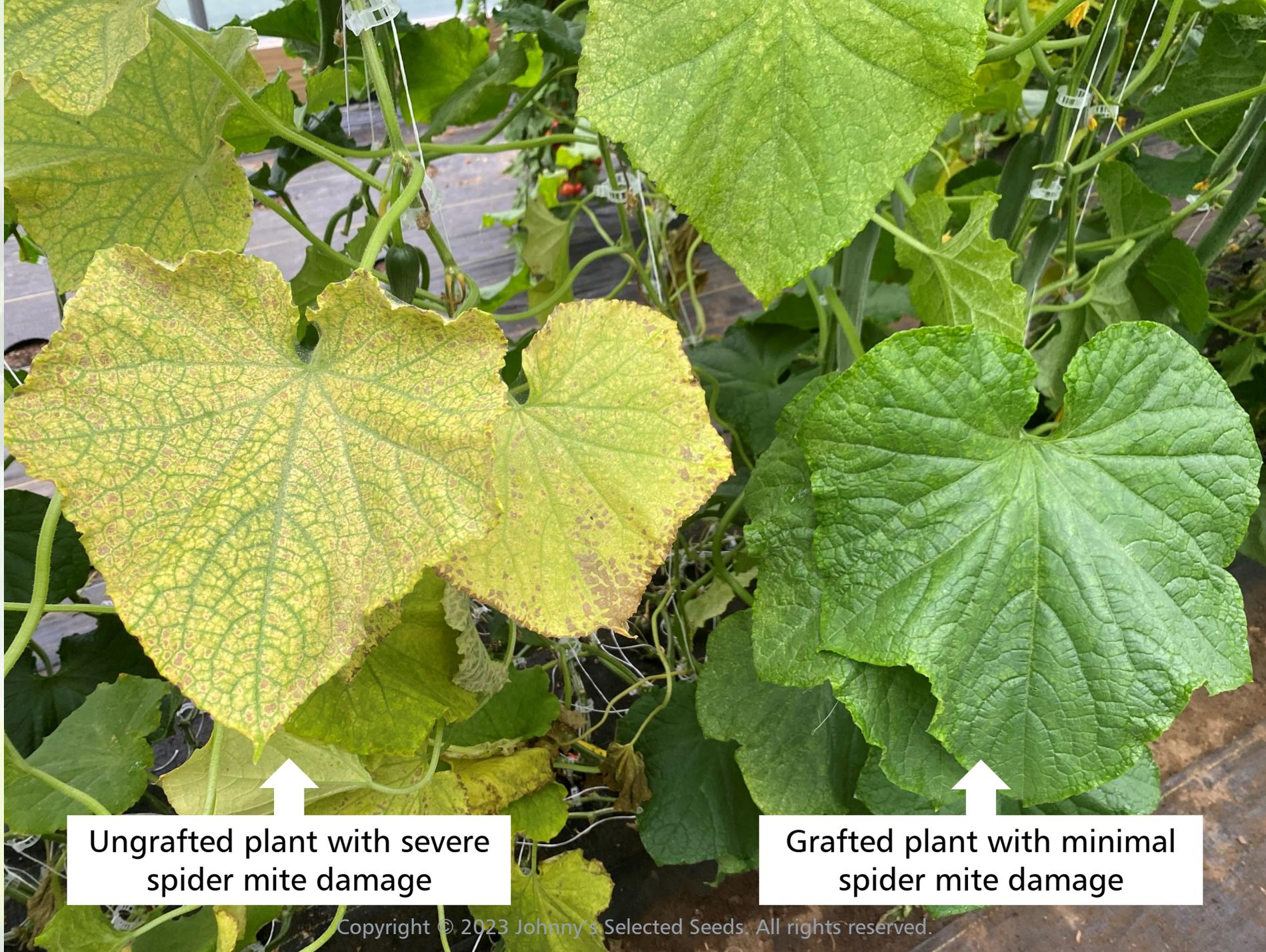


**VIDEO**  
**The Grafting Trial at  
Johnny's Research Farm**

## Grafting and Two-Spotted Spider Mite

In the 2022 grafted cucumber trial, we saw an additional benefit:

- Plants grafted to Tetsukabuto were virtually untouched by an infestation of two-spotted spider mites
- In contrast, those ungrafted “control” plants of the same scion variety, *planted right next to the grafted plants*, were severely damaged



Ungrafted plant with severe spider mite damage

Grafted plant with minimal spider mite damage

Ungrafted



Grafted



Initial spider mite infestation began here, moved steadily down the bed	1A	2A	3A	4A	5A	6A	7A	8A	9A	10A	11A	12A	13A	14A	15A	16A
	16B	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B

Ungrafted



Grafted



# What Can Go Wrong?

What other issues can you encounter with grafted plants?

## Carpal Separation or “Hollow-Heart”

- Fruit growth rate too fast
- Variety-dependent
- Manipulating growing conditions can help

## Poor Flavor

- Some squash rootstock can impart off-flavors to the fruit
- Variety-dependent



# Resources

[Cucumber Grafting: Advantages, Materials, Technique](#) [article]

[Johnny's Cucumber Library](#)

[Johnny's Grafting Library](#)

[Vegetable Grafting Research-Based Information Portal](#)

# THANK YOU

## FOR JOINING US

A recording of this webinar and the presentation slides will be available on March 13, 2023.

[Johnnyseeds.com/webinars](https://johnnyseeds.com/webinars)

