

ANNUAL REPORT OF THE COOPERATIVE REGIONAL RESEARCH PROJECT

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Project: NC-140 Rootstock and Interstem Effects on Pome and Stone Fruit Trees
(Revised October 1, 1997)

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PROGRESS OF THE WORK AND PRINCIPAL ACCOMPLISHMENTS

Uniform rootstock and training system trials (Objective 1) are planned and coordinated by the technical committees at multiple sites for ten-year periods. Publications are prepared following the fifth and tenth years. Other objectives are researched at one or more locations.

Objective 1: Evaluate the performance of pome and stone fruit rootstocks in various environments under different management regimes

1988 Pear Rootstock Trial: Anita Azarenko

This trial is completed and a manuscript will be submitted for publication in 2001. A brief report was presented at an international meeting in Italy in the summer of 2000.

1990 Plum Rootstock Trial: Bob Anderson

This trial is completed and a manuscript is being prepared.

1990 Gala Apple Rootstock Trial: Rich Marini

This trial was terminated in 1999 and the first draft of a manuscript was passed out at the meeting to the 8 cooperating states. The final version of the manuscript will be submitted for publication in early 2001.

1990 Systems Trial: Rich Marini

Data collected from 8 locations showed slender spindle to be the most productive overall, but fruit was poorly colored. Vertical axe was intermediate in productivity with M.9 the best rootstock for this system. The central leaders system on M.26 or Mark was least productive because it took a longer time to fill in the space. This trial was completed in 1999 and a manuscript was distributed at the meeting. It will be submitted for publication in early 2001.

1990 Apple Cultivar/Rootstock Trial: Wes Autio

This trial was terminated in 1999 and a manuscript on overall results was distributed at the meeting. Three additional papers are being prepared on winter damage/blackheart injury, accessory cultivars, and spur quality/morphological differences. The main paper will be submitted for publication by March 1, 2001.

1992-1993 Liberty/CG Rootstock Trial: Terence Robinson

The 1992 planting will be discontinued following the 2000 season and the 1993 planting following the 2001 season. Data are currently being compiled for a 5-year summary of this trial.

1994 Gala Semi-Dwarf Apple Rootstock Trial: Rich Marini

A 5-year report was published in 2000. Tree survival has been good in this trial, although G.30 has been variable. At some sites, all trees have been lost. At others, all have survived. Alternate bearing is a problem at some sites.

1994 Gala Dwarf Apple Rootstock Trial: Rich Marini

A 5-year report was published in 2000. Survival has been good at most of the 25 locations. Biennial bearing is a problem at some sites. The various M.9 clones show some consistent differences. At the 11 sites that have Fleuren 56, it tends to be the smallest clone. NAKBT 337 is also small and Pajam 2 is larger.

1994 Peach Rootstock Trial: Greg Reighard

A 5-year report was reported at an international meeting in New Zealand and will be published in Acta Horticulturae. A more complete report will be submitted to the Journal of the American Pomological Society in 2001. Trees have survived well and the rootstocks have generally performed similarly to each other. Therefore, this planting may not be continued for the full 10 years.

1998 Cherry Rootstock Trial: Frank Kappel

Tree losses are high in the West with Bing as the scion. Largest trees are on Gisela 6 and Giessen 318-17. Serious problems with Pseudomonas in New York and bacterial canker in South Carolina. There are fruit size differences related to tree size. Mahaleb is the largest tree and has the smallest fruit size. W53 has good fruit size, yield and sugar levels. Preliminary summaries will be presented at the international cherry symposium in June 2001.

1998 G.16 Rootstock Trial: Terence Robinson

Flowers were removed in 1999, but trees will be allowed to crop in 2000. G.16 are larger than M.9 with both Gala and Jonagold as scions. G.16 is precocious, productive and fireblight resistant, but very sensitive to latent viruses. Year 4 (2001) should be a good crop year. Trees will be thinned to a moderate crop load. If trees are not vigorous, all fruit will be removed.

1999 Apple Rootstock Trial: Wes Autio

Data are still being collected and compiled for both 1999 and 2000.

Objective 2. To assess and improve asexual techniques of pome and stone fruit rootstocks.

Two states are working on techniques for the improved propagation of apple (NY) and pear (OR) rootstocks.

Objective 3. To improve the ability to identify pome and stone fruit rootstocks through morphological, biochemical and genetic differences

Efforts are continuing to confirm the identity of Cornell-Geneva series rootstocks around the world through DNA testing (NY).

Objective 4. To develop new and better pome and stone fruit rootstocks through breeding and genetic engineering

AR – An ongoing breeding program for both apple and peach rootstocks is being carried out in Arkansas. Twelve apple selections were budded to Smoothie Golden Delicious in 1999 and will be planted in a replicated trial in 2001. For peach rootstocks, 24 in 1997 and another 20 in 2000 were selected for further evaluations.

CA – A peach rootstock breeding program is being conducted to combine disease resistance with dwarfism and other desirable horticultural traits.

NY – The apple rootstock breeding program at Cornell-Geneva will be releasing 4 new rootstocks over the next 3 years. In addition, new rootstocks from around the world are being gathered. In 1999, 16 rootstocks from 3 European breeding programs were established.

OH – Five selections of the Morioka series of rootstocks have been obtained and are being cloned for further evaluations.

Ontario – The Vineland series of apple rootstocks together with several standard are being evaluated for fire blight resistance. The results indicate that wide differences in rootstock susceptibility exist.

Objective 5: To determine biotic and abiotic stress tolerance of pome and stone fruit trees in relation to new and existing rootstocks.

New Brunswick – The Cornell-Geneva apple rootstocks are being screened for cold hardiness.

NY – The Cornell-Geneva rootstocks, as well as many others from around the world, are being screened for tolerance to such biotic and abiotic factors as replant disease, late winter cold temperatures, Phytophthora root rots and fire blight. Three-year-old Gala trees on various rootstocks were inoculated

with fireblight in 1999. During 2000, most of the standard rootstocks died, whereas most of the Cornell-Geneva rootstocks have survived so far.

OH – A visiting scientist from China is studying the interaction of soil compaction and water stress on apple physiology using M.9 EMLA as the rootstock.

Ontario – Studies are continuing to evaluate the fireblight sensitivity and cold hardiness of the Vineland series of apple rootstocks compared to several known standard rootstocks.

UT – Field studies have been conducted to evaluate fireblight sensitivity and bud union breakage under high winds of Gala apples on different rootstocks. Experiments on cherry bud cold hardiness in the fall have shown that Colt rootstock are 2 to 4 degrees C less hardy than buds on trees growing on GM.61.1, MXM.2, Mahaleb, Mazzard and Gi.148.1.

USEFULNESS OF FINDINGS AND IMPACT OF COOPERATIVE RESEARCH PROJECT

Uniform trials continue to suggest superior rootstock selections in an unbiased manner. Nearly all states indicate the importance of the results from these trials as the primary source of information for recommendations made by research and extension personnel. Fire blight continues to be a major limiting factor for apple rootstock selection and several sites are actively involved in screening and other studies to determine sensitivity and reduce tree losses. State surveys of tree planting indicate a dramatic shift to trees on more dwarfing rootstocks in recent years. Growers and industry recognize the importance of unbiased information from broad uniform trials and more than \$1,000,000 is given to support these trials and related rootstock projects.

WORK PLANNED FOR NEXT YEAR

The current project (renewed October 1997) will continue through September 2002. A rewrite committee was formed to prepare a draft for the next annual meeting. Existing trials will be maintained following the protocols developed by the respective technical committees. Current (and supplemental) data will continue to be collected and summarized by the planting coordinator, who will prepare the five- and ten-year reports for publication. Individual state project leaders will, wherever possible, expand the data collection on a particular planting beyond that of the uniform data set so as to gain further information on rootstock performance, or how the rootstocks respond to training and local conditions. As new, not as yet commercially available, rootstocks are wanted for the trials, plantings must be planned three to five years prior to the actual planting being made. The following new trials are in the planning stage:

2001/2002 Peach Rootstock Trial: Greg Reighard

This trial had problems with poor performance of some rootstocks and budded trees in the nursery. The decision was made to salvage the rootstocks that had reasonable bud take and put out a limited trial in 2001. The remaining rootstocks will be propagated again for the 2002 planting.

2002/2003 Pear Rootstock Trial: Gene Mielke

Nine sites have been identified for planting this trial. In 2002 there will be 9 stocks and in 2003 another 12-14 rootstocks will be planted.

2003 Apple Rootstock Trial: Terence Robinson

This trial was originally planned for 2002 but there was very poor take of some of the rootstocks in the nursery. The plan now is to delay until 2003 and have a slightly larger trial. There are over 40 rootstocks on the list but this will be reduced by factors such as availability, fire blight resistance, etc.

2004 Cherry Rootstock Trial: Frank Kappel

This planting has also been delayed a year because of problems with obtaining the desired rootstock and getting them through virus sensitivity testing in time for planting. There are about 30 stocks on the list from Europe, Russia and California.

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