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



<u>United States Rootstocks – Older releases</u>

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> × <i>P. munsoniana</i>)	Nemaguard
	Nemared

<u>United States Rootstocks – Newer releases</u>

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

French Rootstocks – Older releases

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

<u>French Rootstocks – Newer releases</u>



<u>Spanish Rootstocks – Older releases</u>

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)

<u>Spanish Rootstocks – Newer releases</u>

Clonal

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

Densipac Rootpac® 20 (P. besseyi x P. cerasifera)

Nanopac Rootpac® 40 (P. dulcis x P. persica)

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

Greenpac Rootpac[®] 90 (almond x peach \times *P. davidiana*)

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

<u>Italian Rootstocks – Older releases</u>

Clonal

Sirio (*P. persica* × *P. dulcis*)

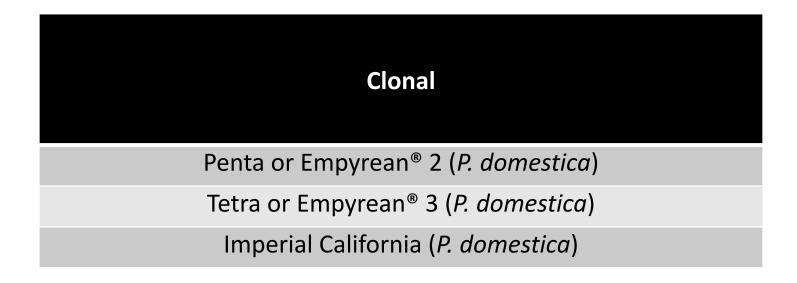
Mr.S. 2/5 (*P. cerasifera*)

Barrier or Empyrean® 1 (P. persica x P. davidiana)

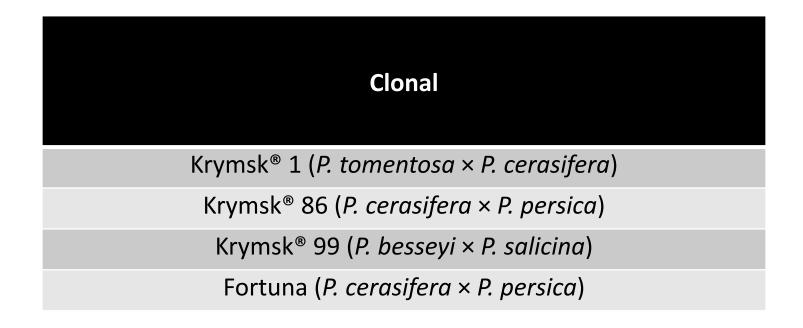
Polluce (*P. persica* x *P. dulcis*)

Castore (P. persica x P. dulcis)

<u>Italian Rootstocks – Newer releases</u>



Russian Rootstocks





Peach Rootstocks in the Southeastern U.S.



Peach Rootstocks Southeastern U.S.

Rootstock	Ring Nematode Tolerance Mesocriconema xenoplax	PTSL Tolerance	Root-knot resistance Meloidogyne incognita	Oak Root Rot Resistance	
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/CLONA

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/