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JUNE 2016 www.goodfruit.com VOL. 67, NO. 11

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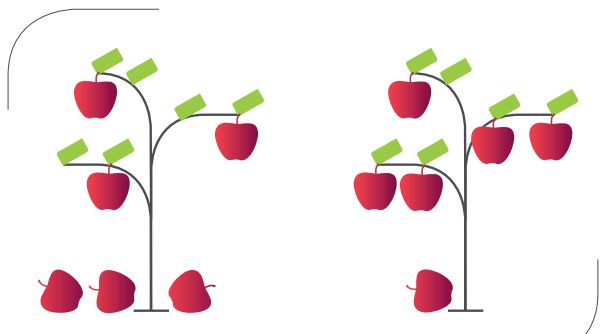

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Centerpiece

New Varieties

The great-tasting, grower-friendly Cosmic Crisp won't hit the supermarket shelves for a few more years, but fruit marketers and growers are working to make sure it's a hit when it comes to market. Read more beginning on page 24.

TJ MULLINAX/GOOD FRUIT GROWER

TJ MULLINAX/GOOD FRUIT GROWER

Last Bite

Good Grape Grower

First Bite

Also in this issue

Departments

On the cover

Washington's Mt. Adams at sunset seen from Oregon's Hood River Valley with pear, apple and cherry orchards in the foreground.

BY DAVID M. COBB, MOSIER, OREGON

dmcobbphoto.com

On the Web

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growing with growers since 1946

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Quick Bites

People and industry in the news.

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WAEF awards $1 million in scholarships

The Washington Apple Education Foundation (WAEF) has reached a milestone of awarding $1 million in a single year to college-bound students raised in fruit growing districts of Washington. Wenatchee-based WAEF was founded in 1994 to be the charity of the tree fruit industry. Its mission is to impact lives through access to educational opportunities.

"Growth of the foundation's scholarship program in recent years has been significant," shared the foundation's outgoing chairman Rachel Sullivan. "WAEF is supported through voluntary gifts from members of the tree fruit industry. Five years ago we awarded just over $400,000 in scholarships. Each year since we've seen significant jumps in industry supported scholarships." Sullivan is CEO of Crane & Crane, Inc. located in Brewster, Washington.

WAEF is funded through voluntary contributions made by growers, packers, suppliers, service providers and others connected to the tree fruit industry, including *Good Fruit Grower*. Donations to the scholarship program are made through annual giving and one-time endowment gifts. Additional funding for foundation operations is generated through annual events, including scholarship luncheons held during the summer months in its primary markets of Yakima and Wenatchee.

For additional information on the Washington Apple Education Foundation or its programs, visit website *www.waef.org* or contact Jennifer Witherbee, executive director, at (509) 663-7713 or *Jennifer.witherbee@waef.org*.

IFTA accepting scholarship applications

The International Fruit Tree Association is accepting applications for young professional scholarships for its summer tour in New York in July and for the annual winter meeting in Wenatchee, Washington, in February.

All young persons involved in the tree fruit industry are invited to apply.

IFTA also is soliciting donations for its young professional scholarship program. More information and applications are available at the IFTA website at *www.ifruittree.org*.

Three new hires for Ohio State grape research

Andrew Kirk

Elizabeth Long

Melanie Lewis Ivey

Ohio State University has hired three people for its grape research program.

Andrew Kirk has been hired as research specialist and manager of the 25-acre facility dedicated to wine grape research and education. Kirk worked in New Zealand, at Lincoln University's research vineyards, while earning a master's degree specializing in viticulture and enology in 2016.

Kirk will direct research and outreach coordination for research and education programs at the Ashtabula Agricultural Research Station, located near Lake Erie in the northeastern corner of the state. He also will work with Ohio State faculty in design and implementation of grape and wine production field research trials on pest, weed and disease control; new variety trials; cold tolerance; and wine quality.

Two new faculty collaborators are Elizabeth Long, an assistant professor of entomology, and Melanie Lewis Ivey, a plant pathology assistant professor.

Long earned a Ph.D in plant, insect and microbial sciences from the University of Missouri in January 2016. She has a specialty in integrated pest management of muck soil vegetables and grapes.

Lewis Ivey, who is currently an assistant professor at Louisiana State University, joins the Ohio State University faculty in June 2016. She earned a Ph.D at Ohio State University in plant pathology and will be conducting research on grape diseases important to the Ohio industry.

Corrections

A story in the May 1 issue on the 100th anniversary of the Del Monte processing plant in Yakima, Washington, contained inaccurate figures. The plant processes about 60,000 tons of pears per year, and growers are paid a negotiated price of $340 per ton this year and $360 per ton in 2017.

Also, a story about Cabernet Sauvignon clones in the April 15 issue included an incomplete list of clones grown at Winemakers LLC's Horse Heaven Hills properties. They are 2, 4, 6, 8, 10, 21, 24 and 33.

Good Fruit Grower regrets the errors.

O. Casey Corr, **Managing Editor**

Foxtrot dances its way onto the apple scene

Central Washington in August can get so hot the air seems to quiver, so maybe grower Rob Wyles thought he saw a mirage. For there in 2007, in an orchard above the Columbia River near Quincy, Washington, he saw an almost freakish thing amongst plantings of Fujis, Galas and Grannys. It wasn't the shape of the apples. It was the color, the fruit unusually red, especially for that time of year. The red apples looked like ornaments on a Christmas tree, he thought.

Wyles knew it was something unique so he marked the tree with tape and told people not to pick it or prune it. He wanted to see what the tree would do. The excitement increased later when he tasted one of the apples. It had a nice crunch, a sweet taste and was very juicy. Growers call that an apple that eats well. The rest of us just say yum.

"The consumer needs this apple."
—Rob Wyles

This is not a story about how an apple was discovered and went on to change an industry. If you want to read about one of those, follow the excitement around the rollout of the Cosmic Crisp apple elsewhere in this issue of *Good Fruit Grower*. No, this story is about how a grower can think he's got a great apple, but if the world doesn't know about it and buy it, well … If an apple tree falls in the forest and there's nobody around to hear it, does it make a sound? Wyles knows the challenge. "It's hard for somebody like me to get this started," he said.

Wyles knows apples. In 1975, he graduated from Washington State University, and, with his twin brother, Ron, as partner, bought 27 acres in Tieton, Washington. They bought another farm in the Columbia Basin, then a third. He kept expanding, and, in 1987, he and partners formed a company called Northwest Management and Realty Service to manage acreage owned by others. (He closed the management company in 2014 after a painful legal battle with Columbia Legal Services, but that's another story.) In Tieton, he and his wife, Michelle, own a building that they've donated to a food bank and an art gallery.

TJ MULLINAX/GOOD FRUIT GROWER

Grower Rob Wyles thinks he has a winner with the brilliant red apple he discovered in an orchard near Quincy, Washington, in 2007.

Back to Foxtrot. Wyles called it that because he liked to name his farms after an animal and "foxtrot" sounded catchy. Wyles took the mother tree and began to graft it to rootstocks, usually the Malling 9 but some on Malling 26. To secure a patent, he hired a lawyer who documented the tree, the flowers, the seeds, the apple and all the particulars of what was called a whole-tree mutation of Tenroy Gala with "intense red fruit," "fragrant, floral aroma" and "exceptional flavor." The patent application predicted a harvest of 35 tons per acre based on high-density planting of 1,100 trees per acre.

Foxtrot has some traction. Four nurseries are selling the trees, which are licensed through Foxtrot LLC. About 250,000 trees are planted. Mike Argo, of Mike & Brians Nursery in Zillah, Washington, thinks the Foxtrot has a future as a branded apple. He declines to reveal how many trees he's growing, but said, "The color is really awesome. ... It's a great eating apple."

But consumers don't know Foxtrot. You can walk into a store and find branded apples such as Pink Lady, Jazz, Lady Alice, Opal and others. Koru, a variety from New Zealand, is getting attention. But not Foxtrot, which arrives at stores in bags marked as Galas.

Without brand recognition, said Wyles, Foxtrot can't go beyond its current appeal to farmers as just an apple that grows and packs well. He has bigger hopes. Consumers want more great-tasting, high-end apples, he said. Today's produce market is far from crowded by existing club varieties; there's plenty of room for Foxtrot and other new apples.

"I just don't have the wherewithal to market it as a club," Wyles said. "The consumer needs this apple. It's beautiful. It tastes really good. It would be good for the state of Washington to have this apple with the Washington sticker on it."

Foxtrot needs a partner with muscle, a big marketing company to invest in a new brand and take all the steps to reach consumers as a great new thing. He figures $1 million will do it.

Sure, that's a huge hurdle, but then Foxtrot has something that no other apple has: Rob Wyles. He's an apple evangelist and, around him, it's hard not to have faith. "I'll bring you a box," he said. "It'll blow you away." ●

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Are your bins sanitary?

Promising options for wooden and plastic bins' "cleanability" were identified in study.

by Shannon Dininny

Tree fruit packers must take additional steps to ensure that bins are examined and receive adequate treatment throughout bin handling, new research shows, in one of the first studies to examine cleaning practices for wooden and plastic bins.

The two-year study, funded by the Center for Produce Safety, identified several important factors to assist the industry in the face of increasing scrutiny of its food safety practices.

Researchers worked with individual packing houses on the study. Their goals: to evaluate current practices for reducing overall microbial levels on both wooden and plastic apple bins and to identify new strategies to maintain bins in sanitary condition throughout the season. The researchers worked with each packing house to develop data collection methods that minimized interference with production for each operation, while allowing the scientists to examine key practices during normal packing line operation. In one facility, fruit bins were tracked over time, and in some cases, research included several trips from the packing house to the orchard and back.

PHOTOS COURTESY INES HANRAHAN

Debris was found on wooden and plastic bins following dump tank treatments. At top, plastic bins go through a dump tank in an apple packing house.

Four collaborating packing houses

worked with scientists to evaluate cleaning practices during packing. Other packing houses "loaned" bins to the researchers to capture data about specific types of wooden and plastic bins. "The level of collaboration between the university, the Washington Tree Fruit Research Commission and the industry representatives to achieve these results was truly remarkable and greatly appreciated," said Karen Killinger, formerly of Washington State University, who led the study.

Overall, researchers found both wooden and plastic bins could become heavily soiled and present difficulties for "cleanability." Since wood and plastic both posed challenges, neither was better than the other. Standard industry practices need to be adapted to increase the percentage of bins that are clean after treatment and before being sent back to the orchard to be filled, the study showed.

As long as the bins were in good repair, bin age did not appear to influence the ability to clean the bins. "That's good news, because we have some wood bins up to 40 years old in the industry, and there has also been a general concern about wooden bin usage," said Ines Hanrahan, projects manager for the Washington Tree Fruit Research Commission, who collaborated on the study with Killinger.

However, Hanrahan said, packers should definitely add steps to their cleaning and sanitizing processes to ensure microbial loads and food safety risks are adequately reduced, if visible debris (rotten fruit pieces, soil, leaves, etc.) is present in bins before deployment into the orchard.

Defining cleaning and sanitizing

The first key to the process is understanding the difference between cleaning and sanitizing. Cleaning is the process of removing soil, minerals and other agents from a surface typically with the aid of a cleaning agent, while sanitizing is the process of reducing the number of microorganisms on a properly cleaned surface to a safe level.

Sanitizing is often accomplished by using either heat or chemicals. A surface must be effectively cleaned first for a sanitizing treatment to work as it should. In addition, some chemical sanitizers, including chlorine, are highly reactive and must be carefully managed. Chlorine can react with organic matter and become less effective over time as debris accumulates in the sanitizing solution or may dissipate over time at certain temperatures or pH ranges.

Study results

A survey from the study found most packers use dump tanks treated with chlorine to clean bins before returning them to the orchard to refill with fruit for packing. Some also employ pressure washing or peracetic acid (PAA) in their dump tanks.

Those practices do not adequately clean bins before sanitizing them, Hanrahan told *Good Fruit Grower*. Sanitizing treatments can be overwhelmed by the organic load in a particularly dirty bin, she said, and neither chlorine nor PAA in dump tanks consistently reduced microbial loads on bins significantly.

For wooden and plastic bins, total coliforms and generic *E. coli* were quantified before and after treatment. The study also examined the levels of chemical treatment. For chlorine, oxidation-reduction potential (ORP), measured in millivolts, examined the chemical activity of the chlorine.

The study showed that the number of positive samples did not decrease in the majority of wooden and plastic bins when subjected to standard chlorinated dump tanks with levels of chlorine at 774 mV (a mV is 1/1000 of a volt, a measure of electrical potential). Increasing the levels to 849 mV did not dramatically improve sanitizing in wooden bins (only one-third of wooden bins decreased in positive sampling sites). In addition, using PAA in the dump tank for wooden bins was not an effective strategy to reduce microbial levels on sampled surfaces. Plastic bins were not tested at higher chlorine levels or for PAA due to lack of availability at certain packing houses.

Hanrahan noted that there are challenges with dump tank management and water recycling that need to be reviewed at many packing houses. Any high-risk practices (such as infrequent water change schedules or water recirculation) as well as cleaning protocols should be assessed, she said. The study showed that packers' challenges with management of dump tank water and of chlorine levels make dump tanks inappropriate as cleaning or sanitizing strategies for bins.

However, promising new techniques were identified. A novel heat treatment involving immersing bins in hot water was tested. Additionally, adding treatments after a pressure wash, using an application of a cleaning solution, water rinse followed by a sanitizer treatment, was also examined.

Following pressure washing alone, 43 percent of plastic bins decreased in the number of positive samples, though that increased to 52 percent when cleaning and sanitizing treatments were added to the process.

For 71 percent of wooden bins, the number of positive samples actually increased when pressure washing was employed, indicating the bins had more microbes present or "active" after pressure washing.

However, 65 percent of wooden bins had the number of positive sampling sites decrease when pressure washing was followed by application of cleaning agent and then a sanitizer.

After a hot water treatment, the majority of plastic bins — 60 percent — decreased in the number of positive samples. Most wooden bins did not decrease in positive samples after hot water treatment alone, but when bins were put through a chlorinated dump tank treatment, followed by hot water treatment, 78 percent of wooden bins decreased in positive samples.

Hanrahan said packers should consider additional steps to ensure bins are adequately cleaned — a chlorinated dump tank followed by hot water treatment or a pressure wash followed by cleaning and sanitizing washes, separate from the dump tank, if visible debris remains in bins.

CPS (*www.centerforproducedsafety.org*) funded the research, with an in-kind contribution of WTFRC staff.

Check up on farm labor rules

After recent court ruling, more growers will need farm labor contractor licenses even for workers they don't directly hire.

by Ross Courtney

An attorney who frequently represents the fruit industry is warning growers to double-check Washington's farm labor contractor rules before putting to work anybody they did not directly hire themselves.

A March decision by the Washington Supreme Court has broadened the definition of farm labor contractor beyond what growers previously believed, said Sarah Wixson, a lawyer and shareholder with Stokes Lawrence Velikanje Moore & Shore in Yakima, Washington.

"I think quite a few people are still getting it wrong and the financial consequences can be dire," Wixson said in an email to the *Good Fruit Grower*. Violations could mean a fine of up to $5,000 or legal damages of $500 per person per violation dating back three years.

On March 3, the Supreme Court ruled 9-0 that an on-site farm management company was indeed required to have a farm labor contractor license from Washington and upheld an earlier $1 million judgment against the firm for lacking one. The companies the management firm worked for were also on the hook.

For 20 years, NW Management and Realty Services of Pasco, Washington, was hired by Farmland Management Services, a California firm, to operate three Yakima area orchards. Farmland, in turn, was hired by property owners John Hancock Life and Health Insurance Company and Texas Municipal Plans Consortium.

As part of their contract with Farmland, NW Management supervisors hired workers. The court agreed that constituted hiring for a "fee" and therefore required a farm labor contractor license, which the company did not obtain.

The company has since closed, Wixson said.

In the first four months this year, the Washington Department of Labor and Industries has issued 169 annual licenses and expects to reach 500 licenses by the end of the year. In all of 2015, the agency issued 166 licenses.

The issue first came up in a U.S. District Court lawsuit alleging worker abuse that was settled, but the license question was appealed to the 9th Circuit Court of Appeals, which certified it to the state Supreme Court on Aug. 5 last year.

In the wake of the decision, Wixson and the plaintiff's attorney, Lori Isley, warn that straight payroll reimbursement or something small such as allowing a driver to fill up a gas tank at the farm may be interpreted as a "fee" under state law.

"I would say both of those entities should be cautious about what they're doing," said Isley, an attorney with Columbia Legal Service's Yakima office.

Meanwhile, many orchard families build corporate structures with several different LLCs that each own different properties for purposes of irrigation and insurance. In those cases, they may require a license to simply move workers from place to place, Wixson said.

Wixson advises growers to carefully review the state's Labor and Industries website that spells out the license rules, something her firm started preaching years ago, she said.

The message may be getting out, said Matthew Erhlich, a spokesman for the state Department of Labor and Industries, which oversees farm labor contractor's licenses.

In the first four months this year, the department has issued 169 annual licenses and expects to reach 500 licenses by the end of the year. In all of 2015, the agency issued 166 licenses — at the time the most ever — and 147 licenses in 2014.

Licenses cost $35, plus a requirement to post a bond of between $5,000 to $20,000 depending on the number of employees.

The department, which has a labor contractor inspection team, has increased the number of audits over the past few years, from 20 in 2014 to 29 last year to 21 the first three months of 2016.

State regulators never tagged NW Management because they never received a complaint, Ehrlich said.

That proves that even reputable companies need to tread carefully, Wixson said.

"NW Management was a well-known, well-established farm management company," she said. ●

ONLINE
To review the Farm Labor Contractor license regulations, visit 1.usa.gov/1pXwyLR

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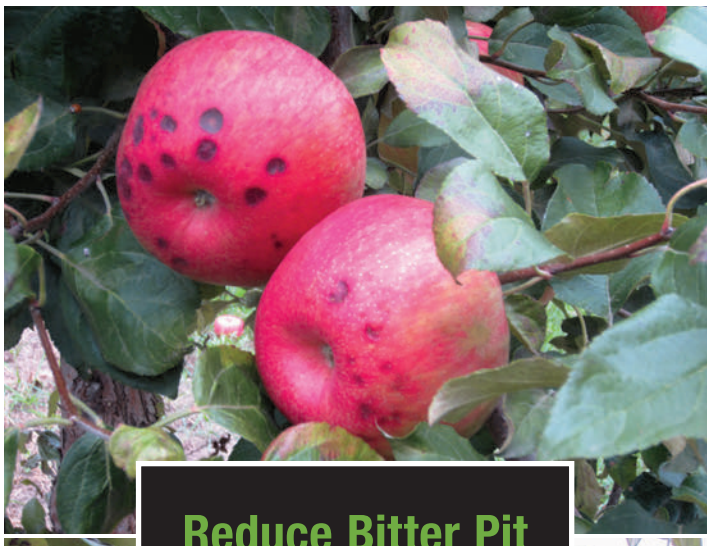

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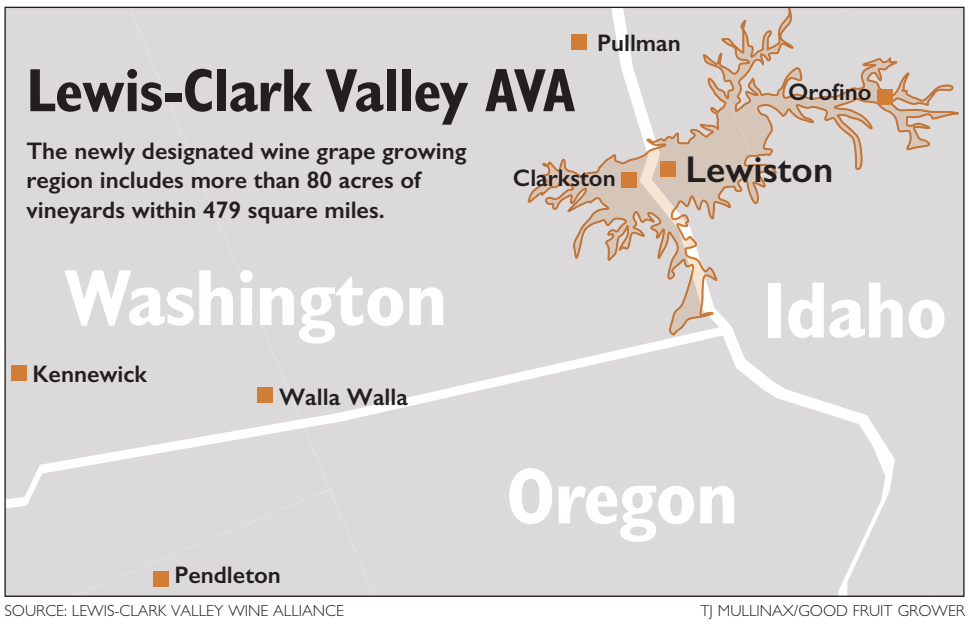
Coco Umiker is winemaker for Clearwater Canyon Cellars in Lewiston, Idaho. Her husband, Karl, manages the winery's estate vineyards.

PHOTO BY KIM FETROW

'An amazing place to grow and make wine'

New Lewis-Clark Valley appellation established on Washington, Idaho border sits in "banana belt."

by Shannon Dininny



SOURCE: LEWIS-CLARK VALLEY WINE ALLIANCE

TJ MULLINAX/GOOD FRUIT GROWER

The federal government has designated a growing wine grape region on the border of Washington and Idaho as the Lewis-Clark Valley American Viticultural Area.

The appellation sits in a geographic region known as the "banana belt" for its high temperatures compared with surrounding areas.

Almost 150 years ago, farmers who had immigrated to the Unites States from France and Germany were successfully growing wine grapes in the region around Lewiston, Idaho, and Clarkston, Washington, until Prohibition halted production. The industry there has been slower to return than in other parts of the Pacific Northwest, but today, the Lewis-Clark Valley is home to three bonded wineries and 16 vineyards growing more than 80 acres of grapes.

To those growing grapes and making wine there, it's not just another grape growing region.

"This is really an amazing place to grow and make wine. I can't think of any place I'd rather be right now than here," said Coco Umiker, winemaker for Clearwater Canyon Cellars in Lewiston. Her husband, Karl, manages the winery's estate vineyards.

"My husband and I really could have gone anywhere, but we decided to plant our flag here in Lewiston on our family farm, not just because we have family here, but because we really believe this is a premier place to grow and make wine," she said.

PHOTOS COURTESY COCO UMIKER

The Lewis-Clark Valley has 16 vineyards and three bonded wineries.

In announcing the designation, the Alcohol and Tobacco Tax and Trade Bureau also modified the boundary of the existing Columbia Valley AVA to eliminate a partial overlap with the new Lewis–Clark Valley AVA.

What sets it apart

Surrounding the Lewis-Clark AVA, temperatures are cooler, rainfall is higher and elevations are higher. Its steep canyon walls, plateaus and bench lands differ from the rounded, rolling hills of the Palouse region to the north or the rugged mountains to the east, south and west.

Alan Busacca, a leading expert on geology and soils who helped craft the Lewis-Clark Valley application, said the region has fabulous growing conditions for *Vitis vinifera*, or wine grapes.

"It's sort of the buxom of the Bitterroot Mountains, where you wouldn't expect to have a place that is warm enough and would have the right conditions for growing grapes," he said.

Culturally, the area is significant as a refuge for Meriwether Lewis and William Clark during their expedition from 1804 to 1806. It's where the Nez Perce sheltered and fed the travelers following an arduous trip across the Continental Divide.

In the broader geologic and geographic sense, the region is distinct from much of the surrounding area in one specific way, Busacca said. In much of Washington's neighboring Columbia Valley, ancient floods released from a glacial lake near Missoula, Montana, sculpted the landscape, dumping gravel and silt in their wake. The soils there have been formed directly from the sediments dropped by the glacial floods.

By contrast, the Lewis-Clark valley is a product of the mountain building and river cutting of the Clearwater and Snake rivers. Soils being farmed in the region have been formed from a secondary product of the flooding: the windblown silt, loess, since the end of the floods. "It settles one dust storm at a time, to form soils up on the canyon walls, up on the Lewiston orchards, and the Clarkston heights," he said.

The result is mineral composition that is similar, but the mode of formation of the soils and how they sit on the landscape is different.

"It's going to take a few generations, perhaps, before we really find out in the Lewis-Clark Valley which wine grapes, which varieties are really going to shine," he said. "That's what's pretty fun: It's wide open for the people who are growing the grapes, to learn more every year."

Growing grapes

Jim and Dana Arnett, owners of Arnett Vineyard in Clarkston, grow roughly 2 1/2 acres of wine grapes in sandy loam, at an elevation of 840 feet at the center of the vineyard. Another 3 1/2 acres will be added to production next year.

Jim Arnett planted his first grapes in 1999, and in the years since has learned much about the varietals that like his site. Namely, reds. The whites are not happy there.

"It's a little hot for them in the summer," he said. Cabernet Sauvignon, Merlot and Malbec shine, however. "It gets hotter than a blister in the daytime, then it will cool down into the 70s at night. So on the reds, if you do leaf thinning around the clusters, you get all that sun exposure. I'm pretty sure that gets it a whole lot of different character."

Arnett sells grapes to Clearwater Canyon Cellars, which opened in 2004 and gets 75 percent of its grapes from vineyards in the Lewis-Clark Valley, including its own estate vineyard.

Jim and Dana Arnett harvest wine grapes at Arnett Vineyard in Clarkston, Washington.

"The bottom of the Lewis-Clark Valley sits around 700 feet above sea level at the river, and the boundary of the AVA goes up to just shy of 2,000 feet," Umiker said. "And within that, you have quite a bit of diversity, in terms of aspect and soil type, and I really enjoy the variation in flavors I get from working with grapes from vineyards in the valley."

Recognizing the region as an appellation is huge for the growers there, she said. "For those of who have been making wine from grapes grown in the valley for years, we're finally able to tell the world, or show the world on the bottle, what we've been doing," she said. "It's nice to finally give credit to growers on the bottle." ●

COURTESY JOHN THULL

Itasca grape clusters weigh from 95 to 145 grams, can be winged or shouldered and show a golden hue at harvest.

Minnesota's dry, cold-hardy white

New white wine grape variety shows resistance to downy, powdery mildew, phylloxera.

by Dave Weinstock

The University of Minnesota has announced its newest cold-hardy wine grape variety, and it's one for which north country grape growers have been waiting. Called the Itasca for the lake in northern Minnesota identified as the source of the Mississippi River, the white grape has a lower acidity than other cold-hardy varieties and high sugar, potentially making it an ideal candidate for a dry white wine.

The variety also shows resistance to downy and powdery mildew, as well as phylloxera, and it is hardy to USDA's Plant Hardiness Zone 4.

Provenance

The Itasca has been in development since 2002. Originally tagged as MN 1285, it was created from a cross pollination of Frontenac Gris and MN 1234, a Seyval Blanc offspring known for its resistance to powdery mildew.

Two of its ancestors are accessions of *Vitis riparia*, from which it acquired its high sugar — and its cold-hardiness. In 2014, the winter of the Polar Vortex, Frontenac Gris had a 25 percent bud survival rate, while Itasca endured the same weather and emerged with 65 percent primary bud survival, said Matt Clark, a University of Minnesota assistant professor and grape breeder.

Though not certified yet, the variety has been submitted to the Clean Plant Center Northwest in Prosser, Washington. To date, they've done a few performance evaluations with some growers but no large-scale vineyard or winery trials.

The university has licensed three nurseries to sell its new variety for the 2017 season: Winterhaven Vineyard and Nursery in Janesville, Minnesota; Double A Vineyards in Fredonia, New York; and Northeastern Vine Supply in West Pawlet, Vermont. Knight Hollow Nursery of Middleton, Wisconsin, uses a tissue culture for micropropagation.

Grower friendly

Vines can be vigorous, depending on the soil. The breeders have found vine spacing should be 6 feet apart when organic matter is 2.5 percent or less and 8 feet apart for 3 percent or more. "Irrigation is important for establishment," Clark said.

Its growth habit is open and manageable. Shoots can either grow upright or procumbent. "Fruit exposure is good with minor adjustments," he said.

The university vines hang on high-wire, double cordon systems. Clark said he thinks they can be trained to vertical shoot positioning, though it's not been tested yet. Kicker shoots on the trunk can reduce vine growth, and should be pruned off or back to short spurs, he said.

Clark said they don't have very good data on when bud break occurs. "It didn't seem to be as early as Marquette, but may be in the same time frame as Frontenac," he said. The fruit ripens earlier than Frontenac, by mid- to late September. Cluster structure is moderately compact,

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weighing in at 95 to 145 grams, is cylindrical and can be shouldered or winged.

Berries take on a golden hue when ripe, with some clusters showing one or two pronounced rosy berries. The fruit has flavors of pear, gooseberries, honeydew melon and star fruit.

The juice

So far, the university has only produced about eight gallons of wine this year, fermented in glass or plastic. Grape berries were harvested, destemmed and pressed in one day and inoculated with yeast on the second day to dry, Clark said.

With a pH of 3.05 to 3.35, Itasca has 30 percent less acid than Minnesota's other cold-hardy varieties, a gift from its European parents. "It has lots of French in its background," Clark said. He said they try to pick the grapes at 26 Brix, but depending on where they are planted, the variety can deliver up to 28 Brix.

The titratable acidity (TA) of Itasca's juice is much lower than the other Minnesota cold-hardy varieties, such as Frontenac, which sports 15 to 16 grams per liter.

"It has titratible acidity in the 9 to 10 grams per liter range, putting it more in line with other vinifera varietal dry table wines like Sauvignon Blanc or even Riesling," said Bryan Forbes, the University of Minnesota's cold-hardy wine grape breeding program interim winemaker.

Itasca can make a crisp, white wine but it is also very versatile, Forbes said. Using malolactic fermentation, for example, a winemaker could make a wine similar to that of a typical Chardonnay, with a richer, potentially buttery character.

It is not hyper-aromatic like a Muscat nor is it bracing on the tongue. "It's pretty zippy but it is not an assault," he said.

Clark deferred to Forbes for a more expert opinion, but allowed the wine would do best on its own. "It would also be nice to blend with high-acid wines to improve mouth feel and flavor," he said. ●

COURTESY IRV GEARY

Irv Geary, who owns the Wild River Vineyards and is the winemaker of Wild Mountain Winery in North Branch, Minnesota, is president of the Minnesota Grape Growers Association.

Five other

These varieties were developed to withstand Minnesota's winters.

by Dave Weinstock

Though the spotlight is shining on the University of Minnesota's newest cold-hardy variety, Itasca, there are four other cold-hardy wine grapes that have been developed by the university, plus a public domain mutation.

Rated to grow in USDA's Plant Hardiness Zone 4, the varieties tend to be grown in Midwest, New England, New York and Canadian vineyards. They include both red and wine varieties, and the wines produced from them currently sell mainly to regional audiences located near the wineries.

Frontenac

Frontenac is one of the more popular grape varieties grown in Minnesota. Born of a cross of Landot 4511 and native American *Vitis riparia*, it is resistant to downy and powdery mildew as well as *Botrytis* bunch rot.

At harvest, this red grape features high acidity and high sugar. The grape is used to produce three styles of wine: a red table wine, an "outstanding" rosé and a port, said Irv Geary, president of the Minnesota Grape Growers Association.

grapes grown to resist the cold

Geary owns the Wild River Vineyards and is the winemaker of Wild Mountain Winery of North Branch, Minnesota.

Bryan Forbes, University of Minnesota's cold-hardy grape breeding program interim winemaker, said Frontenac has "color for miles. It's fairly sugar-ripe and good for port-style wines."

Geary agreed. "The Frontenac port style produces a high-acid wine with a chocolate-covered cherry nose with mocha overtones," he said.

The grape makes an intense, very fruity red table wine. "It's all plums and black currants," Forbes said.

Frontenac Gris

Released in 2003, Frontenac Gris originated from a single cane of a Frontenac vine that bore pink-skinned grapes instead of black ones. Due to its skin pigment, Frontenac Gris grapes make wines with a peach-pink color.

Its high acid needs to be dealt with, said Forbes. That said, he thinks the wine has nice aromatics.

Geary said it is used to make a sweeter style white than its Frontenac parent. "Most winemakers here in Minnesota use it to make a sweet to semi-sweet, white dessert wine," he said.

Others have begun to make ice wine with it because it is a strong grape, capable of hanging on vines well into early winter, Geary said. While some growers were picking it early and freezing it, more growers are leaving it on the vine until the first 15-degree day, usually in November or early December.

Marquette

Introduced in 2006, it has a blue/black fruit and has both Frontenac and Pinot Noir in its pedigree. It comes from a cross of MN 1094 and Ravat 262.

Resistance to downy and powdery mildew and black rot is very good, while phylloxera resistance is moderate. Its growth habit is open and orderly.

Marquette makes a ruby-colored wine, with good tannins and flavors of cherry, berries, black pepper and black currant. "As a dry red wine, it is experiencing more success than Frontenac, because it has lower acidity, more tannins and more body," Geary said.

Forbes describes Marquette as the standard bearer of Minnesota cold-hardy varieties. "It is a very pleasant red grape, much like a Gamay. It can make a nice, dry red, even though it's not overly tannic," he said.

He also said he thinks it makes a nice rosé.

La Crescent

Wines made from this grape have won the Governor's Cup at the International Cold Climate Wine Competition, held in St. Paul, Minnesota, more times than any other variety. Introduced in 2002, it is the product of a cross of St. Pepin and ES 6-8-25.

This is a grape that requires extra attention to get to harvest. While it offers moderate resistance to downy mildew and black rot, it is susceptible to powdery mildew and phylloxera.

Its canopy is high-vigor, requiring attention throughout the season. Poor fruit set and late season berry shelling have also been observed.

Despite its viticulture concerns, Geary describes it as "the premier cold-hardy white wine grape."

Winemakers use it to make semi-dry and semi-sweet varietals. "Getting the sugar balance right is key," said Forbes.

Geary likes the wines' aromatics, saying it has a Muscat-type aroma. Forbes agreed, saying the wine's aromatics are in the Muscat/Gewürztraminer family.

Frontenac Blanc

Introduced in 2012, Frontenac Blanc resulted from white-fruited mutations discovered on Frontenac Gris vines in Canada and Minnesota.

Wines made from this grape are just getting to the marketplace, Geary said.

"It's a true white with more of a stone fruit aroma," he said. The aroma is a bit tamer than that of Frontenac Gris, Forbes added.

Susceptible to powdery mildew and phylloxera, it seems to offer good resistance to downy mildew. The grapes are yellow to gold when ripe and make a very light, straw-colored wine.

Wines made from the mutations are sweet or off-dry whites. ●

The ripe direction

California breeders continue efforts to develop early cherry varieties.

by Ross Courtney

TJ MULLINAX/GOOD FRUIT GROWER

California growers are looking for new cherry varieties that better handle heat and can be harvested earlier. This test variety is planted on Bruce Frost's Acorn Farms ranch near Bakersfield, California.

It took decades, but California growers now have more early ripening cherry varieties that withstand heat and dwindling winter chill. More may be on the way.

From Early Glen to Royal Tioga to the Oh-So-Grand, growers have an array of choices in new cherries to fill the early market, while more are being tested every year.

"The No. 1 thing what's driving these type of varieties is they ripen in the early season," said Glen Bradford, a partner in BQ Genetics in Le Grand, California, one of three private California breeding companies.

Developments over the past 10 years have Golden State growers enthusiastic about the industry's future in spite of poor yields in 2014 and 2015 due to low winter chilling, heat waves and drought.

"You're always looking for something that's an improvement over existing varieties," said Greg Costa, a Lodi grower and packer who has test plots of varieties he declined to name.

Early to market

In California, timing is money.

Southern cherry growers and shippers can't compete with the volumes of Oregon and Washington, so they shoot for the seasonal excitement, hitting the market ahead of the Northwest. Prices typically start high and plummet quickly.

"We know that we can improve on what we have, especially in our early districts," said Mike Collins of Chinchiolo Stemilt, the California division of the Wenatchee, Washington, fruit giant.

Bing cherries were once king in the Central Valley. The Bing is still the most prevalent variety in the state, but it comprised only 40 percent of the 2015 crop volume compared with 66 percent 10 years earlier, according to the California Cherry Board.

One of the first cherries to surge in its place was the the Brooks, probably the most popular variety in the southern counties of California near Bakersfield, where winter chill is so scarce growers use overhead sprinklers to cool in December and January.

In the 1970s, the University of California-Davis discontinued a cherry breeding program that dated back to 1934 for lack of funding. However, Davis researchers continued to work on their varieties and released the Brooks in 1984. The cherry matures about four days ahead of the Bing and develops fewer doubles and spurs in the southern regions.

The Coral Champagne, usually just called the Coral, is another popular early variety from the University of California. Together, the Brooks and Coral accounted for one-third of the state's cherry crop in 2015.

Since then private breeders have taken up the torch.

Cherries are a relatively small crop in California with roughly 40,000 acres compared with millions of acres of grapes and nuts. "It is a race for us," said Bradford, one of three private cherry breeders in California. They all also breed peaches, grapes and other crops.

In 2000, Bradford introduced the Glenred variety, which skyrocketed in popularity under the trade name Sequoia. Warmerdam Packing near Tulare, which has exclusive packing rights, produced 257,000 18-pound boxes in 2015, 23 times the volume of 2005.

"There's a three-week time where there are no cherries in the world, and we're trying to fill that gap."

—David Cain

Since then, he has released three more commercial varieties, the Arvin Glen, the Early Glen and the Glen Heart, all with varying improvements over the Sequoia. Warmerdam has exclusive rights to those, too.

Trial and error

Plant breeding is a slow process with more failure than success.

Bradford and Warmerdam plant about 10 varieties in test blocks each year, hoping just one makes it into commercial production, and many of those don't stand the test of time. He estimates one out of every 5,000 attempts becomes a "success."

About an hour north, Zaiger Genetics in Modesto has a similar story.

When Floyd Zaiger started, experimental early season varieties produced cherries the size of peas, said Leith Gardner, his daughter and family partner. Those early years of trial and error are now starting to pay off.

"The reason why we're having success is because my father started it 50 years ago," Gardner said.

Each year, she and her testing collaborators plant 3,000 to 4,000 cherry seedlings. Only about 50 of those make it to another round of testing.

Among Zaiger's new varieties in the past five years are the Royal Tioga, Royal Lynn and Royal Hazel. (Gardner has a lot of aunts and names cherries after them.) They typically bloom in the last week of February, earlier than Bings. They also produced relatively normal volumes in 2014 and 2015, a period when yields for traditional varieties were down, she said.

Gardner claims her successful varieties have similar bloom times and success anywhere in the state. "If I can't get them to fruit in all kinds of conditions, I cut them off."

Cherries year-round?

Some growers near Stockton, where 70 percent of the state's crop is produced, think these new varieties may slow what has been the industry's steady march to the south, where intense summer heat causes the buds to double postharvest.

That doesn't mean the southward movement will halt, though.

Cherries are narrowly adapted, said David Cain, general manager of International Fruit Genetics, meaning most varieties will perform their best in a specific climate.

Untapped areas lie still farther south, even into Mexico, and he is trying to breed varieties that will work there. He suspects that trend to continue until the market can be filled year-round with fresh cherries grown in both hemispheres.

"There's a three-week time where there are no cherries in the world, and we're trying to fill that gap," said Cain, who started his business in 2001 after collecting start wood from all over the world. He and his California competitors also experiment with varieties in Washington and British Columbia.

Cain has three varieties nearing a patent, he said, but has applied for only one, the Oh-So-Grand. He expects it to ripen about three days ahead of the Brooks, with about the same chilling level but larger fruit and darker flesh.

Private breeders

Since the University of California-Davis closed its cherry breeding program in the 1970s, three private breeders in California have led the search for new varieties.

Here are a few details from two private breeders, BQ Genetics and Zaiger Genetics, about their varieties commercially released in the past eight years. The third, International Fruit Genetics, has patents still pending.

—BQ Genetics of Le Grand, California, is best known for the Sequoia, released in 2000. Partner Glen Bradford compared three more recent varieties to the Sequoia.

2011: The dark red Arvin Glen harvests about the same time as the Sequoia, but grows bigger and firmer. It requires roughly the same amount of chill and, like the Sequoia, has an average crack resistance. Size: 8.5-9 row. Brix: 20.

2012: The Early Glen, a bright red cherry, beats the Sequoia to ripening by a week and is firmer. Chill is about the same but it is more susceptible to rain cracking. Size: 9.5 row. Brix: 22.

2013: The dark red Glen Heart ripens about three days ahead of the Sequoia and is firmer. It is more heat tolerant, but has similar size and chill requirements. Size: 9.5 row. Brix: 18-20.

All three, like the Sequoia, are under an exclusive contract with Warmerdam Packing. Warmerdam is testing all three of them in the Northwest, as well as some unnamed, unpatented cultivars. One of those unnamed varieties is showing a lot of promise, though Bradford would not share specifics. None of them have trouble with doubles and spurs. The Sequoia did not perform well in the Northwest.

—Zaiger Genetics of Modesto California is well known for a line of Royal cherries. Leith Gardner, a partner in the family business, compared her company's three latest varieties to the Brooks, a 1984 University of California-Davis release.

2008: The bright red Royal Lynn matures seven days ahead of the Brooks. It's firmer than the Brooks but produces a few doubles and spurs. The Lynn pollinates for the Royal Hazel. Size: 10-row. Brix: 17-18.

2009: The Royal Hazel has the same dark red color as the Brooks but ripens four or five days earlier and is as firm or firmer. It also will produce a few doubles and spurs if not protected from heat stress, even more than the Lynn. Growers are testing the Hazel in Washington and have called Gardner asking for graft wood. "So my assumption is they are doing well," she said. Size: 9.5-10 row. Brix: 19.

2012: The Royal Tioga, a bright red cherry, ripens an entire two weeks ahead of the Brooks. It's not as firm as the Brooks, which is known for firmness. It showed little rain cracking in Gardner's test orchard in Modesto, even with no treatments. She is unsure if anyone in the Northwest is testing it. It has produced doubles with the heat stress of the Bakersfield area but not in Modesto. Size: 10-10.5 row. Brix: 16-17.

—R. Courtney

His other two, which he declined to name, would require even fewer chilling units than the Brooks and break dormancy without the help of Dormex (hydrogen cyanamide), a commonly used product in the south to compensate for low chill.

He and the other breeders have developed many lines to that effect. The trick is to cross them with desirable traits such as size, firmness, crack-resistance and, of course, flavor.

For example, he has test varieties that will grow in Mexico now. "You wouldn't want to eat them," he said with a laugh.

But someday you might. ●

New Varieties

Cider apple shortage

Bittersweet, bittersharp varieties could be boon to growers.

by Dave Weinstock

Increasing interest in hard ciders and a critical shortage of some varieties of cider apples in the U.S., particularly for bittersweet and bittersharp varieties, could provide apple growers a new market.

There is huge demand for high-tannin cider varieties used in hard cider. One of the reasons for the shortage is the huge boom in demand for hard cider — increases of 78 percent, 63 percent and 49 percent from 2012 through 2014 — before demand fell to just a 10.8 percent increase in 2015. In addition, only a few of the new cideries founded to serve that demand have expertise in growing apples or own productive orchards.

Steve Wood, co-owner with his wife Louise of Poverty Lane Orchards and Farnum Hill Ciders in Lebanon, New Hampshire, said he gets $24 per bushel f.o.b. from his loading dock for his cider apples. "We have a profitable market selling apples to other cider makers," he said.

Ian Merwin, a retired Cornell University horticulture professor turned grower and cider maker, agreed. "People are getting $400 per 20-bushel bin, if you have the right varieties," said the Trumansburg, New York,

The four apples pictured here in grower Steve Wood's hands are, clockwise from the bottom right, Dabinett, Ellis Bitter, Major and Foxwhelp.

COURTESY BRENDA BAILEY

owner and operator of the 64-acre Black Diamond Farm. "It's not a guaranteed $500 a bin, but it will be a good 10 years before the supply of heirloom and cider varieties equals demand."

The market

According to The Cyder Market's Cider Maker Survey, there were 542 cider makers in the United States as of December 2015. That's a 30 percent increase over the previous year.

New York leads the country in the number of cider makers at 65, according to the survey data. Merwin estimates the number to be higher, around 75, with half of them working under farm winery licenses.

Of interest to those looking to enter the cider apple sales business: Many cideries own orchards, but the majority neither own nor lease orchards, instead purchasing or contracting for fruit and juice from others.

Nearly one-quarter of all cider makers claim to use at least one type of heirloom apple in their products. About 10 percent reported they use organically grown fruit. For survey purposes, "organic" was defined as either certified organic or a growers' claims to use accepted organic practices to produce fruit.

Management concerns

For veteran orchardists, growing cider apples is not that different from growing dessert apples. However, new growers shouldn't jump right in to bittersweet and bittersharp production, Merwin said. "It's better to start with growing dual-purpose heirlooms because of some of the special challenges that lie with the others," he said.

Cider apples tend to be smaller, more acidic and to have more tannins. They can set in clusters, are harder to thin and tend toward biennial yields. Some trees are extremely vigorous and others are very spurry. Plantings should be organized by bloom times.

"Many are late-blooming, as much as three weeks later than Fujis," he said. "Timing of chemical thinning sprays is critical. You don't want to be running all over your orchards turning the sprayer on and off because your plantings aren't organized according to bloom."

About half of European bittersweets bloom even later than Northern Spys, he said. They were probably selected that way to reduce damage by Europe's spring frosts, which are sometimes later than those in the U.S.

So, when the temperatures dropped to 5 degrees Fahrenheit in New York's Finger Lakes region in early April, Merwin experienced significant bud damage on his noncider varieties. His bittersweets, however, were still at silver tip and were unaffected.

Rootstocks

When it comes to rootstocks for cider varieties, Wood said he chooses those with which he's most familiar, which include Budagovsky 9 and 118, and Malling 9, M.26 and M.111. For the most part, his decision is driven by how he harvests his cider varieties: He shakes his trees.

"I'm looking for deep-rooted, sturdy, precocious rootstock that has a strong graft union and is capable of being shaken," he said. He shakes his trees because he wants his apples to achieve a very high degree of ripeness. "It's way beyond the appropriate ripeness of an apple that is hand-harvested from the tree for storage or packing."

Merwin advocates using full-dwarf rootstocks. "Smaller trees are easier to prune, spray and harvest, and fruit quality is consistently better on more slender trees," he said.

Big standard trees tend to suffer more from pest and diseases, and their crowns are so dense that the best apples are on the outside and the top, while fruit inside the canopy is denied light and does not develop its full flavor, he said.

"In dwarf trees — at 10- to 12-feet tall and 5-feet wide at the base — every apple gets good sun. An open tree canopy is the easiest to get in a dwarf orchard, and you will get more sugar, pigment and higher quality," he said.

Merwin allows that high-density plantings are very costly to establish — as much as $25,000 per acre with tree

Northeastern U.S. cider varieties

BITTERSWEETS

In approximate order by ripening date in upstate New York

Ellis Bitter – Midseason bloom, ripens early September, annual and productive, vigorous, short storage potential, should be pressed soon after harvest.

Breakwell's Seedling – Mid bloom, ripens early September, scab tolerant, annual, productive.

White Jersey – Mid bloom, ripens early September, productive but biennial, low vigor, precocious, short storage only, press soon after harvest.

Hereford Redstreak – Late bloom, ripens mid-September, productive and annual, low vigor, short storage, press soon after harvest.

Somerset Redstreak – Mid bloom, ripens late September, productive but biennial, vigorous.

Stembridge Jersey – Mid bloom, ripens late September, biennial, scab tolerant, vigorous.

Geneva Tremlett's Bitter – Mid bloom, ripens mid September, biennial but productive, low vigor spur-bearing type, Geneva strain not same as English Tremletts, but excellent for cider.

Harry Master's Jersey – Mid bloom, ripens late September, productive and annual, low-vigor tree adapts well to central axe form.

Coat Jersey – Mid bloom, ripens mid-October, biennial and scab susceptible, vigorous.

Dabinett – Late bloom, ripens mid-October, annual, low vigor, some winter damage in New York.

Fillbarrel – Early bloom, ripens mid-October, biennial and not productive, vigorous, blind wood.

Brown Snout – Late bloom, ripens mid-October, biennial but productive, moderate vigor.

Yarlington Mill – Mid bloom, ripens mid-October, biennial but productive, scab susceptible.

Chisel Jersey – Late bloom, ripens mid-October, biennial but productive, susceptible to fire blight.

Binet Rouge – Late bloom, ripens late October, biennial but very productive in the "on" year.

Bedan des Partes – Late bloom, ripens late October, biennial but productive, susceptible to fire blight.

BITTERSHARPS

Suitable for single variety ciders if desired

Stoke's Red – Late bloom, ripens late October, biennial and not productive, low vigor, scab tolerant.

Kingston Black – Late bloom, ripens late October, biennial and not very productive, vigorous.

Porters Perfection – Late bloom, ripens late October, annual and productive, trees heavily spurred but sprawling, fused double fruit, hangs well while ripening, scab tolerant, cold hardy.

COURTESY OF NEW YORK STATE FRUIT QUARTERLY

Golden Russets bring high sugar and moderate acid to make a very fruity cider. They are a good eating apple, too.

AMERICAN & EUROPEAN HEIRLOOM VARIETIES

Dual-purpose sharps

Bramley's Seedling – Early bloom, ripens mid-September, annual and productive, scab resistant, triploid, nonbrowning, trees moderate vigor, fruit for cooking or cider.

St. Edmund's Pippin – Early bloom, ripens mid-September, tip-bearing, droopy low vigor tree, an early ripening russet, excellent dessert or cider, short storage potential.

Egremont Russet – Early bloom, ripens late September, annual and productive, moderate vigor, scab tolerant, rich flavor good for dessert or cider.

Cox Orange Pippin – Early bloom, ripens late September, annual and productive, prone to heat stress, scab and powdery mildew, popular dessert apple, adds rich aromas to ciders.

Zabergau Reinette – Mid bloom, ripens late September, annual and productive, large russet triploid apple, good for dessert or ciders, short storage and heavy drop if allowed to tree ripen.

Margil (Reinette Musquee) – Early bloom, ripens early October, annual and productive, small russet fruit with intense flavor, scab tolerant, moderate vigor.

Ashmeads Kernal – Early bloom, ripens mid-October, annual and productive, lightly russetted fruit triploid, excellent for dessert or cider, very aromatic.

Calville Blanc – Early to mid bloom, ripens mid-October, annual and productive, nonbrowning flesh excellent for cooking (pastries), excellent sharp for ciders, very scab susceptible.

Roxbury Russet – Early bloom, ripens mid-October, annual and productive, oldest named American variety, lightly russetted hard apples keep well, good for dessert or ciders.

Ciders made from Kingston Black apples have a diacetyl character: a slippery mouth feel coupled with a buttery or butterscotch flavor.

Golden Russet – Early bloom, ripens late October, annual and productive, tip bearing, vigorous tree, heavily russetted fruit excellent for dessert or cider, high sugar and acidity.

Northern Spy – Mid bloom, ripens late October, biennial tendency, prone to preharvest drop, bitter pit and scab, dense flesh, good storage quality, excellent for dessert or ciders.

Baldwin – Mid bloom, ripens late October, biennial but productive, high sugar content, aromatic, good storage quality, excellent for dessert or ciders when fully ripe.

Geneva Red (Redfield) – Early bloom, ripens mid-October, annual and productive, medium size apple with pink flesh, high acidity with soft tannins, mostly used for preserves or ciders.

Rhode Island Greening – Early bloom, ripens late October, annual and productive, large fruit excellent for cooking and as a sharp for cider blends.

Newtown (Albemarle) Pippin – Early bloom, ripens late October, annual and productive, vigorous tree, fruit store well, excellent for dessert and as an aromatic sharp in ciders.

MODERN SCAB-RESISTANT APPLE VARIETIES

Mostly dual-purpose sharps

Pristine – Mid bloom, ripens late August, annual and productive if thinned hard, preharvest drop, an early dessert apple that can provide useful acidity in blends with the early Bittersweets.

Sansa – Early bloom, ripens early September, annual and moderately productive, scab resistant, midsize fruit hangs well on tree, good for dessert, little acidity but adds floral aromas in cider.

Liberty – Early bloom, ripens late September, good disease resistance, annual and productive, aromatic sharp, short storage potential, dessert and cider blends.

Crimson Crisp – Mid bloom, ripens mid-October, annual and productive, self-thinning, prone to fire blight, tip bearing with droopy habit, dessert and ciders.

Sundance – Mid bloom, ripens late October, similar to GoldRush, annual and productive, fruit hangs and keeps well, good dessert apple that adds spice and acidity to cider.

Enterprise – Mid bloom, ripens late October, annual and productive on dwarf rootstocks, large sub-acid fruit hangs well, long storage potential, good for dessert and cider blends.

GoldRush – Mid bloom, ripens early November, annual and very productive when thinned aggressively, good disease resistance, moderate vigor, natural central axe form, nonbrowning flesh and juice, very long storage potential, excellent dessert and base cider variety.

LIST ASSEMBLED FROM DATA AUTHORED BY IAN MERWIN AND PUBLISHED IN THE NEW YORK STATE FRUIT QUARTERLY.

ONLINE
Two cider apple growers weigh in on these varieties: *bit.ly/CiderGrowers*

and trellis costs, management and irrigation. However, returns on investment in their high-density, dwarf plantings are five years versus 15 years for low-density, semi-dwarf orchards. "There is little data to support the argument of not being able to spend $20,000 to $30,000 per acre to establish an orchard for processing apples if you are growing high-priced cider varieties," he said.

However, Merwin concedes there may be times when nondwarfing rootstock are necessary, including in colder growing regions with shorter growing seasons, or at sites with gravelly, shallow or droughty soils. Another place where they make sense are organic orchards where tree-row weed control is difficult and where trees often experience nutrient stress.

"The truth is, there is no single rootstock or planting system best for all sites or growers," he said. ●

Taste for tannins

For some cider makers, tannins are the holy grail of the cider business. Without tannins and fermentation, hard cider is merely sweet cider, a confection, and not the beverage whose demand continues to grow significantly.

They are the chemicals in apples that, once they survive fermentation, impart mouth feel and body to cider. And it's bittersharps and bittersweets that have the highest levels.

In the Mid-Atlantic region of the United States, most of the cider apples grown don't have elevated levels of tannins, according to Edwin Winzeler, a project assistant at Penn State's Fruit Research and Extension Center in Biglerville, Pennsylvania.

The center has a number of ongoing research projects aimed at helping growers successfully grow cider varieties, including those with high tannins.

Properties

Tannins, also known as polyphenols, are the compounds in apples that give cider its bitterness and astringency, Winzeler said.

"Tolerance for bitter flavors varies widely among people. Ciders with excessive bitterness may be either unacceptable or require aging with or without micro-oxygenation," he said.

From a practical standpoint, there are a number of food and drinks whose popularity is based, in good measure, on their bitterness. "Hops, coffee, dark chocolate, brussel sprouts, all the best things in life," he said.

Astringency is perceived when polyphenols meet the protein molecules in saliva. It creates a physical perception in the mouth that imparts a texture to the cider.

"It makes the cider feel 'rough' or 'fuzzy.' It gives 'grip' to a cider. It's like the difference between drinking tea versus drinking water," he said.

Bittersweet cider flavors imparted by tannins include spice, clover, leather, woody, slightly heavy, less fruity, even medicinal. Bittersharps have similar, though somewhat more intense, flavors, accompanied by elevated acidity.

"Most cider makers do some blending, when working with bittersweet apples," Winzeler said. "With Dabinett, for example, in most years you would need a sharper apple to lower the pH so as to reduce the potential for microbial spoilage and to increase the acidity."

Ethrel trial

One of the challenges of growing cider varieties is the need for labor efficiency with small-fruited varieties. One potential solution is a shake-and-catch system augmented with Ethrel (ethephon), which is sprayed at harvest to promote development of the abscission layer in the tree. (Ethrel is not registered for use in Vermont, Rhode Island, Louisiana, Missouri, Nebraska, South Dakota, North Dakota, Montana, Wyoming and Alaska.)

Abscission is a term used to describe how plants shed leaves, fruit, flowers and seed. The abscission layer forms at the base of the pedicel. Its top layer has cells with weak walls and a bottom layer that expands at harvest, causing the top layer to break.

On fruit trees, the abscission layer occurs between the stem of the apple and the tree spur. "We applied it to some crab apple varieties. Some were responsive and some were not," Winzeler said.

Two of the three varieties they tested, Manchurian crab apples and Hughes' Virginia, dropped significantly more fruit when shaken and sprayed with Ethrel than when shaken or sprayed alone.

Ethrel is currently labeled for use in sugarcane, pineapples and large-fruited greenhouse tomatoes in Texas, Colorado, California and Pennsylvania. It is also labeled for apples to promote stem loosening.

—D. Weinstock

Setting sights on the Cosmic consumer

Fruit marketers band together to develop quality standards for Cosmic Crisp.

by Shannon Dininny

The first WA 38 trees will be planted for commercial production next year. The first fruit won't be in the hands of consumers until at least 2019, but a coalition of Washington's biggest fruit marketers is coming together to ensure that consumers will want and buy the apple branded Cosmic Crisp — and come back for more.

The stakeholders in this venture are many, from university researchers to growers, packers and sales companies, to retailers and consumers. And the stakes are high — no more so than for the growers who face the highest financial risk on an untried variety.

Washington State University bred the WA 38 apple and, after years of orchard trials, hired Proprietary Variety Management to handle the commercial rollout: patent, licensing, propagation and sales through several of the nurseries that make up the Northwest Nursery Improvement Institute, and branding and marketing.

"When you're looking to benefit all the stakeholders, the longer Cosmic Crisp has value to the consumer, the more value goes into the pockets of the stakeholders. And that's the key. That's what any business venture is about with customers," John Reeves, PVM's general manager, told *Good Fruit Grower*.

And because growers have the highest risk, Yakima-based PVM has worked hard to have the industry heavily involved, whether it's a marketing group or a standards committee, he said. "If I was a grower, I've got to have the confidence in the system," he said. "We want to minimize the risk."

WA 38 trees will be exclusive to Washington growers in the United States for at least 10 years, beginning in 2017, when the first commercial orchards are planted. Any Washington packer and marketer can be licensed to pack and sell Cosmic Crisp apples; licensed Washington growers must send their Cosmic Crisp apples to a licensed packer, and licensed packers must sell their apples to a licensed marketer.

Continued on page 28

PHOTO BY TJ MULLINAX/GOOD FRUIT GROWER

The WA 38 — now known as Cosmic Crisp — won't be in consumers' hands for another three years. But work is already well underway to promote its success once it hits the supermarket shelves.

PHOTOS BY ROSS COURTNEY/GOOD FRUIT GROWER

Stefano Musacchi, research horticulturalist for the Washington State University Tree Fruit Research and Extension Center, discusses the "click" technique of management on Cosmic Crisp plantings during a field day at WSU test plots. The effects of the click system were less evident in a V-trellis, shown above, because trees are planted closer together.

Growing Cosmic Crisp

Researchers offer more tips for growing WA 38, including girdling.

by Shannon Dininny

Researchers are already finding Washington State University's latest apple variety, WA 38, to be grower friendly, but they're learning more about it each season as commercial production grows closer.

That includes how to horticulturally manage this highly vigorous, tip-bearing variety, whose apical dominance can result in large caliper branches that present significant blind wood.

"When we get these highly vigorous situations, renewal pruning is going to be a critical component of the horticultural program," said Tom Auvil, research horticulturist with the Washington Tree Fruit Research Commission. "We have to be very careful about how we prune and thin a vigorous orchard."

Stefano Musacchi, Washington State University horticulturist and endowed chair in tree fruit physiology and management, notes that this cultivar can produce a high number of secondary clusters, or lateral clusters, on one-year wood, which in some cases can range from 20 to 40 percent of the total flower count on a WA 38 tree. That's according to data from WSU's Sunrise research orchard near Quincy, Washington.

And unlike most other varieties, WA 38, known under the brand name Cosmic Crisp, produces high-quality fruit on spurs and one-year wood.

Managing the blind wood also offers other benefits: It reduces the amount of bloom that could be struck by fire blight, minimizes transplant issues and keeps the fruit all in one place, next to the tree, which will be ideal for mechanical harvest, Auvil said.

"And technically, I think it will improve yields, because the more sites where fruit can grow, the less blind wood, the more fruit we'll harvest," he said.

Researchers presented their latest findings on WA 38 horticultural practices in April during tours of two plantings at WSU's research orchards in Quincy and Prosser, Washington.

Reducing the blind wood

Researchers have examined a number of ways to minimize the other effects of apical dominance in WA 38, including girdling and notching the central leader and different pruning techniques — a "click" system vs. bending limbs and fastening to the trellis wire.

Musacchi is adopting a click pruning technique. This method involves tipping the end of the branches on one-year wood to minimize the blind wood. Tipping once at 1 year old, then returning the following year to tip again, leaving two to three vegetative buds, will help to increase bud swelling at the base of the branch and reduce the blind wood.

Bending tends to result in two to three more nodes of blind wood than clicking-type pruning methods, Musacchi said.

Girdling is ideal for WA 38 trees on a bi-axis training system, because growers don't want to lose 2 feet of crop to blind wood, especially in a fruiting wall, Musacchi said. He recommends a very light girdle around just the bark and the phloem, "every foot, sometimes even more often — every 5 to 6 inches — if necessary."

"Honestly, the girdling did extremely, extremely well," he said. "There is no blind wood through all the length of the fruiting wall."

Musacchi did not girdle a spindle block planted as finished trees, which had significant feathers — 20 to 30 feathers per tree for trees on Geneva 41 rootstocks, and 10 to 15 feathers per tree for those on Malling 9 Nic 29 rootstocks. This means that girdling can be adopted only if necessary.

Musacchi recommends notching and girdling just as deep as the bark and phloem to reduce blind wood. He says bending tends to result in two to three more nodes of blind wood than clicking-type pruning methods.

"Honestly, the girdling did extremely, extremely well. There is no blind wood through all the length of the fruiting wall."

—Stefano Musacchi

Generally, the click system is resulting in better bud breaks the following year, but it's more effective in vigorous conditions, Musacchi said. However, in a V system, because the trees are planted closer together and are less vigorous, the effects were not as evident, because the length of the branches is shorter.

In addition, a mechanical pruning trial at the Prosser, Washington, site is showing promise. Mechanical pruning cuts off the tips of branches, thus removing their inherent apical dominance, and helps to stimulate bud break closer to the trunk, or axe, of the tree and minimize blind wood, Musacchi said.

Researchers mechanically pruned for the first time last year, then did so again in February. The result: Every cut is resulting in one, two or three buds close to the axe, minimizing the blind wood and ensuring short limbs that improve fruits' exposure to sunlight.

Mechanically pruning also prepares a fruiting wall for mechanical harvest in a couple of different ways, Auvil said. Eliminating longer fruiting limbs from rows reduces the potential for damage by limbs that could be sucked into a vacuum harvester, damaging fruit that enter the machine when a limb is in the wrong place.

"The other really, really big advantage for the robotics format, particularly for the bi-ax system, in looking at mechanical pruning, is the uniformity of color and maturity," he said.

Pollinizer reminder

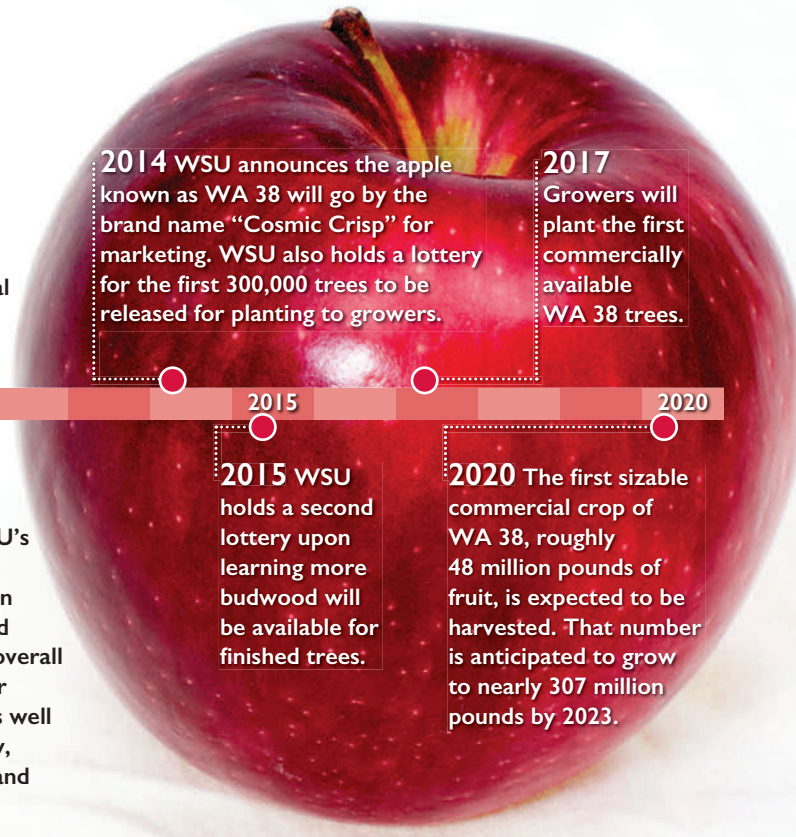
Researchers are also reminding growers who intend to plant WA 38 to remember to order their pollinizers.

Growers should strive to get two different pollen sources distributed in each block — every 30 feet for every row — such as a Mount Everest and a Snowdrift, or midseason commercial apple varieties, such as Red Delicious, Golden Delicious, Granny Smith or Cameo, Auvil said. ●

ONLINE

For more on how to grow WA 38, a WSU summary of WA 38 characteristics and growing tips can be found online at bit.ly/WA38characteristics, or visit the "How to grow Cosmic Crisp" article in the July 2014 issue of Good Fruit Grower at goodfruit.com

Developing the Cosmic Crisp



1997 Washington State University breeder crosses Enterprise and Honeycrisp apples to create WA 38.

1998 Seeds germinated and raised in a greenhouse at the Washington State University Tree Fruit Research and Extension Center.

1999 Seedling budded onto Malling 9 rootstock.

2001 Tree planted in seedling evaluation orchard at WSU's Columbia View orchard. Fruit from this original budded tree was evaluated in 2002 and 2003, when it was advanced to phase two evaluation.

2004 Buds taken from the seedling tree and propagated onto M.9 rootstock.

2006 Five trees planted at each of three sites in central Washington. Additional trees budded onto M.9 rootstocks for larger plantings in 2008.

2008 Trees planted in four locations across Washington and evaluated for horticultural traits and storage behavior.

2009 Consumer evaluations by Dr. Carolyn Ross of WSU's Department of Food Science and Nutrition showed WA 38 rated higher than Fuji for overall acceptance after four months of storage as well as for flavor intensity, crispness, firmness, and juiciness.

2014 WSU announces the apple known as WA 38 will go by the brand name "Cosmic Crisp" for marketing. WSU also holds a lottery for the first 300,000 trees to be released for planting to growers.

2015 WSU holds a second lottery upon learning more budwood will be available for finished trees.

2017 Growers will plant the first commercially available WA 38 trees.

2020 The first sizable commercial crop of WA 38, roughly 48 million pounds of fruit, is expected to be harvested. That number is anticipated to grow to nearly 307 million pounds by 2023.

1997 2000 2005 2010 2015 2020

SOURCE: WASHINGTON STATE UNIVERSITY

PHOTO BY TJ MULLINAX/GOOD FRUIT GROWER

Continued from page 24

Already, a dozen of the industry's largest sales companies have come together to create a marketing advisory board, chaired by Robert Kershaw, president of Domex Superfresh Growers. In addition, representatives of five companies comprise a subcommittee that will help to develop quality standards for Cosmic Crisp.

Ensuring high quality

The subcommittee, chaired by Dave Allan of Allan Brothers Inc., who has been growing WA 38 in an orchard test block for seven or eight years, has met just once so far. But Allan said it's clear that everyone involved views the adoption of quality standards for Cosmic Crisp as a cooperative effort, which he called "significant."

The market for Cosmic Crisp will be established on the retail shelf, he said, and any product that does not meet consumers' needs will remain on the shelf and get old.

"If the product sits on the retail shelf and it doesn't sell, then one of two things happens: Somebody picks it up after it sat on the shelf too long and the quality isn't very good, or the retailer takes it as a loss, a shrink. Both of those situations are bad," he said. "That is probably the primary driver of why we need to have some unified, uniform standards that we can work to."

The subcommittee made just one recommendation in its first meeting, asking WSU to continue developing best practices for growing and storing Cosmic Crisp.

However, the subcommittee members also discussed other key areas of importance to growers of WA 38:

—Should standards compliance be administered by the Washington State Department of Agriculture or by the industry itself?

Having the industry handle compliance would allow producers of Cosmic Crisp greater latitude to change standards very quickly, without any bureaucracy, but they also would likely incur additional costs. "Traditionally we've always had compliance with WSDA administrating it, so considering an industry compliance system, that in and of itself is a pretty significant question," Allan said.

—Should standards be set for minimum harvest date or minimum maturity date?

"There is going to be a lot of pressure to get this product to market quickly. You pick it, you want to sell it," Allan said. "And there's a possibility that could be abused, so we're looking into that."

—Should there be more than one color standard?

The subcommittee is tentatively looking at two color standards for Cosmic Crisp, Allan said. Cosmic Crisp apples from fairly low-vigor trees can be dark red, while apples from higher vigor trees can be lighter red. "The difference between them, the taste is about the same," he said. "But you put that out there, and you have a checkerboard pattern on the retail shelf. You're better off having the dark ones in one group and lighter ones in another group."

WA 38 also is unique in that it can sometimes have a green stain or spot, which may need to be addressed in the standards, Allan said. "Green stain is something we don't really understand. It may be a problem; you can't sell an ugly apple."

The committee also may adopt the common grade standards for punctures, splits and limb rot.

In two other areas, the committee opened initial discussions: whether fruit from 2-year-old trees should be marketed for sale and the involvement of the sliced apple business.

There can be significant differences in fruit maturity among 2-year-old trees, Allan said, yet the second year can present a significant economic advantage to the grower if the trees are big enough to crop.

"It can be really difficult to get a nice looking pack with 2-year-old trees," he said. "Would that be something we want to do? We could probably just eliminate problems, start on the third year, and everybody would know from the onset. We're talking about that."

The subcommittee also discussed encouraging the sliced apple business to get involved with the variety. Cosmic Crisp is slow to brown and has a moderately high acid level, which allows for a better taste in a cut product, Allan said. "We think there's a lot of potential there. It gives us an economic driver, a home for a lower quality apple. Most apples don't have that option, and we might be able to brand Cosmic Crisp in those packages."

PHOTOS BY TJ MULLINAX/GOOD FRUIT GROWER

In taste tests conducted by the Washington State University apple breeding program, Cosmic Crisp earned high marks for texture, appearance and flavor. Read some of the comments from the surveys at *goodfruit.com*.

That makes it a product that could fill a niche in a growth market, he said. "I think eventually, 15 years from now, we're going to sell 20 percent of our product in the sliced format, because that's convenience," he said.

Branding and marketing

PVM's Reeves also sees potential for Cosmic Crisp branding in a number of market segments: fresh apples, sliced and packaged apples, juice.

"Most of the growers I know are looking at return per bin," he said. "If you've got several different places in the store where the same brand is showing up, it cross sells. And the more times that people see that brand, the more they look for it."

Reeves said he also is cognitive of growers' concerns that this apple will turn into a commodity right away. "Minus really good brand research, that could happen. But I also think we have an opportunity to do something with the brand, with a brand promise, and do something for a long time." ●

Cosmic Crisp database

As part of its management of the Cosmic Crisp variety for Washington State University, Proprietary Variety Management will be deploying a new database to manage the trademark and patent on behalf of the university.

Participating nurseries will be required to provide information on who has obtained WA 38 material, where it's being planted and how much. Packers, meanwhile, will be responsible for providing information on the end products, including packouts and pricing schedules.

The database will enable PVM to cross-reference plantings and production on behalf of everyone involved, forecast production by region of the state, and aid the industry with marketing and sales, while keeping individual information confidential, said Lynnell Brandt, PVM president.

"This allows the industry to come together," Brandt said, "and say, 'This is what we have to play for.'" ***—S. Dininny***

What about propagating?

New policy provides guidance for Cosmic Crisp propagation.

by Shannon Dininny

The first plantings of the new apple variety developed by Washington State University — WA 38, which has the brand name Cosmic Crisp — are just around the corner, yet growers still have plenty of questions about how to get trees, if budwood will be available and what the rules are for propagating it.

Proprietary Variety Management (PVM), the company managing the WA 38 rollout for WSU, recently released a summary of policies for producing and distributing it, as well as new rules for propagation. WA 38 sales are being handled by the Northwest Nursery Improvement Institute (NNII), the collective of nurseries propagating the variety for release to growers.

Here are answers to a few of the more commonly asked questions, according to the new WA 38 propagation policy:

—When can growers begin planting WA 38?

Only growers who won a lottery to plant the first commercially available trees — an estimated 700,000 — may plant trees in 2017. In addition, no budwood will be available for propagation that year, as nurseries work to increase production of finished trees to meet high demand.

Nurseries indicate there are 2018 orders for about 2 million trees, and the number may increase through the budding season that ends in September. Growers who want to plant WA 38 in 2018 or beyond should contact participating nurseries to place an order.

—Can growers buy trees from any nursery?

A nursery must be sub-licensed by NNII to propagate, grow and sell WA 38 to growers for planting in Washington. Currently, these include only NNII member nurseries: Biringer Nursery, Brandt's Fruit Trees, C & O Nursery, Cameron Nursery, Gold Crown Nursery, ProTree Nursery, Van Well Nursery and Willow Drive Nursery.

—Will budwood for topworking or grafting be available?

Participating nurseries are expected to have some extra certified virus-tested budwood available in some years, which will be made available for propagation. First priority will be to other NNII nurseries for fall, spring or bench graft propagation, then to contracted WA 38 growers for topworking, though topworking is not allowed until 2018. Finally, if there is still budwood available, it will go to growers for budding of rootstock liners or bench grafts.

Budwood production, collection and distribution costs are at the discretion of the nursery.

—Can a grower propagate WA 38?

Fruit grower topworking and tree production, through budding of rootstock liners or bench grafts, is permitted under certain circumstances. However, topworking will not be allowed until 2018, and then will only be permitted when member nurseries have excess wood on Nov. 1 of the previous year.

Tree production, through budding of rootstock liners or bench grafts, will only be possible when the participating nurseries are unable to deliver trees to meet demand. Trees for propagation can be produced by the grower or a third party, but are only for the contracted fruit grower's own orchards.

Fruit growers are only allowed to grow or to have trees grown for their licensed allocation at a site that is identified in their agreement with NNII. ●

ONLINE

For more information about the WA 38 license agreements, royalties and to see the policy, visit www.cosmiccrisp.com

WA 38 apples in Prosser, Washington, in 2014.

TJ MULLINAX/GOOD FRUIT GROWER

TJ MULLINAX/GOOD FRUIT GROWER

Washington State University first released the WA 2 apple as a nameless variety, at top. WSU is now behind an effort to rebrand the apple as Sunrise Magic, as seen in the promotional packaging near right, even though packer Apple King is selling the WA 2 under the name Crimson Delight, far right. The two sides are in negotiations over what to do next.

COURTESY PROPRIETARY VARIETY MANAGEMENT

COURTESY APPLE KING

New dawn for WA 2

WSU's Sunrise Magic relaunch may conflict with Crimson Delight.

by Ross Courtney

Washington State University's attempt to rebrand the new variety WA 2 may leave the industry with two names for the same apple, as the university continues to negotiate with a packing company that developed its own name and logo a year ago.

The university wants to call the apple Sunrise Magic, while a Yakima, Washington, packer has already labeled it Crimson Delight.

While breeders are pleased their apple — released nameless in 2011 — will get a new push, the two marketing efforts are causing confusion in the industry.

"It was a mistake to offer new product to the marketing professionals prior to understanding the variety. A very severe learning experience."

—Tom Auvil

"If you wanted a blueprint for bungling a new product introduction, that was it," said Desmond O'Rourke, a fruit industry analyst from Pullman, Washington, who is not involved with either trademark.

In February, the university and a contracted variety management firm announced they had trademarked the brand Sunrise Magic for WA 2, adopting a logo that features a red apple with a golden gleam rising as if a sun over the name in lowercase script. However, packer Apple King last year trademarked the name Crimson Delight with its own logo, packed 500 bins during the 2015-2016 season and is now trying to expand.

The two sides are negotiating about what happens next.

GERALDINE WARNER/GOOD FRUIT GROWER

The WA 2 tree is compact and highly productive.

How to grow the WA 2

Both the WA 2 and the WA 38 were developed by Washington State University specifically for Washington growers, but the two apples have some differences in growing tendencies, said Tom Auvil, a research horticulturalist with the Washington State Tree Fruit Research Commission.

Here are a few highlights and pointers from Auvil for growing WA 2.

—The WA 2, known as both the Crimson Delight and the Sunrise Magic, is not as adaptable to all the state's environments as the WA 38, marketed under the name Cosmic Crisp, Auvil said. The WA 2's color development is more temperature sensitive, developing a light pink harvest color in the warmest sites but a maroon coloring in the cooler sites.

—Some locations may cause the apple to develop a "dirty" look with large lenticels or russet, Auvil said. Some sites consistently raise fruit with five pronounced ridges. Other sites produce very symmetrical fruit.

—The WA 2 is a compact tree and should be planted 24 to 36 inches apart on Malling 9 rootstock. The tree can set heavily, so thin aggressively to minimize overcropping and biennial bearing.

—Fruit from one-year wood is unmarketable due to russet and parrot beaks. The fruit can develop significant stem bowl splits if it has advanced starch conversion rating, deep maroon color and a weather change with frosty nights and/or rain.

—WA 2 is a semi-spur type variety, similar to Oregon spur Red Delicious in growth habit. It's easy to maintain and produces high yields with no bitter pit.

—Sunburn for the WA 2 is not a significant problem compared with Honeycrisp, Jonagold or Cameo.

—The fruit polishes to a high sheen if not covered with hard water deposits and sustains a high sheen without wax. It stores 12 months or more in controlled atmosphere storage with no problem and has a long shelf life at room temperature after removal. That's a unique trait.

—Researchers have not observed storage disorders, such as scald, soft scald, internal browning or bitter pit.

—R. Courtney

The university is offering contracts to any orchardist to purchase the trees and market the fruit under the name Sunrise Magic, paying royalties to the college for each tree and each box sold. Existing growers may continue and even expand their own WA 2 orchards using any name they wish, but new growers would have to use Sunrise Magic, said Jim Moyer, WSU associate dean of research.

"There's potential for confusion any way we go," Moyer said.

University officials want to establish a precedent for how they introduce new varieties of apples, raspberries or grains, he said, and allowing too much negotiation on the WA 2 could undermine that precedent.

"We're trying to get all of our commercialization in alignment," he said.

More than anything, Apple King wants to recruit new growers under the Crimson Delight trademark, said Ray Keller, one of the company's partners. They do not plan to seek their own royalties from new growers or other packers who use the Crimson Delight name, though royalties may become part of the negotiations with WSU, Keller said.

"We're willing to compromise," Keller said.

He declined to share how much Apple King spent developing the Crimson Delight brand, calling it only "a substantial amount."

Meanwhile, the confusion is causing some hesitation in the industry.

As of February, Washington nurseries affiliated with Northwest Nursery Improvement Institute had a supply of WA 2 trees and the ability to sell to any grower in Washington. At least one was advising growers, however, to wait until Apple King and the university finalize their agreement, in spite of sizable interest.

"Before your tree goes in the ground, you have to have your marketing strategy," said Stacy Gilmore, marketing manager for Cameron Nursery in Eltopia, Washington.

How things got here

Keller and his company did not invent the name Crimson Delight.

The university's breeding program released the WA 2 in 2011, allowing the Washington State Tree Fruit Research Commission, funded directly by growers, to handle the distribution and licensing of the variety. Staff suggested the name Crimson Delight and let 128 growers purchase test plots of five trees each. Some growers purchased more than one.

COURTESY APPLE KING

A basket of of WA 2 apples, in the foreground, with the brand of Crimson Delight is displayed in a store in Thailand.

Most of them never took the propagation any further due to the lack of a marketing plan. The largest grower, who planted 3,300 of the trees, roughly 4 acres worth, grafted them to another variety.

"No one had a plan to do anything with it, to commercialize it," said Bruce Barritt, the apple's breeder. He has since retired and been replaced by Kate Evans.

In the end, only 24 growers received commercial licenses from the Research Commission, and most of them planted no more trees.

At the same time, Research Commission staff were still learning the quirks of the variety, namely that it needs about two weeks at room temperature to "wake the flavor," said Tom Auvil, a commission research horticulturalist. Industry sales and marketing representatives took one bite of what was otherwise a starchy, grainy apple and walked away. It wasn't until later the Research Commission staff realized the potential.

"It was a mistake to offer new product to the marketing professionals prior to understanding the variety," Auvil said. "A very severe learning experience."

A few growers stuck with the WA 2, however, using the suggested name of Crimson Delight. Some of them are direct marketers, but most of the remaining growers packed through Apple King, which ships them both domestically and internationally. Keller suspects the state has between 100 and 200 acres of WA 2 trees in the ground now, but his few growers have been propagated more.

Enter the Cosmic Crisp

Since then, the university released the WA 38 — also bred by Barritt — using a marketing plan and brand name Cosmic Crisp devised by Proprietary Variety Management, a Yakima, Washington, company contracted to commercialize new varieties. The university asked the company to do the same for WA 2.

The company chose the name Sunrise after two focus groups, one in Spokane and one in Seattle, came up with the term independently in early 2015. The company then added Magic after a trademark attorney advised that two-word names have a better chance at approval from the U.S. Patent and Trademark Office. The logo was chosen in an online poll.

Only Washington growers are allowed to produce the WA 2 in North America for 10 years. The management company is pursuing breeder's rights to protect the brand in several overseas markets, too, said Lynnell Brandt, president of Proprietary Variety Management, or PVM.

Growers will pay $1.25 per tree, plus 4.75 percent of the sales price of each box over $20. The money goes to the university's breeding program and the management company. The university keeps the "vast majority" of the proceeds, Brandt said. Neither Brandt nor Albert Tsiu, the university's technology transfer coordinator, would disclose how much the university pays PVM.

However, of the university's portion, 50 percent will go to the breeding program, 30 percent to the breeder, 10 percent to the university for administrative costs and 10 percent to the university's Office of Commercialization. The breakdown is standard for any vegetatively propagated plant varieties, according to the faculty manual.

An apple with two names is nothing new, said O'Rourke, the analyst from Pullman. In the end, the market may decide which one sticks around. For example, the Pink Lady brand, first trademarked in 1996, has drawn a stronger following than the generic name Cripps Pink, he said.

A brand, a name that tells a story and generates excitement, makes a big difference in the competitive apple industry, both with stores and consumers, he said.

"If you don't have a clear name, title, … you're not going to do very well in the marketplace." ●

The next GMO apple

PHOTOS COURTESY OF OKANAGAN SPECIALTY FRUITS

The Arctic Fuji apple is awaiting approval from the U.S. and Canadian governments. Meanwhile, Okanagan Specialty Fruits, the Canadian company that produces apple varieties that have been genetically modified to not turn brown, is expecting to harvest its first commercial crop of about 50 bins this year, all in Washington.

With Arctic Golden Delicious set to be the first commercial crop of genetically modified apples, plans are underway for an Arctic Fuji.

by Ross Courtney

After 20 years of development, a Canadian company is expecting its first commercial crop of genetically modified apples in 2016 while awaiting approval to forge ahead with its third and latest variety, Arctic Fuji.

Okanagan Specialty Fruits plans to harvest and pack about 50 bins of Arctic Golden Delicious apples and plant its first Arctic Granny Smith apples this year.

The Summerland, British Columbia, company develops and produces apples genetically modified to not turn brown when sliced.

Specialty Fruits received approval for Arctic Golden and Arctic Granny apples from food and plant health agencies in both countries early in 2015 and planted about 15 acres of Goldens in Washington, said Neal Carter, company president and founder. Those trees will

Okanagan Specialty Fruits has already received approval to grow its genetically modified Arctic Granny and Arctic Golden varieties.

Arctic Fuji apple slices, left, resist browning more than conventional apple slices.

yield a small crop this fall, while the company plans to plant significantly more acreage of both varieties in 2016, mostly in Washington, with increasing quantities in the following years in other states and Canada.

The company will test market the first apples from this year in a few select stores, but as it ramps up production, it will distribute to a variety of locations in both the U.S. and Canada, Carter said.

Carter declined to say which growers, packers or retailers will be working with Arctic apples.

At the same time, the firm expects U.S. approval sometime this year of its latest variety, the Arctic Fuji, with Canadian approval to follow within another year.

Arctic Fuji

Specialty Fruits applied for U.S. deregulation for the Fuji on Dec. 31, 2015, in the form of an extension to the documents of previously approved varieties. The process should move faster than the original application, filed with the U.S. authorities in 2010 and the year after in Canada.

The U.S. Food and Drug Administration and the U.S. Department of Agriculture's Animal and Plant Health Inspection Service have regulatory oversight of biotechnology in America. In Canada, the two agencies involved are Health Canada and the Canadian Food Inspection Agency.

Once approvals are in place, the company may propagate and market the apples as if there was nothing different about them. "What that approval means is it's treated like any other apple variety," Carter said.

At its laboratory in Saskatoon, Saskatchewan, Specialty Fruits alters the DNA of apples to silence an enzyme that causes apple flesh to brown when exposed to oxygen, such as when it's sliced or bitten.

"The regulatory thing is quite onerous no matter where you are in the world."

—Neal Carter

Specialty Fruits plans to apply for approval for an Arctic Gala by the end of 2017, with other varieties to follow. The company also is seeking agreements to grow and market its Arctic apples in other countries, a lengthy process just as it is in North America.

"The regulatory thing is quite onerous no matter where you are in the world," Carter said.

In Mexico, the company is seeking a food safety assessment to ship Arctic apples in the country and slice them there, he said, while a group of Australians is discussing growing the apples with the company's representatives.

The company both plants its own orchards and contracts with outside growers. Either way, and no matter where the trees are planted, Okanagan Specialty Fruits will own the trees and apples, unlike the royalty arrangements that usually accompany club varieties, Carter said. Such a structure will give Specialty Fruits more control to prevent cross-pollination and other co-mingling of conventional fruit, one of the biggest objections to the controversial genetic techniques, Carter said.

So far, the company has contracted with two large, well-established growers, one in Washington, one in the Eastern U.S. Carter declined to specify the locations.

Okanagan Specialty Fruits was purchased in April 2015 by Intrexon Corp., a biotechnology company based in Germantown, Maryland. ●

New Varieties

Breeding for consumer preferences

Test orchard plays key role as researchers seek the next great apple variety.

by Peter Mitham

A team of researchers is hoping to find the next stellar apple variety by matching the DNA fingerprints of consumer preferences with the genetics of thousands of seedlings in a test orchard overlooking Lake Ontario in Canada.

"If I told you that a certain apple had a certain amount of sugar in it, and three of us tasted it, we might all say, 'That's really sweet,' 'Not so sweet,' or 'I don't taste the sweetness,' because we all respond differently," said Daryl Somers, research director of applied genomics at the Vineland Research and Innovation Centre in Vineland, Ontario. "If I want to make a sweet apple, I don't necessarily measure the amount of sugar. I measure your reaction for sweetness."

A panel of 10 tasters was presented with approximately 80 varieties of apples in the center's sensory laboratory, run by Amy Bowen, research program leader. The tasters described the sensory attributes, allowing Somers and doctoral student Beatrice Amyotte to understand how the apples were perceived and to match those perceptions with detailed genetic sequencing information for those same apples through a genome-wide association study (GWAS).

Researcher Daryl Somers has developed a test orchard of approximately 11,000 trees at the Vineland and Innovation Research Centre in Vineland, Ontario.

The study "led us to essentially create new DNA fingerprints for how people perceive apples when they taste," Somers said. "We're connecting our genomics and our DNA sequence information directly to human perception and human sensory analysis. To my knowledge, that's never been done before in apples, and I think you'd be hard-pressed to find it in any edible plant species."

The exercise promises to be a boon for apple breeders, because they'll be able to narrow their search for apple varieties that will resonate with consumer preferences. This will ease matchmaking among parent varieties and make better use of the center's 7-acre test orchard.

"It allows you to focus and enrich the population for the higher quality apples that you're looking for," Somers said.

In spring 2015, for example, Somers sprouted 15,000 seedlings in a greenhouse. That summer, genomic analysis eliminated 6,000 of the seedlings from consideration. Last fall, a mere 6,400 were budded onto rootstock, boosting the center's trial orchard to nearly 11,000 trees.

The planting was more than in any previous year, but it was also a richer, more accurate selection of what might be successful in the marketplace, making for a

PHOTOS BY PETER MITHAM

Young trees stand in the seven-acre test orchard at the Vineland and Innovation Research Centre in Vineland, Ontario.

more effective breeding program.

"You're making much better use of your acreage," Somers said. "If you stick with the same acreage, and you increase your chances of success, you're simply more likely to produce a more marketable, high-quality apple at the end of the pipe when you're all finished."

Somers hopes to eventually plant 22,000 trees in the test orchard at Vineland, a former provincial research station that was long managed by the University of Guelph in Ontario and now operates as a public-private partnership.

The apple breeding program was launched in 2009 with the goal of revitalizing the Ontario apple industry.

"We asked our growers how we go about refreshing the variety mix in Ontario and in Canada, and everything pointed toward plant breeding," Somers explained.

While federal apple breeding activities were consolidated at the Pacific Agri-Food Research Centre in Summerland, British Columbia, climatic conditions in Ontario demanded local research.

While everyone wants an appealing, good-tasting apple, how to get that in the humid environment of Ontario was another matter. Traditionally, McIntosh, Gala, Empire and Red Delicious have dominated local orchards, but newer varieties, such as Ambrosia, Honeycrisp and others, have entered the market.

"Our focus is really just on apple quality, the taste experience," Somers said. "You've got to come up with other properties such as storage and disease resistance, but at the outset, it's really to generate a differentiated, high-quality apple."

This is where he hopes the current research program, supported with three years' worth of funding from industry, the province and the University of Guelph totaling Can.$220,000, makes a difference.

The new set of DNA fingerprints Somers has developed is already drawing attention, even though he expects it to be at least a year before he gets a taste of what the new seedlings yield on the palate.

A collaboration with Summerland fruit breeder Cheryl Hampson is on the horizon, and Somers hopes the national cooperation will yield international benefits.

"It's a point of trying to unify some of the apple breeding in Canada," he said. "We're looking outside our borders, too, not just within Canada. You never know how marketable certain genetics might be in other jurisdictions." ●

All dollar amounts are in Canadian dollars; a Canadian dollar is worth approximately 78 U.S. cents as of May 2016.

Peter Mitham is a freelance writer based in Vancouver, British Columbia.

A new way to apply chemicals

Researchers at Michigan State University's Clarksville Research Center, in collaboration with Cornell University, have answered many of the questions posed about the viability of solid-set canopy delivery systems.

The high cost and short residual effects of the current crop of pesticides are increasing demand for more precise chemical delivery, and SSCDS are intended to meet that demand.

Results look promising for solid-set canopy system delivery.

by Dave Weinstock

Per-acre capital costs of prototype SSCDS are 60 percent higher than conventional air blast sprayers. Yet researchers say the efficiency and safety gains offered by the new system, as well as its usefulness beyond pest control, provides growers with a number of options to earn returns on their investments.

Matthew Grieshop, a Michigan State University associate professor of organic pest management, is one of the researchers on the project. "New generation pest controls are more specific and more expensive, which is driving demand for applying pesticides more precisely.

"Organophosphates are disappearing from the marketplace," Grieshop said, "And with the pollination concerns surrounding the neonicotinoids, the fruit industry is facing the loss of a lot of their go-to products."

The basics

The system under review consists of a central pumping station that pushes spray material down tree rows through tubing running along tree canopies. The spray material is then applied via micro-sprinkler nozzles attached to support wires above trees in trellis systems and fruiting walls.

For the Michigan trial, the Clarksville researchers attached two lines of micro sprayers — one at 4.5 feet and another at 8 feet — to the tubing. They fixed single, horizontally oriented micro sprayers on the upper line and two vertically oriented micro sprayers on the lower line, attached with a T-bracket, and spaced both sprayer sets at 6-foot intervals.

The system has four operational stages. First, operators pump spray material through the main line at low pressure. To spray, they close the return line and increase air pressure to apply chemicals. For recovery, operators open the return valve and turn on the air compressor to blow residual material back into the spray holding tank. To clean the system, they close the return valve and run the air compressor to clear the micro sprayers.

Comparison trials

Three years ago, *Good Fruit Grower* reported on the first-year results of this research project, which was being conducted in three states: Michigan, Washington and New York. A recent report released new results from Michigan, incorporating findings from New York, for the last three years of study from 2013 to 2015.

WSU hasn't worked on the project since 2014.

Michigan State University researchers ran field trials to compare SSCDS performance against conventional air blast sprayers. They used three tests to compare coverage: water-sensitive cards, tartrazine dye deposition and an insect pest bioassay.

The team placed water-sensitive cards both face up and face down, at 3-foot, 5-foot and 8-foot levels within the canopy. Then, they sprayed plots using both systems at 80 gallons per acre to compare coverage.

Over the three-year duration of the trial, SSCDS systems provided better coverage on cards facing up compared to cards facing down and tended to provide more coverage higher in the tree rather than lower in the tree, according to the researchers. In contrast, air blast sprayers tended to provide better coverage of the undersides of leaves and the lower portions of the trees.

They also tested for spray distribution within the canopy. Using a food-grade, tartrazine dye mixed into spray applications, results showed much higher spray deposition on SSCDS-treated leaves compared with air blast-treated leaves.

The MSU researchers also evaluated SSCDS's performance in providing disease and pest control against that of an air blast sprayer. For pest management, they gauged the presence of codling moth, Oriental fruit moth, plum curculio and obliquebanded leaf roller after treatment; for disease control, they monitored for signs of apple scab.

The SSCDS provided comparable apple scab control to that of the air blast treatment. Results were consistent with SSCDS plots providing insect control equivalent to air blast sprayers as well, the researchers said.

"New generation pest controls are more specific and more expensive, which is driving demand for applying pesticides more precisely."

—Matthew Grieshop

"We collected field data on all three of those pests and apple scab at MSU and saw no difference between SSCDS and air blast-treated plots," Grieshop said. "Both delivery systems significantly reduced damage compared to the untreated control."

Cornell University entomologist Art Agnello said he compared the fruit quality of apples treated by air blast sprayers and SSCDS harvested from a New York state experimental orchard block. "The data I sent over to Michigan State University for the grant proposal showed the fruit quality was comparable for both systems," he said.

The benefits

Grieshop said one obvious advantage is that this system does not require the use of a tractor. For apple growers whose orchards lie on heavy clay soils, it means not running heavy equipment through the mud during scab season.

"It also means reduced incidence of 'iron blight,' equipment-inflicted tree damage," Grieshop said.

While the system still requires a single operator, that operator stands outside the orchard and well away from the application process. And because the system is not complex, it requires far fewer skills to operate than tractor-based systems.

Grieshop said the application process is very fast, approximately 12 seconds. "We think we have far fewer concerns about spray drift because we are just misting the foliage," he said.

That's also a benefit for those growers whose operations are located near housing developments or commercial areas: SSCDS run very quietly, he said.

Grieshop has just begun exploring using the rapid applications made possible by SSCDS to re-think the rate and frequency at which pesticides are applied. The basic idea would be to apply a full rate of pesticide followed by frequent, subsequent, low-rate applications targeted at maintaining coverage.

"For example, if we consider a pesticide with a seven-day reapplication window at 100 percent rate that is typically applied twice, we could make the first application at 100 percent, followed by three reapplications at 25 percent over the next 14 days," he said.

It would save about one-eighth of the active ingredient and maintain pesticide residuals at a lower, more consistent level on the fruit. "This also could result in reduced residue at harvest," he said.

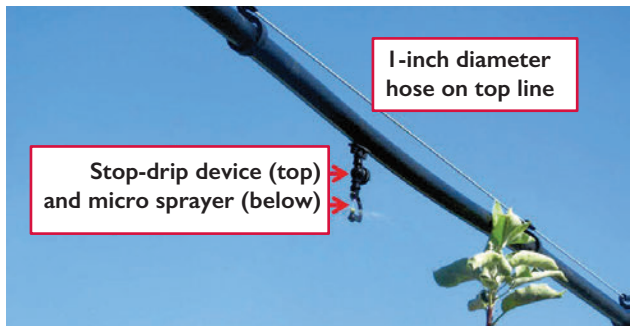
Going forward

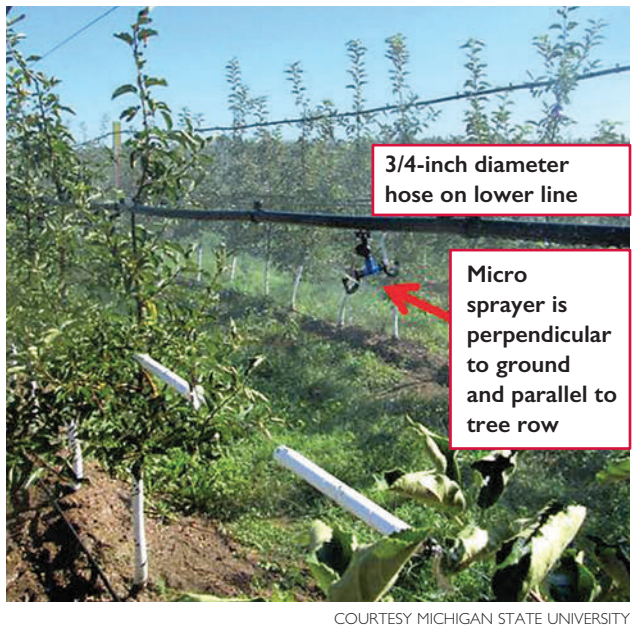
When the trials began, three universities — MSU, Cornell and Washington State University — shared the grant to evaluate the system. Last year, the U.S. Department of Agriculture did not fund the project, although MSU found some state money to continue the work and Cornell University continued to collect data.

Grieshop has written another grant proposal for 2016 that includes both Michigan State and Washington State universities. ●

Solid-set canopy delivery system

Michigan State University's Clarksville Research Center is testing a solid-set canopy delivery system designed to apply pesticides more precisely than conventional sprayers.





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For more information about the SSCDS project, including write-ups about its most recent findings, visit www.canopydelivery.msu.edu

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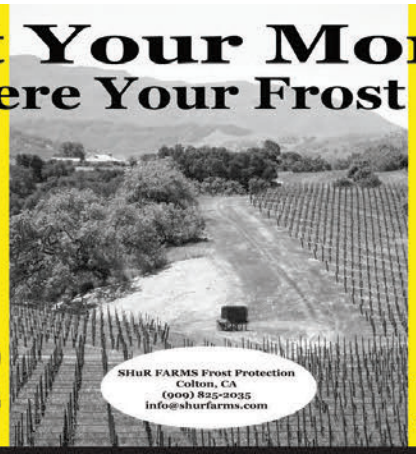

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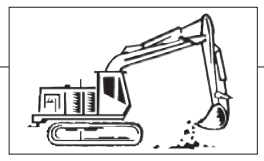

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GOOD STUFF

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Updated website for U.S. Apple Association

The U.S. Apple Association has released a new, mobile-friendly website at *usapple.org*.

The website continues to address the organization's position on key topics such as food safety and agricultural labor reform, while increasing the appeal to consumers and the ease of use for USApple members, says Wendy Brannen, USApple's Director of Consumer Health and Public Relations.

The new site also incorporates the "Blogging for Apples" blog, making it easier to find on-trend recipes and ways to get involved in seasonal marketing campaigns, and features a "Meet the Growers" section on the home page.

A new password-protected section of the site includes a member database and access to the association's publication, available only to members. Still being developed: an orchard map for consumers to find apple farms near their homes or travel destinations.

"This is a tool that has long been missing in our toolbox. Sure, there is great emphasis on social media and blogs these days, but we needed this home base for people to access our most important information — whether that is a legislative aid researching our position on the Farm Bill, a consumer seeking health data and recipes or a journalist seeking the latest industry statistics," Brannen said.

The U.S. Apple Association is the national trade association representing all segments of the apple industry. Members include 40 state and regional associations representing the 7,500 apple growers throughout the country, as well as more than 400 individual firms involved in the apple business.

Sym-Agro, Inc. releases fungicide/bactericide

Sym-Agro, Inc. has launched Prevont fungicide/bactericide, for use on tree fruit, grapes, fruiting vegetables, such as peppers, chilies, tomatoes and potatoes, and on cucurbits, melons and berries. Prevont is a fungicide and bactericide for use against fungal diseases, such as Botrytis and Sclerotinia, and bacterial diseases, such as Xanthomonas and Erwinia.

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GOOD TO GO

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

JUNE

June 1-2: Pear Bureau Annual Meetings, Portland, Oregon, *usapears.org*. Schedule includes Processed Pear Committee, Pear Bureau Northwest and Fresh Pear Committee. For details, call the Pear Bureau at 503-652-9720.

June 13-14: Postharvest Technology of Horticultural Crops Short Course, Davis, California, UC Davis Campus and field tour, *postharvest.ucdavis.edu/Education/PTShortCourse*.

JULY

July 20: Cornell Fruit Field Day, field stops and presentations on current research underway at Cornell in berries, hops, grapes and tree fruit, New York State Agricultural Experiment Station, Geneva, New York, 315-787-2341, *bit.ly/CornellFieldDay*

SEPTEMBER

September 13-15: Fresh-cut Produce: Maintaining Quality & Safety Workshop, Davis, California, UC Davis Campus, *postharvest.ucdavis.edu/Education/FreshCut*.

September 14-16: Macfrut 2016, Italian Fruit & Vegetable Trade Fair, Rimini Fiera, Italy, *macfrut.com*.

NovaSource names new regional account manager

NovaSource, the crop protection business unit of Tessenderlo Kerley, Inc. (TKI), has created an additional sales territory in Idaho and the Rocky Mountain region.

The sales territory will be managed by a new team member, Tad Comer, who will oversee an area that includes Idaho, Utah, Wyoming, Montana and Colorado from an office based in Twin Falls, Idaho.

Comer had most recently served as an area sales manager for Van Diest Supply Co., where he managed a large and diverse distribution business across Colorado and Nebraska.

NovaSource develops and markets a variety of crop protection products for niche uses in agriculture worldwide.

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AD INDEX

Last Bite

More Young Growers at **goodfruit.com/yg**

Suzanne Niemann

grower / *Yakima, Washington*
age / *23*
crops / *Apples, cherries*
business / *Horticultural researcher for Allan Brothers Inc.*
family background / *Suzanne's love of agriculture grew out of her interest in the sciences. She is the daughter of Joe and Marti Niemann, and she is working to apply research to improve fruit from the field to the consumer.*

How did you get your start?

I'd always grown up enjoying the science part of nature. I was involved in 4-H, and I was always interested in sustainable agriculture. I pursued my undergrad degree at Washington State University, then obtained my master's degree in horticulture. One of the reasons why I think agriculture is so inspiring for me is — it's meteorology, it's geology, it's chemistry, biology, botany — it's all these different sciences together, and all in one industry and career. It's agriculture, that's all it is. So being able to combine all of those fields into my job, my career, is just a dream come true.

Describe your job as a horticulturist?

My role is in assisting precision agriculture because there's a lot of things like irrigation fertilizer management, pruning trials, that no matter what research is available, we still need to be able to apply it to each growing environment. For Allan Brothers, we have orchards from Naches, Mattawa, Pasco that all have different soil types, so knowing how research can fit our particular orchards, climate, etc., that's how my role in the company can be influential. I can spend my time looking at the nitty-gritty details of growing instead of trying to master everyday operations.

What do you enjoy about your job?

The work I do changes constantly. Sometimes I'm in the warehouse with quality control, sometimes I'm in the field making applications or checking fruit. Let alone there's the statistical side of it, where I'm gathering all of the data, putting it into a computer and learning what the numbers are telling me. I can go back to people in upper-management and explain, "We did these trials, this is what we saw, then we can do something different, or maybe do the same thing."

What are some of your goals?

Some of the long-term goals would be looking at organics and sustainable agriculture. Is organics really sustainable or can we grow conventionally and still be sustainable using less inputs and having better practices for our environment? I'm also really interested in improving our quality control data that we take at the warehouses. I'd really like to better fine-tune our QC practices and our storage protocol. In this industry, there's always new things to learn and always new things to gain.

What I do is really dynamic and that's just the fruit side of my job.

by TJ Mullinax

More from this interview and other Young Growers at goodfruit.com/yg.

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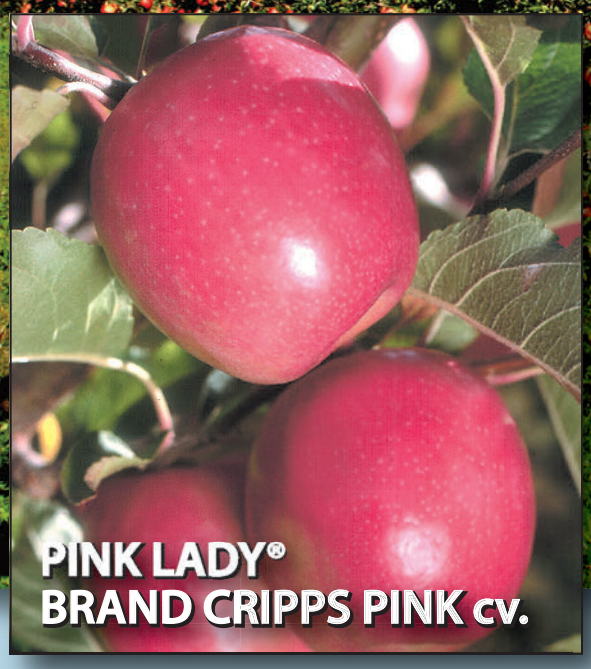

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