

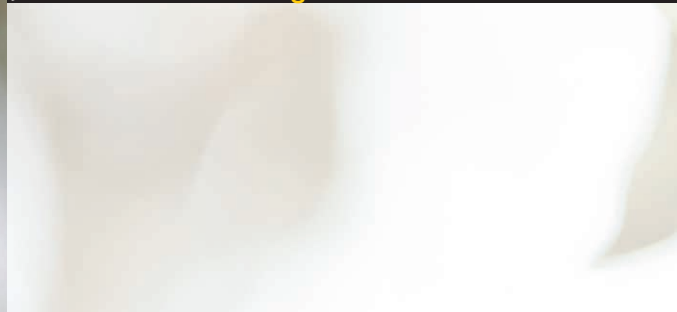


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Del Feigal in his orchard near Vantage, Washington.

PHOTOS BY TJ MULLINAX/GOOD FRUIT GROWER

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Young Grower: Catherine Kiyokawa



Catherine Kiyokawa at her orchard in Parkdale, Oregon.

TJ MULLINAX/GOOD FRUIT GROWER

On the cover

A pear still hangs after an early season snowfall in Oregon.

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MOSIER, OREGON

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Tatura Trellis origins

Dear *Good Fruit Grower*:

I was saddened to read that Richard Lehnert had passed away. I learned a lot from reading his articles.

"Faraway regions form a growing relationship" (October 2015, *Good Fruit Grower*) is a beautiful story about a rich country helping a poor country. I am involved with assisting a consultant in Uzbekistan, Shuhrat Abrorov, who was trained in California with financial help from the USAID Aglink Project and who visited Australia last year. He wanted to come this month with a couple of his clients, but was refused visas from the Australian embassy in Moscow. I don't have the whole story (yet), but have asked Shuhrat to try to give the Australian embassy a copy of your article on Kyrgyzstan, because the conditions in Uzbekistan are very similar to those in Kyrgyzstan.

It was interesting to see that the orchard on the cover of the August *Good Fruit Grower* consists of Open Tatura system. Fruit growers in the United States don't call this system by its assigned name, but that does not matter. Jason Matson calls his trellis just V-trellis, which is really an A-plus-V-trellis, much like what Grady Auvil started. In fact, the original Tatura Trellis consisted of steel A-frames, joined together to make Vs (1973). Our prototype mechanical harvester did not fit under the A-frames and needed to go over the canopies, so we decided to make it all V-frames. More changes were made later when treated pine poles proved to be cheaper than steel poles.

I tried to keep a simple nomenclature to keep the names of Tatura Trellis separate from the Open Tatura system, which is used in Australia, but not in some other countries, maybe because they have been hybridized.

Bas van den Ende
Shepparton, Australia



UVC machine on an apple packing line.

postharvest diseases of apples and other fruits. Now, a Brazilian company is marketing the machine to be used in packing facilities.

I'm sending you a link to the website and a picture of a UVC machine on an apple packing line.

<http://bit.ly/1POiSfD>

Best regards,
Rosa Maria Valdebenito Sanhueza
Vacaria, Brazil

Remarkable Richard

Dear *Good Fruit Grower*:

Great tribute to Richard Lehnert in the October *Good Fruit Grower*. Richard did an occasional bee story, and I was always impressed at the quality and depth of his writing. Unlike some bee stories in other publications, I never found a misstatement or misquote in anything Richard wrote (on bees or on any subject). He really did his homework and you could tell he spent lots of time on any subject he tackled. Although it's not in my field, I found his article on Honeycrisp storage quite well done — factual, and easy to comprehend. *Good Fruit Grower* readers will miss Richard as much as you and your staff do.

Joe Traynor
Scientific Ag. Co.
Bakersfield, California

UVC in use in Brazil

Dear *Good Fruit Grower*:

About the UVC technology ("Ultraviolet lights the way," *Good Fruit Grower*, November 2015), I want to tell you that inspired by the research of Dr. Charles Wilson (retired U.S. Department of Agriculture researcher based in Kearneysville, West Virginia) and his team, we did research at EMBRAPA (the Brazilian Agricultural Research Corporation) to control



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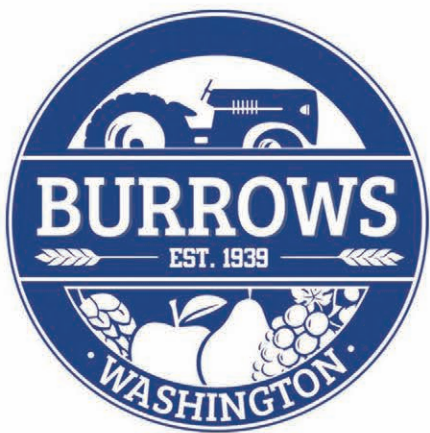
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QUICK BITES

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Cherry Institute is this month

The 73rd Annual Cherry Institute begins Jan. 15 at the Yakima, Washington, Convention Center with an update on the Cherry Breeding Program at Washington State University by Dena Ybarra of Perleberg Orchards.

Other presentations that day include: Observations on the Newest Cherry Breeding Materials by Dr. Ines Hanrahan of the Washington Tree Fruit Research Commission; Sweet Cherry Horticulture by Dr. Matt Whiting of WSU-IAREC; an overview of the 2015 cherry season by B.J. Thurlby of the Washington State Fruit Commission; Evolving Dynamics of Cherry Marketing by James Michael and Keith Hu of Northwest Cherry Growers; and Preharvest Water Management on Cherry Fruit Quality and Tree Health by Nadia Valverdi of WSU-IAREC.

The luncheon speaker is comedian John Keister of Seattle, former host of KING-TV's "Almost Live!" program.

The afternoon sessions include: a grower panel on Precision Horticulture and Cherry Tree Stress Management, moderated by Whiting; food safety regulations affecting cherry producers by Kate Woods of the Northwest Horticultural Council; UAV applications in cherries by Dr. Lav Khot of WSU-IAREC; Detecting and Managing Little Cherry Virus by Dr. Andrea Bixby-Brosi of WSU Tree Fruit Extension & Research Center; and Emerging Status and Management of Brown Marmorated Stinkbug in the Pacific Northwest by Dr. Mike Bush and Gwen Hoheisel of WSU Extension.

For further information, contact cherryinstitute@wastatefruit.com.



TJ MULLINAX/GOOD FRUIT GROWER

The annual Cherry Institute returns to the Yakima Convention Center on Jan. 15.

FirstFruits makes a difference

FirstFruits Marketing of Yakima, Washington, has been honored by the Southeast Yakima Community Center and the Opportunities Industrialization Center of Washington for making a difference in the lives of others.

FirstFruits donated \$5,000 to create a computer lab for elementary schoolchildren in an impoverished neighborhood who stay at the center after school. In addition, several FirstFruits employees volunteer with the organization by teaching dance classes or participating in events during the year.

A percentage of FirstFruits' profits is allocated each year by its employees to nonprofit organizations. Those it has supported recently include Yakima Northwest Harvest and Convoy of Hope for South Carolina flood relief.

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K & K Farms honored

The Michigan State Horticultural Society has honored growers Fred and Linda Koenigshof of K & K Farms in Coloma, Michigan, and media professional Matt McCallum with Distinguished Service Awards.

Started in the early 1900s, K & K Farms grows raspberries, blackberries, currants, peaches, nectarines, apples, plums, pears and pumpkins. The farm is certified through the Michigan Agriculture Environmental Assurance Program and uses high-density fruit tree plantings, high-tunnel raspberry production and rotating-arm trellis systems. The farm also participates with Michigan State University in an irrigation monitoring program and in spotted wing drosophila studies.

Fred is past president of the Michigan State Horticultural Society and the Great Lakes Expo and is a member of the newly formed Michigan Tree Fruit Commission. K & K Farms also donates berries and apples to the Chicago-based Good Food Project, a non-profit organization dedicated to introducing students to the taste of fresh fruit and to teaching them how to make healthy eating choices. Fred and Linda also serve on the organization's board.

McCallum is publisher of *Fruit Growers News*, as well as 13 other publications in specialty agriculture, sports, and specialty gift markets. McCallum purchased 50 percent of McCallum Orchard from his uncle and, in 1993, purchased two magazines, then known as *Great Lakes Fruit Growers News* and the *Great Lakes Vegetable Growers News*. He has served on the Michigan Vegetable Council for nearly 20 years.



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Does it profit to grow for DIRECT-MARKET?

Direct-market farming is often portrayed as a highly profitable alternative to row crops or a way to work very hard for very little money.

For people who want to start their own orchards, direct marketing is often seen as an entry point. Growers who want to sell their apples on the farm or at farmers' markets have a smaller initial investment than wholesale producers, due to smaller land and equipment requirements. A direct-market orchard can be planted anywhere there are enough customers to buy the products, as long as the land has the right soil and climate. While direct marketers can sell their products for a much higher price than wholesalers, they also face higher overhead and labor costs, and there are the underappreciated costs of selling their products. The long-term viability of these small farms depends on whether or not they can recoup their investment and make a yearly profit.

Growers can sell for a higher price, but they also face higher overhead and labor costs.

by Thaddeus McCamant

Since 2009, instructors working for the Minnesota State Colleges and Universities have been collecting data from small, direct-market fruit and vegetable growers to determine both the cost of production and the whole farm profitability of high-value crops. Crops included in the study included pick-your-own strawberries, mixed vegetables and apples. The costs of production and profitability of all three crops were very similar.

To determine the cost of producing apples for direct markets, I selected four farms in eastern and southern Minnesota that are representative of small, Midwestern, direct-market apple orchards. The owners of these farms bought land and planted trees while still holding a full-time job. Three farms sell the majority of their crop from on-farm stores, while a fourth farm sells primarily at farmers' markets. Wholesale accounted for less than one-quarter of all sales for each farm. All farms primarily use Malling 26 and Budagovsky 9 rootstocks and grow an average of eight varieties of apples. Three of the four farms raise other fruit for direct-market sales, but apples account for the majority of their sales. The orchards ranged from 4 to 12 acres, though farm sizes changed during the seven years of the study as growers either expanded or reduced their acreage. The oldest farm was 30 years old, while the youngest farm was 5 years old at the start of the study.

The growers invested an average of about \$240,500 from the time they bought the land until they started selling apples (Figure 1). Prospective growers usually worry about the cost of trees and land, but for these orchards, land and orchard establishment (trees, irrigation and deer fences) accounted for only half the investment. The rest of the investment was in buildings to sort and sell their produce, vehicles to deliver their apples to farmers' markets, and orchard equipment.

The participating growers sold an average of

Figure 1
Investment costs for small, direct-market apple orchards

Average investment totals \$240,465.

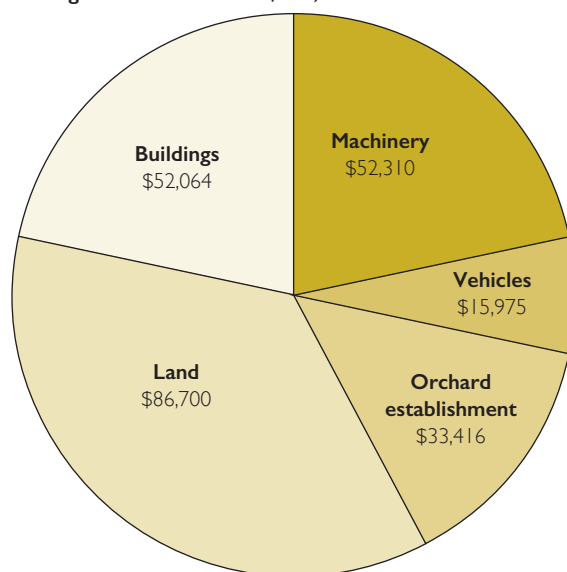
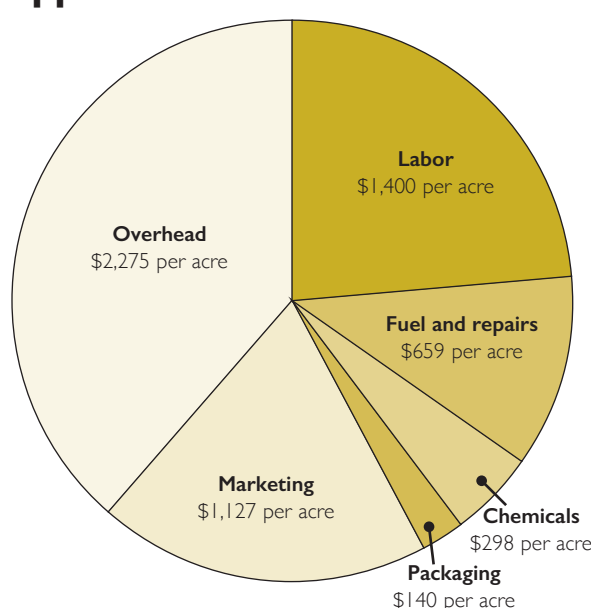


Figure 2
Costs for small, direct-market apple orchards



\$8,226 worth of apples per year. The lowest receipts were \$2,562 per acre, while the highest receipts were \$16,630 per acre. The average yield of sold apples was 160 bushels per acre. The low average yields were due to a combination of factors, including two years with frost, one year with hail, alternate bearing, recently planted trees, and apples that were either left on the tree for lack of market or knocked to the ground by careless customers.

An acre of apples costs about \$5,900 to grow and

pick. The largest single cost was labor, at \$1,400 per acre (Figure 2). All the growers who participated in the study do most of the pruning and tractor work themselves, and unpaid family labor was not calculated here. Farms with less than \$20,000 in sales can get by without hiring labor. Overhead costs averaged \$2,275 per acre, and varied little between farms. Overhead costs include farm insurance, property taxes and equipment depreciation. The largest overhead cost was miscellaneous supplies, which is also known as "trips to the hardware store."

With an average annual profit of \$2,324 an acre, and an average of 6 acres per farm, growers are being paid little for their own labor. When gross sales were less than \$5,000 an acre due to frost or hail, the growers earned nothing. In good years, growers made \$15 to \$30 an hour for their orchard work.

The largest overhead cost was miscellaneous supplies, which is also known as "trips to the hardware store."

When expenses for the entire farm are analyzed, which includes pumpkin sales and other crops, the participating growers made a whole farm profit of \$13,474 per year. The return on investment varied from 1.2 percent to 6 percent. The farmers are barely able to pay themselves, but they continue to farm.

All the growers work very hard for low profit, but their net worth is increasing each year. The increases in net worth during this study were from paying off loans or buying assets and did not include increases in land values during the course of the study. Even without incorporating increases in land values, the average farm had an increase in net worth of \$23,400 per year. Unfortunately, an increase in net worth does not buy groceries, but all the farmers have a spouse with an off-farm job.

In spite of the low profit, every grower continues to farm due to a variety of personal and financial goals. The apple orchards have given the participating growers a way to live a rural lifestyle, to provide jobs for children and other relatives, and to pay off property. Most direct-market growers are farming one-third of the land that they own, with their remaining land being in forests or being rented out. The extra land increases overhead costs and decreases profits, but I have yet to meet any farmer who wants to sell their 20 acres of forests.

Direct-market apple production can be profitable, but it is a great deal of work, and it helps to have a spouse with an off-farm job.

Thaddeus McCamant, Ph.D., is a specialty crops management instructor and freelance writer based in Frazee, Minnesota. ●



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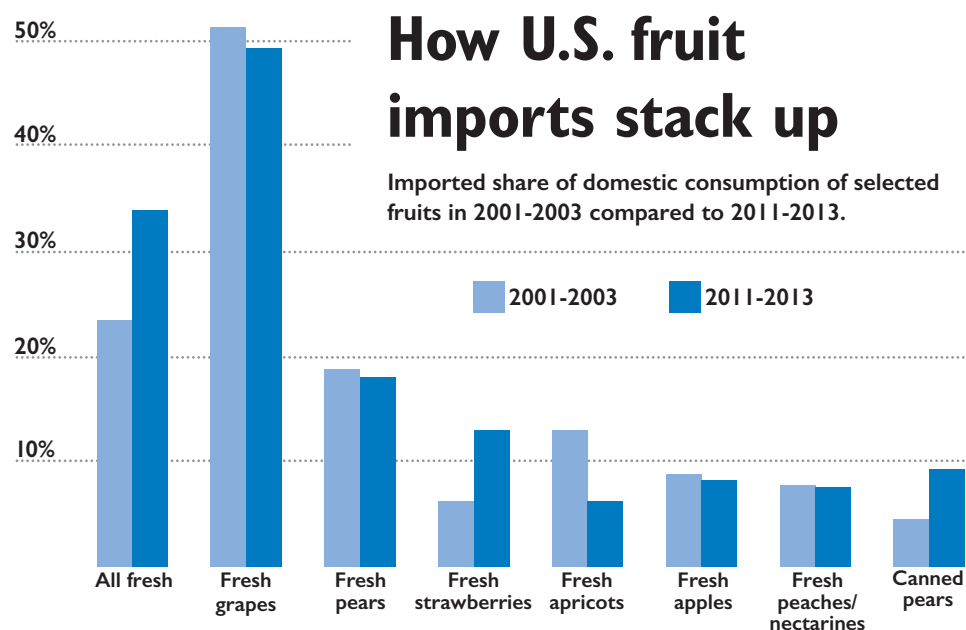
Impact of IMPORTS

Fresh apples, pears and sweet cherries hold their own for U.S. producers.

by Desmond O'Rourke

Imports continue to account for an increasing share of fresh fruit eaten by U.S. consumers. On average, one-third of all fresh fruit consumed in the United States from 2011-2013 was imported. This represented an increase of over 10 percent in market share compared with a decade earlier, 2001-2003 (*see chart*).

Much of the increase in fruit imports has been due to the growing popularity of exotic or tropical fruits not produced in the United States, such as mangoes,



SOURCE: USDA, ECONOMIC RESEARCH SERVICE, FRUIT AND NUT YEARBOOK ONLINE, DETAILED TABLES.

JARED JOHNSON/GOOD FRUIT GROWER

papayas and pineapples. However, even in the case of table grapes, about half of domestic consumption is still supplied by imports.

The share of fresh apples imported actually fell slightly between 2001-2003 and 2011-2013 as the U.S. apple industry has continued to expand the volume and diversity of apple varieties available in the late season to compete against apple imports from the Southern Hemisphere. The proportion of fresh pears supplied from imports also has fallen slightly in the last decade, but at 18 percent it is still more than twice that of fresh apples.

The picture is not so reassuring for processed products. The share of apple juice and cider supplied from imports (*not shown in the chart*) has risen in the decade from 75.5 to 82.7 percent, while the share of canned pears imported has doubled from 4.6 to 9.3 percent.

In general, to compete in the U.S. market, foreign exporters of fresh apples, pears and sweet cherries have been upgrading the consumer appeal of the products they ship through improved quality, tighter grade standards and more varietal innovation, and they have been garnering much higher prices than in the past. However, U.S. producers have more than matched these achievements. U.S. exporters of fresh apples have increased the volume of exports by 67 percent between 2001-2003 and 2011-2013 and the average price by 87 percent. Pear exporters have increased volume by 16 percent and average prices by over 83 percent.

Sweet cherries differ from apples and pears in that virtually all imports come from the Southern Hemisphere (mainly Chile) in the winter months and do not overlap with the domestic shipping season. In that case, the U.S. has been able to expand both its exports and imports dramatically — exports by almost 100 percent and imports by over 70 percent.

Outlook for fresh fruit imports

For most U.S. producers, packers and marketers of fresh apples, pears and sweet cherries, the history of imports is not as important as is the outlook for the next decade.

To analyze this, we attempted to measure the response of fruit imports both to the competition from domestic supplies

and to general economic conditions in the U.S. market. As one might expect, imports were higher in any season when there were temporary shortages of domestic supplies.

For fresh apples and fresh pears, increases in U.S. per capita incomes had no significant effect on the volume imported. For sweet cherries, the influence of increased incomes was positive, but relatively weak. So, increases in U.S. incomes will have limited impact on imports of fresh apples, pears or sweet cherries.

While Chile dominates imported supplies of sweet cherries, that country has experienced wide fluctuations in its available supplies due to rapid growth and weather variations. For most of the last decade, the U.S. dollar was weak relative to currencies like the pound sterling and the euro, so Chilean exporters reduced the share of exports going to the U.S. market. When the U.S. dollar weakened, Chilean sweet cherries went to other countries.

However, in the case of imports of all fruit, their share of U.S. domestic consumption has tended to increase as U.S. per capita incomes increased. Each 10 percent increase in U.S. per capita incomes was associated with an almost 8 percent increase in the import share of all fruit consumption.

Implications

Our analysis suggests that U.S. fresh apples, pears and sweet cherries face little direct threat from foreign suppliers of their own products in the U.S. market. Indeed, all are formidable net exporters. However, they face a very real threat from imports of competing fruits as U.S. consumers continue to switch from traditional deciduous fruits to an increasing range of tropical, exotic or specialty fruits and berries.

If per capita incomes in the U.S. continue to increase in the next decade, the share of imported fruits in U.S. consumption is also likely to increase. A major challenge for fresh apples and fresh pears will be preventing further erosion of their share of U.S. fresh fruit consumption.

Desmond O'Rourke, Ph.D., is president of Belrose Inc. in Pullman, Washington, and publisher of the monthly World Apple Report. ●

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Elevating Idaho TABLE GRAPES

Researchers will study new varieties and canopy management for table grapes in the Gem State.

by Melissa Hansen



The Emerald table grape variety is a large, yellow-green, midseason grape.



Pasargad grapes have been successful in farmers' markets.



Alborz is the main commercial table grape variety in the U.S. Intermountain West.

Idaho's burgeoning table grape industry, poised for great things, needs a nudge before additional expansion takes place. Industry members hope a new research grant will take the industry to the next level.

More than two decades ago, University of Idaho's Dr. Esmaeil Fallahi showed local growers that table grapes could thrive in southwestern Idaho. His initial research trials identified varieties suitable for the Treasure Valley, an area west of Boise where most of the state's tree fruit and wine grapes are grown. Since then, several hundred acres of table grapes have been planted in the Intermountain West region of Idaho and neighboring states, and progress has been made in developing a new industry.

But growers believe the newest round of Fallahi's research, made possible by a 2015 specialty crop block grant from the Idaho State Department of Agriculture, is what's needed to take the industry to the next level. The \$163,000 grant significantly expands Fallahi's research and allows him to test new table grape selections and study canopy management and training systems as he works to increase yields and improve quality parameters of fruit and cluster size.

"There's a tremendous amount of interest and activity in table grapes right now," said Tom Elias, founding member of what's now called the Snake River Table Grape Growers Association, a group that renamed itself to align with Idaho's first wine grape appellation, the Snake River Valley American Viticultural Area. Elias, past president of the grower group, grows table grapes and Asian pears near Marsing, Idaho. He also provides table and wine grape plant material to other growers.

While Elias couldn't give a definitive number of table grape acres in Idaho, he told *Good Fruit Grower* the number is "more than a hundred and less than a thousand." Though a few vineyards have been removed in recent years because they were in the wrong location or the grower wasn't prepared for the amount of work involved, according to Elias, table grape acreage of late is on the upswing. He cited several 20-acre blocks recently planted and said there's planting interest from drought-stricken grape growers in California who are searching for ground with water. (Even though there was a lack of snowfall in the Pacific Northwest this past year, Elias had enough surface water to grow his grapes and has the option of pumping groundwater.)

"When I analyze the profitability of growing table grapes in Idaho, I see amazing revenue potential."

—Kevin Schultz

Table grape harvest in Idaho starts in September and continues into October. "It's late enough to avoid overlap with California," said Elias. "Our timing is perfect — we're after most California table grapes are harvested but before imported Chilean grapes arrive in November. Most of the California grapes sold in our time frame are coming out of cold storage."

Convert

The current president of the Idaho table grape growers group, Kevin Schultz, is a recent convert to Idaho's table grape industry and represents a new generation of growers. At 37, he's much younger than other table grape growers who planted small vineyards to keep them busy in retirement.

"I have a business background, so I see things from a different perspective than some of the older growers," Schultz said. "When I analyze the profitability of growing table grapes in Idaho, I see amazing revenue potential." He planted 20 acres of table grapes in Eagle last year for Dry Creek Grapes LLC, and the partnership has another 200 acres of table grapes planted near Emmett.

Schultz believes the local food movement is a key reason why Idaho table grapes can be profitable and compete with California. Large and small grocers are promoting the origins of local fruits and vegetables.

New varieties

Fallahi, pomologist at UI's research and extension center in Parma, shares the enthusiasm of Elias and Schultz. "There's a lot of excitement in the industry right now," he said. In the right location, growers can produce good quality fruit. However, he warned that growers must be mindful of their grapevines' cold hardiness. "Avoid planting table grapes in cold pockets — save those spots for shop buildings or other crops — and be ready to cut



PHOTOS COURTESY ESSIE FALLAHI, UNIVERSITY OF IDAHO

The quadrilateral training system has been a successful canopy style for Alborz grapes in Idaho.

off irrigation early, especially in young vineyards, to help vines go into winter dormancy.”

The research grant allows Fallahi to greatly expand his varietal research by adding more than 15 new selections to his variety trials, some from California’s Sheehan Genetics, a private California company developing new varieties from the breeding program of the late Tim Sheehan. Fallahi hopes the new generation of red and green seedless table grapes will result in new and improved cultivars better suited to Idaho’s growing conditions.

For example, the main cultivar grown in the state is Alborz, a variety similar to Flame Seedless. Fallahi wants to find a red seedless cultivar similar to Alborz, but with better cold hardiness. Jupiter, a blue-colored grape has a following in Taiwan, but it produces small clusters. The green seedless Emerald variety is productive but susceptible to powdery mildew.

California table grape varieties typically don’t do well in Idaho because they are not cold tolerant. Varieties currently planted have come from several breeding programs, including the University of Arkansas, Cornell University and Australia.

A major focus of Fallahi’s expanded research is to improve cluster and fruit size through training and canopy management. He plans to compare vines trained to single, double and quadrilateral cordons and will vary the numbers of clusters per vine to manipulate yield and fruit and cluster size.

Awareness

Schultz believes there’s a lack of awareness of the state’s potential as a viable area for the table grape industry. While a few growers are making gains in wholesale markets—Elias sells his grapes to markets in Canada and Alaska, and another grower is exporting table grapes to Taiwan—more work is needed to identify improved varieties, elevate fruit quality and expand the industry to develop critical mass.

“We need a couple of flagship growing operations to put Idaho table grapes on the map, and I hope one is mine,” said Schultz. “I’d like to be the poster child that helps bring awareness and publicity to Idaho’s table grape industry.” ●



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"Washington will never compete with California's table grape production. But for those interested in niche markets, table grapes in the state have potential."

—Kevin Judkins

Grape EXPECTATIONS

Table grapes grow well in eastern Washington and could be popular in niche markets.

by Melissa Hansen



Kevin Judkins

Inland Desert Nursery, with just 3.5 acres of table grapes, is likely the largest table grape grower in Washington. Although the nursery's primary goal in growing table grapes is to supply clean plant material to nurseries and growers, Inland Desert's Kevin Judkins says table grapes may have potential for commercial growers in the state.

The Pacific Northwest has never been considered a prime location for table grapes. Traditional table grape varieties are too tender for harsh winters of inland regions of the Northwest, which is why California has a lock on table grape production and grows nearly all of the nation's table grape supply. But newer varieties, developed in places like Arkansas and New York, that are cold hardy and disease resistant are helping expand table grape production beyond the Golden State, albeit on a small scale.

Idaho growers have been working since the late 1990s to establish a viable table grape industry in a state that built its agricultural reputation on potatoes. Table and wine grapes have been found to thrive in the state's southwestern region known as the Snake River Plain and some believe the area is on the verge of increased table grape plantings. (See "Elevating Idaho table grapes" on page 12.)

In Washington, Inland Desert Nursery grows more than 100 grape cultivars and rootstocks to provide clean plant material to growers and nurseries throughout North America. The nursery's plant list relates mostly to wine varieties, but 20 are table grape varieties.

Judkins, president of the Benton City nursery, displayed more than a dozen table grape cultivars during a grape field day held last summer. The August field



PHOTOS BY TJ MULLINAX/GOOD FRUIT GROWER

A rainbow of table grapes grown by Inland Desert Nursery was displayed during a grape field day at Washington State University's research center in Prosser.

day, sponsored by Washington State University and the Washington State Grape Society, was held at WSU's Irrigated Agriculture Research and Extension Center in Prosser.

"Table grapes have been a consistent piece of business for Inland Desert," Judkins said, adding that their



Jupiter, a variety with Muscat-flavored fruit, has been exported to Taiwan by a few growers in Idaho.

table grape cuttings and potted vines are sold to garden centers and nurseries throughout the United States and Canada. He believes table grapes grown in Washington could fill niche markets.

Retail nurseries within the state rely heavily on Inland Desert because Washington grape quarantine laws require agricultural officials to inspect grape plant material imported from other states. Quarantine regulations are designed to protect the state's grape industry from unwanted pests and diseases not currently found in Washington.

"When Washington State Department of Agriculture officials began checking on grape plant material sold at big box retail nurseries, we became valuable to those businesses because we can provide clean plant material produced within the state that doesn't need inspection," he said. (Inland Desert is registered with the state as a certified nursery and undergoes annual state inspections to ensure plant material is free of known grapevine diseases.)

Potential

Judkins sees opportunity for table grapes in Washington, particularly for growers interested in direct marketing, at places like farmers' markets and u-pick operations. In the past, Inland Desert supplied grapes to a farmers' market vendor. These days, Inland Desert sells its table grapes for a dollar per pound to those willing to pick their own fruit. "Between birds and friends, we get fruit off the vines," he said.

Table grape research trials have not been conducted in Washington, so there is little information regarding which varieties do best and what type of training and trellising is needed. However, eastern Washington temperatures are similar to those of southwestern Idaho, which has a small, but growing table grape industry.

Judkins has found that some of the varieties they grow are disease resistant and need few, if any, sprays for mildew, a trait he believes could be a benefit for grapes sold at farmers' markets. Also, some cultivars are cold hardy and said to survive cold temperatures down to -15°F, although such extreme temperatures have not yet tested his table grapes.

Interlaken, an early-season white seedless variety developed at Cornell University, is the first table grape variety to ripen at Inland Desert. It usually ripens around the end of July. Another early-season variety is Jupiter, which has blue berries and was developed by the University of Arkansas. Table grape harvest at Inland Desert ends in October with Flame Seedless.

"Washington will never compete with California's table grape production," Judkins said. "But for those interested in niche markets, table grapes in the state have potential." ●

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BIG supply = LOW prices

Juice grape prices are likely to remain flat this year, but 2017 could be brighter for growers.

by Shannon Dininny

A continued stockpile of juice and juice concentrate means growers can likely expect low prices again in 2016, but 2017 could prove to be brighter as that supply works its way onto the market.

In 2014, U.S. growers produced their largest Concord crop since 2007 at 505,180 tons, a 12 percent increase from 2013. Washington, the largest producer, saw a 60 percent increase, harvesting 260,000 tons of Concord grapes.

The resulting supply of juice and juice concentrate is depressing prices nationally and could result in a continued decline in acreage next year, according to Dr. Trent Ball, a partner in Agri-Business Consultants LLC and director of the viticulture and enology program at Yakima Valley Community College. Washington now has an estimated 19,300 acres — the lowest since 1978 — and could have fewer than 18,000 acres in 2016, Ball reported at the Washington State Grape Society's annual meeting in Grandview in November.

Cash price per ton of Concord grapes remains at \$110, the same as in 2014 but down from \$225 per ton in 2013, and growers are at the breaking point, Ball said. "They are just covering variable costs. They are in survival mode, but they cannot operate at that price point long term and be sustainable."

Growers have seen up-down cycles before, but even with a high yield in 2016, production won't be as high as in previous years because so many acres have come out of the ground, Ball said. "That's why I'm optimistic that it will start to turn around, because the adjustment is already taking place. Unfortunately, it just takes time to move out the inventory that already exists. And every processor has inventory."

Record Brix

Following a mild winter, growers experienced the highest number of growing degree days on record during the 2015 growing season. Harvest started and ended early, and fruit had the highest Brix level on record with small berries, good color and low acids. The Concord crop was below average of the past 10 years, coming in at 164,000 tons. Growers harvested an estimated 11,670 tons of white Niagara grapes, which comprise just 10 percent of Washington's juice grape crop, on about 1,500 acres.

In Michigan, growers experienced no harsh freezes and harvested a slightly above average crop. In New York, the crop size was 90 percent of the long-term average. Yield per acre also was down, with one-third of Concord vineyards seeing significant bud damage due to a winter freeze.

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Growers in Washington's Yakima Valley who get irrigation water from the Roza Irrigation District saw their water supply shut off for three weeks due to drought. Because the value of Concords is so low right now, growers who have other crops tended to water higher-value crops first. As a result, yields were down a bit, but sugars were sky high, said Keith Oliver, production manager for Olsen Brothers Inc. in Prosser.

"Concords are pretty low on the priority list — like last," said Oliver, who noted that Olsen Brothers pulled out 40 acres of organic Concords in the fall. "Everything else is worth more than Concords, and money talks."

Juice imports

Washington's Concord grape juice production averaged 195,273 tons from 2004 to 2014. For 2015, Washington production is estimated at 164,078 tons, compared with 111,000 tons for New York, the nation's second-largest producer. The price for juice concentrate remains low, at an estimated \$8 per gallon for concentrate produced in Washington compared with \$10 per gallon for concentrate in the eastern United States. The reduced price in the West can be attributed to transportation costs, Ball said.

The U.S. continues to import a significant amount of white grape juice concentrate, Ball said, which is resulting in the removal of grape acreage in California. Some 20,000 acres were removed in 2014 — many for almonds. Another 40,000 acres could be removed going into 2016, Ball said. However, the amount of overall

imports is declining, with 33 million gallons imported in 2015, down from 40 million gallons last year and 45 million gallons in 2013. Argentina accounts for more than 80 percent of the import volume.

"Everything else is worth more than Concords, and money talks."

—Keith Oliver

"The reality is we're seeing fewer and fewer imports coming in, because the juice market is so soft," he said.

In addition, juice exports are at a 28-year low — about 9.3 million gallons in single-strength form in 2014-2015. Canada, Japan, South Korea, China and

Costa Rica represent the top five U.S. export markets, but over the past two years, each of those countries has seen a decline in U.S. exports.

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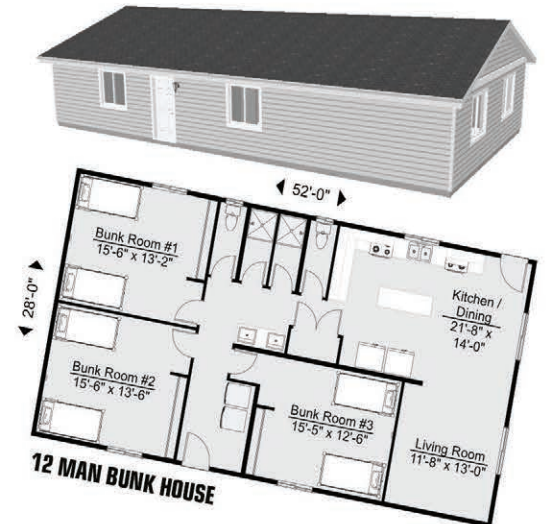
A study by the Produce for Better Health Foundation shows that juice consumption by U.S. consumers declined 14 percent from 2004 to 2014. Broken down by fruit, the number of times consumers drink juice each year bears that out: seven times for Concord juice, nine times for berry juice, 16 times for apple juice and 51 times for orange juice. The trend is consistently down across the board, Ball said.

Juice has been caught up in the nationwide push for healthier menus in schools and healthier diets with less extra sugar, and it's just not moving in the marketplace, Ball said. But, he added, studies also show that those who consume juice actually eat more fruits, eat more vegetables and have a healthier lifestyle. "The theme is, 'We need to drink more juice,'" he said. "Tell your friends, it's good for you." ●

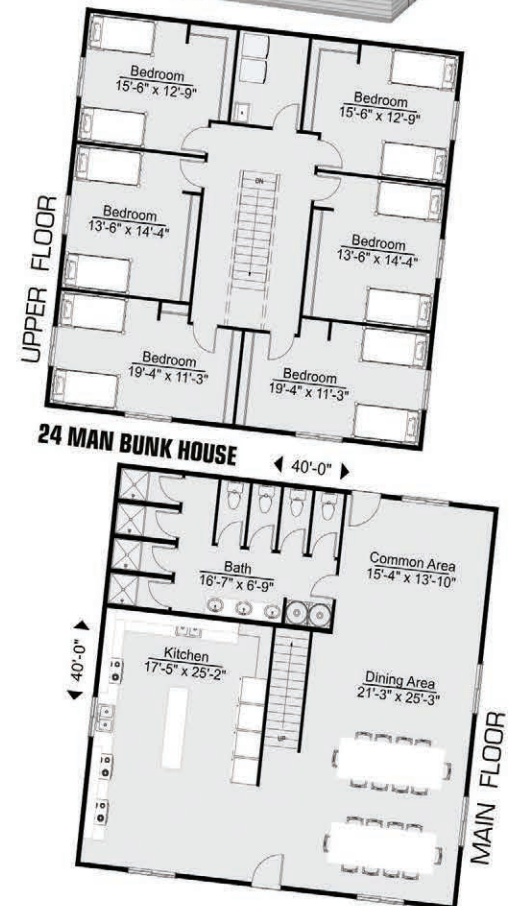
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Wine GROWTH stays strong

Acreage, production and prices continue to increase in Washington.

by Shannon Dininny

Acreage devoted to wine grapes continues to increase in Washington, as does production, and still, prices are rising — all positive trends for the wine industry.

Washington growers harvested 227,000 tons of wine grapes on 51,770 acres in 2014. Early estimates courtesy of the Washington Association of Wine Grape Growers show growers harvested 233,288 tons on 53,353 acres in 2015.

Meanwhile, top wine-producer California saw a decline in production and continues to pull out acreage due to the ongoing drought, said Dr. Trent Ball, a partner in Agri-Business Consultants LLC

and director of the viticulture and enology program at Yakima Valley Community College. California production for 2015 is estimated at 3.8 million tons. “Almost every single region saw a decline, some almost 30 percent in production,” Ball reported at the Washington State Grape Society’s annual meeting in Grandview in November.

In Washington, the 2015 growing season turned out to be exceptional in another way, with the highest number of growing degree days on record — 3,157 — at Washington State University’s Irrigated Agriculture Research and Extension Center in Prosser. In 2014, researchers there recorded 3,093 growing degree days, and the long-term average is 2,628.

Each variety responded differently to the intense heat, but sugar development and ripening happened quickly, Ball said. “Some varieties had smaller berries and lower yields, while others came in higher than expected,” Ball said. “Fruit was allowed to hang a little longer, the sugars

“Fruit was allowed to hang a little longer, the sugars really climbed and the acids continued to decrease. The quality of the flavors is really solid.”

—Trent Ball

really climbed and the acids continued to decrease. The quality of the flavors is really solid.”

In the field

Growers are always looking for more heat, and it certainly came through in 2015, said Russ Smithyman, director of viticulture for Ste. Michelle Wine Estates. The 2014 growing season was the hottest in 50 years, and 2015 broke that record.


The heat came in a little differently in 2015, too, he said. In 2014, growers saw some heat at the beginning of each month, but in 2015, the heat was spread out for a continual heating trend, which resulted in early development and an

earlier harvest start and end date. Harvest started for some whites in early August, “which is unheard of,” with really ripe fruit.

Fruit still required irrigation during the earlier harvest at a warmer period in the season. “We saw some issues if we didn’t keep up with irrigation — the fruit was starting to dehydrate and shrivel a little bit more than we would like,” he said.

But the heat also meant few pest or disease issues, Smithyman said. Because of the early season heat, Ste. Michelle was able to save a couple of sprays early in the season for powdery mildew, he said, and hardly any botrytis or rot issues presented in September and October. The early

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Grape industry honors members

The Washington State Grape Society recognized industry contribution of several members during its annual meeting in Grandview, Washington, in November.

Jack Maljaars of Vine Tech Equipment received the 2015 Walter Clore Award for his service to the industry. Maljaars grew up on a dairy farm with seven brothers. He started Vine Tech in the garage of his house with just a service truck in 2002. The company has since grown to 20 employees and provides vital equipment and services to grape growers in the region. "It's about relationships," Maljaars said. "That's how our business is built. I would give the honor to all those people, rather than myself."



PHOTO COURTESY MADI CLARK
Jack Maljaars after receiving the Walter Clore Award with wife, Denise, and children, Calvin and Ellie.



Mike Miller

The Grape Society honored the late **Mike Miller** and family with its Lloyd H. Porter Grower of the Year Award. Miller grew up in the Yakima Valley — his grandfather helped to bring irrigation water to the area and his father was one of the first to plant wine grapes in 1968. Miller earned an agronomy degree at Washington State University in 1974 before returning to the family farm, which today is entirely wine and juice grapes. Miller founded Airfield Estates winery in 2007 and opened a tasting room that same year in Prosser. A second tasting room was opened in 2010 in Woodinville. Miller died in October 2014 at age 67. His wife, Kristeen, and children are carrying on the family business. His son, Marcus, is winemaker at Airfield Estates and his daughter, Lori Stevens, is marketing director.

Inland Desert Nursery received the Distinguished Exhibitor Award. For more than 40 years, the nursery has provided clean, healthy plants to vineyards across the country, though roughly 80 percent of its business is with Washington growers. Inland Desert sources virus-tested, disease-free stock from the Clean Plant Center of the Northwest and works with growers on the selection of varieties, clones and rootstock to help build profitable, sustainable vineyards.



Eric Gale

Inland Desert founder Tom Judkins Jr. first propagated grape cuttings in his high school Future Farmers of America class in Prosser. With the help of Clore, he established the first certified wine grape mother-blocks in Washington. The nursery provided roughly 4 million plants in 2015. His son, Kevin Judkins, accepted the award on behalf of the nursery.

Eric Gale, a master's degree candidate at Washington State University, received the Grape Society's Memorial Fund Scholarship of \$1,000. Gale began his graduate work in horticulture at WSU in 2013. He is working with Dr. Michelle Moyer on a research project involving cold hardiness of grapevine roots. —*Shannon Dininny*

ripening also meant growers were able to get fruit off the vines before any freeze event.

"Any time we have a hot vintage, we consider that one of the good vintages," Smithyman said. "Reds really do benefit more from the heat, though I've heard good things about some whites. Generally, it means a smaller berry size, a little bit less crop sometimes, but we saw more concentration of the fruit and great phenolics."

Prices

The Washington State Department of Agriculture and U.S. Department of Agriculture will post prices in February, but the trend of rising prices is likely to continue, Ball said.

U.S. off-premise wine sales topped the previous year in 2015. Like other retail industries, the biggest sales occur during holiday seasons in November and December and again in the spring for Easter. Sauvignon Blanc and red blends showed the largest sales growth rate in 2015, followed by sparkling wine, Pinot Noir, Pinot Grigio, Cabernet Sauvignon and Chardonnay. Nationally, Merlot and Syrah showed a decrease in sales, but Washington Merlot and Syrah showed positive sales growth, Ball said.

That Cabernet remains a hot variety is still good news for Washington, especially when the price point is taken into consideration, he said. "Our bread and butter is the higher price points, and those are all growing." ●

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INNOVATION &

Del Feigal's talents in the orchard are a valuable resource for other growers.

by O. Casey Corr

photos by TJ Mullinax

To reach grower Del Feigal's office, you travel on Interstate 90 until you reach the hamlet of Vantage, then head south down the Columbia River's west bank until the county road ends. There you'll find one of the most interesting minds in the business, a Washington grower who is relentless about developing ideas to grow great fruit efficiently.

Feigal, 48, president of orchard management at Auvil Fruit Company, was selected to receive the 2015 Silver Apple Award, delivered last month at the Annual Meeting of the Washington State Tree Fruit Association.

For a man whose formal horticulture training consisted of two years at Wenatchee Valley College, Feigal has earned a considerable reputation as an orchardist whose experiments have led to growing practices adopted by others.

"Del has been very innovative in his pruning and cropping systems and in irrigation," said Mike Robinson, general manager of Double Diamond Fruit in Quincy. "He's continued the Auvil Company tradition of sharing what they know. I can drive around the industry and see bits and pieces and complete copies of what he does."

Last year's *Good Fruit Grower* magazine Growers of the Year, Mike and Craig O'Brien, cited Feigal as one of their resources.

Feigal appeared in this magazine in 2006 in an article on orchards of the future that dealt with his work to grow a consistent fruiting wall. He planted apple trees 20 to 22 inches apart, trained to a modified Tatura trellis with 13 feet between rows and 3 to 4 feet between the tops of the canopies. His trellis was built with six to eight wires, about

18 inches apart, with the top wire at 12 feet high. He trained one limb to each wire on either side of the tree trunk to create a consistent fruiting surface, tree to tree and row to row. His goal was 40 bins in the third leaf, and full production of 80 bins per acre from the fourth leaf onward.

Feigal wanted to build the canopy as fast as possible with high-quality fruiting wood, so that the main focus would be on using horticultural tools to grow high-quality fruit, rather than on growing vegetative wood and trying to get the trees to fill the space.

This shows an approach that others have followed.

"He knows what he wants to grow per acre, how many apples," Robinson said. "He knows the maximum his trees will grow, and he translates that into how many



Feigal is experimenting with on-demand propane water heaters to warm a 6-acre block of trees in late winter at Auvil Fruit Company near Vantage. The heaters supply hot water to underground pipes beneath the apple trees in the distance.



Del Feigal, president of orchard management for Auvil Fruit Company, is the win

INSPIRATION



Winner of the Washington State Tree Fruit Association's 2015 Silver Apple Award.



Del Feigal walks by a block of his Aurora Golden Galas near Vantage, Washington.

apples per foot of limb. Then he thins and prunes to achieve that.”

Feigal has experimented with just about every major variable in growing, from computer-controlled irrigation systems to using platforms for harvest. Last February, he began something new: pumping heated water into soil to manage how trees emerge from dormancy. The water is heated by on-demand propane heaters and pumped through standard irrigation pipes buried 8 to 12 inches to serve a 6-acre block. It’s a fascinating new idea, though Feigal said it’s too early to assess results.

Feigal began managing orchards in high school, when his father gave him responsibility for 3 acres of Golden Delicious. Feigal took to it immediately. He liked the variety of orchard work. He liked the outdoors. After his graduation in 1985 from Eastmont High School in East Wenatchee, it was a natural choice to enroll in the horticulture program at Wenatchee Valley College, which led to jobs managing orchard operations, a stint as a consultant with G.S. Long, and then Auvil. Feigal became Auvil’s president of orchard management in 2014. In that role, he oversees close to 2,000 acres of fruit. At two main locations in Orondo and Vantage, the company grows Aurora Golden Gala, Braeburn, Cripps Pink, Fuji, Gala, Granny Smith and Honeycrisp apples and Rainier, Bing and Lapin cherries.

Feigal sees himself as continuing the tradition set by the legendary Grady Auvil, the Washingtonian who pioneered the Granny Smith, Gala and Fuji apples. Grady Auvil, who passed away in 1998 at age 92, was celebrated for his willingness to share knowledge with other growers. “Grady enjoyed growing fruit, and he liked to see others enjoying doing it, too,” said Feigal.

Grady Auvil was a pioneer in trellises. Feigal continues to experiment with trellises, tweaking different elements to achieve maximum tonnage per acre with the best quality. Feigal often carries black tape in his pocket to guide limbs along wire. His goal is to design the best trellis system and then, with precision pruning, replicate it across an orchard so the benefits of uniformity extend from flower to harvest, with limbs producing fruit in predictable numbers and location so picking is efficient. Each apple variety comes with a specific goal of tonnage per acre; all effort serves that goal.

“I learn more from the trees than from any textbook.”

—Del Feigal



Feigal talks about a trellis system he installed. He has been managing orchards since high school, when his father gave him responsibility for 3 acres of Golden Delicious.

Robinson provides an insight into how Feigal thinks.

“Del is not horribly interested in what other people want or think about their trees,” said Robinson. “He will look at the tree and think, ‘What if I do this? I’ve seen how a tree responds, so I’ll try this.’ He’s willing to look at a tree and think about it. It’s surprising how few people in the industry think about it. Most people are more interested in replicating somebody else’s system. Del is way more interested in maximizing his system.”

Like innovators in any industry, Feigal is relentless about trying new things. He doesn’t seem satisfied with the status quo. Great horticulture is certainly a complex activity, yet Feigal’s underlying philosophy is simple. “Pay attention to how the trees perform,” he said. “I learn more from the trees than from any textbook.” ●

Tree fruit leaders honored at 2015 WSTFA banquet

The following individuals were honored at the 111th Annual Meeting of the Washington State Tree Fruit Association in December. Look for further coverage on the Silver Pear and Latino Leadership honorees in upcoming issues of *Good Fruit Grower*.

SILVER APPLE AWARD

Del Feigal, president of orchard management for Auvil Fruit Company



SILVER PEAR AWARD

Don Gibson, Mt. Adams Orchard president, White Salmon, Washington

Gibson worked in banking before moving to Anheuser-Busch, then to the pear industry, where he has been involved in the growing, packing, processing and marketing of pears. He is a past president of the Yakima Pom Club and, since 1997, has served on the Northwest Horticultural Council's Science Advisory Committee. For years, he has also been heavily involved with Pear Bureau Northwest as an important voice for the pear industry.

"I love the transparency of this industry, for everyone shares information," Gibson said in accepting the award.



WASHINGTON TREE FRUIT DISTINGUISHED SERVICE AWARD

Geraldine Warner of Good Fruit Grower

Warner has written for Good Fruit Grower since 1987 and served as its editor since 1992. She is a graduate of the leadership program of the Washington Agriculture and Forestry Education Foundation. She received the Washington State Horticultural Association's Women's Leadership Through Service Award in 1996 and the association's Silver Apple Award in 2002. She retired from the magazine at the end of December.



Ofelio Borges



Flor Servin



Jaime Ramon



Ramón Benavides

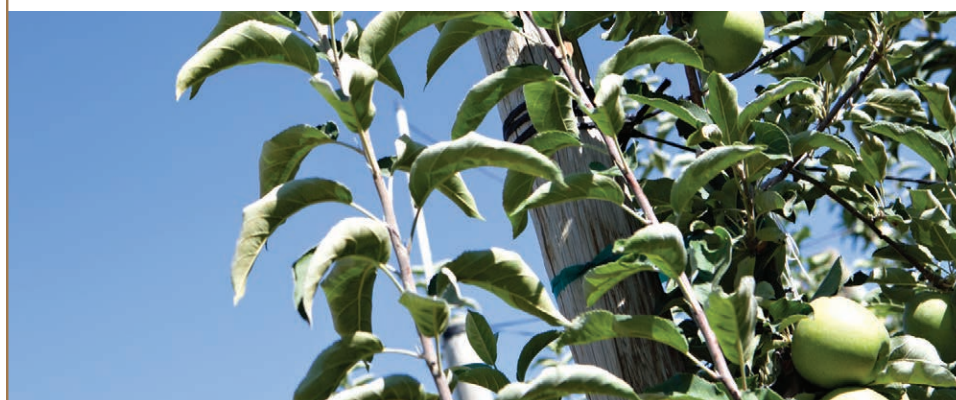
LATINO LEADERSHIP AWARD

Ofelio Borges, Flor Servin, Jaime Ramon and Ramón Benavides of the WSDA Farmworker Education Team

Since 2000, the Farmworker Education Team has provided hands-on training to nearly 20,000 people on everything from worker protection standards to respirator use. "They're not just numbers," said Karen Lewis, WSU Extension specialist. "These are people changing lives."



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Getting the most out of APOGEE

Growth regulator should be applied as early in the season as possible.

by Geraldine Warner

Plant growth regulators are useful tools to manipulate fruit trees and help make an orchard more productive, though they can't work miracles, Dr. Duane Greene, horticulturist at the University of Massachusetts, told Washington growers at a recent fruit school.

It has to start with a well managed orchard, he said. "They do not undo a multitude of sins. They are not miracle workers. You can't transform poor quality fruit on poorly managed trees into good quality fruit."

Plant growth regulators have many uses, but in his presentation at Washington State University's Fruit School on Apple and Pear Horticulture in November, Greene focused on use of the gibberellin synthesis inhibitor prohexadione calcium (sold under the brand names Apogee and Kudos) to control vegetative growth.

Although tree growth also can be controlled by rootstock, crop load management, tree training, pruning and root pruning, use of a plant growth regulator has several advantages. It's convenient, it can be started and stopped as needed, and the effect is not irreversible.

Gibberellins are a group of hormones responsible for stimulating vegetative growth, and controlling production of



"If you don't get it on early, you're going to lose a real opportunity."

—Duane Greene

those hormones is a very effective way to regulate tree growth, Greene said. There are several known gibberellin biosynthesis inhibitors, but prohexadione calcium is the only one approved for use in U.S. apple orchards.

The compound is relatively benign, Greene said, and its registration was fast-tracked in the late 1990s. Besides controlling vegetative growth to enhance productivity, it is used in eastern U.S. growing regions as an alternative to streptomycin applications for controlling the shoot phase of fire blight.

Two formulations are available in the United States. Apogee has been available since the compound was registered and is the one most widely used. However, Greene said there is still much to learn so that growers can take full advantage of it. Kudos was registered more recently. Both contain 27.5 percent active ingredient and have performed similarly in trials.

In other parts of the world, prohexadione calcium is available under the brand name Regalis, which contains only 10 percent active ingredient but also includes magnesium sulfate in the formulation.

Keys to success

For the best results, growers should include either an equal quantity of magnesium sulfate or water conditioner with the Apogee to lower the pH level. At high pH levels, Apogee becomes inactive.

A surfactant should also be included in the tank and an anti-foam agent if the surfactant is one that foams. Apogee should

Enhancing fruit QUALITY

Many growth regulators are available for apples.

by Geraldine Warner

Several plant growth regulators are available for enhancing the quality of apples at harvest or for managing harvest maturity.

Dr. Dana Faubion with AgroFresh, a major supplier of 1-MCP for the tree fruit industry, said 138 growth regulator products are registered for use on apples in Washington, of which about 23 affect fruit quality.

Plant growth regulators fall into five classes of hormones: auxins, cytokinins, ethylene, anti-ethylene products and gibberellins. A hormone is a chemical messenger that sets a process in motion within the plant.

NAA (naphthaleneacetic acid), sold by Amvac under the brand name Fruitone L, is an auxin that prevents fruit drop by inhibiting abscission. It can be applied between four weeks and one week before expected harvest and is effective for two weeks. It has a two-day preharvest interval.

A challenge of using this material is that high levels can accelerate fruit senescence and its effects can vary depending on the rate, timing and condition of the fruit.

Promalin is a mixture of two growth regulators: gibberellic acid 4 and 7 (GA) and the cytokinin benzyladenine (BA). It is applied around bloom to enhance fruit size and typiness.

Ethrel (ethephon) is a synthetic version of the ripening hormone ethylene. It can be applied before harvest to improve the red color of apples and degreen the fruit. However, this is a tricky chemical to use, Faubion warned, as it stimulates fruit respiration and production of ethylene inside the fruit and can make the apples turn greasy and soft, impairing storability.

AVG (aminoethoxyvinylglycine), sold by Valent under the brand name ReTain, inhibits production of ethylene in the fruit to prevent fruit drop

not be mixed with calcium, according to the product label. Greene said he believes this is because calcium products inactivate Apogee.

For maximum growth control, Greene recommends applying Apogee very early in the season — as soon as there is enough leaf area to absorb the compound. He thinks petal fall applications are too late because by then the shoots are growing rapidly. Apogee does not stop growth immediately when sprayed on the tree, so shoots can grow significantly during the 10 to 14 days it takes for the compound to work.

“If you don’t get it on early, you’re going to lose a real opportunity,” he warned.

In Massachusetts, Greene applied Apogee in a mature block of Cortland apples to illustrate its effects to growers. The trees grew on Malling 26 rootstocks and were overly vigorous. This had been aggravated by heavy pruning each year. Flower bud formation and fruit set were poor, and the apples were large, green, soft, affected by bitter pit, and had poor storage potential. The block had never been productive.

Greene tested two treatment timings with Apogee at a rate of 9 ounces per 100 gallons of water: one at the pink stage of bloom and the other at petal fall. The pink-stage treatment resulted in more open trees, better light penetration and improved fruit set. With the petal fall timing, much of the growth retardant effect was lost, he reported, although it did increase fruit set and opened up the trees somewhat compared to untreated trees.

Rates

In a trial on McIntosh apples, Greene assessed the effect of various rates of Apogee on fruit set and return bloom. Rates tested were 125, 250 and 375 parts per million. Fruit was thinned based on the needs of the control treatment.

Trees treated with the lowest rate set 5.3 fruit per square centimeter of limb cross-sectional area versus 9.8 for the highest rate. However, the lowest rate had the highest return bloom (8.4 fruit per centimeter of limb cross-sectional area) versus 3.3 for the highest rate.

“As we increase the amount of Apogee we get increases in fruit set, but the reduction in return bloom is a problem,” he said, noting that growers should adopt a more aggressive thinning program in trees treated with Apogee.

Growers in the eastern U.S. tend to use lower rates of Apogee at first but apply it more frequently. This is because they sometimes have difficulty thinning the crop adequately and the theory is that using lower rates initially will reduce the increase in fruit set, though this has not been proven, Greene said.

Last year, he did an experiment with Fuji to study the effect of different rates of Apogee on fruit set. He applied 3, 6, 9 or 12 ounces per 100 gallons in late May when shoot growth was 1 to 2 inches long. All the treatments increased the crop load in comparison with the control. The 3-ounce rate set as much fruit as the higher rates, suggesting that Apogee did not increase initial fruit set, but the reduction in vegetative growth retarded June drop.

Greene said it is not clear why there was no statistically significant rate response in the Fuji trial, as there was in the McIntosh study, and he intends to conduct another experiment to clarify this.

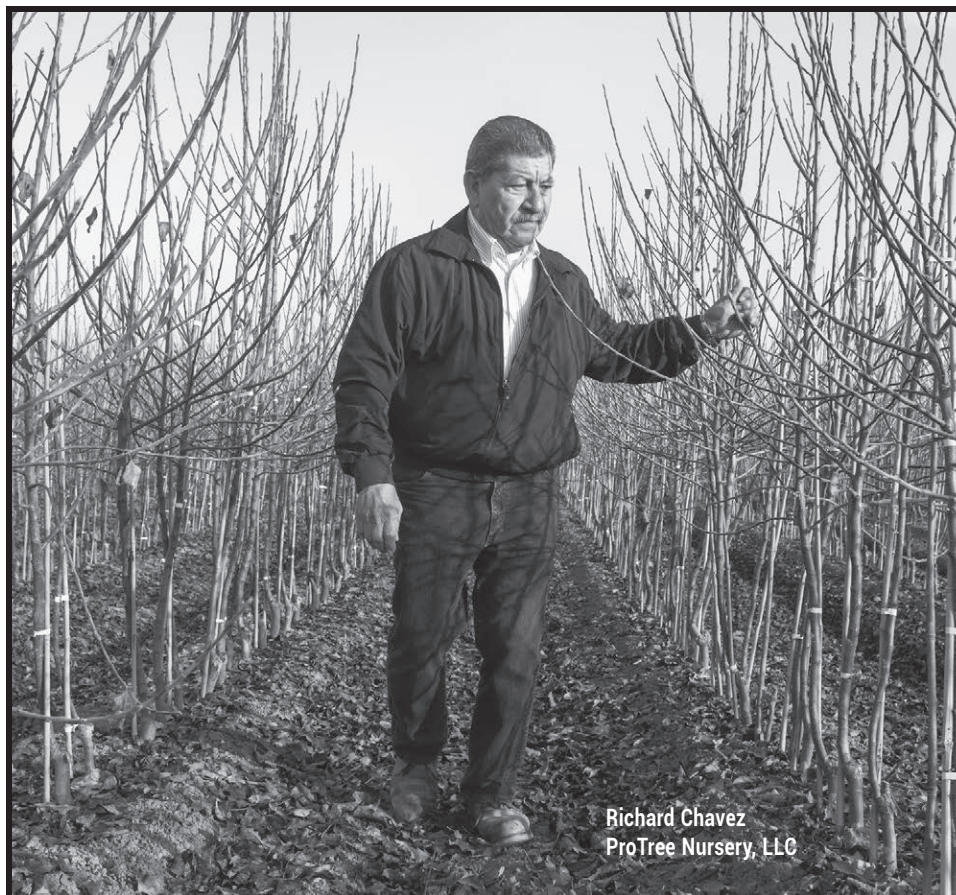
He also studied how long the effect of Apogee endured in the trees before the compound was metabolized and the shoots began to regrow. Only trees treated with the 3-ounce rate regrew. The higher rates controlled growth for the whole season, but much of this growth was attributed to added weight because the terminals were pulled down horizontally by the weight of the fruit. ●

and retain firmness. It works by preventing SAM (S-adenosylmethionine), which is a precursor of ethylene, from synthesizing into ACC (1-aminocyclopropane-1-carboxylic acid) and then into ethylene.

Faubion said AVG applied before harvest helps get the fruit into storage in good condition, but is unable to prevent the apples from reacting to ethylene in the storage room. It does a better job in controlled-atmosphere (CA) storage than in regular storage because low oxygen, high carbon-dioxide, and low temperature all help to inhibit ethylene production.

1-MCP (1-methylcyclopropene), sold by AgroFresh under the trade name Harvista, works by blocking the ethylene receptors in the fruit, making it unable to detect ethylene. It can be applied before harvest by air (helicopter) or ground and takes effect more quickly than AVG, Faubion said. It controls fruit drop and also can maintain fruit firmness in storage because fruit may still be unable to detect ethylene in the environment. Harvista combined with a postharvest treatment of MCP (SmartFresh) is the best of all in terms of maintaining fruit quality, he said.

Faubion spoke during Washington State University’s Fruit School on Apple and Pear Horticulture in November. ●



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Gathering data for FOOD SAFETY

Research will help inform the FDA and producers as the Food Safety Modernization Act is implemented.

by Geraldine Warner

Research by scientists in Washington and other parts of the country could influence what will be required from tree fruit growers and packers as the Food and Drug Administration implements new food safety regulations.

Since the Food Safety Modernization Act became law in 2011, the FDA has been developing a series of rules covering food production, handling, transportation, importation and auditing, with the focus on preventing food-related illnesses.

Kate Woods, vice president of the Northwest Horticultural Council, said the FDA, which had never before regulated farms, began proposing very prescriptive rules governing on-farm practices. However, there was not much data showing the safety or health



Kate Woods

risks to consumers posed by current growing practices for different types of produce.

For example, little was known about which pathogens farmers should test for in water and at what levels the water could be considered safe for application to tree fruit if pathogens are present. Nor was it known where the water should be sampled within the irrigation system

to get the most accurate reading, or what the best mitigation measures might be.

Growers are covered by the Produce Safety Rule (standards for the growing, harvesting, packing and holding of produce). Most Northwest tree fruit growers irrigate from open canal systems, and the initial version of the rule (proposed in January 2013) included water standards that seemed completely unachievable in terms of how frequently growers would be required to test their

water supply and what they should do if results came in at unacceptable levels, Woods said. After receiving feedback and releasing an interim draft of the rule for public comment, the FDA published the final rule on Nov. 27. It includes slightly more workable standards and requirements for produce growers and some flexibility should future scientific studies show different methods that would allow producers to meet FDA's standards for human health protection.

Research

Woods said research is being done around the country, some of it funded by the Center for Produce Safety, to fill in the gaps and provide information that will be critical as the regulations are implemented. For example, Dr. Karen Killinger, former food safety specialist at Washington State University, and Dr. Ines Hanrahan, project manager with the Washington Tree Fruit Research Commission, have been working on projects relating to food safety in the orchard and packing house. (See "Food safety research focuses on packing" on page 28.)

The final Produce Safety Rule is 801 pages long, and Woods said that, as of press time for this issue of *Good Fruit Grower*, the Northwest Horticultural Council and other produce organizations were still analyzing and seeking clarifications from FDA on exactly how it will impact growers. However, as was expected based on previous versions, the rule will require growers to test their water and take certain actions should microbial tests come back above a set threshold close to harvest.

The rule appears to provide options for science-based alternatives to certain parts of the new water requirements created in the rule. It's hoped that, based on data from current or future research, the FDA will be able to give growers flexibility in setting and achieving these standards and not force them to meet requirements unnecessary for human health protection. The research also will provide growers with information to help them implement the rules.



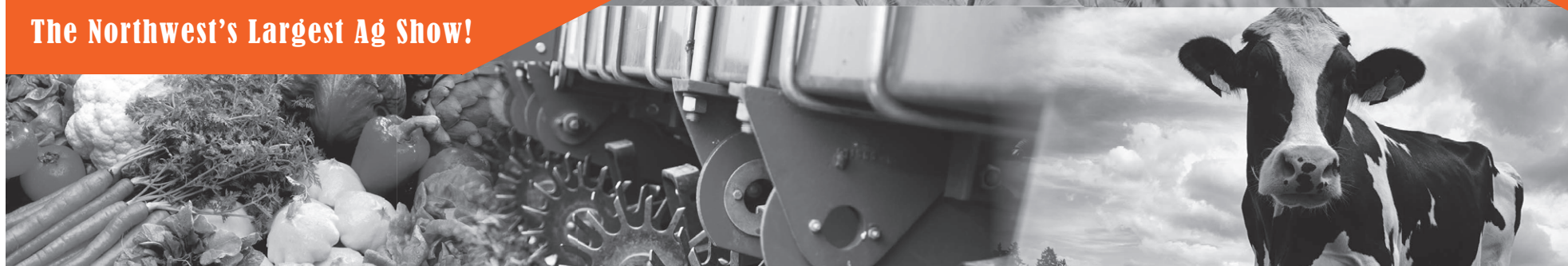
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Very small growers — those with less than \$250,000 in annual produce sales — will have four years from Jan. 26, 2016, the day the rule goes into effect, to comply with most provisions in the Produce Safety Rule. Growers with \$250,000 to \$500,000 in sales will have three years to comply, and all others will have two years. However, growers will be given an additional two years to meet the water quality standards because of concerns about the difficulty that growers may have in meeting these new requirements.

Woods said once the industry has finished analyzing the rule and has a better idea of exactly what will be required, growers should start looking at their operations to see if changes need to be made. The FDA is preparing guidance documents, but it's not known when they will be issued.

Packers

The other FSMA rule that will have a significant impact on the tree fruit industry is the Preventive Controls for Human Food Rule. Some fresh fruit packers might fall under the Produce Safety Rule if most of the fruit they pack comes from company-owned orchards, though the location of the orchards is also a factor. However, if most of the fruit comes from outside growers, the packer will likely fall under the Preventive Controls for Human Food Rule instead. This could lead to some confusion at first, Woods said. Packers who handle fruit from their own orchards and from other growers will need to determine which rule applies to them. This also applies to storage facilities.

The FDA issued the final version of the Preventive Controls Rule in September 2015. It's a document of more than 900 pages that industry representatives are still analyzing in order to understand the implications. One thing's certain: It will require more paperwork from packers to document their use of safe practices. Each packer will need to identify food-safety hazards in their facility and how to address them. An industry-wide approach won't work, Woods said, because each packing facility has different points where there might be vulnerabilities and different solutions that might be best to address them.

"There's information we can provide, but I don't think there's going to be a cut-and-dried plan that's going to work industrywide," she said. "There's certainly going to have to be science and data and research provided to assist packing houses to address these concerns."

Woods said Pacific Northwest fruit packers won't have to duplicate what they're already doing for third-party auditors or the U.S. Department of Agriculture's Good Handling Practices, but there will likely be additional requirements that will take additional time and resources at first. Produce industry organizations, such as the Northwest Horticultural Council, Produce Marketing Association and United Fresh Produce Association are all still analyzing the Preventive Controls Rule to find out exactly what it will mean for packers.

Very small businesses, with less than \$1 million in annual sales, will need to comply with the Preventive Controls Rule by September 2018. Small businesses, those with fewer than 500 full-time equivalent staff, will have to comply by September 2017. All others will need to comply by September 2016.

The FDA will publish guidance documents specific to fresh produce packing that should provide more information on how the FDA will interpret the rules, but Woods said it's not known when those will be available.

Training

Woods said there should be plenty of training opportunities for growers and packers. The Produce Safety Alliance at Cornell University in New York will offer train-the-trainer courses for people interested in training growers on how to meet the Produce Safety Rule requirements. FDA has been working with the alliance to develop the curriculum.

Industry associations, including United, PMA and the Washington State Tree Fruit Association are working on education and training efforts for producers. Since the FDA has no experience with regulating on-farm practices, the agency will probably also work with states to implement and enforce the rules, though that's not yet been announced. ●

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Food safety research focuses ON PACKING

Scientists hope to reduce food safety risks in Washington apple packing houses.

by Geraldine Warner

Scientists in Washington have been doing research to help fruit packers ensure fruit is clean when it goes in the box and reduce their food safety risks.

Dr. Ines Hanrahan, project manager with the Washington Tree Fruit Research Commission, has been working with Dr. Karen Killinger, former food safety specialist with Washington State University, to evaluate the most effective microbial controls for packing houses and identify new products and approaches.

Dump tank

Controlling microbes in the dump tank is difficult because of all the soil (organic matter) that is dumped with the fruit. Organic matter binds to and inactivates chlorine.



PHOTOS COURTESY INES HANRAHAN

Researchers collect apples for analysis after treatment in a split dump tank system.

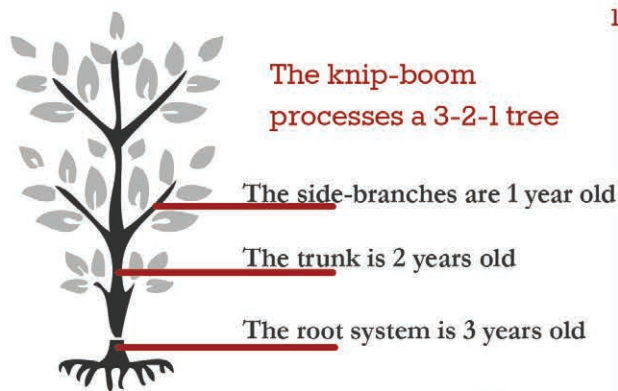
Hanrahan said it is not uncommon for packers to just have one dump tank and change the water once a week. "This is where you can lose control, and you then start contaminating the fruit," she said.

Ideally, the dump system should have two parts beginning with a small tank where the bins are initially submerged. Then, the fruit would go under a rinse bar and into a separate, cleaner dump tank.

"It's much easier to control your chlorine levels and prevent cross-contamination in the second dump tank, and you may get a microbial reduction, depending on your management system for the dump tank and flume system," she said.

Packers might not have room for two dump tanks on their existing lines, Hanrahan said. "But it's easy, if you're

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“Determining an appropriate water change schedule with more frequent water changes can improve safety.”

—Ines Hanrahan

building a line, to consider that, and it doesn't cost a lot of money to do it. Just a little alteration makes a huge difference for food safety.

“If you have two separate water systems, a dump tank followed by a separate flume system, you can switch the water in the first dump tank very frequently. You don't have to dump all the water in the system at one time. It's easy to replenish that tank and keep it clean. Determining an appropriate water change schedule with more frequent water changes can improve safety.”

The oxidation/reduction potential (ORP) can be used as an indicator of how much active chlorine is in the system to help control microbes, so it's important to measure the ORP with a meter or probe to make sure it stays in the right range, she said.

However, readings can be affected by the placement and accuracy of the instrument as well as frequency of calibration. For example, if readings are taken close to the chlorine injection system, perhaps because it's a convenient location, they might not accurately indicate the overall ORP level throughout the entire system. The scientists recommend aiming for ORP readings higher than the minimum target levels to control microbes to account for variability in readings and the accuracy of the probes. Meters need to be maintained properly.

Spray bars

A spray bar system can be an effective way to reduce the microbial load on fruit. However, Hanrahan said many packing lines don't have a spray bar or, if they do, it's not long enough. “If you have a spray bar that applies a treatment directly to the fruit for a few seconds, that's clearly too short.”

Research has shown that generic (non-pathogenic) *Escherichia coli* on apples can be reduced by more than 90 percent when 60 to 80 parts per million of peroxy-acetic acid are directly applied to the fruit for at least 30 seconds, with or without soap.

Some packers have changed the layout of their packing lines to add spray bars or created space for longer spray bars.

“This is a nice outcome, so you can get microbial reductions on the packing line,” Hanrahan said.

The scientists emphasize that microbial control must be maintained throughout the packing process. In a study at a cooperating packing house, they found no evidence of coliforms or generic *E. coli* in the pre-size dump tank water system, but the lack of a sanitizer in the flume system and bin fillers resulted in increasing microbial loads on fruit after pre-sizing.

They also monitored microbe levels after each step during final packing: dump tank, soap spray bar, hyper-wash, water rinse spray bar, fans, wax application and dryer. The step that appeared to reduce microbes the most was drying.

Research is now underway to further study how drying during the packing process affects microorganisms on fruit.

Overall, progress is being made on identifying steps in a packing system that can improve microbial control and offer opportunities for microbial reduction, Killinger and Hanrahan report. ●



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Prices going up after Washington growers harvest third-largest crop ever.

by Ross Courtney

Apple prices were going up just as Washington's packing houses announced their December storage report. Growers harvested 118.5 million boxes of apples for the fresh market this season, the third-largest crop ever, said Jon DeVaney, president of the Washington State Tree Fruit Association.

That's about 15 percent smaller than last year's monstrous 140 million boxes of apples.

"Growers need to know that it's a very manageable crop," said DeVaney.

The good news for growers this season is that it's improving with time.

"If you talk to most growers, they feel that this year is shaping up so much better than last year," DeVaney said.

As of Dec. 1, packing houses had shipped about 25 percent of the crop, a higher than average share by that point of the season.

"We're off to a strong start," DeVaney said.

Also, early December prices are higher than last year, which should make for higher returns from packing houses.

Meanwhile, prices are climbing this year as opposed to falling, as they did in early December 2014, right when the Puget Sound port slowdowns began.

The season didn't start out so well.

The early 2015 harvest had caused some extra overlap with 2014 storage, especially Red Delicious apples, putting downward pressure on prices in September and October.

Holdovers always overlap with the new crop some, but this year "is unusual only because the 2014 crop was unusually large," DeVaney said.

"We carried over some fruit into August and September, which we normally don't do," said Chris McCarthy, a spokesman for Auvil Fruit Company in Orondo. "Usually we're done by April or May."

The 2014 crop cleared warehouses at about the same pace as the 2012 crop, the previous record. The industry shipped 6.7 percent of the 2014 crop after Sept. 1 in 2015, compared to 8 percent of the 2012 crop after Sept. 1, 2013.

Growers are expressing some concern about storage quality due to water shortages and extra hot weather over the summer.

"Weather had an impact on us just like it did everybody else," McCarthy said.

Charlie de La Chappelle, an Outlook orchardist, estimated he culled about 20 percent of his Galas, higher than usual, and noticed checking (cracks in the skin) on 25 to 35 percent of his Fujis.



TJ MULLINAX/GOOD FRUIT GROWER

Gala apples from the 2015 season are harvested north of Wapato, Washington, in August. Washington's apple crop this season was its third largest, coming in at more than 118 million boxes.

Guessing is hard because some of the problems aren't showing up until the apples are packed, said de la Chappelle, who farms in the Roza Irrigation District, a junior-rights district that shut off deliveries for three weeks in May.

"It's like opening a Christmas present — you don't know until you run them over the line," he said. ●

Washington's apple crop

December storage report:

Total:	118.5 million boxes
Red Delicious:	29 million boxes, 24.8 percent
Gala:	25 million boxes, 21.4 percent
Fuji:	15.9 million boxes, 13.4 percent
Golden Delicious:	8.5 million boxes, 7.2 percent
Honeycrisp:	7.3 million boxes, 6 percent
Others:	32.8 million boxes, 27.2 percent

SOURCE: U.S. DEPARTMENT OF AGRICULTURE, AGRICULTURAL MARKETING SERVICE



GOOD POINT

Lindsey Morrison, Columbia Fruit Packers

Lessons in leadership

The Washington Agriculture and Forestry Education Foundation (AgForestry) is a leadership development program for adults working within and connected to Washington state's agriculture, forestry and fishing industries. Good Fruit Grower asked Lindsey Morrison, a graduate of the program, to describe its benefits.

The Washington State AgForestry Education Foundation, established in 1978, enrolled its 38th leadership class in October 2015. The program seeks to enhance the leadership skills of people in forestry, agriculture and natural resources for a better comprehension of industries, resources and communities.

Each year the program awards fellowships to 24 people from across Washington. Twelve seminars are held across the state over an 18-month period highlighting natural resources, agricultural and forestry issues. One week is spent in Washington D.C. learning about national government; in the winter of the second year, two weeks are spent abroad learning about global agricultural and forestry issues.

In the fall of 2014 I began my leadership journey with AgForestry with my first trip to Pullman where I met my classmates and AgForestry foundation staff. It was a whirlwind of leadership lessons and what we refer to

in class as "aha!" moments. I will never forget the takeaway from that first seminar: "Life begins at the edge of your comfort zone," a quote by Neale Donald Walsch. We happened to be the last class to hear from Dr. Elson Floyd, late president of Washington State University. His words were inspiring, and we all mourned the loss of such a visionary with his passing.

Thanks to generous donations from people in the industry, AgForestry has helped produce many leaders in the agriculture industry in Washington. As a graduate, I have been inspired to seek out opportunities to play an active leadership role with my employer, Columbia Fruit Packers Inc. of Wenatchee, where I've worked since 2009. I've had many different roles at the company. I was originally hired to work on orchard sustainability and that quickly expanded to include developing a food safety program for our company orchards and outside growers. For the past three years, I have been performing fieldwork with outside growers, and additionally, I recently began managing our new variety testing program.

The AgForestry program provided the skills and knowledge necessary for me to make positive contributions in the tree fruit industry. The program also gave me new business contacts and expanded my professional network. In my humble opinion, the best part of the program is the people. Each and every one of my classmates

has taught me a lesson or two or three. I feel so fortunate to be a part of Class 37. My class included people from different ages and backgrounds. My group included growers, shellfish farmers and foresters. We formed a unique bond and made lifelong friendships.

I highly encourage everyone in the tree fruit industry to consider the AgForestry Leadership Program. It is within this diverse group that the magic happens. There is something inspiring about everyone coming together for a common goal. I challenge you all to find alumni to nominate you for Class 39. The deadline for Class 39 applications is April 30.

Lindsey Morrison is a Central Washington University graduate with a bachelor's degree in biology. Additionally she took the core horticulture classes at Wenatchee Valley College. She has been at Columbia Fruit Packers since 2009. ●



ONLINE
To learn more about the AgForestry leadership program and its alumni, visit
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COURTESY OF VAN DOREN SALES/JOHN CURRY PHOTOGRAPHY

Pictured after receiving a 2015 Family Business Award in Seattle are (from left) Brian Green, Bret Pittsinger and his daughter Karle, Lynn Pittsinger, and Carl Van Doren.

Van Doren receives family business award

Van Doren Sales of East Wenatchee, Washington, has received a silver Family Business Award for midsize firms from *Seattle Business* magazine. The company builds equipment for cleaning, waxing, sorting and packing fresh apples, pears and cherries.

The company was founded in 1946 by Louis Van Doren, who was formerly shop manager for the fruit company Skookum Inc. in Wenatchee. He purchased Skookum's shop equipment and set up his own business called Van Doren Machine and Repair Shop where he produced and serviced fruit packing and box conveying equipment. In 1954, he changed the name to Van Doren Equipment and Van Doren Sales, and later the business became a single corporation.

Louis' three children joined the business in the early 1960s. Louis "Van" Van Doren Jr. worked in sales, Carl Van Doren was production manager, and Lynn Pittsinger was the bookkeeper and controller.

The third generation of the family — Lynn's son Bret Pittsinger and Carl's son-in-law Brian Green — joined the company in 1993 and continued to follow Louis Van Doren's original motto "Quality pays."

The company moved from Wenatchee to the Baker Flats area in East Wenatchee in 1996 and now employs about 90 people. It has invested heavily in community sponsorships.

Crimson Snow launched

Crimson Snow, a variety managed globally by the Italian company KIKU Variety Management, was harvested this fall in Serbia and Italy. About 3,000 tons were produced in Italy this season, primarily for the Italian and German markets, though there is also interest in exporting to Spain, North Africa, the Middle East and Asia.

After the next planting season, there will be more than 200 hectares (500 acres) of the variety planted in Serbia, Italy and Switzerland.

Acreage is likely to increase over the next two to three years to 500 hectares (1,250 acres). Partners producing the variety include Verda Vivo/Agrounija in Serbia, Iseppi Frutta in Switzerland, and three Italian marketers, F.lli Clementi, Rivoira and Sanifrutta.

According to information from KIKU, it's important to choose the right growing areas because of the late harvest of the variety. It matures after Fuji.

Crimson Snow (cultivar MC38) is a chance seedling discovered by Allan McLean in Australia. The apple is red and colors well on the tree. It has a balanced sweet-tart flavor, and the flesh is slow to turn brown.

Licensed marketing partners met with KIKU in Europe this fall to discuss promotion and merchandizing plans. For more information, go to www.crimsonsnow-apple.com.



COURTESY KIKU VARIETY MANAGEMENT

Italian orchardist Adriano Musola harvests Crimson Snow.

GOOD TO GO

For a complete listing of upcoming events, check the Calendar at www.goodfruit.com

JANUARY

January 4-5: Kentucky Fruit and Vegetable Conference, Lexington, Kentucky, www.khort.org. For information, call (859) 257-5685.

January 6-8: Illinois Specialty Crops, Agritourism and Organic Conference, Springfield, Illinois, www.specialtygrowers.org. For information, call (309) 557-2107.

January 7-8: Yakima Ag Expo, Yakima, Washington, www.yakimaagexpo.com. For information, call (509) 248-2900.

January 7-8: Precision Farming Expo, Kennewick, Washington, precisionfarmingexpo.com.

January 12: Washington Highbush Blueberry Workshop, Ellensburg, Washington. For information, call (360) 848-6124 or email lisa.devetter@wsu.edu.

January 11-13: Northwest Food Manufacturing and Packaging Expo, Portland, Oregon, www.nwfp.org. For information, call (503) 327-2200 or email expo@nwfp.org.

January 15: Cherry Institute, Yakima, Washington, www.wastatefruit.com. For information, call (509) 853-3504 or email cherryinstitute@wastatefruit.com.

January 18: Lake Chelan Horticultural Day, Chelan, Washington. For information, email tianna.dupont@wsu.edu.

January 18-20: Ohio Produce Growers & Marketers Association Congress, Sandusky, Ohio, www.opgma.org.

January 19: North Central Washington Stone Fruit Day, Wenatchee, Washington. For information, email tianna.dupont@wsu.edu.

January 19-21: Empire State Producers Expo, Syracuse, New York, nysvga.org/expo/information.

January 19-21: Indiana Horticultural Congress and Trade Show, Indianapolis, Indiana, www.inhortcongress.org.

January 20: North Central Washington Pear Day, Wenatchee, Washington. For information, email tianna.dupont@wsu.edu.

January 21: North Central Washington Apple Day, Wenatchee, Washington. For information, email tianna.dupont@wsu.edu.

January 26-28: Northwest Ag Show, Portland, Oregon, www.nwagshow.com. For information, call (503) 769-8940 or email agshow@wvi.com.

January 26-28: Unified Wine & Grape Symposium, Sacramento, California, unifiedsymposium.org.

January 27-28: Apple Horticulture and Postharvest Research Review, Confluence Technology Center, Wenatchee, Washington, www.treefruitresearch.com. For details, call Kathy Coffey at (509) 665-8271 ext. 2 or email kathy@treefruitresearch.com.

January 28-29: Apple Crop Protection Research Review, Confluence Technology Center, Wenatchee, Washington, www.treefruitresearch.com. For information call Kathy Coffey at (509) 665-8271 ext. 2 or email kathy@treefruitresearch.com.

January 29-30: BC Fruit Growers Association Annual Convention, Kelowna, British Columbia, Canada, www.bcfga.com.

FEBRUARY

February 2-4: Mid-Atlantic Fruit & Vegetable Convention, Hershey, Pennsylvania, www.mafvc.org. For information, call (717) 694-3596 or email pvga@pvga.org.

February 2-5: CiderCon and U.S. Association of Cider Makers annual conference, Portland, Oregon, www.ciderconference.com.

Fresh Pear Committee nominations will be held at industry meetings

Pear growers will elect nominees for positions on the Fresh Pear Committee during industry meetings in January and February. The committee is responsible for the collection of assessments for research and the promotion and advertising of all pears marketed in domestic and export markets.

Nominations for the grower and handler positions in the Wenatchee district will take place Jan. 20 during the North Central Washington Pear Day at the Wenatchee Convention Center, 201 N. Wenatchee Ave., in Wenatchee, Washington. The grower position is currently held by Matt McDevitt (Kevin Stennes, first alternate; Daryl Harnden, second alternate). The handler position is held by Craig Christensen (Dan Kenoyer, first alternate; Ken Jackson, second alternate).

Nominations for the Mid-Columbia district will take place Feb. 5 at the Hood River Inn, 1108 E. Marina Drive, Hood River, Oregon. Mark Laurance currently holds the grower position (Erick von Lubken, first alternate; Derek DeBorde, second alternate). The handler position is held by Don Gibson (Fred Duckwall, first alternate; Bob Wymore, second alternate).

All pear growers are eligible to attend and participate in the respective nominations. Names of those elected will be submitted to the Secretary of Agriculture for official appointment to the committee. Newly elected members will serve for two years.

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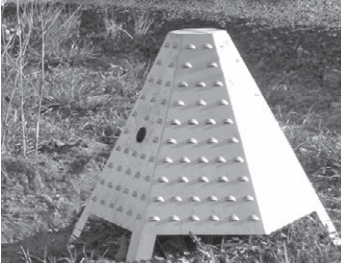
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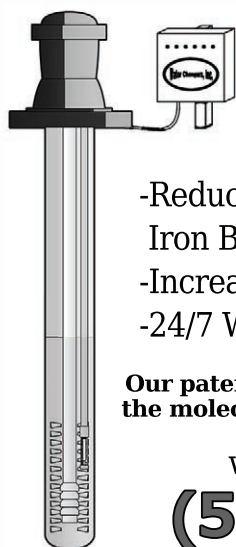
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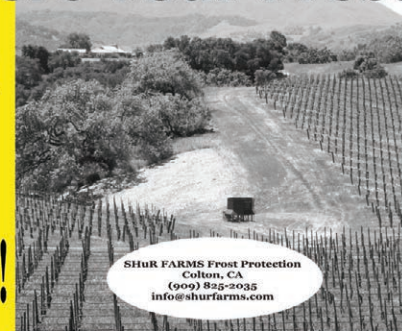
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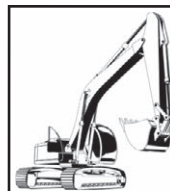
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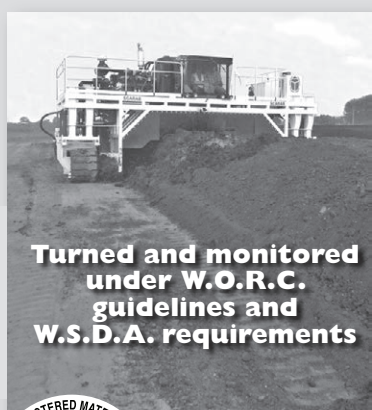
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Shannon Dininny, Senior Editor

Catherine Kiyokawa

grower / Parkdale, Oregon

age / 21

crops / Pears, apples, cherries, peaches, blueberries, kiwi

business / Kiyokawa Orchards

family background / Catherine is a fourth-generation farmer. Her grandfather, Mamoru Kiyokawa, started growing tree fruit on the farm. Catherine works closely with her father, Randy, and older brother Cameron.

What was your path to farming?

“When I went to college, I majored in business because our farm continues to expand. At the time I believed having a business degree would be a useful tool for me to have on the farm. Not including the accounting, it was really good to learn how the everyday business functions work.

What projects would you recommend other young growers take on?

“Definitely the technology aspect of the farm. Some farmers don't even use texting or computers. There's tech out there that can help them, like online spray records, GlobalGAP record keeping — you have to document everything.

What are your goals?

“I'm learning how to take on projects like our Global-GAP and Tilth certifications. I'm learning how to document everything including regulations, organic farm management, auditors and studying manuals. It's taken a lot of time.

How do farmers' markets work into your job?

“My dad got this grand idea that we should go into this farmers' market one season. Even if it was just a one-time market, we just did it. We wanted to get our fruit out there. Now we are doing 26 different farmers' markets. It's been a challenge. Some markets have very specific requirements. The farmers' markets have really helped during poor seasons.

Did you see yourself returning to the farm?

“Dad didn't want us to use the farm as a crutch, however, I knew that I would not get a lifestyle like this just anywhere. I love harvest time when my family comes together. It's something that you just can't get anywhere else.

“It's really important to stay up to date with technology because everything's digital.

by TJ Mullinax

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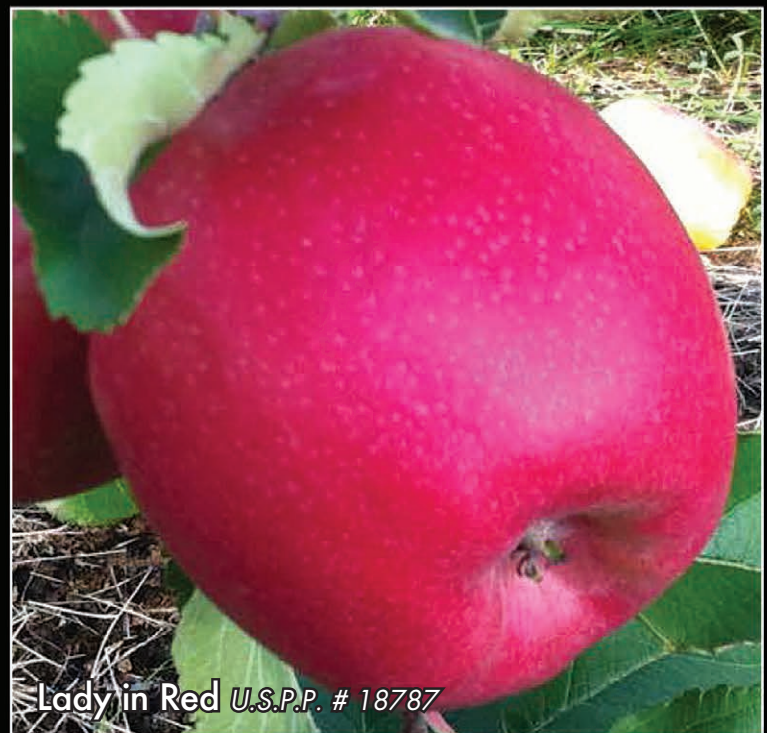
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