

the BeeLine

Fall 2018

Newsletter of the Western Cascade Fruit Society



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PFC
Fruit Show
Oct. 27,
2018

Peninsula Fruit Club, Apple I.D. Team: (L to R) Dr. Bob Norton of Vashon Island, Jean Williams of PFC, Shaun Shepherd of HOS, Lori Brakken of Seattle Tree Fruit



Dr. Bob Norton, VIFC and Jean Williams, PFC



Bill Horne, 2018 Master Gardener of the Year Nominee. Bill has been a MG for Pierce County since 2005, serving over 3,750 hours as a teacher, clinic director, and county board officer.



The BeeLine is a quarterly publication of Western Cascade Fruit Society, a non-profit 501(c)3 corporation in the State of Washington.

NCGR, Corvallis, Oregon

Tissue Culture Program Phasing Out

The USDA Agricultural Research Service genebank, the National Clonal Germplasm Repository (NCGR) in Corvallis, has just begun a new five year project as part of their long term goal of preserving and maintaining the national collections plant genetic resources of temperate fruit, nut, and specialty crops. They preserve hazelnut, strawberry, hops, mint, pear, currant, gooseberry, blackberry, raspberry, blueberry, cranberry, and lingonberry genetic resources. This germplasm is highly used by breeders and researchers interested in crop development.

A Stakeholder meeting at the NCGR was held September 18, 2018, at which Marilyn Couture, OOS, was invited to attend. Representatives of each of these crops convened and proceeded with developing the NCGR project.

Listed below are the largest NCGR accessions:

genus	accessions
Pyrus (Pear)	2349
Rubus (Blackberry, Raspberry)	2179
Fragaria (Strawberry)	1942
Vaccinium (Blueberry, Cranberry)	1854
Ribes (Currant, Gooseberry)	1282
Corylus (Hazelnut)	840
Humulus (Hops)	626
Mentha (Mint)	455

In the past Joseph Postman, Director and Pear Collection Curator, has used meristem tissue culture to eliminate viruses from infected trees and berries, but it has been many years since he has done much virus therapy work. WCFS has been dependent upon NCGR, Corvallis, for receiving plant material in a disease free condition.

One of the reasons for gathering germplasm users for a “stakeholder meeting” was to share their plans and ask for suggestions for downsizing in the face of future budget uncertainties. One thing they will be doing at the end of this fiscal year (September 30, 2018) is phasing out the tissue culture program so that they can focus resources on their primary goal of preserving and maintaining greenhouse and field collections.

The ARS pear genetic program is moving to Wenatchee where the Washington Tree Fruit Research Commission funds research on apples, cherries and stone fruits.

We need to maintain and enhance germplasm for breeding – without germplasm there is no breeding.

Marilyn Couture, OOS

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NCGR Research Project

Interstem Grafts to Evaluate Pear Germplasm for Dwarf Potential

Joseph Postman, Director and Pear Curator

Start Date: May 1, 2017

End Date: Jun 30, 2019

Objective:

1. Examine whether interstem grafts can be used to identify pear selections that have dwarfing potential.
2. Provide a rapid assay for screening pear germplasm for prospective rootstock candidates.

Approach:

Approximately 40 pear selections will be evaluated for dwarfing potential by using them as interstems, grafted onto Bartlett seedling rootstocks. Some of these selections are known to be either dwarfing or vigorous when scions are grafted onto them directly. Scion cultivars Bartlett and Bose will be simultaneously grafted onto the interstem pieces. Grafted trees will be grown in pots for the first growing season. Vegetative growth of cultivar scions (stem diameter and height) will be evaluated at the end of the first growing season. Trees will be planted in a replicated field trial for another year.

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Controlling ants organically

Ron Weston, President WCFS

I've had a serious problem with thatch ants attacking my fruit tree blossoms these past several years--our orchard is next to a large wooded area with substantial numbers of these ants. I've successfully blocked their access by placing a band of sticky tangle-trap around the trunks of each tree and any support structures that would provide a pathway into the trees. You may need to tend these bands because over time enough ants trapped by the barrier or wind blown vegetation can provide a bridge over it. However, this method works for me, and without it the fruit blossoms would be devoured--eliminating any fruit set.

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Fall Nutrient Management Tree Fruit WSU Tree Fruit News, Oct. 15, 2018.

Why apply nutrients in the Fall?

Plants need light, carbon dioxide (CO₂), water (H₂O), and minerals for their development, growth, and for producing quality fruit (Marschner 2002). Most nutrient uptake occurs through the roots, between bloom and the rapid vegetative growth phase. In most perennial tree fruit, however, initial Spring growth and early fruit development rely mainly on reserves accumulated the previous season (Weinbaum et al., 1984). There is evidence that Fall applications of nutrients can help in building up reserves for the subsequent year's critical early growth (Nielsen et al 1996; Lang 2005).

The macronutrients nitrogen (N), potassium (K), phosphorous (P), calcium (Ca), magnesium (Mg) and sulfur (S), should always be managed through the soil, unless there are absorption problems such as poor root volume or alkalinity. Micronutrients, on the other hand, can be managed effectively and efficiently with foliar sprays, especially under low or high soil pH (below 6.0 and above 7.5), coarse texture soils (sandy or gravelly soils), and if needed early in the season when root uptake is low. Foliar applications of micronutrients are effective, however, keeping their level in the soil within adequate levels is always beneficial for root growth and tree health.

Fall nutrient sprays can be utilized for different purposes; to ensure adequate reserves for following season, to manage vigor and return bloom or for disease control. So, before one decides to spray nutrients or not, is important to define your goal. In the following I provide a few examples and things to consider.

Fall sprays to build reserves and overall nutrient management

Fall sprays are recommended for nutrients that are mobile in the plant and can be stored for the following season, or nutrients that are needed early in the spring when root uptake is not efficient (Fageria et al., 2009). Fall sprays will be positive and effective only when the trees are deficient for that particular nutrient. Under adequate nutrient condition, foliar sprays are ineffective (Wojcik and Morgas 2013) and can also lead to toxicity.

Orchard deficiency can be predicted with leaf tissue analyses during summer (<http://treefruit.wsu.edu/leaf-tissue-analysis>) and visual analyses of symptoms. Some metals have characteristic symptoms, however if your soils are alkaline, calcareous or with pH above 7.5, you most certainty will need Zn on a frequent basis.

Nitrogen is the only macronutrient that has been recommended for fall sprays because it can be stored and remobilized during early development. Nitrogen and carbohydrate reserves are the main source for initial growth and early fruit development in most tree fruit species, most importantly in fruit that have short and early development or in those where pollination happens before leaves are fully expanded such as cherries, apricots, peaches, nectarines, apples and pears (Nielsen et al. 1996; Lang, 2005).

Leaf tissue analyses obtained during the summer, combined with assessment of the overall tree vigor are the best indicators for nitrogen deficiency (Righetti et al. 1998). Fall nitrogen sprays have also been suggested when the trees were cropped heavily and appear weak after harvest.

Micronutrients. Among the micronutrients, boron (B) and zinc (Zn) are most frequently recommended for fall application. Deficiency of both nutrient have been reported widely in the PNW region due to extensive areas with high soil pH and sandy soils (Nielsen et al. 2004, Peryea et al, 2003). Boron is needed early in the season for new growth; root and shoot tips, pollen tube growth and fruit set (Wojcik and Wojcik 2006) and early fruit development and quality (Cheng and Raba, 2009). Fall applications can increase boron content when deficient, for early spring growth. However, Peryea et al. (2003), reported that boron maintenance sprays in apples and pears are more effective at pink flowering stage and mentioned that postharvest sprays haven't been widely adopted in apples due to logistics and efficacy in later harvest dates.

Zinc, also has low mobility in plants and it is needed early in the season for carbohydrate metabolism, fertility and seed production. Deficiency can be easily observed in younger leaves with interveinal chlorosis and shortened internodes, most frequently in cold, wet soils, or in soil with a high pH (above 7.5), where Zn becomes unavailable. Fall and dormant sprays have alleviated Zn deficiencies in tree fruit (Nielsen and Nielsen 1994). For leaf nutrient sprays, mixing micronutrients with urea have shown improved uptake (Fernandez et al. 2013; Sanchez and Righetti 2005).

There are several formulations for each nutrient. Always check the label recommendation. To calculate the amount of product based on the actual amount needed, divide the actual amount recommended by the percentage of the element indicated in the label.

Fall nutrient spray should be done when growth has ceased as it can increase danger of winter freeze damage when promoting new growth (Righetti et al. 1998), but before natural leaf fall (green leaf), to ensure absorption and remobilization to the roots. Cont. on page 4

From pg. 3.

Fall sprays to manage vigor and return bloom

If you have excess vigor in your orchard, avoid nitrogen during the fall. On the contrary, if you need more vigor in your orchard, fall nitrogen can help develop reserves. Nitrogen deficiency have also been associated with inducing biennial bearing. If you are in your “off year” and you expect higher cropping the following year, fall nitrogen can increase vegetative to fruit relation, and vice versa, when expecting low crop, avoid fall nitrogen.

For disease prevention

Some fall nutrient sprays can help prevent fungal diseases. Copper (Cu), for example it is utilized as a fungicide although its application can also help if the copper is deficient.

Fall sprays of urea have also been utilized to induce leaf drop. The concentration should be higher than that used as a fertilizer. For example, urea at 5% has been utilized to reduce inoculum of *Venturia inaequalis* responsible for apple scab (Qazi et al. 2005).

The effect of high rates of urea, in some cases also combined with zinc sulfate, seems to be associated more to a toxic effect, which induces leaf drop earlier in the season, before cold or rain can increase the probability of the infection through the leaf scar. Ouzounis and Lang (2005) also indicated that urea spray for early defoliation improved cold acclimation in cherries.

Summary

- Fall sprays are beneficial and effective only when the trees are deficient for that particular nutrient.
 - Fall nitrogen applications can help in building up reserves for the subsequent year’s critical early growth.
 - Fall zinc and boron spray can benefit reproduction and early fruit development.
- Fall spray should be done when growth has ceased but before natural leaf fall.

For more information:

Sallato, 2018. Leaf tissue analysis. Fruit Matters. <http://treefruit.wsu.edu/leaf-tissue-analysis>

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Scientists thought they had created the perfect tree. But it became a nightmare.

Jennifer Heffner/For The Washington Post, Adrian Higgins, Gardening columnist Sept. 17, 2018

Pyrus calleryana, or the Callery pear, is a species of pear tree native to China and Vietnam, in the family Rosaceae. It is most commonly known for its cultivar 'Bradford', widely planted throughout the United States and increasingly regarded as an invasive.

The U.S. Agriculture Department scientists who gave us the Bradford pear thought they were improving our world. Instead, they left an environmental time bomb that has now exploded.

From the 1960s to the 1990s, the Callery pear was the urban planner’s gift from above. A seedling selection named Bradford was cloned by the gazillion to become the ubiquitous street tree of America’s postwar suburban expansion.

It was upright and symmetric in silhouette. It exploded with white flowers when we most needed it, in early spring. Its glossy green leaves shimmered coolly in the summer heat, and in the fall, its foliage turned crimson, maroon and orange — a perfect New England study in autumnal color almost everywhere it grew. And it grew everywhere. It flourished in poor soil, wet or dry, acidic or alkaline. It shrugged off pests and diseases, it didn’t drop messy fruit like mulberries or crab apples. Millions of Bradford pears were planted from California to Massachusetts. However, the Bradford pear crossed over to something darker. It turned from thornless to spiky, limber to brittle, chaste to promiscuous, tame to feral. Most of all, it became invasive.

It is squeezing out native flora and reducing biodiversity. As eye-catching as the flowers are, they are simply the start of the seasonal march of this invader. Six months after the blooms appear, clusters of seedy berries attract birds. In the bird’s droppings, the seeds will germinate and advance, becoming ever more genetically diverse in the process and making the pear ever more adapted to its own spread.

The Callery pear, first brought to the States in 1908, was highly resistant to fire blight and originally was going to be used as a rootstock onto which varieties of the European pear could be grafted.

It is up to future generations to try to contain the Bradford pear and other invasives in the hope that one day scientists can find a way to eradicate them. It is a problem that scientists could not have envisioned a century ago, but the Bradford pear persists as a case study in how even the brightest scientific minds can be blind to what they might be creating long after they have gone.

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Regional variation in juice quality characteristics of four cider apple cultivars in northwest and central Washington

Alexander, T. R., J. King, A. Zimmerman, and C.A. Miles. 2016. HortScience 51(12):1-5.

In this study, four cider apple (*Malus × domestica* Borkh.) cvs., Brown Snout, Dabinett, Kingston Black, and Yarlington Mill, were collected from four orchards, two in northwest Washington and two in central Washington, to compare juice quality characteristics. Northwest Washington has a cool, humid summer climate (16.0 °C on average during this study) and is the origin of the state's cider apple industry, while central Washington has a hot, dry summer climate (22.1 °C on average during this study) and is the center of the state's dessert apple industry. Each year from 2012 to 2015, fruit of the four cultivars was harvested and stored at each orchard until it was collected.

Fruit were pressed and the juice analyzed for five quality characteristics important to cider making: soluble solids concentration [SSC (percent)], specific gravity (SG), pH, titratable acidity [TA, malic acid equivalent

(g.L-1)], and tannin [tannic acid equivalent (percent)].

Harvest dates and climate data were recorded annually for each orchard location. There were no significant differences in any of the juice quality characteristics due to region and no significant interaction of region, cultivar, and/or year. Results did show, as expected, a significant difference in all five juice characteristics due to cultivar. 'Brown Snout', 'Dabinett', and 'Kingston Black' were higher in SSC and SG than 'Yarlington Mill'; Dabinett had the highest pH and lowest TA while 'Kingston Black' had the lowest pH and highest TA; and tannin was highest in 'Yarlington Mill' and lowest in 'Kingston Black'. There was also a difference in SG and tannin due to year; SG was lowest in 2013 while tannin was highest in 2012. The difference in SG from year to year may be a result of variable year-to-year storage time at each orchard prior to collection of fruit. The difference in tannin from year to year was likely due to climatic variation over the four years of the current study.

On average, growing degree days increased 10% and chilling hours decreased 10% from 2012 to 2015 in both regions. Classification of the four cultivars included in this study differed from historical records at the Long Ashton Research Station (LARS) in England; in this study the four cultivars exhibited tannin levels below 0.20% and would not be classified as bitter, unlike their historical classification at LARS. Results from this study indicate that variations in juice quality characteristics occur between cultivars as expected and occur within a cultivar from year-to-year, but for the four cultivars included in this study variations did not occur due to production region in Washington.

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WCFS meeting Saturday, January 12, 2019, 10:00am

Zoom audio and video conferencing by computer, as well as telephone conferencing is a useful tool. The paid subscription for our group would be \$14.99/month. Both free and paid subscriptions permit 100 participants. Marilyn Couture and Patti Gotz will test Zoom prior to the next teleconference.

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Be on the lookout for weeds that do not die

Growers in Canada watch for herbicide resistance
Peter Mitham, Good Fruit Grower, Nov. 6, 2018

Orchardists have been alerted to be on the lookout for herbicide-resistant weeds which could compete for nutrients with mature trees and make it harder to establish new plantings.

They are reporting Roundup-resistant weeds in two or three species in particular, clover and lambsquarters.

Pressure from herbicide-resistant weeds is greatest during the initial years of an orchard's establishment. During the establishment phase, root growth is absolutely essential. You can't damage the roots, so often reliance is on chemical control or hand-weeding.

Weeds compete with trees for nutrients, especially in high-density systems where the trees have shallower root systems than in the old full-size orchard blocks. The competing weeds can also grow into the orchard canopy as well as infrastructure such as irrigation lines, especially the new micro-sprinklers growers are adopting for more efficient water use.

"Weeds can obstruct the water, and then you end up with lots of rain shadow," David Machial, chair of the BC Fruit Growers' Assn. said. "You're not getting the full irrigation coverage that you need."

Growers should start using other chemical groups and start rotating to manage it. That's what we do with our other pests, so logically it makes sense to do that with our weeds.

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WHEN TO PICK PEARS

by R.A. Norton, J. King, and G.A. Moulton

A frequent question at the extension office at this time of the year is: When should I pick my pears? Most people know that if you let pears ripen on the tree, they are likely to break down at the core and be soft and mushy when eaten or canned. Commercial growers use a pressure tester to determine proper pear maturity for harvest. By determining the pressure necessary to puncture the flesh, they can determine when pears are ripe enough to pick, but not overripe. What do people do if they don't have such an instrument? In most years we can determine within a week or two, when individual pear varieties should be getting close to proper maturity.

The following list should cover western Washington fairly well. Choose the earlier date for Southwest Washington and the later date for more northerly and colder areas.

Clapp Favorite Aug 20-Sep 1
 Bennett Aug 22-Sep 3
 Bartlett Aug 25-Sep 5
 Aurora Aug 19-Sep 9
 Rescue Aug 25-Sep 10
 Orcas Aug 28-Sep 15
 Serrine Sep 4-Sep 10
 Flemish Beauty Sep 10-Sep 26
 Seckel Sep 25-Oct 9
 Comice Sep 19-Oct 9
 Highland Sep 25-Oct 12
 Anjou Sep 25-Oct 15
 Bosc Sep 25-Oct 15
 El Dorado Oct 1-Oct 21

The next step in determining picking is ease of fruit removal. If you notice several pears dropping from the tree, it may already be too late, but it is a sign they should all be picked. Better yet, every few days as you approach the harvest period shown above, give the pears a lift test. Put your index finger on the stem and lift the pear from the normal vertical orientation to a horizontal or flat position, with a slight twist. If the fruit snaps off between the stem and the twig, the pears are ready to strip from the tree. If you have to wrench off the fruit either breaking the twig or the fruit stem, the fruit is probably not ready. In larger trees, fruit growing in the top often ripens earlier than fruit in the shaded interior.

Certain late ripening pear varieties such as Anjou, Bosc and Comice, may not ripen properly if just picked off the tree and allowed to ripen normally. These varieties, particularly Anjou, need 3-4 weeks of storage at 32-45 degrees Fahrenheit in the refrigerator or possibly in a root cellar. Some kind of wrapping to reduce shriveling is a good idea.

Asian pears? These are easy since they ripen on the tree. Simply sample them from time to time as they ripen from greenish to various shades of yellow or orange. When they taste good, pick them. You don't have to harvest them all at once, but if they are left on the tree too long, they may develop a winey taste you may not like.

Fruits which do not ripen after picking: blackberries, blueberries, cherries, grapes, plums, raspberries, strawberries, and watermelons. Fruits which do ripen after picking: apples, apricots, peaches, and pears.

This article is from BeeLine 2010, but is worth repeating.

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Pollination – Pear

Pear blossoms have a short season and the small amount of nectar produced is not attractive to bees. Twice as many bees should be available to pears than for other fruits. Move bees into the pear orchard when the trees are in one-third bloom. Although Anjou and Bartlett are partially self-fruitful, they should be cross-pollinated to produce heavy and regular crops. Bartlett, Comice and Hardy may set large crops of parthenocarpic fruit. European and Asian pears will cross-pollinate if blooming at the same time. Bartlett is an excellent pollinator.

Resources:

Orange Pippin Fruit Trees – website has a fruit tree pollination compatibility checker tool and several other useful online tools.

Raintree Nursery – website has nice European pear compatibility chart.

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Ginger Pear Preserves Recipe

5-1/2 cups finely chopped cored peeled pears (about 8 medium)
 Grated zest and juice of 3 limes
 2-1/3 cups granulated sugar
 1 Tbsp freshly grated gingerroot

COMBINE pears, lime zest and juice, sugar and gingerroot in a large stainless steel saucepan. Bring to a boil over medium heat, stirring to dissolve sugar. Boil, stirring frequently, until mixture thickens, about 15 minutes. Remove from heat and test gel. If preserves break from spoon in a sheet or flake, it is at the gel stage. Skim off foam. Note: pectin may be added while boiling. LADLE hot Ginger Pear Preserves into hot jars leaving 1/4 inch headspace. Remove air bubbles. Wipe rim. Apply lid and band until fit is fingertip tight. Place jar in boiling water canner. PROCESS jars in a boiling water canner for 10 minutes.

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Urea Spray for Cherries

Lynn Long

Dr. Greg Lang of Michigan State University has found that late summer or autumn urea sprays increased the shoot hardiness of the cherries that he tested and produced up to 20% larger spur leaves in the spring. As a whole, throughout the growing season, the spur leaves are the most important leaves for supplying nutrients to developing fruit. Greg speculates that if the spur leaves are larger then photosynthesis is increased and there are more carbohydrates being exported to the developing fruit.

In his trials Greg applied two applications of low biurate urea as a foliar spray. An application on August 31 and a second application about one week later actually gave the best uptake of N into spur tissues and provided earlier acquisition of cold hardiness in the year that it was treated. However, application can be made up to leaf fall.

Each application should consist of 15 to 20 pounds of actual N/acre. Dilute sprays of 250 gallons/acre are possible, but some leaf burn at the leaf margin should be expected with these dilute sprays. Concentrate sprays ranging from 25 to 75 gallons/acre showed less phytotoxicity when applied with a curtain-type sprayer (small volume, small droplet size). The reduced toxicity which was noted with the concentrate sprays is probably due to less pooling of the material along leaf margins and therefore less burning of the foliage.

It is also a good idea to apply boron in the fall. Studies show that there is greater boron uptake in the fall while leaves are still on the tree than during a delayed dormant application in the spring.

<http://www.capitalpress.com/Orchards/20180115/long-crowned-2018-cherry-king-for-work-in-nw-industry>

Submitted by Judi Stewart

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Weed Killer!

In one gallon of vinegar dissolve 2 cups of Epsom salt and 1/4 cup of liquid dish detergent. It really works!

Jim House, OOS

Peach Tree Leaf Spot: Bacterial Spot On Peach Trees

Amy Grant, University of Georgia Plant Pathology

Bacterial leaf spot of peach, also known as bacterial shot hole, is a common disease on older peach trees and nectarines. This peach tree leaf spot disease is caused by the bacterium *Xanthomonas campestris* pv. *pruni*. Bacterial spot on peach trees results in loss of fruit and the overall malaise of trees caused by recurrent defoliation. Also, these weakened trees are more susceptible to winter injury.

Symptoms of Bacterial Leaf Spot of Peach Trees include angular purple to purple-brown spots on foliage, followed by the center of lesion falling out, giving the leaves a “shot hole” appearance. Leaves soon turn yellow and drop. Fruit has small water-soaked markings that enlarge and merge to eventually cover large areas. Cracking or pitting occurs along the lesions as the fruit grows, enabling brown rot fungus to infiltrate the fruit. Bacterial leaf spot also affects current season growth. Two types of cankers can be spotted on twigs. “Summer cankers” appear on green twigs after leaf spots can be seen. Cankers are sunken and circular to elliptical. “Spring cankers” occur late in the year on young, tender twigs but only appear the following spring at buds or nodes right around the time the first leaves emerge. Bacterial Spot Life Cycle The pathogen for bacterial spot overwinters in protected areas such as cracks in the bark and in leaf scars that were infected the previous season. As temperatures rise over 65 degrees F. (18 C.) and budding begins, the bacteria begin to multiply. They are spread from cankers via dripping dew, rain splashing or wind. Severe fruit infections occur most frequently when there is ample rainfall combined with high humidity. The infection is also most severe when the trees are planted in light, sandy soil and/or if trees are stressed. Check with your local extension office for resistant varieties. Chemical spray with copper based bactericide and the antibiotic oxytetracycline have some effect used preventatively.

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Scab control

Time to work on your scab control. Since the scab fungus overwinters in the infected leaves or fruit on the ground, you can reduce the inoculum load in the orchard by helping the leaves to decompose faster and cleaning up dropped fruit.

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Apricots

U. California Extension, 2015.

Apricots are native to parts of Asia. They are hugely popular in Middle Eastern countries, with Turkey and Iran being the world's largest producers of the fruit. Spanish missionaries are credited with introducing the apricot to California, which is the leading state of apricot production within the United States. Plums and apricots are genetically very similar and thus can hybridize making pluots (75 percent plum, 25 percent apricot), plumcots (50 percent plum, 50 percent apricot), and apriums (75 percent apricot, 25 percent plum) (University of Illinois – Extension, 2010).

Today, nearly 85 percent of the apricots grown in the United States come from California. The remainder largely comes from Washington.

Apricots primarily mature in early summer, making them one of the earliest available summer fruits. The marketing season for apricots is from May 15 to July 5 for California; June 10 to August 15 for Utah; and June 20 to August 1 for Washington, according to the National Agricultural Statistics Service. Currently, about 40 percent of U.S. apricot production is sold fresh and commands a price almost three times higher per ton. The remaining 60 percent is destined for the processing sector (NASS, 2015).

Although fresh apricots demand a higher price, they also demand more finesse during harvesting. Apricots are very delicate; therefore apricots destined for the fresh market must be picked by hand and when still firm. A common way to add value to fresh market apricots is to plant varieties that will ripen over an extended period of time. Some varieties of apricots such as Blenheim cannot be shipped fresh because they are so delicate. Selling these types of apricots locally at farmers' markets or processing them are ways to add value. Processed apricots are mainly dried, canned, frozen or made into jams and jellies (Apricot Kings Orchards, 2015).

Like most stone fruits, apricots thrive in a Mediterranean climate, needing a warm and dry growing season, but plenty of irrigation. All stone fruits depend on a considerable amount of high quality water for successful production and desirable fruit size. Stone fruits are not tolerant of high salinity levels or toxic elements, including boron chloride and sodium. Both water availability and quality must be determined before establishing any orchard. Drip and flood irrigation are the two most commonly used irrigation methods for apricots. Planting apricot trees on berms is recommended if using flood irrigation. Apricots also require a decent amount of chilling hours (700 to 1,000 hours at or below 45 degrees Fahrenheit) to induce flowering (University of California – Extension, 2012).

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Lewis apricot

Russellville Nursery Co., Portland, Oregon. Originated with H. A. Lewis, Russellville, Oregon, about 1895 from a seed of a Russian apricot. Fruited first in 1898 and introduced by Mr. Lewis about 1900. Fruit large. Flesh not stringy, but mellow, juicy, rich and sweet. Tree vigorous and productive. July and August. H. A. Lewis was Marilyn Couture's great grandfather. The Lewis cot appears lost.

Proceedings of the Thirty-sixth and Thirty-seventh Meetings of the American Pomological Society 1919-1921, St. Louis and Columbus, MO, 1920

Submitted by Editor, Marilyn Couture

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Pluots, Apriums, Plumcots, Apriplums: What's the Difference?

August 6, 2015 by Sara Yoo

All four of these fruits are hybrids that combine varieties of plums and apricots, and the differences are subtle. Plumcots are first-generation descendants of a 50-50 plum and apricot cross. In the 1980s, Zaiger Genetics trademarked the term "pluot," a term that refers to dozens of varieties, from Dapple Dandies to Flavor Grenades that have a higher plum-to-apricot ratio.

Like pluot, "aprium" is a Zaiger Genetics-trademarked name bestowed upon a plum-and-apricot-crossed fruit, only this time, apriums have a higher apricot-to-plum heritage. These hybrids resemble apricots, down to the orange flesh and slight fuzziness. Apriplums have a long history like the plumcot, and these days, the term is used to describe apricot-plum crosses not created by Zaiger.

As a result of their heritage, plumcots and pluots have a flavor closer to plums, and apriplums and apriums taste more like apricots. One thing these hybrids have in common is intense sweetness, thanks to their high sugar content. Use them in pies, crumbles, salads, and dishes that call for other stone fruits.

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Grow a Plum or Pluot in your Garden

by Thea Fiskin, UC Master Gardener

There are approximately 250 varieties of plums grown in California. There are two main categories of plums: European, *Prunus domestica*, and Japanese, *Prunus salicina*. There are also hybrids known as Pluots, which are a cross between a plum and apricot. Plums can be as small as a cherry or as large as a baseball, depending on the variety. The ripening season is June thru October. Japanese plum varieties ripen first; pluot varieties usually ripen at the end of summer. Plums and pluots can be enjoyed fresh, dried, or canned as jelly, jam or as juice.

European plums were probably introduced to the United States by the pilgrims, and might have been on the Thanksgiving menu in 1621. Fruits of European plums varieties can be yellow, red or green, but purple-blue are the most common. Most European plums do not require a pollinator. Prunes are usually made from the varieties richest in sugar, which are the French, Imperial, Italian and Green Gage.

Japanese plums are originally from China and were introduced to the United States in the 1870's. Generally, they are larger, rounder (or heart shaped), and firmer than the European. They are also more disease-resistant and vigorous. Varieties of Japanese plum fruits are yellow or light red, but never purple-blue.

Pluots are genetically one-fourth apricot and three-fourths plum. The fruit's smooth skin closely resembles a plum--it is solid or speckled and ranges in color from yellow-green to black. Pluot flesh is white to red. Pluots are generally larger than plums and higher in sugar content; they are a flavor delight.

Pluots, like plums, will need a pollinator of a different variety for good fruit set. Most will pollinize with another pluot, or certain varieties of plum. There are approximately 20 varieties of pluots.

Standard plum trees can reach 30 feet tall and 25 feet wide, but for the home garden, it is much more convenient to keep the trees smaller with pruning.

Winter is the time to prune plum and pluot trees. Remove any diseased or broken limbs and prune any overlying shoots by either heading them back to a side shoot or removing them altogether. Thin out remaining branches for shape. Winter is also the time to spray plum and pluot trees with a dormant oil to control aphids, mites, scale and any other pest eggs that might be overwintering.

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Acidifying Soil for Blueberries

Blueberries are acid-loving plants that require a soil pH between 4.5 and 5.5 to thrive. They will not perform well in soils with a higher pH. It is best to test your soil pH and acidify it before planting. If the pH is between, 5.5 and 6.5, add an acidifying agent. If the pH is much above 6.5, it will be difficult to acidify the soil adequately. Plant your blueberries elsewhere.

Elemental sulfur is the most cost-effective acidifying agent. Sawdust, ammonium sulfate, and sphagnum peat are only weak acidifiers; aluminum sulfate is toxic to blueberries; and, contrary to popular opinion, neither coffee grounds nor pine needles do much to acidify soil.

Apply sulfur based on the starting pH and soil texture. Heavier soils (soils with more clay in them) require more sulfur to achieve the same acidification. (See below.) Work the suggested amount of sulfur into the top 8 inches of soil.

Recommended pounds* of sulfur to lower soil pH to 4.5

Starting pH	Pounds of sulfur per 100 square feet		
	Sand	Loam	Clay
5.0	0.4	1.2	1.9
5.5	0.8	2.4	3.7
6.0	1.2	3.5	5.3
6.5	1.5	5.6	7.0

*One pound of elemental sulfur is equal to about 2 cups.

From: Otto, S.B. The Back Yard Berry Book. Ottophysics; Maple City, Michigan; 1995.

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Growing Apples for Storage

John Saltveit, HOS, Pome News, 2018

A few years ago, I was talking with the late Jerry Shroyer and he told me about a problem he had. “Too many apples,” he complained. I thought the concept absurd, but amusing.

Since my early years of harvesting apples, I wanted to grow more storage apples. I love the flavor of home-grown apples ripened on the tree—selected cultivars I enjoy best—grown in great soil I have invested in over time. And in my case, organic. However, there are only so many apples I can eat per day. After four, the value of each additional one diminishes. Another problem I had was no home-grown apples between January and July.

I researched which varieties would store well for an extended time. An important fact I learned was that apples are one of the best keeping fruits. This appears to be because they thrive in cold, northern regions. For centuries, our forebears saved and cultivated varieties that would store a long time. Modern mankind is the beneficiary of this endeavor.

Ted Swenson wrote an article many years ago about how the old timers used to grow sour storage apples because the sour flavor prevented bugs and diseases from taking over. In addition, the sour flavor dissipated quickly after harvest, so those same apples would be just right for eating after a bit of storage time.

Some of the cultivars I initially grafted were ones I liked best: Winesap, King David, Northern Spy, and Mammoth Black Twig. They also stored well. There were others that were said to store well, but I had never tried: Glockenapfel, Sturmer Pippin, Topaz and Altlander Pfannkuchenapfel. One of the problems I had working with grafts is that it could take years for some cultivars to bloom, set, and produce fruit.

As my trees matured, they began bearing more varieties and more apples. I think the addition of mason bees had a lot to do with it. Actually, probably everything helped: diversifying the orchard, improving soil health, and improving drainage.

At first, it was exciting to see apples store a month later each year. I would go into my unheated toolshed, check on the condition of the apples, and decide which one to eat next. After a year years, I was able to store some apples until April. Last year I finally understood what Jerry was talking about. Instead of just making it into May, which was my old record, my supply of apples lasted into June. Then July arrived with apples still remaining. Hey! I’d achieved my goal! I didn’t need to store apples longer than July. By then I had freshly picked summer apples ready to eat.

So which varieties proved to be the best keepers for me? That’s both an easy and a hard question.

The easy answer is that, for now, Gold Rush is by far my best storage apple. It lasted spectacularly into July. Ironically, storage wasn’t the reason I started growing it. I selected it originally because I loved its strong, tart, aggressive flavor. This variety is one of the few apples I have on its own tree. Alas, this year my Gold Rush didn’t set a single apple, so it appears to bear biennially.

The harder question is which cultivar will be my best storage apple in the long run. King David and Spitzenberg have been solid throughout, but I don’t think they will eclipse Gold Rush. Allan’s Everlasting is supposed to be great, but I haven’t harvested enough apples yet to properly evaluate. My Northern Spy is just now coming into production and looks great, as does my Sturmer Pippin, but it’s still too early to tell how many apples of each I’ll harvest this year. Altlander Pfannkuchenapfel is now producing lots of fruit and seems to be a contender.

So, for now, my best storage apple is Gold Rush. Only future harvests will determine whether another cultivar tops it.

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WWOOF Organic Farming Opportunities www.woofusa.org

Visitors, or ‘WWOOFers’, spend about half of each day helping out on a host farm, learn about the organic movement and sustainable agriculture, and receive room and board during their visit – with no money exchanged between Hosts and WWOOFers. WWOOF is an educational and cultural exchange program.

WWOOF Hosts offer a variety of educational opportunities, including growing vegetables, keeping bees, building straw bale houses, working with animals, making wine, and much more. It is your responsibility as a Host to provide projects and tasks to WWOOFers in which they can learn about sustainable growing methods.

The WWOOF standard is for hosts to expect approximately 20-30 hours per week of volunteer help in exchange for food (preferably organic), clean and comfortable accommodation, and learning opportunities in organic farming/growing and sustainable life practices.

We have WCFS members who host Volunteers in this program. Interested in hosting? Check with Marilyn Couture, OOS, 360-681-3036.

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How to Manage Available Phosphorus

By Jon Frank, owner, International Ag Labs.

When trying to manage available phosphorus, here's a question that you may not realize is related: Have you ever baked a cake? If you want the cake to turn out well you need to have the right amounts and ratios of ingredients. What would happen if you decided to modify the cake recipe and double the liquids, while cutting the flour and dry ingredients in half? It would mix just fine in a bowl, but when you take it out of the oven you would have some glop that nobody wants to eat, and you wouldn't dare call it a cake. You must understand the right proportions to make modifications, or else you need to follow a recipe.

In this same way, in order to manage available phosphorus correctly, you need to maintain the right levels of available nutrients in soil if you want to produce nutrient-dense foods. It is especially important to keep your eye on the big three: calcium, phosphorus and potassium. If you get these three right in your soil, everything else is a piece of cake.

The easiest problem to fix is low potassium. Just add it, and your problem is over. Raising a low calcium level is a bit more challenging because it takes microbial digestion. Harder still is to build up low phosphorus in soil. Once phosphorus is built up it becomes much easier — all you have to do is maintain a consistent level.

When considering the overall influence of growth versus fruiting energy in soil, the primary reproductive energy comes from phosphorus. Manganese gets honorable mention, but phosphorus is the big one.

When looking at phosphorus in soil, it is important to view this nutrient in relation to other elements. For example, the phosphorus to potassium ratio should be around 1:1 with a level of around 175 pounds per acre of each. At this level these elements are well supplied, but are not interfering with calcium.

Another ratio to keep an eye on when you manage available phosphorus is calcium to phosphorus. Look for an 18:1 ratio as ideal. When the ratio gets narrower than 12:1, phosphorus begins to interfere with the function of calcium. What does that mean? Produce tastes like garbage. I have seen many soils showing 2-3,000 pounds of phosphorus and potassium with only 1,800 pounds or less of calcium. Instead of 18:1, the ratio becomes 0.7:1. This is just like that gloppy cake recipe. There is no way a soil like this can grow nutrient-dense foods until the levels and ratios are corrected.

As hard as it is to build phosphorus in soil, it is much harder to reduce an extreme level of phosphorus. It only comes down at a snail's pace. Many zealously amended soils will need 20 years to reduce all that phosphorus. Here is my best advice in such a situation; move your garden or crops. Another option is to excavate the top 6 inches of soil and replace with unamended topsoil. A third option is to dilute existing soil with 6 inches of unamended topsoil. All three of these approaches are much quicker than trying to bring down phosphorus to the right level by cropping it out.

On the other hand, many new gardens are critically deficient in phosphorus. They are so low that the plants are practically on life support. Phosphorus is the P in ATP. ATP (Adenosine 5-triphosphate) is the prime mover in the energy cycle in plants. Plants need phosphorus to make sugars, transport minerals and transport sugars.

RAISING PHOSPHOROUS IN DEPLETED SOIL

When phosphorus is undersupplied in a plant, everything suffers — especially quality.

1. Use soft rock phosphate as the base. About 50 pounds per 1,000 square feet should do it. Repeat one more time if needed. Do not waste your time with hard rock phosphate.
2. Use 11-52-0, an acid phosphate, in conjunction with soft rock phosphate. This will supply the plants' need for phosphorus right away, and the acid assists in making soft rock phosphate more available.
3. Use other acids in the fertility program. This again helps the soft rock phosphate become available.
4. Use a liquid fish that has been stabilized with phosphoric acid as part of the nutrient drenches.

I have used this exact program on hundreds of gardens all across the pH spectrum and it works very well. Rarely does it take more than 2-3 years. What really slows this process down is trying to do it 100 percent organic. The other acids and the commercial phosphate are the key to getting soft rock phosphate available.

The strategy I use to raise phosphorus — and manage available phosphorus — is to get a big hammer and swing it as hard as I can. In many instances, a low phosphorus reading of 20 pounds per acre might move up to 70 or 80 pounds in one year. I normally repeat the program from the first year and see phosphorus further rise to 150-180 by the beginning of the third year on the program. Then it goes into maintenance mode where small doses of soft rock phosphate are added whenever the soil test shows phosphorous between 150 and 250 pounds per acre. The maintenance dose is 12 pounds per 1,000 square feet or 500 pounds per acre.

As phosphorus rises to the optimum level, commercial phosphate is taken out of the program. Here is what I don't suggest: apply low doses of phosphorus, use mycorrhizae and hope for the best. This approach keeps the soil depleted for a long time and rarely yields nutrient-dense produce. If you want nutrient-dense foods you must get available phosphorus to around 175 pounds as quickly as possible. At this level of available phosphorus, mycorrhizae go dormant and aren't much use to roots. The best use of mycorrhizae is to use it on low fertility soils where re-mineralizing with phosphorus is not economical.

Phosphorus in soil is very similar to a dry sponge. If water is dribbling on a sponge, no runoff will occur until the sponge is saturated. First you have to saturate the sponge. The same principle applies to phosphorus. You have to apply quite a bit at first to saturate the sponge; and then available phosphorus will show up all of a sudden.

Submitted by Judi Stewart

Dan's Favorite Fig

Erik Simpson, OOS

Dan's favorite fig is the best fig that we can grow in Sequim-Port Angeles area. This fig is also known as Dan's Pride and its French name Madeleine des Deux Saisons (fig of two seasons). Dan Ackerman discovered this fig about 18 years ago on his rental property in Brinnon.

To grow a new fig, take a cutting from last year wood and place it into a container with at least one leaf node in water. Keep indoors in a sunny location or in a green house or solarium. In three to four weeks the top node will start to grow and produce a new leaf.

Plant fig scion in a small pot with one leaf node above the soil and at one bud below the soil. Keep the pot in the standing water in the bottom. Take an empty clear plastic coke bottle with the bottom cut off and the cap removed and place it over the fig cutting so it will not dry out. Only remove the plastic after two or more leaves have opened. During the growing season, try to keep the soil temperatures above 65 but below 80 degrees F. Keep the soil moist but not wet. In the fall the fig should keep indoors below 50 degrees, out of direct sun and above freezing. Keep it in the same pot for one year without disturbing any hair roots.

The following year the fig can be planted in a 2-3 gallon container, half whiskey barrel, or planted outdoors in a sunny location close to a retaining wall where soil temperatures stay above 65 degrees F. during the heat of the day. Recommend a slow release fertilizer. Protect from prevailing winds. Your goal should be to keep and retain heat in the roots. Container pot should be moved into an unheated garage or greenhouse for winter. Dan's favorite figs will ripen in full sun from late August to mid Sept. The figs can be eaten fresh or, dried. They make an excellent jelly or jam, and are great on fresh cookies. The fig will produce two crops annually if grown in Greenhouse or solarium.

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Thank you to Volunteers!

The 2018 Washington State Fair is now history. It appears to have been a great success. Although no numbers have been released it seems to be always busy and on some days the crowds were amazing. Thanks to all those that helped staff the WCFS - Tahoma booth with special thanks to those from other chapters like Peninsula, Vashon, South Sound and Seattle. Dan and Jill Correll who build the Correll Cider press (which we raffled off) spent most of one day with us & are planning to return next year. Please mark your 2019 calendars for the Washington State Fair, scheduled to begin on Friday, August 30, 2019. We would love to see you then.

Thanks,
Bill Horn, Tahoma

It's cold — so can I prune?

By Lynn E. Long Good Fruit Grower, Dec 6, 2013

With the early cold weather that we are experiencing you may be wondering how recently pruned trees will respond to these cold temperatures.

When a pruning cut is made, there is an invigoration of the tissue around that cut making the limb somewhat more cold sensitive than non-pruned limbs. The greater the percentage of wood removed the greater the stimulation to the tree. Therefore, big cuts and cuts on young trees are potentially the most hazardous cuts. In addition, special care should be taken to avoid pruning old, weak trees immediately before or during intense cold. Cold sensitivity seems to last for a period of about 10 days. As time passes after the cut was made, the tree becomes less and less sensitive until it regains its former hardiness level approximately 10 days after pruning.

Generally speaking, if your pruners can stand the cold, so can your trees. However, constant, moderately cold temperatures like we've had the last few days are generally not the problem. The greatest problems occur when temperatures drop quickly, especially, if the temperature has been moderate or warm for a period of time. It is at these times that you want your trees at the maximum cold hardiness possible. It makes sense, therefore, not to prune immediately before a cold spell is predicted. The best way to be safe is to keep your eye on the long range forecast. If near 0° F temperatures are predicted, all pruning should stop at least 5 days before the cold weather is expected.

It is also important to carefully plan your pruning. Since young trees are more sensitive than large trees, plan to prune your healthiest, mature blocks at the time of year when cold spells are most likely to occur.

Lynn E. Long is an Extension Horticulturalist with Oregon State University

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Attention WCFS Members

Want to know instantly what's happening in the organization? Subscribe to the WCFS Forum. It's a benefit of membership. The Forum is private and closed to the public. It keeps us together and on top of what's happening in our chapters. Click on this link and follow the prompts:

<http://lists.ibiblio.org/mailman/listinfo/wcfs>

Judi Stewart, Forum Administrator



The 1-2-3 rule of pruning

Turn wood into fruit on apple and pear trees.

Bas van den Ende, Jan 15, 2010, Good Fruit Grower

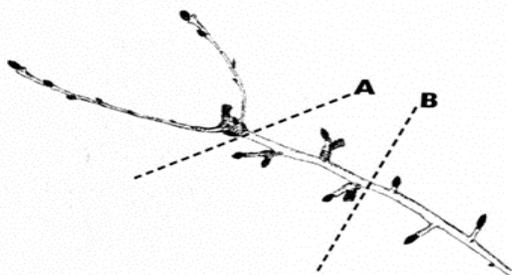
The largest and best quality apples and pears grow on two-year-old wood and young spurs. To develop two-year-old wood, prune trees according to the 1-2-3 rule of renewal pruning. This rule ensures that the fruiting wood remains young and productive. Your trees are as young as the -fruiting wood. Using a pear tree as an example, here is how you use the 1-2-3 rule.

1. The 1 of the 1-2-3 rule refers to the one-year-old laterals, also called pencils. These laterals are 12 to 16 inches long and a little thinner than a pencil. The buds at the tips are often fruit buds (Fig. 1). Never shorten these laterals.



Remove the strong upright shoots and long laterals without fruit buds at the tips. About one-third of the renewal wood should be one year old.

2. The 2 in 1-2-3 refers to fruiting wood that is now two years old. This two-year-old wood has had one or more pears at the tip last year and has now spurred up. The fruit bud at the tip has also grown one or two bourse shoots (Fig. 2).



How you prune this two-year-old wood depends on the number of buds and the vigor of the trees. Here are two options:

- Cut back to the “ring.” This is the division between the one- and two-year-old wood. This cut is called the “ring” or “fertility” cut, because it improves fruit set (Fig. 2A).
- Cut deeper than the ring to reduce the number of fruit buds. Often you find differences in the fruitfulness of this wood on the same tree. Cut deeper when the wood is weaker (Fig. 2B). About one-third of the renewal wood should be two years old.

3. The 3 in 1-2-3 refers to three-year-old wood which was cropped when two years old and sometimes one year old. Renew the three-year-old wood by cutting it back hard (Fig. 3). This way you will generate new laterals, and the cycle starts again (Fig.4). You may leave some good young fruiting spurs on this three-year-old wood, but you must cut back hard to get new -laterals.

About one-third of the renewal wood should be three years old.

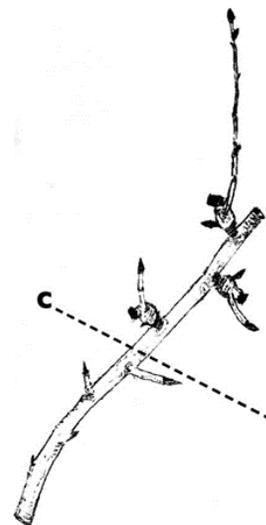


Fig.3: This 3-year-old wood was cropped when in it was one and two years old. It was cut back deeper than the ring. The three buds behind the cut have set fruit shown by the swelling (bourses) and bourse shoots. The buds on the bourses are of little value, because they are not fruit buds. Cut this piece back to (C) to generate new laterals.



Fig. 4: The 3-year-old wood has produced two laterals. You could keep one of both laterals. They cycle of wood renewal can start again.

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Debunking the Myth of Calcium and Fruit

Quality by John Kempf

Growers have been able to substantially reduce bitter pit in apples, cork in pears, and other calcium-related disorders in a single growing season by understanding and addressing these nutrient interactions.

In my nutrition management work, I have focused on understanding how to manage nutrition at different stages of fruit development to affect fruit quality. I have learned that it is relatively easy to substantially impact fruit size, firmness, sugar and solids content, shelf life, and storability with nutrition management. Many of these improvements in fruit quality are in some way associated with calcium metabolism in the fruit.

By closely measuring calcium flow in the trees of many different orchards, I have observed that bitter pit on ‘Honeycrisp’ apples and other calcium-related physiological disorders often are not the direct result of calcium shortage. In fact, many growers have been applying substantial calcium, with very little effect on bitter pit.

Bitter pit and other calcium-related disorders result when there is unregulated absorption of potassium, leading to potassium concentrations in plant sap high enough to inhibit calcium flow into the developing fruit embryo, regardless of calcium concentrations already accumulated in the plant. The context for these observations is our use of systematic sap analysis to monitor nutrient movement within a plant throughout the entire growing season.

Assessing Nutrient Content Since 2011, we have been using recently developed plant sap analysis technology to measure the nutrient content of plant sap in leaf tissue. Sap analysis is substantially different from petiole analysis, which you may be familiar with, and provides a more accurate indicator of nutrient levels within plant sap.

Differential testing is used in collecting leaf samples for sap analysis. Samples are collected and measured from the old and new leaves separately. These samples are collected every two weeks throughout the growing season, until leaf drop in the fall, to observe nutrient movement within the plant of all the mobile elements. Plants may be storing a surplus of nutrients in the older leaves while keeping the new growth at optimal levels or, conversely, they may be sabotaging their older leaves and moving nutrients away from old leaves and into new growth or the fruit.

This testing method enables us to observe how plants are partitioning all the mobile nutrients throughout the tree frame, and to predict potential deficiencies or excesses long before they express as visual symptoms. I have evaluated thousands of sap analysis samples from many different crops in the last six years. This process gives insight into nutrient flow within plants throughout the growing season, and actionable real world information on how to resolve fruit quality challenges from a very practical perspective.

The Big Difference with ‘Honeycrisp’ While working with sap analysis, there was a startling difference between the

nutritional profile of ‘Honeycrisp’ apples and apple varieties that were less susceptible to bitter pit. ‘Honeycrisp’ fruit contained potassium concentrations as much as two or three times that of apple varieties grown right beside them in identical soil types with identical fertilization practices. The same trend was observed on other crops that are exceptionally susceptible to calcium disorders, such as chili and bell peppers, ‘Braeburn’ apples, and others. These cultivars and species have a clearly visible predisposition to hyperaccumulate potassium.

The antagonistic relationship between potassium and calcium in plant tissue is well documented and is strikingly visible when using sap analysis. When plants contain high concentrations of potassium, foliar or soil applications of calcium are ineffective at producing the desired crop response. This explains why some growers have been making intense calcium applications with limited or no crop response. The use of sap analysis helped us understand that ‘Honeycrisp’ apples do not have a calcium deficiency problem. They have a potassium excess problem that is expressed in the plant as an inability to absorb calcium.

To manage this crop characteristic of excessive potassium absorption, the obvious first step is to reduce, or in many cases entirely eliminate, all soil and foliar applications of potassium. Even a very small application — as little as 8 ounces of actual potassium per acre applied as a foliar during fruit development — can reduce calcium mobility into the fruit. This is especially true during critical early periods of fruit development, such as the cell division stage immediately after pollination.

However, with a number of growers we have worked with, simply stopping potassium applications has not been enough. If the soil contains a generous supply of potassium either from historical applications or from high native levels in the soil’s geological profile, plants continue to accumulate potassium even without further applications.

A Promising Experiment

For several years, we were uncertain how to manage this situation. Then we had a fascinating experience with potassium absorption challenges in tomatoes. With a large group of East Coast tomato growers, we discovered that by making foliar applications of manganese, specifically in the reduced form, potassium absorption was very well regulated in the crop.

Manganese seems to function as an effective thermostat for potassium absorption and translocation within the plant. It can both up-regulate and down-regulate potassium absorption, as well as modulate potassium translocation into the fruit. When trees have a generous supply of manganese in the proper form, potassium does not move into the fruit as rapidly as when the tree contains a surplus of potassium, allowing calcium to move into the fruit more readily, and helping to prevent bitter pit challenges.

Cont. on pg. 15



Cont. from pg. 14

More than 90% of all the orchards we have worked with did not have adequate manganese to provide this potassium regulation effect, or the manganese being applied was in a form that the trees could not absorb and metabolize.

How to Apply This to Your Orchard In practical application in the field, these four issues need to be addressed:

1. You need to measure where these nutrients are to understand where the sticking points may be in your operation. Consistent plant sap analysis is very inexpensive when you consider improved crop value and saved fertilizer costs.
2. Stop all potassium application until you are certain you need it, as measured by an analysis.
3. You will likely need to continue calcium applications as potassium concentrations begin to drop.
4. To help regulate potassium inside the plant, you probably will need to find manganese chelate in the reduced form and add it to your foliar mix.

Submitted by Judi Stewart

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Brown Marmorated Stink Bug

Seth Truscott, WSU College

Funded by grants from the USDA and the Washington Tree Fruit Research Commission, Joshua Milnes and his advisor, WSU Entomology Professor Elizabeth Beers, are developing biological controls for BMSB. Scientists elsewhere had already discovered one such living weapon—a tiny wasp, *Trissolcus japonicus*, a.k.a. the Samurai wasp, that preys on the bug in its native Asia.

“It’s BMSB’s natural enemy—a little wasp that packs a big punch,” Milnes, a grad student in entomology at WSU, said.

An effective weapon

Samurai wasps lay their eggs inside stink bug eggs. The young wasps, called larvae, then devour the developing stink bugs, called nymphs, before they can hatch. A single wasp can eliminate an entire egg cluster, making it a promising, natural pest control.

“The Samurai wasp is so effective, it will wipe out 70 to 100 percent of those eggs,” Milnes said.

Only about a millimeter long, the Samurai wasp only targets stink bugs, not humans.

“They’re so small that if they did try to sting you, you’d never feel anything,” Milnes said.

Regulations are strict when it comes to release of an exotic natural enemy. Milnes was able to skip years of process after discovering an already-established population of Samurai wasps attacking stink bugs in a park in Vancouver, Wash., in 2015.

“My goal is to get brown marmorated stink bug under control,” Milnes added. “Now that it’s spread across Washington, we may never be able to eradicate it. But we can keep it from harming our agriculture without resorting to damaging pesticides.

* * * * *

Beer Brewers' Spent Yeast Could Be Next Bait for Fruit Fly Pest

By Ed Ricciuti

The smelly sludge left over from making beer may be a new tool for fruit growers to control spotted-winged drosophila (*Drosophila suzukii*), a scourge of fruits and berries, according to researchers in China.

The possibility is good news for beer brewers, too. Disposing of the dregs remaining after beer production can be a major headache, not to mention costly. Moreover, improper discharge of the gunk at the bottom of the barrel can run a brewery afoul of the Clean Water Act and other environmental protection regulations.

Known as spent brewer’s yeast, this microbial protein from the fungus *Saccharomyces cerevisiae* has been turned into a few marketable products, but they have seen low uptake in the United States. One use is in compost. Spent yeast also has been tried with mixed success as an ingredient of animal feed and food spreads for humans.

In a study published in October in the *Journal of Economic Entomology*, a team of scientists in China, led by Pumo Cai, Ph.D., of the Fujian Agriculture and Forestry University, show that protein bait derived from spent brewer’s yeast is much more attractive than traditional baits used on the spotted-winged drosophila, a major pest of soft-skinned fruits such as cherry, strawberry, blackberry, and blueberry. Unlike other *Drosophila* flies, which deposit eggs in fruit already softened by decomposition, the spotted-winged drosophila has an ovipositor with serrated edges, enabling it to puncture intact fruit. That adaptation, together with its high fecundity and ability to thrive in multiple habitats, makes it an especially scary threat to fruit and berry production. Not only does the egg-laying process damage the fruit, but the larvae that hatch from the eggs consume it.

Use of yeast as an attractant makes sense because studies have shown that protein is essential to egg development in the group of flies to which the spotted-winged drosophila belongs. The Chinese researchers compared brewer’s yeast protein bait with ACV and SVW baits and found it was by far the most attractive. The yeast protein not only attracted more flies but also drew in flies of both sexes and over a wide age span. Potentially, say the scientists, the bait could be used to remove reproductively immature female flies from the field before they start to mate and lay eggs in crops.

Another finding of the research could help integrated pest management practitioners deploy baits more effectively. It found that the baits attracted the most flies between 8 a.m. and 10 a.m. and between 2 p.m. and 4 p.m.

The researchers stress that the spent yeast attractant has yet to be examined in crop fields. It is also not known if the odors arising from fruit could overcome those from the yeast. Before it is truly employed, the attractant may have to be tweaked but it does hold promise.

Submitted by Judi Stewart

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Chapter News

OOS

Nov. 14 – "Raising Chestnuts on the Olympic Peninsula" by **Chris Kresa**, OOS Member, with recommendations for which varieties to acquire, how to grow and harvest.

Dec. 12—**Holiday Dinner with 2018 OOS Review**, St. Andrews Episcopal Church, Port Angeles.

Sat., Feb. 2—**Pruning Workshop with Gordon Clark**, Certified Arborist, Sequim Prairie Grange.

Sat., Mar. 23—**Grafting Workshop and scion exchange**, Sequim Prairie Grange.

Tues., Mar. 26—**Grafting, Sequim High School Horticulture class.**

Note: OOS Meetings are generally held at second Wednesday of the month, 7pm in the Commissioners' Quarters, Clallam County Courthouse, Port Angeles.

Paul Götz

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The Fall 2018 BeeLine was produced by Gathering Editor Marilyn Couture, with input from membership. Please contribute your articles for our next Winter issue!

Issue Deadlines:
Winter December 15;
Spring February 15;
Summer May 15;
Fall August 30

Email your articles to: couture222@msn.com
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North Olympic	Janeann Twelker janeann.twelker@gmail.com
Peninsula	Cliff Reinke onareinke@hotmail.com
Seattle Tree Fruit	Mike Ewanciw mikewan@aol.com
Snohomish County	Christopher Pence cpence@gmail.com
South Sound	Brian Williams, Acting Pres. bkwill@well.com
Tahoma	Paul Mallary paulmallary@gmail.com
Vashon Island	Charon Scott-Goldman Charon@centurytel.net

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Links

Here is a list of sites on the web that may be of interest to you.

Related Organizations

- Backyard Fruit Growers
www.sas.upenn.edu/~dailey/byfg.html
- California Rare Fruit Growers
www.crfg.org
- East of England Apples and Orchards Project
www.applesandorchards.org.uk
- Indiana Nut Growers Association
www.nutgrowers.org
- Midwest Fruit Explorers
www.midfex.org
- North American Fruit Explorers
www.nafex.org
- Northern Nut Growers Association
www.northernnutgrowers.org
- Oregon Sustainable Agriculture Land Trust
www.osalt.org
- Western Cascade Fruit Society
www.wcfs.org
- Western Washington Fruit Research Foundation
www.wwfrf.org
- Home Orchard Society
www.homeorchardsociety.org/
- Seattle Tree Fruit Society
www.seattletreefruitsociety.com/
- Seattle Tree Fruit Society—Apple ID program
www.seattletreefruitsociety.com/appleid.php

Fruit Research

- National Clonal Germplasm Repository
www.ars-grin.gov/cor
- Tree Fruit Research and Extension Center, Washington State.
www.tfrec.wsu.edu
- Northwest Berry and Grape Infonet.
berrygrape.oregonstate.edu
- Pedigree: A Genetic Resource Inventory System
www.pgris.com
- Oregon Department of Agriculture
www.oda.state.or.us

Government Sites

- US Dept. of Agriculture
www.usda.gov
- USDA Agricultural Research Service
www.ars.usda.gov

Helpful Sites

- Orange Pippin
www.orangepippin.com
- Kiyokawa Family Orchards
www.mthoodfruit.com
- Red Pig Tools
www.redpigtools.com
- Friends of Trees
www.friendsoftrees.org
- Cornell Gardening Resources
www.gardening.cornell.edu
http://www.fruit.cornell.edu/tree_fruit/GPGeneral.html
- The National Arbor Day Foundation
www.arborday.org
- UBC Botanical Garden
www.ubcbotanicalgarden.org
- The Reckless Gardener
www.recklessgardener.co.uk
- Farm & Garden
www.farm-garden.com
- SeeMeGarden.com
www.seemegarden.com
- GardenGuides.com
www.gardenguides.com
- VitiSearch: Helpful Resources about Grapes
www.vitisearch.com
- Avant-Gardening: Creative Organic Gardening
www.avant-gardening.com
- The Hardy Plant Society of Oregon
www.hardyplantsociety.org
- Ask the Berry Man
www.asktheberryman.com
- BackyardGardener.com
www.backyardgardener.com
- Tom Brown's website
www.applesearch.org

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