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2002 NC-140 Apple Rootstock Trial in Massachusetts

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As part of the 2002 NC-140 Apple Rootstock Trial, a planting of Buckeye Gala on 11 rootstocks was established at the University of Massachusetts Cold Spring Orchard Research & Education Center in Belchertown.

Trees are growing well in this irrigated block, but fruit set was lighter than expected prior to 2007 (average yields in 2006 of only 3 kg per tree with 157-g average fruit size). In 2007, fruit set was good and the trees performed well (average yields in 2007 of 38 kg per tree with 186-g average fruit size). In 2008, fruit set was again less than expected (average yields in 2008 of 12 kg per tree with 175-g average fruit size). In 2009, trees performed well, with average yields of 57 kg (about 3 bushels)

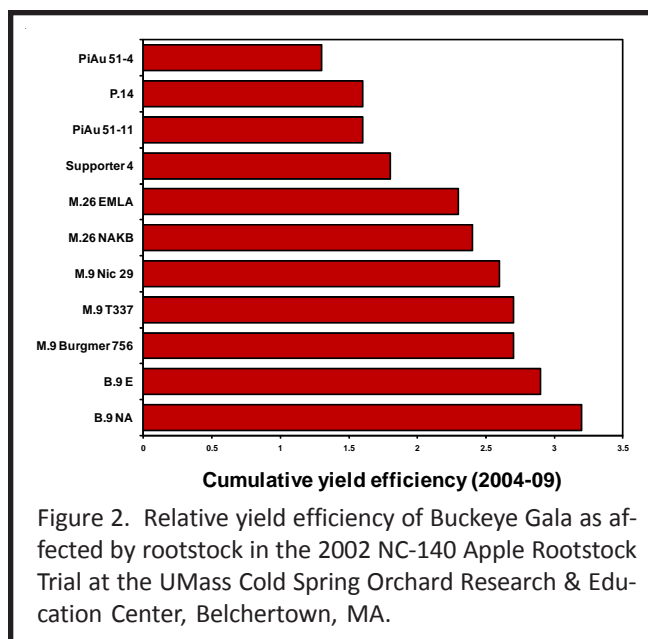
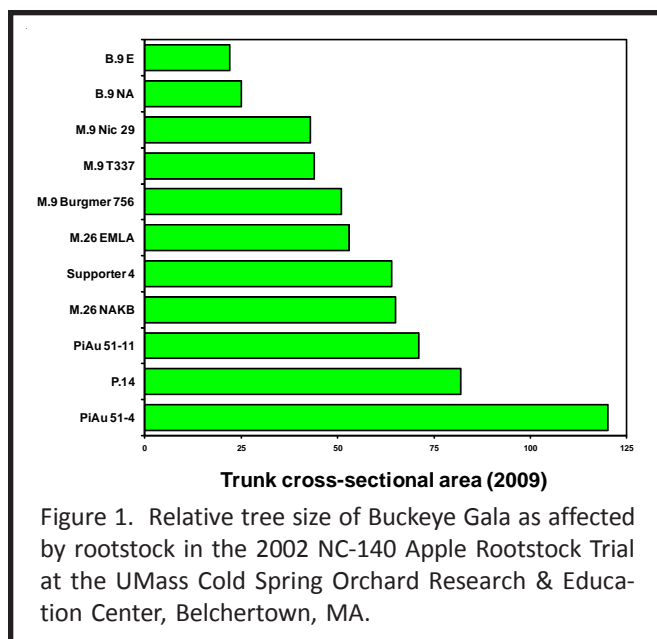
per tree with 162-g average fruit size (between 96 and 120 count). Although yields suggest a biennial-bearing pattern, trees have bloomed well in the last two off seasons. The planting includes seven replications in a randomized-complete-block design. Means from 2009 (8th growing season) are included in Table 1.

After the 2009 growing season, trees with the largest trunk cross-sectional area (TCA) were on PiAu51-4, followed in decreasing size by those on P.14, PiAu51-11, M.26 NAKB, Supporter 4, M.26 EMLA, M.9 Burgmer 756, M.9 NAKBT337, M.9 Nic 29, B.9 (North America), and B.9 (Europe) (Table 1 and Figure 1). Clearly, P.14 and PiAu 51-

Table 1. Trunk cross-sectional area, suckering, yield, yield efficiency, and fruit weight in 2009 of Gala trees on several rootstocks in the Massachusetts planting of the 2002 NC-140 Apple Rootstock Trial.^z

Rootstock	Trunk cross-sectional area (cm ²)	Root suckers (no./tree, 2002-09)	Yield per tree (kg)		Yield efficiency (kg/cm ² TCA)		Fruit weight (g)	
			2009	Cumulative (2004-09)	2009	Cumulative (2004-09)	2009	Average (2004-09)
B.9 (Europe)	22 f	11 b	24 d	65 d	1.1 abc	2.9 ab	167 a	156 b
B.9 (North America)	25 ef	8 b	33 cd	81 cd	1.3 a	3.2 a	174 a	165 ab
M.26 EMLA	53 cd	3 b	56 b	122 abc	1.1 abc	2.3 bcd	163 a	170 ab
M.26 NAKB	65 bcd	3 b	67 b	149 a	1.0 bcd	2.4 bc	162 a	173 ab
M.9 Burgmer 756	51 cd	8 b	69 ab	138 ab	1.3 a	2.7 ab	173 a	170 ab
M.9 Nic 29	43 def	30 a	53 bc	113 abc	1.2 ab	2.6 ab	168 a	175 a
M.9 NAKBT337	44 de	11 b	56 b	118 abc	1.3 a	2.7 ab	177 a	178 a
P.14	82 b	3 b	71 ab	137 ab	0.9 cd	1.6 de	153 a	172 ab
PiAu51-11	71 bc	10 b	56 b	105 bcd	0.9 cd	1.6 de	151 a	169 ab
PiAu51-4	120 a	10 b	90 a	152 a	0.7 d	1.3 e	143 a	165 ab
Supporter 4	64 bcd	3 b	55 bc	111 abc	0.9 cd	1.8 cd	151 a	170 ab

^z Means within columns not followed by a common letter are significantly different at odds of 19 to 1 (Tukey's HSD, *P* = 0.05).



Buckeye Gala, planted May 6, 2002

North

	V01	Royal Court/B.9	U01	Royal Court/B.9
Rep 1	V02	M.26EMLA	U02	B.9Treco
	V03	No data	U03	B.9Europe
	V04	M.26NAKB	U04	M.9T337
	V05	M.9Berg756	U05	P.14
	V06	P.14	U06	M.9RN29
	V07	B.9Europe	U07	M.26EMLA
	V08	PiAu51-11	U08	PiAu51-4
	V09	PiAu51-4	U09	Supp.4
	V10	M.9T337	U10	M.9Berg756
	V11	B.9Treco	U11	M.26NAKB
	V12	M.9RN29	U12	PiAu51-11
	V13	Royal Court/B.9	U13	Royal Court/B.9
Rep 2	V14	M.9T337	U14	M.9RN29
	V15	B.9Treco	U15	B.9Treco
	V16	Missing	U16	PiAu51-11
	V17	M.9RN29	U17	M.26NAKB
	V18	M.26NAKB	U18	B.9Europe
	V19	PiAu51-11	U19	M.26EMLA
	V20	M.9Berg756	U20	M.9T337
	V21	B.9Europe	U21	P.14
	V22	PiAu51-4	U22	PiAu51-4
	V23	Supp.4	U23	M.9Berg756
	V24	P.14	U24	Supp.4
	V25	Royal Court/B.9	U25	Royal Court/B.9
Rep 3	V26	B.9Treco	U26	M.9Berg756
	V27	P.14	U27	M.26EMLA
	V28	M.9T337	U28	PiAu51-4
	V29	M.26NAKB	U29	No data
	V30	Supp.4	U30	Supp.4
	V31	PiAu51-11	U31	B.9Treco
	V32	M.9RN29	U32	M.9T337
	V33	Missing	U33	M.9RN29
	V34	PiAu51-4	U34	M.26NAKB
	V35	M.9Berg756	U35	B.9Europe
	V36	B.9Europe	U36	Royal Court/B.9
	V37	Red Cort/M.26	U37	M.9RN29
		U38	M.26NAKB	
		U39	B.9Treco	
		U40	M.9T337	
		U41	No data	
		U42	M.9Berg756	
		U43	P.14	
		U44	M.26EMLA	
		U45	B.9Europe	
		U46	Royal Court/B.9	

South

11 could be considered semidwarfs, and PiAu 51-4 could be considered semi-standard in size. Supporter 4 is a large dwarf.

Cumulative (2002-09) root suckering was significantly greater from M.9 Nic 29 than from all other rootstocks (Table 1). It is interesting to note how much greater it is than the other strains of M.9, with nearly four times the suckering of M.9 Burgmer 756 and nearly three times that of M.9 NAKBT337.

Greatest yields in 2009 and cumulatively (2004-08) were harvested from trees on PiAu 51-4 (Table 1). Cumulative yields from trees on M.26 NAKB were also high. Lowest yields in 2009 and cumulatively were from trees on the two strains of B.9.

Yield efficiency adjust yield based on tree size, giving some estimate of how the tree might perform on a per-acre basis. Generally, yield efficiency is inversely related to tree size, with small treems being much more efficient than large trees. In 2009, yield efficiency was greatest for trees on B.9 (North America), M.9 Burgmer 756, and M.9 NAKBT337 and least for trees on PiAu51-4 (Table 1). Cumulatively (2004-09), B.9 (North America) resulted in the greatest yield efficiency, while PiAu51-4 resulted in the lowest (Table 1, Figure 2).

Fruit size in 2009 was good for trees on all rootstocks, averaging from 143 to 177g, with no significant differences among trees on the different rootstocks. Average fruit size over the fruiting life of the planting (2004-09) was largest from trees on M.9 NAKBT337 and those on M.9 Nic 29 and smallest from trees on B.9 (Europe).

This trial will continue through the 2011 growing season. At this point, there appears to be little value to either PiAu rootstock, Supporter 4, or P.14.

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