Summary of Peach Rootstocks and Current Research

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Most growers in NJ and the New England states have been using the same rootstocks for many years. Primarily seedling rootstocks. We will review those and then outline some of the research that is ongoing to identify newer stocks that are more dwarfing and productive.

New Jersey is the most northern state with large commercial acreage of peaches and nectarines. About 5000 acres remain. Pennsylvania and New Jersey trade places for who is the third and fourth largest peach producing states. Growers in New York and all the New England states have expanded peach production over the past 20 years, but cold winters, early springs do limit the life of peach plantings in these states and growers loose more crops when looking at 5 year cycles.

We desperately need dwarfing peach rootstock(s) that are disease resistant, cold hardy and precocious and productive in the Northeast. These peach rootstocks must be well anchored and produce large fruit on the scion variety. Finding peach rootstocks with all these characteristics has long been the goal. Many researchers have conducted peach rootstock trials in the Northeast, most in conjunction with NC-140.

2009 NC140 Peach Rootstock Trial

This trial located in 16 locations had Redhaven as the cultivar. Lovell and Guardian are the standard rootstocks commercially grown included for comparison. Some of the new rootstocks in the NC-140 trials have been clonally propagated and included genetics of peach and other *Prunus* species (Table 1).

Massachusetts. Dr. Wes Autio, UMass, noted on the Massachusetts trial at UMass Cold Spring Orchard, that Under Northeastern conditions in this trial, most peach rootstocks performed similarly. It is interesting, however, to look more closely at the dwarfing rootstocks. In this trial, trees on Controller 5, Krimsk 1, and *P. americana* were all substantially smaller than trees on all other rootstocks. Trees on *P. americana* yielded similarly to those on Lovell. Cumulatively (2011-15), trees on Krymsk 1 and *P. americana* yielded similarly to trees on Lovell, but trees on Controller 5 yielded less.

Pennsylvania. Dr. Jim Schupp, Penn State, reports the following: "This trial has identified a range of tree size control options, and with good tree survival, high

NC-140 technical committee meeting, Clemson, South Carolina, November, 2014, touring peach rootstock plantings at Clemson University.

Dr. Greg Reighard, Clemson University, discusses the 2009 NC-140 Trial with the NC-140 group, November, 2014.

Table 1. Rootstocks included in the 2009 NC-140 Peach Rootstock Trial.

Rootstock	Genetics	Source	Origin
Lovell	Peach	California (1882 selection drying cultivar)	USA--CA
Guardian	Peach	USDA/Clemson	USA--SC
HBOK 10 (Controller 8)	Peach	University of California Davis	USA--CA
HBOK 32 (Controller 7)	Peach	University of California Davis	USA--CA
KV010-123	Peach	Ralph Scorza, USDA Kerneysville	USA--WV
KV010-127	Peach	Ralph Scorza, USDA Kerneysville	USA--WV
Prunus americana	American Plum	Bailey's Nursery	USA--MN
Penta	European Plum	Istituto Sperimentale per la Frutticoltura	Italy
Controller 5	Japanese plum x Peach	University of California Davis	USA--CA
Krymsk 86 (Kuban 86)	Myrobolan Plum x Peach	Krymsk Breeding & Research Station	Russia
Krymsk 1 (VVA-1)	Nankin Cherry X Myrobolan Plum	Krymsk Breeding & Research Station	Russia
Brights Hybrid 5	Almond x Peach	Brights Nursery	USA--CA
Mirobac (Replantpac)	Myrobolan Plum x Almond	Agromillora Catalana	Spain
Atlas	Peach x Almond x Flowering Plum	Zaiger's Genetics	USA--CA
Viking	Peach x Almond x Flowering Plum	Zaiger's Genetics	USA--CA

Dr. Wes Autio hosts a grower tour of the 2009 NC-140 Peach Trial planting at UMass Cold Spring Orchard Research & Education Center, July 12, 2016.

productivity, and freedom from flaws, so far. Some are P. persica (HBOK 10, HBOK 32, KV 10123, and Guardian), which should result in less risk of incompatibility. *Prunus americana*, a selection of American Plum grown from seed, is among the most dwarfing, with tree size 60% that of Lovell. It was the most precocious rootstock when cropping began in 2011. It has been very productive with high yield efficiency, second only to HBOK 10. Survival has been 100% to date, however root suckering is excessive. (Same for California, Massachusetts). HBOK 10, recently named Controller™ 8 is a Harrow Blood x Okinawa cross from UC Davis. In our trial it produces a small semi-dwarf tree, 70% the size of Lovell. Its high cumulative yield is similar to that of large trees on standard rootstocks, ranking it first in yield efficiency. Survival is 100% to date. HBOK 32, recently named Controller™ 7, is another Harrow Blood x Okinawa cross from UC Davis, with tree size 79% that of Lovell. It has been precocious in our trial, with good cumulative yield and average yield efficiency. KV 10123 is the largest of the "semi-dwarfs", producing a tree 88% size of Lovell. In our trial it was very precocious and high yielding. It is a Prunus persica (peach) cross from Dr. Ralph Scorza's breeding program at USDA, Kearneysville, WV."

California. Kevin Day, UC Davis, reported to the California Cling Peach association on the 2009 trial. **"**Dwarfing rootstocks could provide a significant benefit to the cling peach industry by substantially reducing labor costs without sacrificing yield. When comparing rootstocks among the various locations, it is interesting to note that some behave very differently from one location to another. For instance, Mirobac is quite dwarfing in California (about 50% of Lovell) but even more vigorous than Lovell in Alabama, Missouri and Utah and about equal to Lovell in most other locations." *Prunus Americana,* Krymsk 1, and Controller 5 were the most dwarfing stocks. Mirobac, HBOK 32, Penta, HBOK 10, and Tetra were the next smallest and statistically the same, and would be considered semi-dwarfing.

North Carolina. Dr. Mike Parker, NC State Univ., North Carolina reported in 2016: "The 2009 Peach Rootstock Trial is planted at the Sandhills Research Station in Jackson Springs, NC and consists of 17

Dr. Jim Schupp discusses the peach trial at Penn State Fruit Research & Extension Center, Biglerville, PA. January, 2013.

rootstocks with Redhaven as the scion cultivar. Soil was preplant fumigated in October 2008 with Telone II. Tree death has been an issue, primarily due to bacterial canker (*Pseudomonas syringae* pv. *syringae* van Hall) and all of the trees on Imperial California have died and will be removed from the analysis. Excessive tree death has also occurred with trees on Controller 5, Empyrean 2 (Penta), Mirobac (Replantpac), Krymsk 1, and Fortuna."

2017 NC-140 Peach Rootstock Trial

A new peach rootstock trial was planted in the spring of 2017 at 10 locations in North America (AL, CO, GA, MI, NC, NY, ON, PA, SC, and UT). Cresthaven was used as the scion cultivar. Eight rootstocks were included. Guardian and Lovell were used as controls. University of California Davis rootstocks included were Controller 6 (HBOK 27), Controller 7 (HBOK 32), and Controller 8 (HBOK 10). Rootpac 20 (Nano Pac) and Rootpac 40 (Densi Pac) were from Agromillora Catalana, Spain.

MP-29 (from Tom Beckman, USDA, Byron, Georgia) is a clonal plum-peach interspecific hybrid that was released in 2011 and is resistant to peach tree short life (PTSL), Armillaria root rot (ARR), and root-knot nematodes.

All trees are planted across the state plantings at a spacing of 1.8m (5.9') X 5.5m (18'). The training system will be Perpendicular-V.

Evaluating these more dwarfing rootstocks in a closer spaced system will allow better assessment of these newer rootstocks in a modern higher density production system.

Summary

It is important to evaluate peach rootstocks in different regions of North America. Peach rootstocks perform differently under different growing conditions. For the Northeast Jim Schupp summed up our NC-140 peach trials very well as follows "Several promising new rootstocks are under trial, with a range of tree size-control options, and with good tree survival, high productivity, and freedom from flaws, so far. Some are *P. persica* (HBOK 10, HBOK 32, KV 10123, and Guardian), which should result in less risk of incompatibility. Thus there is good reason for some optimism that we may soon have the missing key in peach rootstocks"

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