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Kentucky Fruit Facts

August-September 2010/ (8-9-2010)

Fruit Facts can be found on the web at: http://www.ca.uky.edu/fruitfacts/

John Strang, Extension Fruit Specialist, Editor
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Fruit Crop News

By John Strang, U.K. Extension Horticulturist

Apple harvest is proceeding and fruit are maturing earlier than normal. Production concerns are quite variable between orchards. The intense summer heat which has run roughly 3 to almost 5° F above normal for most of the summer has made fruit drop more readily. This is a good season to use a sticking agent such as NAA or Retain to hold fruit on the trees longer. The heat has reduced fruit color and sugar content and has resulted in somewhat smaller fruit sizes. Thus, growers are delaying harvest to develop more color on both red and yellow varieties. High temperatures increase the fruit respiration rate and at temperatures in the low to mid 90° F most of the sugars produced by photosynthesis are utilized in the respiration process. As a result it has been difficult to produce sugars, color the fruit and increase

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size. The cool nights of September should help considerably. Lack of rainfall has been worse in the western part of the state. In central Kentucky rainfall in June and July has held us until now.

I have talked with growers that have dealt with high numbers of codling moths, oriental fruit moths, summer rots and hail. Cedar-apple and cedar-quince rust infections are widespread and a few growers have found scab lesions on some fruit. The hot weather has allowed mites to prosper in some orchards. Weed control has been difficult. Generally European and Asian pears have produced very well and quality has been good. Some growers report excellent sales while others report that apple sales are lagging because of the economy.

Upcoming Meetings

Oct. 2 – Mountain Ag and Energy Field Day, Robinson Center for Appalachian Resource Sustainability, Quicksand, KY. 10:00 a.m. – 4:00 p.m. Tours, Demonstrations, Quilt Show, and 4-H Talent. There is no charge for the field day or meal that will be served from 11:30 a.m. – 1:00 p.m. Contact David Ditsch 606-666-2438 or email: dditsch@uky.edu Tours will cover High Value Fall Crops and Farmers Market;

Grapes, Vineyards and Wine Making; Beekeeping and Honey Production; Sweet Sorghum; Goat Production; Basic Horse Management; Robinson Forest SMZ Study; Cutting Board Making Workshop; Beef Cattle; Small Flock Pasture Poultry Production; Energy: Sources, Efficiency and Economic Opportunities; Pasture Renovation; and the History of Quicksand and Impact of the Robinson Station on the Region.

Nov. 8-10 – Southeast Strawberry Expo. Wyndham Hotel, Virginia Beach VA. Contact Tom Baker 757-721-0558. For more information, visit www.ncstrawberry.org.

Dec. 7-9 – The Great Lakes Fruit, Vegetable and Farm Market EXPO, Devos Place Convention Center, Grand Rapids Michigan. On line registration starts September 27 at: www.glexpo.com. Register by November 12 to save on the registration fee. Call 734-677-0503 for registration questions or to receive registration and program information by mail.

Jan. 3-4, 2011, Kentucky Fruit and Vegetable Conference, Embassy Suites Hotel, 1801 Newtown Pike, Lexington, KY. Contact John Strang, 859-257-5685 office; 859-396-9311 mobile; email: jstrang@uky.edu OR Tim Coolong 859-257-3374 office; or 859-421-5973 mobile; email: tcool2@uky.edu.

Jan. 5-7, 2011, Illinois Specialty Crops Conference, Springfeild, IL. Contact Elizabeth Wahle, 618-692-9434; wahle@niuc.edu

Fall Borer Control Considerations

Dave Kain and Art Agnello, Entomology, Aug 16, 2010 Scaffolds Fruit Journal, Vol. 19, No.22 Cornell University, Geneva, NY

[Ed. note: This is an update from our annual article on borer management, reprinted because of its timeliness and applicability to the situation in many commercial orchards recently.]

There is increasing concern throughout the Northeast about damage done to apple trees by borers. The species of primary concern is dogwood borer, but American plum borer can be prevalent in western New York apple orchards that are close to tart cherry and peach orchards. While we do not yet fully understand the effects these borers have on dwarf trees, we do know that they reduce vigor and can, in time, completely girdle and kill trees.

We tested a number of insecticides against these borers over a number of growing seasons. Lorsban is very effective for this use and we have urged growers to take advantage of it where needed. In 2001–2003 we compared some other materials, including white latex paint, endosulfan, Avaunt, Surround, Intrepid, Danitol, Imidan, spinosad and Esteem with Lorsban, with varying results. To make a long story short, only Avaunt, Danitol and, possibly Esteem, applied two or three times in midsummer, provided control comparable to one application of Lorsban. Assail and Altacor were effective when applied only once in midsummer but, obviously, will control only the summer generation.

Our tests have shown that borers can be controlled season-long by applying Lorsban at various times in the spring and summer. While a postbloom trunk application of Lorsban is still allowed, enabling growers to spray at the peak of the dogwood borer flight, applying this material prebloom as early as half-inch green works well, too, and may be more convenient. Fall also may be a good time to control dogwood borer. Results from 2002 indicated that Lorsban applied postharvest the previous year (sprays went on in October 2001) controlled both the overwintering and the summer generations of dogwood borer. An October 2002 application of Lorsban similarly provided season-long control of dogwood borer in 2003. Lorsban works when applied in the spring or fall because it infiltrates burrknot tissue (Figure 1) and kills larvae concealed within. It is also very persistent in wood so it continues to work for a considerably long time after it is applied (apparently 9–12 months in our trials). Fall application may offer growers a more convenient alternative for applying borer control sprays. Recall that new Lorsban label restrictions allow only ONE application of any chlorpyrifos product in apples, whether as a foliar or trunk spray, so these recommendations pertain only if no earlier applications have been made. In a survey we conducted recently, we observed some relationships between borer infestation and various orchard

Fig. 1 Burrknots

parameters such as the proportion of trees with burrknots, proximity to stone fruit orchards and presence of mouseguards. Conventional wisdom has held that borer problems are worse where mouseguards are in place.

Mouseguards can contribute to increased expression of the burrknots that borers invade, and may shield borers from predators and insecticide sprays. This has led some growers to contemplate removing mouseguards under the premise that mice are easier to control than the borers. However, results of our survey indicate that dogwood borer larvae may be found as readily in trees without mouseguards as in those with them. (American plum borer may be a different story in orchards near tart cherry or peach trees.) The orchard in which we have conducted borer control trials has never had mouseguards and there is no shortage of dogwood borers. If mouseguards are deteriorated and no longer protect the tree, there may be some small advantage, in terms of borers, to removing them. But, in orchards where mouseguards still provide protection against rodents, removing them for the sake of borer control is probably not worth the risk. Instead, we would recommend the use of trunk sprays to control borers. Even with mouseguards on, insecticides will give adequate control if they are applied carefully (i.e., a coarse, low-pressure, soaking spray with a handgun). Bottom line: as we go into fall, consider using Lorsban after harvest to control borers, and reconsider removing mouseguards on trees where they still afford protection.

Kentucky Plum Pox Virus Survey Results

By John Hartman, U.K. Extension Plant Pathologist

The 2010 Kentucky plum pox virus survey has been completed and survey results indicate that the disease is not present in Kentucky peach orchards.

Representatives from the State Entomologists office collected 808 samples from 7 Kentucky orchards and assisted in sample preparation. All 808 samples were tested in the U.K. Plant Disease Diagnostic Laboratory using an enzyme-linked immunosorbent assay (ELISA) method. Plant pathology department diagnosticians spent extra time to complete these tests along with their regular diagnostic duties. Kentucky peach grower cooperation in this survey was much appreciated.

Apple Variety Reactions to the Sooty Blotch and Flyspeck Disease Complex

By John Hartman, U.K. Extension Plant Pathologist

Kentucky apples are being harvested now and later varieties will continue to ripen through autumn. Some growers may notice that their apple fruits are covered with a black sooty substance or tiny black specks. These superficial dark smudges and spots are diseases caused by fungi. Sooty blotch (Figure 2) and flyspeck (Figure 3) diseases are caused by a complex of fungi involving up to perhaps 60

Figure 2. Apple sooty blotch disease appearing on the fruit surface.

different species including *Schizothyrium pomi, Peltaster fructicola, Leptodontidium elatius,* and *Geastrumia polystigmatis.* Apple growers seeing some sooty blotch and flyspeck on early-harvested apples should expect to see more as the harvest sea-

Figure 3. Apple flyspeck disease, appearing as tiny black dots, and sooty blotch, both on the fruit surface (C. Kaiser photo).

son progresses according to a research article published in the July 2010 issue of Plant Health Progress. (This journal is available to U.K. employees through the Plant Management Network at APSnet.org.) The article, "Relative Susceptibility of Selected Apple Cultivars to Sooty Blotch and Flyspeck" by Alan Biggs et. al. was based on research done in Massachusetts, New York and Virginia over a period of several years. The researchers evaluated apples from two sets of plantings established in the 1990's involving 45 different apple cultivars and lines. In general, sooty blotch and flyspeck (SBFS) incidence for different cultivars varied mainly by harvest date. Cultivars that were harvested later in the fall had the highest SBFS disease incidence although orchard location was also important.

The first group of apples (listed in order of increasing SBFS disease) included the early maturing apples Sansa, Pristine, Sunrise, and Ginger Gold; mid-season apples Arlet, Honeycrisp, NY75414, Golden Supreme, Pioneer Mac, Creston, Gala Supreme, Yatake, and Senshu; and late-season apples Cameo, Suncrisp, Orin, Enterprise, Fortune, Golden Delicious, Shizuka, Braeburn, Fuji Red Sport, and GoldRush. Average SBFS disease incidence over several years and locations was low in the early apples and up to 69% in the late apples.

The second group of apples (also listed in order of increasing SBFS disease) included the early season apples Zestar, Silken, and NJ109; early mid-season apples NY79507-72, Crimson Crisp, Rogers McIntosh, September Wonder Fuji, NY 79507-49, and CQR10T17; late mid-season apples NJ90, BC 8S-26-50, NY65707-19, Princess, Runkel, Scarlet O-Hara, and Hampshire; and late season apples Pinova, Ambrosia, Sundance, Delblush, Golden Delicious, Cripps Pink, and Chinook. In this group, average SBFS disease incidence was low in the early apples but nearly 100 % in some of the late apples.

Minimally managed apples in Kentucky typically are covered with SBFS in most seasons. These signs are more visible on yellow fruit than on red or dark-colored fruit. Prolonged periods of moisture and high humidity favor appearance of SBFS, and symptoms appear earlier in seasons with wet spring and summer weather than under drier conditions. Thus, it is possible that earlier maturing cultivars may avoid disease by being exposed to fewer hours of wetting and high relative humidity, environmental factors favorable for growth of SBFS fungi. Generally, the longer fruit remain on trees without fungicide protection, the more likely it is that SBFS fungi can develop and produce signs. Growers applying fungicide sprays late in the season, i.e., close to harvest, are usually attempting to manage SBFS. Apple orchards located on a northeast-facing slope surrounded by woods will show more SBFS incidence than orchards located on open land. The fact that maturation date and location had the greatest impacts on SBFS incidence suggests that cultivar resistance is unlikely to contribute very much to integrated management approaches for SBFS. Thus, in addition to orchard site selection, this study emphasizes that SBFS management with fungicides cannot end in late summer, but must be continued throughout the harvest season, with particular attention paid to late season cultivars.

Apple and Pear Black Rot

By John Hartman

A good apple or pear crop can be ruined due to decay caused by parasitic fungi. Several of the fungi that cause fruit rot disease can begin their infections at bloom or shortly thereafter. The fungi may invade killed fruitlets, infect sepals, or exist in a latent phase in healthy fruit, only to begin decaying them when they reach full size. Apple and pear fruit rots can occur both in the orchard and in storage after harvest. Decayed fruit represent a significant loss to growers because much of the investment

Figure 4. Black rot disease causing decay of pear and apple fruits (P. Bachi photo).

in the crop is made before the fruits show any indication of decay. Recent observations in the U.K. plant disease diagnostic laboratory suggest that the black rot fungus successfully invaded apple and pear flowers or young fruitlets causing black rot (Figure 4). Black rot is caused by the fungus *Botry-*

Figure 5. Apple leaf with frogeye leaf spot caused by the black rot fungus.

osphaeria obtusa. The fungus infects blossoms, leaves, twigs, branches, and fruits. On leaves, the fungus causes frogeye leaf spot (Figure 5). Black rot inoculum originates from colonized dead wood within the tree or from mummified fruit and fruitlets. Fruit with black rot infections at the calyx end usually result from sepal infections that occurred early in the season (Figure 6). These infections, which may happen as soon as the flower bud scales loosen, typically develop into blossom end rot. If black rot infections appear on the sides of growing fruit in summer, the source of inoculum can often be traced to one or more killed fruitlets located above the infection site within the tree canopy. Late fruit infections occur through cracks in the cuticle, wounds and lenticels. Black rot fruit infections are favored by temperatures about 70 degrees F with prolonged wetness. The black rot fungus can also be one of several different fungi that may be present in fruit with moldy core. Infected fruits eventually shrivel and dry down to pycnidia-covered mummies (Figure 7) which remain attached to the tree, serving as inoculum sources in the spring of the following year.

Figure 6. Calyx-end black rot occurring on the apple blossom end. Note presence of fungal pycnidia on the rotted fruit surface (Clemson Univ photo).

Growers finding black rot in their orchards now will want to review their disease management practices in order to have better results next year.

•Remove from the tree or pick up off the ground overwintering fruit mummies and destroy them.

• Prune out dead and diseased branches and remove from the orchard or chop up twig and branch prunings in late winter before the growing season begins.

Figure 7. Apple fruit mummy (C. Kaiser photo).

• Maintain an effective spray schedule. See the U.K. Extension publication ID-92, 2010 Midwest Tree Fruit Spray Guide, available at County Extension Offices statewide.

• Fungicides containing active ingredients such as thiophanate-methyl, captan, mancozeb, azoxystrobin, or kresoxym methyl most likely have good effectiveness against black rot.

KSU Releases New Pawpaw Cultivar

From the KSU Website

The KSU-Atwood™ pawpaw was first introduced to the public in September 2009 and has now been released by Kentucky State University. It has a mango-banana-pineapple-like flavor and is the first of several pawpaw cultivars that KSU will release for sale and cultivation. The new cultivar was developed by Dr. Kirk Pomper, principal investigator of horticulture, and co-investigators Sheri Crabtree and Jeremy Lowe on the KSU Research and Demonstration Farm in Frankfort, Ky. When it was released, the university held a naming contest and selected KSU-Atwood to honor one of the university's longest serving and most influential presidents, Dr. Rufus Ballard Atwood.

Fig. 8. Photograph of KSU-Atwood taken by Kirk Pomper

Nolin River Nut Tree Nursery in Upton, KY, Northwoods Nursery Inc. in Molalla, OR, and Hartmann's Plant Company in Lacota, MI, will carry this cultivar. Three additional nurseries are in discussions with KSU and are interested in propagating and selling KSU-Atwood. Proceeds generated from the cultivar sales will benefit continued research and student engagement opportunities. For more information on KSU-Atwood, visit www.pawpaw.ksu.edu

Kentucky Farm Start

By Sarah Lovett, U.K. Extension Associate, Agricultural Economics

KyFarmStart is funded through the USDA Beginning Farmer Rancher Program. This intensive educational program targets those individuals who have ten years or less farming experience. The program is designed as a whole farm management program for beginning farmers, providing a basic foundation of production, marketing, management, and networking,

which are necessary for beginning farmers to succeed in today's dynamic agriculture environment.

KyFarmStart is designed as a two-year producer education program. In the first year, producers participate in a series of 12 face-to-face educational programs, including nine traditional county extension meetings and three on-farm demonstrations/farm field day experiences. Additionally, all of the curriculum will be made available as an on-line course to provide all producers the opportunity to take part in the program, even if they are unable to attend the classroom portion. Producers may choose to participate in the classroom education, on-line, or both.

In year 2, producers will be matched with a successful farmer mentor. The mentorship program will work with beginning farmers to connect them with experienced farmers with a similar enterprise interest so that they will have a mentor that understands the challenges, both production and financial, that the operation will face. This will assist producers in translating the knowledge gained in the classroom to on-farm practical experiences. Kentucky Women in Agriculture and the Kentucky Cattleman's Association will assist in the identification and training of mentors. For more information contact Sarah Lovett (sarah.lovett@uky.edu), Lee Meyer (lee.meyer@uky.edu), or your county extension agent.

Cedar-Apple and Cedar-Quince Rusts Active in Kentucky

By John Hartman, U.K. Extension Plant Pathologist

Based on conspicuous symptoms being observed in Kentucky orchards and landscapes, this has been a good year for cedar-apple rust of apples and cedar-quince rust of hawthorns. Leaves of susceptible apples are covered with orange-yellow spots and hawthorn fruits are swollen and bright orange. Cedar-apple and cedar-quince rusts, caused by the fungi *Gymnosporangium juniperi-virginianae* and *G. clavipes*, are two of three cedar rust fungi common to Kentucky. The other one is cedar-hawthorn rust. Cedar rusts are widespread this year because wet spring weather favored infection of rosaceous hosts such as apple and hawthorn from spores produced on infected eastern red cedars (junipers).

Cedar-apple rust. Rust-infected apple leaves have been quite visible. These leaves first became infected in spring by spores produced on gelatinous orange protrusions formed on galls in nearby cedars.

Figure 9. Cedar-apple rust symptoms on apple leaves (P. Bachi photo).

Leaves are now showing bright yellow-orange spots (Figure 9) that produce spores on the underside of the leaf (Figure 10). These spores, called aeciospores, are carried by air currents to nearby cedar trees where they cause infections during moist summer weather.

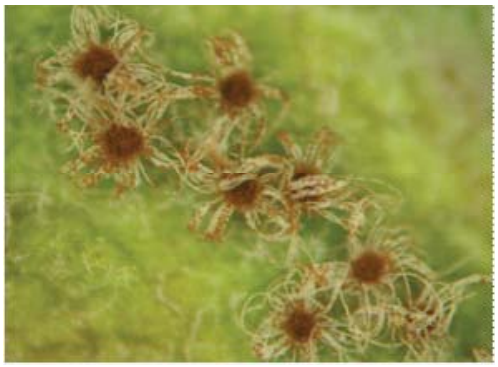

Figure 10. Cedar-apple rust aecia and aeciospores on apple leaf underside (P. Bachi photo).

Cedar-quince rust. Hawthorn fruit infection also occurred during the spring when the trees were in flower. Like cedar-apple rust, the inoculum for these infections came from nearby rust-infected eastern red cedars. In this case, the fungus appeared in spring as a bright orange gelatinous substance on slightly swollen infected cedar twigs and branches. On hawthorn, as summer progressed, infected fruits enlarged abnormally and are now covered with small white papery tubes called aecia (Figure 11) and a dusting of orange aeciospores (Fig-

Figure 11. Cedar-quince rust-infected hawthorn fruits with healthy green fruits nearby.

ure 12). Cedar-quince rust can also infect apple fruits, hawthorn thorns, and crabapple and hawthorn shoots, causing abnormal swelling and death of shoot tips. Like cedar-apple rust, aeciospores are carried by air currents to infect nearby cedar trees in summer.

Figure 12. Cedar-quince rust shedding orange aeciospores on hawthorn leaf from infected fruit above.

Disease management. Cedar rust diseases need to infect two different host plants in sequence to complete the fungus life cycle. Almost two years from now, after the ongoing infection by aeciospores this summer, the cedar-apple (Figure 13) and cedar-quince rust fungi will mature on cedar and produce more galls or swellings that will yield spores to infect nearby apple or hawthorn trees. In the meantime, infections of cedar that occurred during last year's moist summer will begin producing inoculum next spring to continue the cycle. Thus, these diseases occur almost every year in Kentucky.

• Normally, if disease control is needed, fungicides are applied to apples, hawthorns and crabapples in early spring to prevent rust infections. Cedars are not much damaged by cedar rust diseases.
• Cedar-apple rust springtime inoculum can be reduced by pruning out cedar galls or removing nearby cedar trees in winter. It is more difficult to find the cedar-quince rust infections on cedar during the dormant season, however.
• Avoid close planting of cedars and susceptible hosts like apple and hawthorn.

Fig. 13. Cedar-apple rust gall on Red Cedar.

Walnut Thousand Cankers Disease – A Potential Threat

By John Hartman, U.K. Extension Plant Pathologist and Lee Townsend, U.K. Extension Entomologist

Thousand Cankers Disease (TCD) is a recently recognized disease of walnuts (*Juglans spp*.). The disease results from the combined activity of the walnut twig beetle (*Pityophthorus juglandis*) (Fig. 17 & 18) and a canker producing fungus called Geosmithia. TCD has been active in the western United States for a decade but the cause was only recently described. TCD has been involved in several large scale die-offs of walnut, particularly black walnut (Juglans nigra), growing in the west. In the past few weeks, investigators in Tennessee may have found the first case of TCD in an eastern state. If TCD is present in Tennessee, it surely represents a threat to black walnut plantings in Kentucky.

Symptoms. Trees infected with the causal fungus first develop yellow leaves and eventually twig and branch decline and dieback (Figure 14). The fungus causes canker, visible by peeling back the bark, corresponding to the activity of the insect vector in the branch or limb (Figure 15).

Figure 14. Walnut yellowing dieback caused by thousand cankers disease (Photo by W. Cranshaw, Colorado State University).

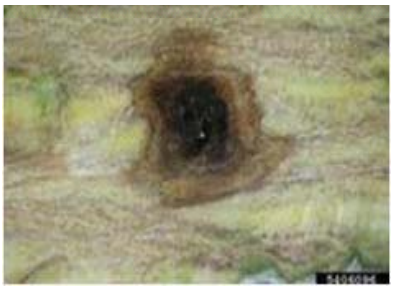

Figure 15. Canker on walnut limb caused by the fungus Geosmithia (Photo by N. Tisserat, Colorado State University).

When multiple cankers develop on the limbs (Figure 16) the vascular system is so disrupted that the limb dies. The combination of disease-causing fungus and insect vector is a lethal combination for walnuts.

Figure 16. Multiple coalescing cankers on walnut limb illustrate destructive potential of thousand cankers disease (Photo by N. Tisserat, Colorado State University).

Disease vector. The walnut twig beetle (Pityophthorus juglandis), the vector of Thousand Cankers Disease (TCD), is native to New Mexico and Arizona where its distribution follows that of Arizona walnut, the likely native host. This 1.5 to 1.9 mm long yellow brown bark beetle aggressively attacks black walnut and carries the pathogens associated with TCD. Contrary to its common name, beetle attacks are not confined to twigs; tunneling is most commonly seen in branches greater than 0.7 inches in diameter and sometimes in trunks.

The adult female begins to tunnel in walnut by early May to form a nuptial chamber with 1 or more radiating egg galleries. The small, white legless larvae develop below bark. A generation from egg to adult takes a little less than 2 months. However, adults can be present from mid-April through early October.

Urban and parkland trees have been infected with TCD. Kentucky arborists, homeowners, and woodlot owners need to be alert to the possibility of TCD and report suspicious cases of walnut decline to local County Extension Agents and foresters.

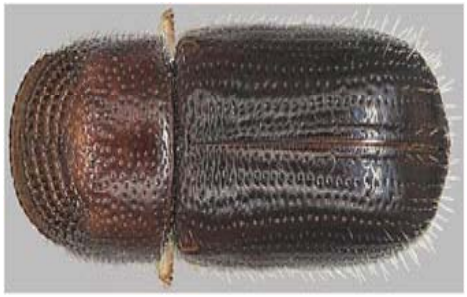

Figure 17 & 18. Dorsal and lateral views of the walnut twig beetle, the head is completely hidden from view, a characteristic of many bark beetles (Photo by J. LaBonte, Oregon Dept of Ag).

Phase-out and Cancellation of Endosulfan

The US EPA announced that they will cancel all uses of endosulfan (brand names include Endosulfan, Thionex, and [previously] Thiodan on June 9, 2010. The EPA published a five-year phase-out schedule based on the impact of the cancellation on various crops and the availability of alternatives at the end of July. It looks like most uses will be canceled on July 31, 2012, so it would be best to start thinking about using up excess supplies. For the fruit and nut crops use on plums, prunes, annual strawberries, tart cherries and walnuts will be cancelled July 31, 2012; pears on July 31, 2013; apples and blueberries on July 31, 2015; and matted row strawberries July 31, 2016. More crop-specific information can be found at http://www.epa.gov/pesticides/reregistration/endosulfan/.

Dwarfing Rootstocks for Peach

Jim Schupp, Rob Crassweller, Edwin Winzeler and Don Smith
Penn State Department of Horticulture

Orchard intensification is a proven method to increase the production of high quality fruit and hasten grower return on investment in apple; however the primary peach production system is low density open vase. This system has not changed significantly in over 150 years. A key missing factor needed for peach orchard intensification is an efficient size-controlling rootstock. Tree size control in peach orchards has potential to increase labor efficiency in this labor-intensive fruit crop, and to increase the usefulness of new labor-efficient technologies, such as labor platforms and mechanical thinners. We began rootstock trials at the Fruit Research and Extension Center (FREC) mainly to explore the potential for dwarfing effects, but rootstocks can impact orchard performance in other ways too. These include factors such as adaptation to climate (cold hardiness), adaptation to soil types (tolerance to wet soils), disease and nematode resistance, or productivity (increased precocity, yield or fruit size). These important factors are not limited to dwarfing rootstocks, so several non-dwarfing rootstocks were also included in these trials.

Pennsylvania participated in a 2002 NC-140 trial of Redhaven on eight different rootstocks. This planting had to be removed in 2006 after only 5 seasons of growth; however one dwarf and one semi-dwarf rootstock in this trial showed early promise and have been included in new trials. Further study of these and other new rootstocks is again underway to determine how well these trees survive and perform under our conditions, and what the final tree size of each will be at full maturity.

Four plantings were established in 2008, and one in 2009 to evaluate a number of potential size controlling rootstocks using regionally-important varieties. The rootstocks under consideration purportedly range in tree size from standard to semi-dwarf through fully dwarf (Table 1), and thus may provide growers with a range of size control options, as is the situation with apple. The 2008 trials include nine rootstocks with the variety Johnboy. The trial plantings were established at the FREC in Biglerville, the Horticulture Research Farm (HRF) at Rock Springs, and at grower sites in Franklin and Adams Counties. One of the commercial sites is a high density perpendicular V planting, while all others are conventional open vase systems at wider spacing. The Rock Springs location was selected to provide a challenging site for cold hardiness evaluation.

The 2009 NC-140 project tests Redhaven on 16 rootstocks. This trial is planted at several locations throughout North America. The trees in both years were planted and maintained with support provided by the State Horticultural Association of Pennsylvania and Penn State's Agricultural Experiment Station.

Seven of the rootstocks are peaches. Lovell and Bailey are included as local standards, and Guardian is included in the NC-140 trial as the southeastern U.S. standard, where it is used for its tolerance to peach tree short life complex. All three of these rootstocks are propagated as open pollinated seedlings. Two HBOK selections from California exhibit tree size control, while little is known about tree size from two new "KV" selections from Ralph Scorza's breeding program in Kearneysville, WV. Four rootstocks are plum; one being a selection of *Prunus Americana* with potential for dwarfing from Bailey's nursery in MN. The other three are European plums from Italy. Penta, now named Empyrean®2, performed well in earlier trials. Both Penta and Tetra reportedly provide some tree size control and are tolerant of heavy wet soils.

Twelve of the rootstocks are *Prunus* hybrids that contribute traits that peach rootstocks lack, such as tolerance or adaptability to cold winter temperatures, poor soil drainage, or soil alkalinity, as well as tree size control and/or disease resistance. Bright's Hybrid#5, Empyrean®1, Atlas and Viking are examples of high vigor rootstocks with broad tolerance to poor soils and with good disease resistance that are selected for replant sites where standard rootstocks fail to thrive.

There is much interest in the northeastern and mid-Atlantic U.S. about the Kyrmsk series of rootstocks from Russia. These rootstocks are reportedly very tolerant of cold winter temperatures and heavy soils, while Krymsk 1 and 2 offer a good degree of dwarfing. California rootstocks, Controller 5 and 9 are reportedly 50% and 90% the size of peach seedling trees respectively. Over the next 10 years these rootstocks will be evaluated for survival, adaptation to the climate, tree size control, yield, fruit size and quality and freedom from physiological defects, such as graft incompatibility or root suckers.

Krymsk 1

Lovell

Controller 5

Receiving Fruit Facts Electronically on the Internet

Fruit Facts is available on the web in the pdf format. To get notification of the monthly Fruit Facts posting automatically and approximately two weeks earlier than it would normally be received via mail, you can subscribe to the UK College of Agricultures's Fruit Facts listserv.

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