Comparison of Strains of B.9, M.9, and M.26 to New Polish and Pillnitz Dwarfing Apple Rootstocks: Six-year Summary of the Massachusetts Planting of the 2002 NC-140 Semidwarf Apple Rootstock Trial

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Rootstocks for evaluation and potential adoption by the North American apple industry come from the development and release of new rootstocks, but new strains of older rootstocks also become available from time to time. Several strains of M.9 have been identified and 6 have been evaluated previously in North America with significant differences in vigor but similar orchard productivity. One strain of M.9 has not had significant evaluation in North America: M.9 Burgmer 756 (from Burgmer Nurseries in Germany). M.9 NAKB T337 (from the virus indexing program in the Netherlands) has had extensive testing and is the most commonly planted strain of M.9 in North America. M.9 Nic 29 (from Nicolai Nursery in Blegium) was tested in a multi-location NC-140 trial from 1994-2003 and was found to be more vigorous than M.9 NAKB T337. Testing that has been conducted in the U.S. and Latvia suggests that M.9 Burgmer 756 performs similarly to M.9 NAKBT337, but M.9 Nic 29 may be better than M.9 Burgmer 756. The two strains of B.9 exhibit different growth habits in the nursery which has raised the concern that the strain of B.9 commonly used in Europe is different from the one used in North America. Two strains of M.26 are available, M.26 NAKB (from the virus indexing program in the Netherlands) and M.26 EMLA (from the virus indexing program in Great Britain). New rootstocks are also regularly available for testing, either after initial release or after their introduction to North America. Supporter 4 is from the Institut für Obstforschung Dresden-Pillnitz, Germany, and is reported to produce a tree similar to or slightly larger than those on M.26 but with greater yield efficiency.

The objectives of the 2002 NC-140 Apple Rootstock Trial were to assess and compare performance of Supporter 4, P.14, two unnamed Pillnitz rootstocks, and different strains of B.9, M.26, and M.9 with Buckeye Gala as the scion variety. This trial was established at several locations in the U.S., Canada, and Mexico, but only Massachusetts data are reported here.

Trees were spaced 2.5x4.5m, supported by wire-stabilized conduit pipes, and trained to vertical axes. The experiment was replicated seven times at the University of Massachusetts Cold Spring Orchard Research & Education Center.

After the sixth growing season, trees with the largest trunk cross-sectional area were on PiAu51-4, fol-

Table 1. Trunk cross-sectional area, suckering, yield, yield efficiency, and fruit weight in 2007 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, 2002-07)	Yield per tree (kg)		Yield efficiency (kg/cm^2 TCA)		Fruit weight (g)	
			2007	Cumulative (2004-07)	2007	Cumulative (2004-07)	2007	Average (2004-07)
B.9 (Europe)	15.4 e	4.9 b	21.1 c	38.0 a	1.35 ab	2.40 a	176 cd	156 c
B.9 (Treco)	17.6 e	2.7 b	23.3 bc	40.3 a	1.33 ab	2.37 a	184 bcd	167 bc
M.26 EMLA	34.3 bcd	1.5 b	38.7 abc	48.9 a	1.13 abc	1.43 bc	184 bcd	174 abc
M.26 NAKB	41.9 bc	1.4 b	43.4 a	58.3 a	1.06 abc	1.48 bc	194 abc	185 ab
M.9 Burgmer 756	32.3 cd	3.9 b	46.4 a	55.2 a	1.40 a	1.68 ab	197 ab	184 ab
M.9 Nic 29	28.0 d	17.3 a	37.5 abc	48.9 a	1.32 ab	1.72 ab	207 a	194 a
M.9 NAKBT337	28.2 d	4.3 b	39.6 ab	46.1 a	1.40 a	1.63 b	198 ab	187 ab
P.14	47.9 b	0.1 b	48.9 a	55.2 a	1.01 bcd	1.13 bc	180 bcd	181 ab
PiAu51-11	40.4 bcd	3.0 b	31.5 abc	36.4 a	0.83 cd	0.95 bc	181 bcd	186 ab
PiAu51-4	66.2 a	3.0 b	45.2 a	55.9 a	0.68 d	0.84 c	164 d	173 abc
Supporter 4	38.0 bcd	1.0 b	38.9 abc	41.9 a	1.04 bcd	1.12 bc	182 bcd	180 abc

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

lowed in decreasing size by those on P.14, M.26 NAKB, PiAu51-11, Supporter 4, M.26 EMLA, M.9 Burgmer 756, M.9 NAKBT337, M.9 Nic 29, B.9 (Treco), and B.9 (Europe) (Table 1). Cumulative (2002-07) root suckering was significantly greater from M.9 Nic 29 than from all other rootstocks (Table 1).

Largest yields in 2007 were harvested from trees on M.26 NAKB, M.9 Burgmer 756, P.14, and PiAu51-4 (Table 1). Lowest yields were harvested from the two B.9 strains. Other rootstocks resulted in intermediate yields. Cumulatively (2004-07), rootstock did not affect yield per tree (Table 1).

Yield efficiency in 2007 was greatest for trees on M.9 Burgmer 756 and M.9 NAKBT337 and least for trees on PiAu51-11 and PiAu51-4, with other rootstocks generally resulting in intermediate efficiency (Table 1). Cumulatively (2004-07), the two B.9 strains resulted in the greatest yield efficiency, while PiAu51-4 resulted in the lowest.

Fruit size in 2007 was very good for Gala for trees on all rootstocks, averaging from 164 to 207g (Table 1). The M.9 strains resulted in the largest fruit, and B.9 (Europe) and PiAu51-4 resulted in the smallest. Average fruit size over the fruiting life of the planting (2004-07) was largest from trees on M.9 NAKBT337 and smallest from trees on the two B.9 strains.

At this point in the trial, the Pillnitz rootstocks have not distinguished themselves in any way. P.14, likewise, does not show any particular promise as a new rootstock for the Massachusetts apple industry. The two strains of M.26 are performing similarly, and the two strains of B.9 seem also to be performing similarly. In other locations, however, the two strains of B.9 are beginning to differ, with the European strain producing a smaller tree with a greater tendency to develop burr knots. The three strains of M.9 have developed differences in vigor, with trees on M.9 Burgmer 756 the largest and those on M.9 NAKBT337 the smallest. Yield and fruit size are similar among the three strains.

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