

State of the Science of Rootstock Propagation

Seedling vs. Clonal

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Rootstocks

- Rootstocks are important for fruit production - provide required protection for pest and pathogens.
- Two propagation methods:
 - Sexual
 - Asexual (clonal)

Sexual Propagation

- Rootstock production by seed is the most common method.
- Lower cost and allows to produce large numbers.
- Variable seedlings.
- Possible issues with viruses that can be seed transmitted.
- Rootstock growth and budding – one-year cycle.



Asexual Propagation

- Produce plants that are genetically identical to the original.
- Different types:
 - Cuttings (softwood and hardwood cuttings)
 - Micropropagation
 - Layering and stooling
- Rootstock growth and budding – two-year cycle.

Cuttings

- Generally, more expensive than seedlings.
- Require specialized operations sometimes with greenhouses, mist or fog systems and typically heating.
- A clean source is required – important to avoid any diseases.
- Two types: softwood and hardwood cuttings.



Micropropagation

- Generally, more expensive than cuttings.
- Highly specialized operation.
- Useful to build a large number of plantlets in a short time.
- Plants in tissue culture can be easily moved across national borders – easily satisfy plant importation and phytosanitary regulations.



Stooling and Layering

- Induction of adventitious rooting on shoots still attached to a mother plant.
- Mother plants planted
 - Upright position: Stooling
 - Angled position: Layering
- In both cases, plants are mounded with soil or sawdust during the growing season as new shoots grow from the mother plant to induce rooting.
- Shoots are harvested in fall.
- Diseases can be a problem.





Peach Rootstocks Available in the Market

Information obtained from Dr. Greg Reighard



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United States Rootstocks – Older releases

Clonal	Seed
Hansen 536 (<i>P. persica</i> x <i>P. dulcis</i>)	Lovell
Hansen 2168 (<i>P. persica</i> x <i>P. dulcis</i>)	Halford
Viking (multi-species hybrids)	Bailey
Atlas (multi-species hybrids)	Tenn. Natural
Marianna 2624 (<i>P. cerasifera</i> x <i>P. munsoniana</i>)	Nemaguard
	Nemared

United States Rootstocks – Newer releases

Clonal	Seed
Controller™ 5 (<i>P. salicina</i> × <i>P. persica</i>)	Guardian® (<i>P. persica</i>)
Controller™ 9 (<i>P. salicina</i> × <i>P. persica</i>)	<i>P. americana</i>
HBOK 27, 32, 10, 50 (Harrow Blood × Okinawa) a.k.a. Controller™ 6, 7, 8, and 9.5	Flordaguard (<i>P. persica</i>)
Cornerstone, Brights Hybrids & Nickels (<i>P. dulcis</i> × <i>P. persica</i>)	
Sharpe (<i>P. angustifolia</i> hybrid)	
MP-29 (Edible sloe × <i>P. persica</i>)	

French Rootstocks – Older releases

Clonal	Seed
Cadaman® (<i>P. persica</i> x <i>P. davidiana</i>)	Montclar (<i>P. persica</i>)
	Rubira (<i>P. persica</i>)

French Rootstocks – Newer releases

Clonal	Seed

Spanish Rootstocks – Older releases

Clonal

Adesoto or Empyrean® 101 (*P. insititia*)

Adarcias (*P. dulcis* x *P. persica*)

Monegro (*P. dulcis* x Nemared)

Felinem (*P. dulcis* x Nemared)

Garnem (*P. dulcis* x Nemared)

Spanish Rootstocks – Newer releases

Clonal

Mirobac cv PAC 941 (*P. cerasifera* × *P. dulcis*)

Densipac Rootpac® 20 (*P. besseyi* × *P. cerasifera*)

Nanopac Rootpac® 40 (*P. dulcis* × *P. persica*)

Purplepac Rootpac® 70 (almond × peach × *P. davidiana*)

Greenpac Rootpac® 90 (almond × peach × *P. davidiana*)

Replantpac Rootpac® R (*P. cerasifera* × *P. dulcis*)



Italian Rootstocks – Older releases

Clonal

Sirio (*P. persica* × *P. dulcis*)

Mr.S. 2/5 (*P. cerasifera*)

Barrier or Empyrean® 1 (*P. persica* × *P. davidiana*)

Polluce (*P. persica* × *P. dulcis*)

Castore (*P. persica* × *P. dulcis*)

Italian Rootstocks – Newer releases

Clonal

Penta or Empyrean[®] 2 (*P. domestica*)

Tetra or Empyrean[®] 3 (*P. domestica*)

Imperial California (*P. domestica*)

Russian Rootstocks

Clonal

Krymsk[®] 1 (*P. tomentosa* × *P. cerasifera*)

Krymsk[®] 86 (*P. cerasifera* × *P. persica*)

Krymsk[®] 99 (*P. besseyi* × *P. salicina*)

Fortuna (*P. cerasifera* × *P. persica*)





Peach Rootstocks in the Southeastern U.S.



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Peach Rootstocks Southeastern U.S.

Rootstock	Ring Nematode Tolerance <i>Mesocriconema xenoplax</i>	PTSL Tolerance	Root-knot resistance <i>Meloidogyne incognita</i>	Oak Root Rot Resistance <i>Desarmillaria</i>	
Lovell	Fair	Fair-Good	Susceptible	Susceptible	SEED
Halford	Fair	Fair-Good	Susceptible	Susceptible	SEED
Nemaguard	Poor	Poor	Resistant	Susceptible	SEED
Guardian	Fair-Good	Very Good	Resistant	Susceptible	SEED
MP-29	Very Good	Very Good	Resistant	Resistant	CLONAL
Sharpe	Likely ??	Good	Resistant	Resistant	CLONAL
Flordaguard	Poor	Fair-Good	Resistant	Susceptible	SEED/CLONAL
P-22	Very Good	Very Good	Resistant	Tolerant	SEED

OPEN PANEL

- Find common goals and needs between growers, nurseries and researchers.
- Possible issues with current propagation methods that need to be addressed?
- What to keep in mind in the future.

Information Source

Special thanks

- Dr. Gennaro Fazio and Mr. Richard Adams
–USDA and Cornell University – Apple Rootstock Breeding Program.
- Dr. Tom Beckman – USDA-ARS – Retired Stone Fruit Rootstock Breeder.
- Dr. Greg Reighard – Clemson University – Retired Peach Horticulturist.

UGA Peach Program Members





Questions?



THANKS!

Useful links:

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<https://site.caes.uga.edu/chavezlab/>

<https://blog.extension.uga.edu/peaches/>

<http://www.caes.uga.edu/commodities/fruits/gapeach/>