

FINAL REPORT
WTFRC Project #: PR-01-92

Project title: Evaluation of Pear Rootstocks

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Objectives: To develop a rootstock that is precocious, high yielding with high quality fruit, and has some dwarfing characteristics. This would result in high-density orchards, that inputs are efficiently managed from the ground or platforms, and are friendlier to the environment. Ideally the rootstock should be resistant (or at least tolerant) to the pests and diseases that plague Northwest orchards.

1. Identify rootstocks that induce dwarfing characteristics, precocity, high production, and high fruit quality under varying soil and climatic conditions in the Northwest utilizing conventional rootstocks, interstems, and newly available rootstock material.
2. Determine the fireblight sensitivity of the new rootstocks.

Significant findings:

- On d'Anjou, Bartlett, Golden Russet Bosc, and Comice trees on 708-12 rootstocks were larger than the non-interstem control.
- Trees with 708-36 rootstocks continue to produce more fruit; however, production is more variable between 708-36 rootstocks.
- More variability between trees with 708, Fox 11, or Fox 16 rootstocks was noted in tree growth and production.
- Pyrodwarf, Pyro II, and OHxF 97 rootstocks had no effect on 5-year-old Bartlett, Comice, and Concorde pears.
- 3-year-old Columbia Red d'Anjou trees with 708-36 rootstocks were significantly larger than trees with OHxF 97 rootstocks.

Methods:

Objective 1: Identify rootstocks that induce dwarfing characteristics, precocity, production, and fruit quality under varying soil and climatic conditions in the Northwest utilizing conventional rootstocks, interstems, and newly available rootstock material.

Maintain the following plantings. Evaluate each plot annually for growth, flowering, productivity, and winter survival. Evaluate fruit for yield, size, and quality.

- a. 1996 Interstems – terminate 2005.
- b. 1998 English 708 and French OH11 trial – terminate 2007.
- c. 2000 Pyrodwarf and Pyro 2-33 trial – terminate 2009.
- d. Pyrodwarf/Pyro II trial – terminate 2009
- e. 2001 Fox/708 trial – terminate 2010
- f. 2001 Pyronia trial – terminate 2010
- g. Continue propagation of three Russian rootstocks for a future trial – terminate after 10 years. (Material should be released from quarantine this year.)
- h. Grossly evaluate the remainder of the Horner rootstock series. Three hundred of the Horner selections are currently at Fowler Nursery and will be planted in 2004. The remainder, propagated in the summer 2002, shipped to Fowler spring 2003 to be budded and returned for field planting in 2005. Repropagated selections will be planted in 2006. Each set of selections would be evaluated for 5 years. Based on a set of desirable characteristics selections will be identified for further development. Initial evaluation to terminate 2008-2010.
- i. Begin propagation of *P. betulifolia* (Shaanxi, China), *P. ussuriensis* (Khabarovsk, Russia), and *P. salicifolia* (Arpa Gorge, Armenia) for future trial – terminate after 10 years.

Results and discussion:

1996 Interstems: In the 9-year trial of d'Anjou, Bartlett, Bosc, and Columbia Red d'Anjou with five OHxF rootstocks with four OHxF interstems and a non-interstem control, the main effect of fruit size and production is contributed by the rootstock with slight modification by the interstem. Interstem does affect tree shape and growth habit.

1999 English 708 and OH11 Rootstock Trials: In the 6-year-old green d'Anjou, Bartlett, Golden Russet Bosc, and Comice trial with 708-2, 708-12, 708-36, OH11, and Bartlett seedling rootstocks, Bartlett and Bosc trees with 708-12 rootstocks were significantly taller, and had the largest diameters and TCSAs. D'Anjou and Comice tree size was not affected by rootstock. D'Anjou and Bartlett trees with 708-36 produced the most fruit and greatest yield, producing almost twice as much as trees with seedling Bartlett rootstocks; however, yields on 708-36 were more variable. Fruit size was not affected by rootstock or crop load.

2000 Pyrodwarf and Pyro II Rootstock Trial: In a 5-year-old Bartlett, Comice, and Concorde trial with Pyrodwarf, Pyrodwarf II, and OHxF 97 rootstocks, rootstock did not significantly affect TCSA, yield or tree size. This contradicts observed results in larger grower trials.

2001 Hanners Rootstock Trial: In a 4-year-old d'Anjou and Bartlett trial with 708-2, 708-12, 708-36, Fox 11, Fox 16, OHxF 40, and OHxF 87 rootstocks, rootstock significantly affected TCSA in d'Anjou and Bartlett. D'Anjou trees with Fox 16 rootstocks were significantly larger than trees with 708-12 rootstocks. Bartlett trees with Fox 11 rootstocks had significantly larger TCSA than did trees with 708-36 rootstocks, which were 33% smaller. D'Anjou and Bartlett trees with 708-36 rootstocks produce more fruit than trees with any other rootstock. The possibility exists that trees on 708-36 rootstocks may be becoming biennial in yield. Fruit size was not affected by either rootstock or crop load

2001 Pyronia and 708-36 Rootstock Trial: In a 4-year-old d'Anjou and Columbia Red d'Anjou trial with Pyronia (*P. pyronia* sp.), 708-36, OHxF 87, and OHxF 97 rootstocks, rootstock had no significant size effect in d'Anjou. Columbia Red d'Anjou trees with 708-36 rootstocks had a significantly larger TCSA and were significantly taller and had a larger branch spread than trees with OHxF 97 rootstocks. This trial has become significantly influenced by the roots from an adjoining Port Orford cedar windbreak.

Horner Mother Block Evaluation: Liners from the first 289 of the Horner selections were established in 4.5' x 5' x 16' double row spacing. The goal was to plant two trees of each selection; however, growth and budding losses reduced some selections to a single tree. Where tree numbers were reduced below two, materials were to be repropagated for the 2006 planting. In spring 2005, 152 additional selections will be shipped from Fowler and established in Hood River. Approximately 50 selections that were repropagated will be shipped from Fowler Nursery for planting in spring 2006. These trees will be initially evaluated for 5 years for dwarfing character, precocity, productivity, and fruit size. The goal will be to reduce the collection to the most desirable 15 to 20 selections for further evaluation.

P. betulifolia (Shaanxi, China): A limited number of seedlings of previously collected Shaanxi seeds were available from Joseph Postman at the USDA Germplasm Repository in Corvallis. These were sent to Fowler Nursery, and will be included in the Hood River Northwest Pear rootstock trial to be planted in 2006.

Russian Rootstocks: The Russian three rootstocks will be released this year. The intent is for Bill Proebsting to increase the rootstock lines to permit initial tests in Hood River.