Rootstock Effects on Ginger Gold Apple Trees

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On of the most critical decisions when establishing an apple orchard block is the selection of rootstock. Rootstock can affect tree size, yield per tree, and fruit quality. Improper understanding of how a rootstock affects these characteristics can result in an inefficient or even unsuccessful block. Therefore, it is important for growers to have knowledge of rootstock performance when grown with varieties important to the region and with the climatic conditions experienced in the region. The objectives of the study reported here were to compare performance of several of the newest rootstock clones with a variety of increasing importance to retail orchardists.

Materials & Methods

In April, 1995, a trial was established at the University of Massachusetts Cold Spring Orchard Research & Education Center in Belchertown. It included Ginger Gold trees on ten different rootsocks. The experiment was conducted in a randomized-complete-block design with ten replications. Annually, trunk cross-sectional area, yield, and fruit size were measured.

Results

At the end of the 2001 growing season (seventh leaf), trees on Mark and V.1 were the largest, as assessed by trunk cross-sectional area (Figure 1). Please note that in a number of research and commercial plantings Mark has grown vigorously during the first few years, matching trees on M.26 in size. After 6-8 years, however, they usually begin

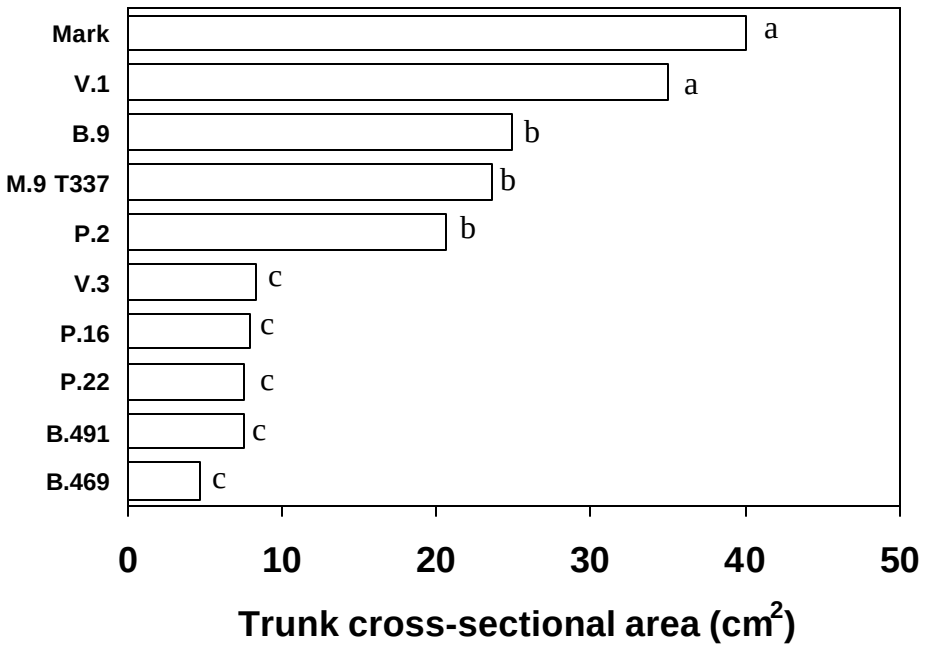

Figure 1. Trunk cross-sectional area in 2001 of Ginger Gold trees on several rootstocks planted in 1995. Bars not followed by the same letter are significantly different at odds of 19 to 1.

Table 1. Yield, yield efficiency, and fruit weight in 2001 of Ginger Gold trees on several rootstocks planted in 1995.[z]

Rootstock	Yield per tree (kg)		Yield efficiency (kg/cm^2 TCA)		Fruit weight (g)	
	2001	Cumulative (1997-2001)	2001	Cumulative (1997-2001)	2001	Average (1997-2001)
B.491	1 b	13 e	0.2 a	1.7 ab	208 ab	207 a
P.2	2 ab	32 cd	0.1 a	1.6 ab	209 ab	212 a
P.22	1 b	12 e	0.2 a	1.7 ab	189 ab	201 a
V.1	3 ab	49 ab	0.1 a	1.4 ab	203 ab	218 a
V.3	1 b	11 e	0.1 a	1.1 b	184 ab	200 a
B.469	0 b	7 e	0.1 a	1.3 ab	144 b	130 b
P.16	1 b	16 de	0.1 a	2.0 a	202 ab	202 a
B.9	6 a	35 bc	0.3 a	1.5 ab	223 ab	224 a
M.9 T337	3 ab	39 bc	0.1 a	1.7 ab	238 a	215 a
Mark	3 ab	65 a	0.1 a	1.6 ab	244 a	206 a

[z] Means within columns not followed by the same letter are different at odds of 19 to 1.

fruiting heavily and often stop growing unless special care is taken. Trees on B.9, M.9 T337, and P.2 were similar in size but smaller than those on Mark or V.1. The smallest trees were on V.3, P.16, P.22, B.491, and B.469. This last group, in general, was in the subdwarf size category. It is important to note, however, that trees on V.3 in other research trials with different varieties have been in the M.9 range rather than the subdwarf category.

Yield in 2001 was very low in this trial due to an early May frost. Cumulative yield (1997-2001), however, was significantly differences among rootstocks (Table 1). Generally, however, cumulative yield followed tree size, with the largest trees producing the greatest amount of fruit. Yield efficiency is a statistic that relates yield to tree size. As might be expected because of the close relationship between cumulative yield and trunk cross-sectional area, there was little difference in cumulative yield efficiency (Table 1). The only statistically significant difference was that trees on P.16 were more efficient than those of V.3.

Fruit size in 2001 and on average from 1997 through 2001 was relatively consistent among trees on the different rootstocks (Table 1). The only rootstock which appears to affect fruit size negatively was B.469. Fruit from these trees was only two thirds the size of fruit from other trees on average.

Conclusions

This trial is still relatively young, and with a poor year in 2001, we are not prepared to make any definitive conclusions at this time. However, it points to a few possible practical outcomes. First, among the subdwarfs, P.16 appears to be the best. It has consistently (among a number of studies) has performed well, producing good yields with good fruit size, both of which are difficult in general for trees on the subdwarf rootstocks. Second, M.9 and B.9 continued to perform similarly and well. Last, V.1 looks interesting for an M.26-sized tree. In other research trials, trees on V.1 have yielded significantly more than comparable trees on M.26.

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