



Massachusetts Agricultural Experiment Station

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2009 NC-140 Peach

As part of the 2009 NC-140 Peach Rootstock Trial, a planting of Redhaven on 15 rootstocks was established at the University of Massachusetts Cold Spring Orchard Research & Education Center. Trees grew well in their first five seasons. It is important to note that these trees experienced a heavy snowstorm at the end of October 2011. Leaves were still present, and some scaffold breakage occurred. Where possible, scaffolds were pulled back and bolted into place. The longevity of some of

these trees may be reduced. The planting includes eight replications in a randomized-complete-block design. Means from 2013 (5th growing season) are included in Table 1, and cumulative means are included in Table 2.

At the end of the 2013 season, largest trees were on Guardian and Lovell, and smallest trees were on *Prunus americana*, Krymsk 1, and Controller 5 (Table 1). Significantly more suckering occurred from trees on *P. americana* than from any other rootstock (Table 1).

Greatest yields in 2013 were harvested from trees on Lovell and Guardian, and the lowest yields were

harvested from those on Controller 5 (Table 1). On a cumulative basis (2011-13), yield was similar among most trees, except that yield from trees on Controller 5 was significantly lower than all others (Table 2). The most yield efficient trees in 2013 were on Controller 5 and Krymsk 1, and differences among trees on the other rootstocks were nonsignificant (Table 1). Cumulatively (2011-13), yield efficiency was greatest for trees on *P. americana* and Krymsk 1 (Table 2). Fruit size in 2013 was largest from

Table 1. Trunk size, root suckering, yield, yield efficiency, and fruit size in 2013 of Redhaven peach trees in the 2009 NC-140 Peach Rootstock Trial at the UMass Cold Spring Orchard Research & Education Center, Belchertown, MA. All values are least-squares means, adjusted for missing subclasses and for crop load in the case fruit weight.²

Rootstock	Trunk cross-sectional area (cm ²)	Root suckers (no./tree, 2009-12)	Yield per tree (kg)	Yield efficiency (kg/cm ²)	Fruit weight (g)	Fruit ripening (Julian date, 10%)
Atlas	134 b	0.0 b	34 a	0.3 c	184 abc	220 ab
Brights Hybrid 5	122 b	0.0 b	32 ab	0.3 c	181 abc	219 ab
Controller 5	36 c	0.0 b	21 b	0.6 a	200 abc	216 b
Guardian	157 a	0.1 b	34 a	0.2 c	166 c	221 ab
HBOK 10	110 b	0.0 b	30 ab	0.3 c	176 abc	222 a
HBOK 32	110 b	0.0 b	33 ab	0.3 c	179 abc	222 a
KV010-123	111 b	0.0 b	29 ab	0.3 c	166 c	220 ab
KV010-127	124 b	0.1 b	37 ab	0.3 c	180 abc	222 a
Krymsk 1	63 c	1.1 b	32 ab	0.5 ab	209 a	219 ab
Krymsk 86	127 b	0.0 b	30 ab	0.2 c	182 abc	220 ab
Lovell	137 ab	0.0 b	36 a	0.3 c	174 bc	223 a
Mirobac	109 b	2.0 b	29 ab	0.3 c	173 bc	221 ab
<i>Prunus americana</i>	64 c	43.1 a	26 ab	0.4 bc	202 ab	218 ab
Penta	109 b	1.0 b	28 ab	0.3 c	178 abc	220 ab
Viking	125 b	0.0 b	30 ab	0.2 c	176 abc	219 ab

² Means were separated within columns by Tukey's HSD ($P = 0.05$).

Table 2. Cumulative yield and yield efficiency and average fruit size in for the fruiting life of Redhaven peach trees in the 2009 NC-140 Peach Rootstock Trial at the UMass Cold Spring Orchard Research & Education Center, Belchertown, MA. All values are least-squares means, adjusted for missing subclasses.^z

Rootstock	Cumulative yield per tree (2011-13, kg)	Cumulative yield efficiency (2011-13, kg/cm ²)	Average fruit weight (2011-13, g)
Atlas	72 a	0.5 d	185 a
Brights Hybrid 5	73 a	0.6 d	175 a
Controller 5	34 b	1.0 bc	164 a
Guardian	79 a	0.5 d	184 a
HBOK 10	76 a	0.7 cd	180 a
HBOK 32	73 a	0.7 cd	175 a
KV010-123	79 a	0.7 cd	177 a
KV010-127	79 a	0.6 d	177 a
Krymsk 1	73 a	1.2 ab	179 a
Krymsk 86	69 a	0.6 d	178 a
Lovell	81 a	0.6 d	181 a
Mirobac	72 a	0.7 cd	172 a
<i>Prunus americana</i>	81 a	1.3 a	183 a
Penta	65 a	0.6 d	182 a
Viking	83 a	0.7 cd	176 a

^z Means were separated within columns by Tukey's HSD ($P = 0.05$).

trees on Krymsk 1 and *P. americana* and smallest from trees on Controller 5 (Table 1). On average over the fruiting life of these trees, fruit size was similar among trees on all rootstocks (Table 2). There was a modest advancement of ripening in 2013 of fruit from trees on Controller 5 and a possible delay in ripening of fruit from trees on HBOK 10, HBOK 22, KV010-127, and Lovell (Table 1).

2010 NC-140 Apple

As part of the 2010 NC-140 Apple Rootstock Trial, a planting of Honeycrisp on 31 rootstocks was established at the University of Massachusetts Cold Spring Orchard Research & Education Center. In 2010, trees in this planting grew relatively little, but growth has been good in the last three seasons. The planting includes four replications in a randomized-complete-block design, with up to three trees of a single rootstock per replication. Means from 2013 (4th growing season) are included in Table 3.

At the end of the 2013 growing season, largest trees

were on B.70-20-20, and smallest trees were on B.71-7-22 and B.9 (Table 3). The largest number of root suckers were produced (cumulatively, 2010-13) by G.202N (Table 3). The greatest portion of the canopy affected by Honeycrisp zonal chlorosis was for trees on B.71-7-22, and the lowest amount was assessed for trees on B.64-194, B.67-5-32, B.70-20-20, G.11, G.41N, G.202N, G.935N, CG.4003, and CG.4004 (Table 3).

Yield was greatest from trees on CG.3001 and least from trees on B.9, B.7-3-150, B.71-7-22, CG.2034, PiAu 9-90, M.9 NAKBT337, and M.26 EMLA (Table 3). The most yield efficient trees were on CG.3001, and the least were on PiAu 9-90 (Table 3). The largest fruit were harvested from trees on G.202N, and the smallest were harvested from those on PiAu 9-90 (Table 3).

Publications

Autio, W., T. Robinson, D. Archbold, W. Cowgill, C. Hampson, R. Quezada, and D. Wolfe. 2013. 'Gala' apple trees on Supporter 4, P.14, and different strains of B.9, M.9, and M.26 Rootstocks: Final 10-year report on the 2002 NC-140 Apple Rootstock Trial. *J. Amer. Pomol. Soc.* 67:62-71.

Hoover, E., R. Marini, E. Tepe, W. Autio, A. Biggs, J. Clements, R. Crassweller, D. Foster, M. Foster, P. Hirst, D. Miller, M. Parker, G. Peck, J. Racsco, T. Robinson, and M. Warmund. 2012. eApples: A case study using eXtension to increase access to research-based information. *HortTechnology* 22:576-579.

Marini, R., W. Autio, B. Black, J. Cline, W. Cowgill, R. Crassweller, P. Domoto, C. Hampson, R. Moran, R. Quezada, T. Robinson, D. Ward, and D. Wolfe. 2013. Return bloom on 'Golden Delicious' apple trees as affected by previous season's crop density on three rootstocks at 11 locations. *J. Amer. Pomol. Soc.* 67:73-79.

Marini, R., W. Autio, B. Black, J. Cline, R. Crassweller, P. Domoto, C. Hampson, R. Moran, R. Quezada, T. Robinson, M. Stasiak, and D. Wolfe. 2012. The influence of crop density on annual trunk growth of 'Golden Delicious' apple trees on three rootstocks at 11 locations. *J. Amer. Pomol. Soc.* 66:183-195.

Autio, W., J. Krupa, J. Clements, W. Cowgill, R. Magron, and S. Sollner-Figler. 2013. Third-leaf results from the 2010 NC-140 Apple Rootstock Trial in Massachusetts and New Jersey. *Fruit Notes* 78(3):7-8.

Table 3. Trunk cross-sectional area, cumulative root sucker number, zonal chlorosis, yield per tree, yield efficiency, fruit weight, and horticultural rating in 2013 of Honeycrisp apple trees on various rootstocks in the 2010 NC-140 Honeycrisp Apple Rootstock Trial.²

Rootstock	Trunk cross-sectional area (2013, cm ²)	Cumulative root suckers (2010-13, no.)	Zonal chlorosis (2013, % canopy affected)	Yield per tree (2013, kg)	Yield efficiency (2013, kg/cm ² TCA)	Fruit weight (2013, g)	Clements tall-spindle index (0=poor, 3=excellent)
B.9	4.9 fg	3.2 b	47 ab	7.1 d	1.3 bcd	221 abc	0.8 cde
B.10	7.5 defg	0.0 b	50 ab	15.8 bcd	2.1 bc	204 abc	2.0 ab
B.7-3-150	11.2 bcde	0.5 b	45 ab	10.9 d	1.0 bcd	237 ab	1.9 ab
B.7-20-21	12.3 bcd	1.1 b	59 ab	17.2 bcd	1.4 bcd	222 abc	2.3 a
B.64-194	14.2 b	0.0 b	41 b	15.8 bcd	1.1 bcd	222 abc	1.1 bcde
B.67-5-32	13.3 bc	0.7 b	42 b	12.4 cd	1.0 bcd	228 abc	1.1 bcde
B.70-6-8	12.8 bc	0.4 b	50 ab	17.3 bcd	1.4 bcd	228 abc	1.8 ab
B.70-20-20	24.3 a	4.2 ab	31 b	17.2 bcd	0.7 cd	234 abc	0.5 de
B.71-7-22	1.7 g	2.1 b	90 a	1.8 d	1.2 bcd	183 bc	0.0 e
G.11	6.9 defg	6.3 ab	39 b	14.7 cd	2.2 b	236 abc	2.0 ab
G.41N	6.5 efg	0.1 b	30 b	14.5 cd	2.1 bc	229 abc	2.3 a
G.41TC	6.6 defg	5.3 ab	65 ab	8.1 d	1.3 bcd	227 abc	1.3 abcd
G.202N	14.3 b	18.1 a	31 b	29.1 ab	2.0 bc	251 a	1.5 abc
G.202TC	10.0 bcdef	9.5 ab	58 ab	20.8 abc	2.1 bc	204 abc	2.4 a
G.935N	10.3 bcde	5.1 ab	43 b	24.6 abc	2.4 b	219 abc	1.8 ab
G.935TC	8.1 bcdefg	8.1 ab	69 ab	15.4 bcd	1.9 bcd	201 abc	1.5 abc
CG.2034	5.2 efg	0.3 b	79 ab	7.0 d	1.1 bcd	213 abc	0.5 de
CG.3001	13.7 bc	0.1 b	69 ab	40.9 a	2.9 a	209 abc	1.5 abc
CG.4003	6.4 efg	1.8 b	40 b	13.6 cd	2.1 bc	234 abc	2.5 a
CG.4004	12.4 bcd	7.5 ab	33 b	26.6 abc	2.2 b	229 abc	1.3 abcd
CG.4013	8.5 bcdefg	5.1 ab	55 ab	23.3 abc	2.5 ab	210 abc	2.0 ab
CG.4214	10.3 bcde	9.2 ab	53 ab	15.8 bcd	1.6 bcd	233 abc	1.5 abc
CG.4814	9.8 bcdef	11.3 ab	65 ab	20.6 bcd	2.0 bc	213 abc	2.1 ab
CG.5087	9.4 bcdef	4.1 ab	55 ab	22.6 abc	2.0 bc	223 abc	1.3 abcd
CG.5222	11.5 bcde	10.6 ab	65 ab	15.2 bcd	1.3 bcd	209 abc	2.3 a
Supp.3	6.1 efg	1.1 b	55 ab	12.0 cd	2.0 bc	215 abc	1.5 abc
PiAu 9-90	12.2 bcd	0.0 b	68 ab	8.9 d	0.6 d	138 c	0.2 e
PiAu 51-11	11.7 bcd	2.2 b	61 ab	13.9 cd	1.2 bcd	233 abc	1.4 abcd
M.9 NAKBT337	7.7 cdefg	5.7 ab	55 ab	10.7 d	1.4 bcd	224 abc	1.6 ab
M.9 Pajam 2	6.7 defg	8.8 ab	53 ab	11.7 cd	1.8 bcd	204 abc	1.3 abcd
M.26 EMLA	7.6 cdefg	5.3 ab	57 ab	9.2 d	1.2 bcd	217 abc	1.4 abcd

² Least-squares mean separation within column by Tukey's HSD ($P = 0.05$).

Autio, W., J. Krupa, J. Clements, W. Cowgill, R. Magron, and S. Sollner-Figler. 2013. Third-leaf results from the 2010 NC-140 Apple Rootstock Trial in Massachusetts and New Jersey. *New Jersey Horticultural News* 93(3):7-8.

Autio, W., T. Robinson, D. Archbold, W. Cowgill, C. Hampson, R. Quezada, and D. Wolfe. 2013. 2002 NC-140 Apple Rootstock Trial: Gala apple trees on Supporter 4, P.14, and different strains of B.9, M.9, and M.26 rootstocks, final progress report. *Compact Fruit Tree* 46 (1):23-28.

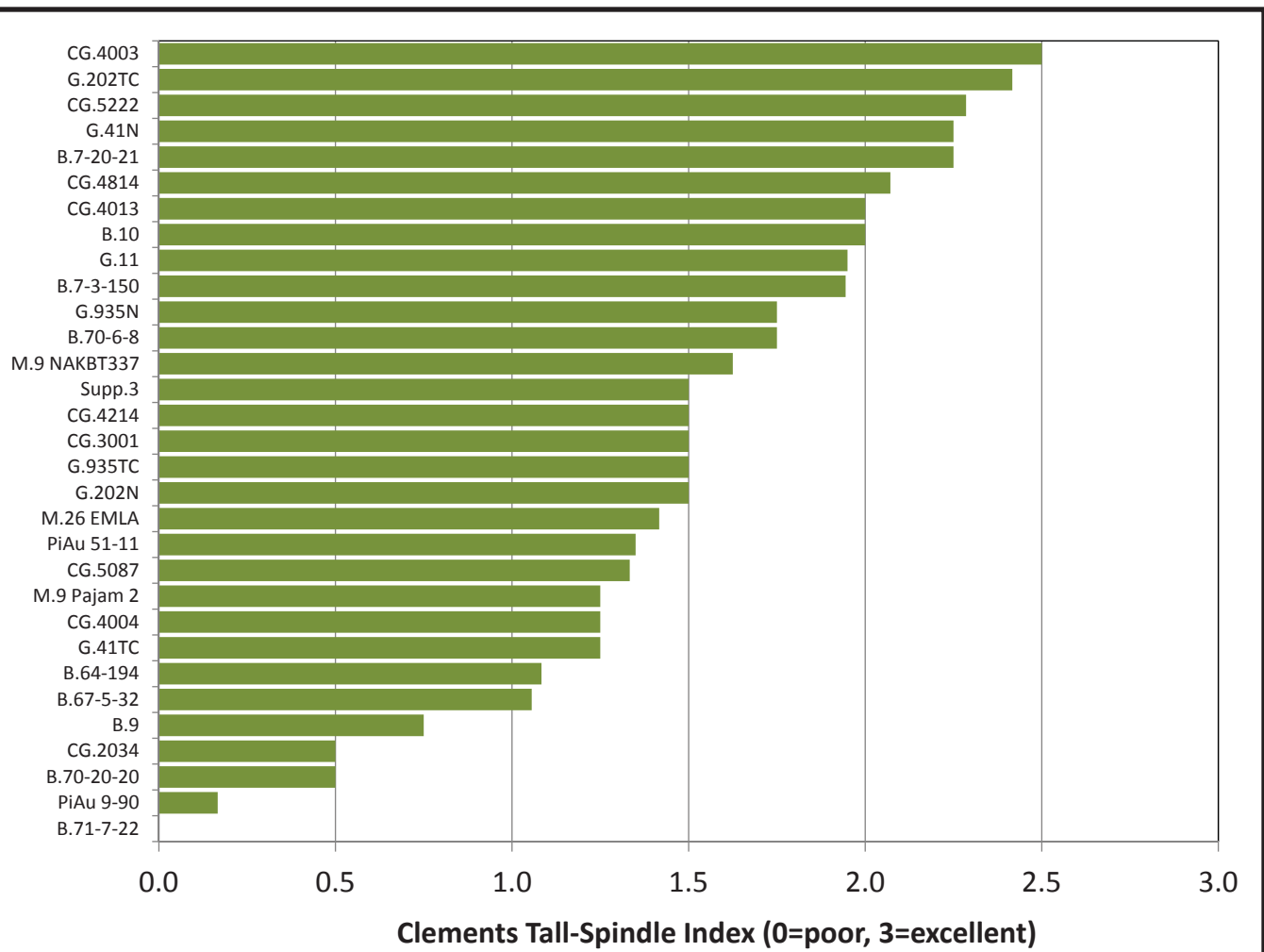


Figure 1. Average rating (Clements Tall-spindle index) for each rootstock treatment in the Massachusetts planting of the 2010 NC-140 Honeycrisp Apple Rootstock trial. Mean separations are presented in Table 3.