Fruit Notes

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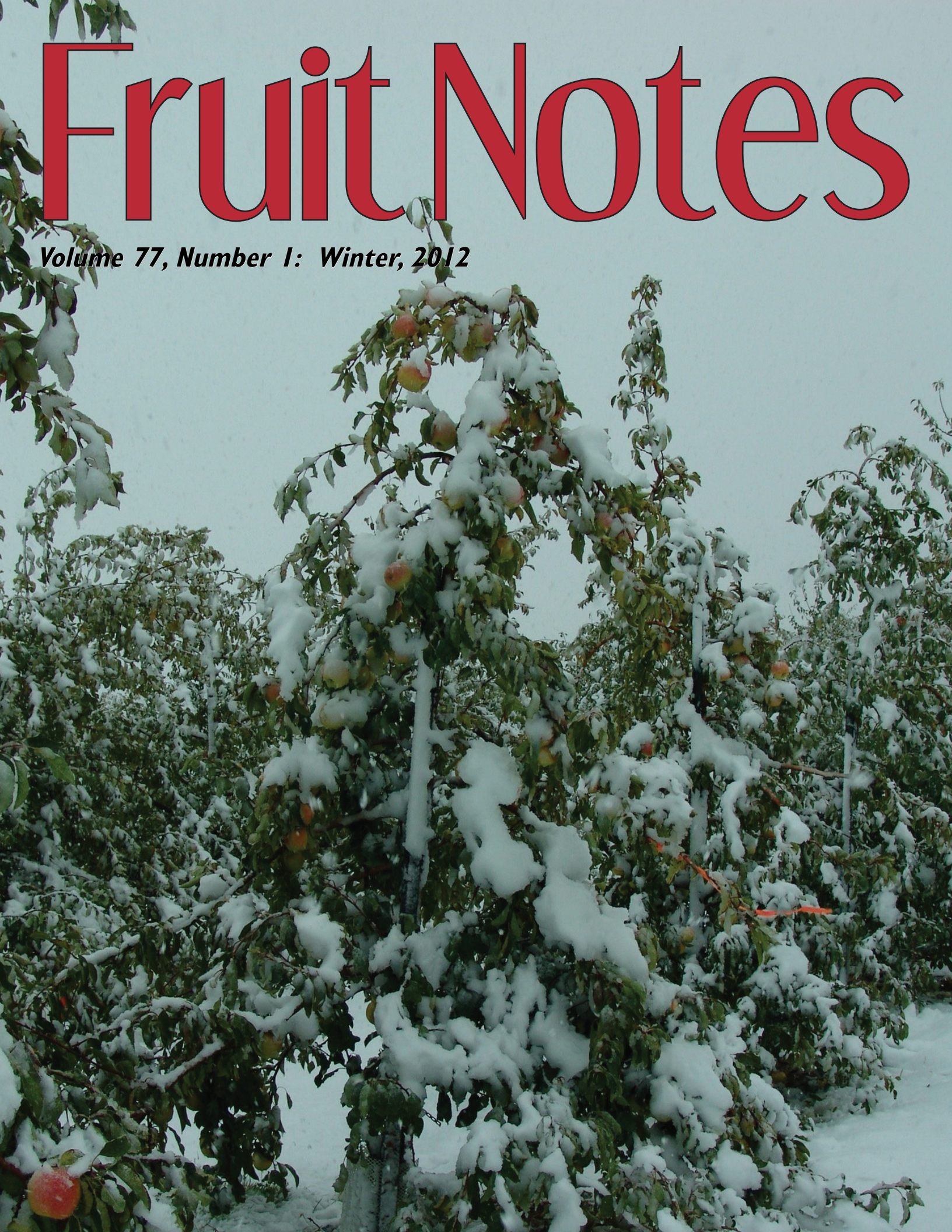

Fruit Notes

Editors: Wesley R. Autio & Winfred P. Cowgill, Jr.

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Cover: October 2011 snowstorm on Suncrisp at Rutgers Snyder Research & Extension Farm, Pittstown, NJ. Photo by Win Cowgill.

Performance of the Pearl Cherries in Massachusetts

Jon M. Clements
University of Massachusetts

The 'Pearl' series of sweet cherry are recent introductions by International Plant Management (www.varietymanagement.com). They include Black Pearl, Burgundy Pearl, Ebony Pearl, and Radiance Pearl. The Pearl cherries originated with Bob Andersen's former stone fruit breeding program at Cornell University and were partially selected for adaptability when grown in the humid Northeast.

In 2003, a sweet cherry variety evaluation trial was planted at the that included eleven NY-numbered selections from the Andersen breeding program on behalf of IPM at the UMass Cold Spring Orchard in Belchertown, MA. Although NY numbered selections at the time, it turns out that the planting included Ebony Pearl (NY 32), Burgundy Pearl (NY 38L), and Black Pearl (NY 8139) (three trees of each variety). These cherry trees are on Gisela 6 rootstock with between-tree spacing of six feet. The trees have grown well and have been quite manageable at this spacing on moderate-fertility soil.

Once these Pearl cherries started flowering and fruiting in 2005, annual information collected included: time of bloom; crop load; fruit size, color, sugar, eating quality, and resistance to cracking. A summary of these characteristics and observation on overall suitability for our climate follows.

Average Bloom Date

All three Pearl cherries bloom early. Bloom typically is during the latter part of the last week in April. Burgundy Pearl is slightly ahead of Black Pearl which is slightly ahead of Ebony Pearl, but they all overlap. Depending on the timing of frost, this early bloom may be good or bad; however, in general, early blooming cherries are more likely to be frosted. Frost occurred during bloom in 2008 resulting in few cherries; however, they have cropped heavily in all years without frost.

Cropping

In general, the Pearl cherries are heavy bloomers and croppers. Annual yields for Black Pearl and Burgundy Pearl were described as heavy to very heavy. Ebony Pearl yields were medium-heavy. Fruit size suffers with heavy yields, so pruning to promote vigorous re-growth will be important to help manage crop

Table 1. Fruit characteristics (average of years 2005-2011) of Black Pearl, Burgundy Pearl, and Ebony Pearl sweet cherries at UMass Cold Spring Orchard, Belchertown, MA.

Cherry	Harvest date	Fruit shape	Stem length	Skin color	Average fruit weight (g)	Flesh color	Soluble solids (%)
Black Pearl	July 3	oblate- heart	medium-long	dark red	8.9	red	13.1
Burgundy Pearl	June 30	oblate- heart	short-medium	red	9.1	orange-red	12.8
Ebony Pearl	June 28	oblate- heart	medium-long	red	10.0	orange	13.6

Table 2. Black Pearl, Burgundy Pearl, and Ebony Pearl trees on Gisela 6 rootstock in bloom, May 6, 2011, UMass Cold Spring Orchard, Belchertown, MA.

Black Pearl	Burgundy Pearl	Ebony Pearl
		
early to mid-season bloom	early-season bloom	mid-season bloom

load on these cherries (see giselacherry.com for pruning instructions).

Fruit Quality

Table 1 is a summary of 6-7 years of the Pearl cherries fruit characteristics.

Average harvest date. Black Pearl was picked later than both Burgundy and Ebony Pearl. But, because of cracking (and birds), both Burgundy and Ebony Pearl were likely picked too early in most years. In fact, information from International Plant Management suggests Black Pearl is harvested about a week earlier than the other two. Best fruit quality harvest dates in Massachusetts for these three cherries might now be surmised to be: Black Pearl – July 1 and Burgundy and Ebony Pearl – July 7. Thus, the first week in July would be the 'target' harvest week for the Pearl cherries.

Fruit shape. All cherries are described to have an acceptable, oblate-heart fruit shape. Thus, they are somewhat round-flat in appearance, but still classic-enough cherry shape.

Stem length. Burgundy Pearl has a shorter stem than the other two Pearl cherries.

Skin color. Black Pearl exhibited the darkest red skin color of the Pearl cherries. Both Ebony and Burgundy Pearl were a more 'translucent' red color in appearance, which was very attractive.

Fruit weight. All Pearl cherries were smaller than the target fruit weight of 10 g. Heavy crop loads and too-early harvest contributed to the smallish fruit size. Careful crop load management and delaying harvest should result in larger fruit size. Still, these are not 'big' cherries. They are average but adequate size.

Flesh color. Black Pearl had the darkest flesh and was characterized as being 'red.' Both Burgundy and Ebony Pearl were orange-red in flesh color.

Soluble solids. The sugar content should have been better. Again, too early harvest is not conducive to good sugars in the cherries. Fruit have to hang longer to get good cherry sweetness. Soluble solids of sweet cherries should be in the high teens at harvest.

Resistance to Cracking

Crack-resistance was somewhat disappointing. Although literature from International Plant Management suggests that Burgundy and Ebony Pearl have 'excellent' resistance to cracking, and Black Pearl has 'low' cracking, all three cherries cracked and split in wet years here in Massachusetts. Drier years were better, with Black Pearl pulling through with a little less cracking than Burgundy and Ebony Pearl. The latter two cherries were often picked too early as heavy cracking was observed. This observation only heightens the fact that *successful and profitable sweet cherry growing in Massachusetts requires rain covers!*

Conclusion

Although I was disappointed in the amount of cracking over the years, the Pearl cherries are no worse and likely somewhat better than other cherries that we might grow. If you think you can grow them without

Table 3. Black Pearl, Burgundy Pearl, and Ebony fruit, UMass Cold Spring Orchard, Belchertown, MA.

Black Pearl	Burgundy Pearl	Ebony Pearl
		

covers, think again – in most years they will crack. They are certainly highly productive, and will require the right kind of pruning to achieve adequate fruit size. Because they are relatively early cherries, they are attractive to birds (particularly cedar waxwings).

I have been most successful in harvesting a good crop of Black Pearl over the years, and therefore, declare it the best of the three. Personal correspondence with International Plant Management suggests "Burgundy Pearl has the best flavor, Ebony Pearl is the nicest cherry in its season, and Black Pearl will be the big winner of the three." All three Pearl cherries are worth consideration and are available from major nurseries and Summit Tree Sales (summittreesales.com).

2002 Massachusetts/New Jersey 'Cameo' Dwarf Rootstock Trial

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Planting Description and Protocol

In 2002, NC-140 plantings were established at the University of Massachusetts Cold Spring Orchard Research & Education Center in Belchertown, MA and at the Rutgers Snyder Research and Extension Farm in Pittstown, NJ. Cameo apple trees (Willow Drive Nursery) on three dwarfing rootstocks (G.16, M.9 NAKBT337, and B.9) were planted in a randomized complete block design (10 replications) spaced at 1.2 X 3.6 m. (Massachusetts) and 2.5 X 4.5 m (New Jersey). All trees were trickle irrigated and were trained to a vertical axis.

Annual measurements of trunk circumference, tree height and spread (2006 and 2011 only, reported here for 2011), root suckering, fruit yield (beginning in 2003), and fruit size (NJ only in 2004, 05, 08) have been made.

Table 1. Typical Cameo trees after harvest (October 11, 2011) on M.9 NAKBT337, G.16, and B.9 rootstocks, UMass Cold Spring Orchard, Belchertown, MA.

M.9 NAKBT337	G.16	B.9

Table 2. Overall trunk size, tree height and spread, suckers, and percent of the rootstock shank covered with burr-knots in 2011 of Cameo apple trees on three rootstocks in the 2002 MA/NJ NC-140 Cameo Dwarf Rootstock trial.

Rootstock	Trunk cross-sectional area (cm^2)	Tree height (m)	Tree spread (m)	Root suckers (no.)	Burr-knots (%)
G.16	66.2 a	4.2 a	2.5 a	1.3 b	3 a
M.9	50.6 b	3.8 b	2.4 a	2.8 a	1 ab
B.9	29.9 c	3.3 c	2.1 b	1.5 b	0 b

Levels not followed by a common letter are significantly different (Tukey HSD, $P = 0.05$).

Results

This report presents data from the 2011 (10th and final leaf) growing season, and results are presented in Tables 1-5.

Regarding tree growth (Table 2), G.16 had the largest trunk cross-sectional area followed by M.9 and B.9. In Massachusetts, G.16 was larger than both M.9 and B.9 (Table 2). In New Jersey, G.16 and M.9 were both larger than B.9. Trees were much larger in trunk area in New Jersey than Massachusetts, except for B.9. Those on G.16 were the tallest trees (tree height), followed by M.9 and B.9. B.9 had a lesser tree spread than G.16 and M.9. G.16 had more burr-knots than B.9 (Table 2) but did not differ from M.9 (which did not differ from B.9). None of the rootstocks had a large percentage of the above-ground shank covered with burr-knots.

M.9 had more root suckers than G.16 and B.9, which did not differ (Table 2). In Massachusetts, again M.9 had more suckers than the other two rootstocks; however, in New Jersey the rootstocks did not differ in suckering (Table 3). Overall, Massachusetts had more root suckers than New Jersey.

In 2011, there was no difference in yield per tree between the rootstocks across both states (Table 4). Yield per tree was much higher in New Jersey (36.3 kg) than in Massachusetts (15.3 kg). Cameo is highly biennial – in 2010, it was just the opposite, i.e. yield per tree in Massachusetts far exceeded New Jersey. Cumulative yield (2003-11) was higher for M.9 compared to B.9, however, M.9 did not differ from G.16 (Table 4).

Overall yield efficiency in 2011 was lowest for G.16 compared to M.9 and B.9, which did not differ (Table 4). This was also true in Massachusetts, however, in New Jersey B.9 had the highest yield efficiency compared to M.9 and G.16 which did not differ from each other (Table 5). B.9 had the highest cumulative yield efficiency (2003-2011) followed by M.9 and G.16 (Table 4). In Massachusetts, however, M.9 and B.9 did not differ but had higher yield efficiency than G.16. In New Jersey, B.9 had the highest cumulative yield efficiency compared to M.9 and G.16, which did not differ (Table 5).

Across both states, fruit size (fruit weight) did not

Table 3. Trunk size and number of root suckers by state in 2011 of Cameo apple trees on three rootstocks in the 2002 MA/NJ NC-140 Cameo Dwarf Rootstock trial.

	Trunk cross-sectional area (cm^2)		Root suckers (no.)	
Rootstock	Mass.	New Jersey	Mass.	New Jersey
G. 16	48.5 a	84.0 a	2.1 b	0.4
M.9	26.1 b	75.1 a	5.6 a	0.1
B.9	21.5 b	38.4 b	2.7 b	0.2

Levels not followed by a common letter are significantly different (Tukey HSD, $P = 0.05$).

Table 4. Overall fruit yield, cumulative yield, yield efficiency, cumulative yield efficiency, and fruit weight in 2011 of Cameo apple trees on three rootstocks in the 2002 MA/NJ NC-140 Cameo Dwarf Rootstock trial.

Rootstock	Yield per tree (2011, kg)	Cumulative yield per tree (2003-11, kg)	Yield efficiency (2011, kg/cm^2 TCA)	Cum. yield efficiency (2003-11, kg/cm^2 TCA)	Fruit weight (g)
G.16	26.2	181.5 ab	0.37 b	3.84 c	223
M.9	27.4	194.4 a	0.66 a	5.03 b	220
B.9	23.8	156.3 b	0.77 a	6.78 a	209

Levels not followed by a common letter are significantly different (Tukey HSD, $P = 0.05$).

Table 5. Yield efficiency and fruit size by state in 2011 of Cameo apple trees on three rootstocks in the 2002 MA/NJ NC-140 Cameo Dwarf Rootstock trial.

	Yield per tree (2011, kg)		Cumulative yield per tree (kg, 2003-11)		Yield efficiency (kg/cm^2 TCA)		Cumulative yield efficiency (kg/cm^2 TCA, 2003-11)		Fruit weight (g)	
Rootstock	Mass.	New Jersey	Mass.	New Jersey	Mass.	New Jersey	Mass.	New Jersey	Mass.	New Jersey
G. 16	11.4	41.0	167	196	0.24 b	0.49 b	3.76 b	3.92 b	230 a	215 b
M.9	21.2	33.6	196	193	0.88 a	0.44 b	5.63 a	4.44 b	193 b	248 a
B.9	13.4	34.3	148	164	0.63 a	0.91 a	6.84 a	6.72a	199 b	221 b

Levels not followed by a common letter are significantly different (Tukey HSD, $P = 0.05$).

differ between the rootstocks (Table 4), however, fruit in New Jersey were significantly larger (228 g) than those in Massachusetts (207 g). Within Massachusetts, Cameo fruit from G.16 trees were larger than those from M.9 and B.9, but in New Jersey, fruit were larger from M.9 (Table 5).

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Results from the First Year of Fruiting in the 2009 NC-140 Peach Rootstock Trial in Massachusetts

Wesley R. Autio, Jon M. Clements, and James S. Krupa
University of Massachusetts

In 2009, NC-140 established a peach rootstock trial at 14 locations in the U.S. and two locations in Mexico. It included Redhaven on 17 different rootstocks. One of these locations was the UMass Cold Spring Orchard Research & Education Center in Belchertown. Not all locations had all rootstocks; the Massachusetts planting has 15 rootstocks [see Fruit Notes volume 75, number 3 (summer, 2010) or Horticultural News, volume 90, number 3 (summer, 2010) for details regarding the rootstocks in this trial]. All trees are spaced 13' x 16.5' and trained as open centers. The planting includes eight replications of each rootstock.

In October 2011, tree size was assessed with trunk circumference (measured below the lowest scaffold branch), and these data were used to calculate trunk cross-sectional area. Root suckers were counted each year. Trees yielded significantly in the third growing season (2011), and all fruit from each tree were counted and weighed. These data were used to calculate

Table 1. Trunk size, root suckering, yield, yield efficiency, and fruit size in 2011 of Redhaven peach trees in the 2009 NC-140 Peach Rootstock Trial.[z]

Rootstock	Trunk cross-sectional area (cm^2)	Root suckers (no./tree, 2009-11)	Yield per tree (kg)	Yield efficiency (kg/cm^2)	Fruit weight (g)
Atlas	75.3 ab	0.0 b	20.7 ab	0.28 cde	161 c
Brights Hybrid 5	66.6 abc	0.0 b	17.8 b	0.27 cde	159 c
Controller 5	17.7 f	0.0 b	4.0 c	0.23 e	172 abc
Guardian	83.0 a	0.0 b	21.1 ab	0.26 cde	176 abc
HBOK 10	60.0 bc	0.0 b	24.7 ab	0.43 bcd	180 abc
HBOK 32	60.3 bc	0.0 b	23.0 ab	0.39 bcde	171 abc
KV010-123	57.4 cd	0.0 b	24.7 ab	0.44 bc	178 abc
KV010-127	66.4 abc	0.0 b	23.8 ab	0.36 cde	169 bc
Krymsk 1	36.5 e	0.0 b	20.0 ab	0.55 ab	192 ab
Krymsk 86	64.7 bc	0.0 b	19.0 b	0.31 cde	163 c
Lovell	74.1 abc	0.0 b	21.1 ab	0.30 cde	174 abc
Mirobac	56.9 cd	0.5 b	20.6 ab	0.36 cde	176 abc
Prunus americana	42.3 de	3.0 a	29.7 a	0.72 a	200 a
Penta	69.2 abc	0.0 b	16.0 b	0.25 de	160 c
Viking	66.4 abc	0.0 b	24.2 ab	0.38 bcde	166 c

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

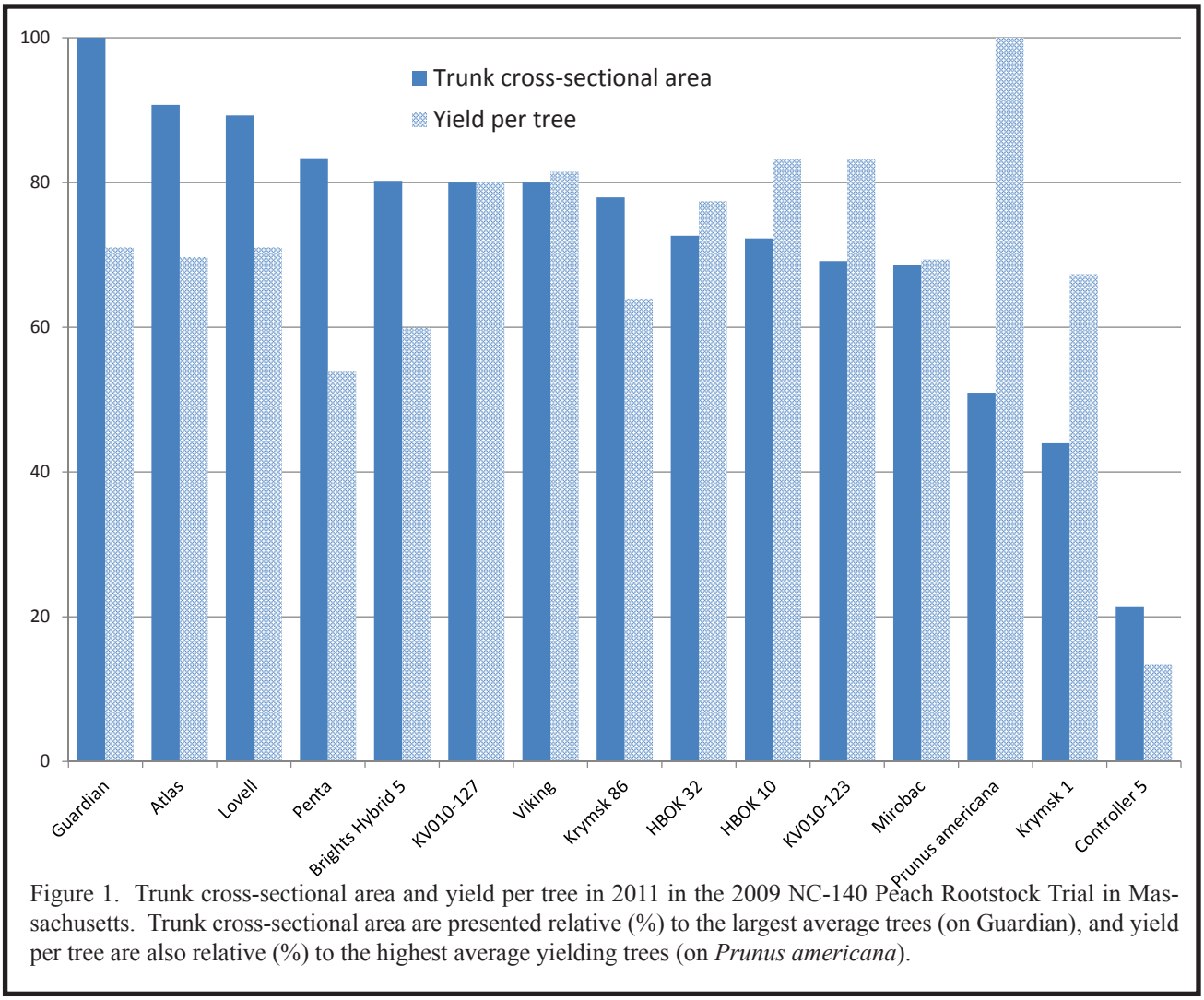

Figure 1. Trunk cross-sectional area and yield per tree in 2011 in the 2009 NC-140 Peach Rootstock Trial in Massachusetts. Trunk cross-sectional area are presented relative (%) to the largest average trees (on Guardian), and yield per tree are also relative (%) to the highest average yielding trees (on *Prunus americana*).

average fruit size for each tree.

After three growing seasons, the largest Redhaven peach tree were on Guardian rootstock, and the smallest were on Controller 5 (Table 1, Figure 1). A few of the trees appear to be dwarf to semidwarf in size, specifically those on Controller 5, Krymsk 1, Prunus americana, Mirobac, KV010-123, HBOK 10, and HBOK 32.

Root suckering has been very light on these trees, with the most suckering from Prunus americana with only three suckers total (Table 1).

Yield per tree varied from a low from trees on Controller 5 to a high from trees on Prunus americana (Table 1, Figure 1). Yield efficiency, likewise, was greatest for trees on Prunus americana and lowest for trees on Controller 5 (Table 1).

Fruit size was largest from trees on Prunus americana and smallest from trees on Brights Hybrid 5, Penta, Atlas, and Viking (Table 1).

Obviously, several additional years of data will be required to evaluate these rootstocks, but to date, Prunus americana looks very promising. Figure 1 displays tree size from largest to smallest and includes the associated yield per tree. Trees on Prunus americana clearly are dwarfed (only about 50% of the size of those on Guardian) but they also yielded the most in 2011. Often a dwarfed tree has greater yield efficiency than a larger tree, but it usually does not have greater actual yield per tree. As an added bonus, trees on Prunus americana had the largest fruit in the trial.

Please stay tuned; we will continue to report results from this trial in future years.

Asian Pear Cultivar Trial in New Jersey and Massachusetts

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New Jersey Agricultural Experiment Station, Rutgers Cooperative Extension

Jon M. Clements and Wesley R. Autio
University of Massachusetts

As part of a Northeast regional variety trial, plantings of Asian Pears were established in New Jersey and Massachusetts in 2010. The trials are located at the Rutgers Snyder Farm, Pittstown, NJ and the UMass Cold Spring Orchard, Research and Education Center, Belchertown, MA.

Background

Asian pears are becoming an important commodity for selected growers in NJ and MA. New Jersey has over 150 acres planted, MA over 60 to date. Growers utilizing tailgate markets and PYO growers with a customer base that desires Asian Pears both do well.

The purpose of this trial is to evaluate superior cultivars of Asian pears for commercial plantings in North Jersey and Massachusetts and identify the best ones for adoption. We hope to identify a handful of cultivars that will be well adapted to sustainable, direct-marketing farm operations.

Tree survival and size will be measured at the end of the study. Annual fireblight counts to evaluate fireblight susceptibility will be taken. Of greatest importance will be the evaluation of fruit quality. Three years of fruit quality data will be taken to identify the

Shinko Asian pear fruit in 2011 at the UMass Cold Spring Orchard in Belchertown, MA.

Shinko Asian pear tree in 2011 at the UMass Cold Spring Orchard in Belchertown, MA.

The 2010 Asian Pear Trial at the Rutgers Snyder Research & Extension Farm, Pittstown, NJ.

superior cultivars.

Hand-thinning time will be assessed for each cultivar. Chemical thinning trials will be continued in New Jersey. Maxcel (6-Ba) at the full label rate has been shown to eliminate 50% of the hand thinning costs for selected cultivars of Asian pears in NJ (more information will be published in a future article).

Fruit IPM Program Presented with Distinguished Service to New Jersey Agriculture Award

The New Jersey Farm Bureau recently awarded, on November 14th, the "Distinguished Service to New Jersey Agriculture Award" to the entire Fruit IPM delivery team at the annual Farm Bureau Convention banquet. Those present were Dean Polk (accepting the award), David Schmitt, Atanas Atanassov, Win Cowgill, Gary Pavlis and Peter Nitzsche.

The NJAES/Rutgers Cooperative Extension Fruit Integrated Pest Management (IPM) Program is a team effort that delivers IPM information and services to NJ fruit growers, helping them produce fruit and manage pests in an economically sustainable fashion. The program uses multiple technologies to manage pests and minimize pesticide use. IPM program staff combine with specialists and county agents to provide an educational delivery program, driven by current research in NJ and other states. The program is supported by state funds, federal competitive grants, and grower/industry grants and fees.

The core staff for program delivery consists of a statewide agricultural IPM agent, Dean Polk, and 3 full time program associate staff. Eugene Rizio in Atlantic County has blueberry responsibilities in Atlantic and Burlington Counties. David Schmitt in Gloucester County has tree fruit and grape responsibilities in Gloucester, Cumberland, Salem, Camden, Burlington and Atlantic Counties. Atanas Atanassov in Hunterdon County is responsible for tree fruit growers in Hunterdon, Warren, Mercer, Monmouth, Middlesex, Morris, Bergen, Somerset, and Sussex Counties. Unlike extension in most other states, our program centers on the weekly delivery of farm scouting information to the

Left to right: Atanas Atanassov; Dean Polk; Win Cowill; Gary Pavlis; Peter Nitzsche; Rich Nieuwenhuis, president, New Jersey Farm Bureau, and Dave Schmidt.

commercial grower. The scouting and monitoring information is backed up with interpretation and recommendations to the grower for control and management decisions. Recommendations are through written reports, faxes, emails, or one-on-one discussion. Monitoring data is summarized for weekly articles in extension newsletters, grower update and annual meetings. Growers or grower organizations contribute funds that pay for seasonal technicians/field scouts, insect traps and other supplies, transportation and vehicle maintenance and portions of staff salary if needed. The core staff focuses on seasonal scouting for insects and disease, weeds (program dependent), management recommendations, regular communication with the growers, fertility sampling, and weekly newsletters.

Researchers and subject matter Extension Specialists provide back-up for production issues, assist in staff training, and conduct IPM research from which results are used within the delivery program as recommendations, monitoring procedures, or other knowledge required for successful management. The program represents a 2 way approach where delivery staff share on-farm information, and collaborate on research projects, which results in improved research and overall extension programming for clientele. Researchers and extension specialists continuously involved in the program include: Peter Oudemans, Plant Pathology (blueberries, grapes), Cesar Rodriguez-Saona, Specialist in Entomology (blueberries, grapes), Bradley Majek, Specialist in Weed Science (blueberries, tree fruit, grapes), Norman Lalancette, Specialist in Plant Pathology (tree fruit), Daniel Ward, Specialist in Pomology (tree fruit and grapes), and George Hamilton, Specialist in Pest Management (tree fruit and coordinator for federal and state funding).

County based agricultural agents interface with their growers, and provide expertise on plant growth regulators, fertility management, and other horticultural practices that may impact IPM decisions. County agents who provide regular input include Gary Pavlis in Atlantic County for blueberries, Jerome Frecon in Gloucester County for tree fruit, Winfred Cowgill in Hunterdon County for tree fruit, and Peter Nitzsche in Morris County.

Grower participation is at 2 levels. Primary participants have all or part of their acreage enrolled in the program for scouting and recommendations; get IPM reports, fruit quality analyses, tailored fertility recommendations, and end of year pesticide use reports. All fruit growers can get newsletters, attend meetings, or receive emails and faxes where IPM information is summarized and discussed with general recommendations. Secondary participants are all other growers getting IPM information, but not enrolled in the scouting program.

During 2011 the fruit IPM program worked with 88 growers as primary participants, consisting of 41 blueberry growers, 41 tree fruit growers, and 6 wine grape producers. Participating farms made up 66% of total NJ blueberry acreage, and about 80-85% of total peach and apple acreage.

The program is information intensive. Fruit growers now rely on narrow spectrum and expensive pesticides that must be timed for specific pest stages and managed to avoid pest resistance. This means growers must know more about the biology of pests, make use of pest levels and treatment thresholds, insect and disease degree day phenology models and other environmental monitoring tools, various pheromone technologies, and have a knowledge of beneficial insects and biological controls. IPM goals are to bring these factors together into one management program. However, the recent arrival of 2 invasive species, the brown marmorated stink bug, and the spotted wing drosophila are refocusing program efforts to the more intense control tactics that will have to be used for these insects. In the coming years the NJ fruit industry will require more applied research and increased collaborative efforts with other states, and the New Jersey Department of Agriculture to help solve these issues.

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