

SOILS & WEED MANAGEMENT

GOOD FRUIT GROWER

“Preparing for the worst lets my crops be their best.”



Be prepared for powdery mildew and scab. Protect your fruit with DuPont™ Fontelis® fungicide.

Fontelis® fungicide prevents scab and provides highly effective post-infection treatment for apples, pears and cherries*. You get strong, reliable control of difficult soil-borne and foliar diseases, with the power and flexibility you need for high-quality crops. Want to be ready for anything? Ask your DuPont representative or retailer about adding Fontelis® to your fruit protection program. fontelis.dupont.com

**DuPont™
Fontelis®**
fungicide



*Not for use on cherries in California for control of scab.
Always read and follow all label directions and precautions for use.
Unless indicated, trademarks with ®, ™ or SM are trademarks of DuPont or affiliates. © 2016 DuPont. DUPCNS16004_041516_GFG

PHOTO BY TJ MULLINAX/GOOD FRUIT GROWER

Site of a future orchard being prepared for Washington Fruit & Produce Co. near Kittitas, Washington.
Read about soil preparation for this and other new plantings on page 28.

www.goodfruit.com

Soils and Weed Management

35 A closer look at soil

Advances in testing tell growers what they need to know.

37 Is your soil healthy?

Every orchard is different, of course, but there are some standards that can help.

38 High-tech mapping

Helpful soil-mapping web tools available to growers.

40 The microbes beneath

Soil biology is critical to life, but still largely unknown.

42 Woolly aphid surge

Researchers looking to overcome pest find promise in sandy soils.

43 There's more to mulch

Tests show mulch tops organic herbicides for weed control in pears.

Centerpiece

28 Big digs

Properly preparing the soil can help new orchard plantings thrive.

Good Grape Grower

20 Resistance is growing

Help to control herbicide-resistant weeds.

24 Send in the clones

Wine grape growers weigh in on Cabernet Sauvignon clones



Managing Editor

O. Casey Corr
casey.corr@goodfruit.com • 509-853-3512

Senior Editor

Shannon Dininny
shannon@goodfruit.com • 509-853-3522

Associate Editors

Ross Courtney
ross@goodfruit.com • 509-930-8798

Dave Weinstock
dave@goodfruit.com • 616-970-4735

Advertising Manager

Doug Button
dbutton@goodfruit.com • 509-853-3514

Advertising Sales

Rick Larsen
rick@goodfruit.com • 509-853-3517

Theresa Currell
theresa@goodfruit.com • 509-853-3516

Design/Production Manager

Jared Johnson
jared@goodfruit.com • 509-853-3513

Digital Producer

TJ Mullinax
tj@goodfruit.com • 509-853-3519

Design/Production

Aurora Lee
aurora@goodfruit.com • 509-853-3518

Circulation

Maria Fernandez
maria@goodfruit.com • 509-853-3515

Advisory Board

Lindsay Hainstock, Denny Hayden, Steve Hoying,
Jim Kelley, Desmond Layne, Jim McFerson,
Ian Merwin, Todd Newhouse, Don Olmstead,
Mercy Olmstead, Marvin Owings, Mark Roy,
Mark Tudor, Chris Van Well, Mike Wittenbach

U.S. SUBSCRIPTIONS: \$35.00 per year, 3 years \$75.00. CANADIAN SUBSCRIPTIONS: \$55.00 per year (U.S. funds, Canadian G.S.T. included: G.S.T. Registration #135100949). SUBSCRIPTIONS OUTSIDE U.S.A. & CANADA: \$100.00 per year (payment by credit card only). Single copies of current issues are \$5.00. To subscribe, call 1-800-487-9946.

Good Fruit Grower (ISSN 0046-6174) is published semimonthly January through May, and monthly June through December, by the Washington State Fruit Commission, 105 South 18th Street, Suite 205, Yakima, WA 98901-2149. Periodical postage paid at Yakima, WA, and additional offices. Publications Mail Agreement No. 1795279.

The publication of any advertisement is not to be construed as an endorsement by the Washington State Fruit Commission or Good Fruit Grower magazine of the product or service offered, unless it is specifically stated in the advertisement that there is such approval or endorsement.

POSTMASTER: Send address changes to Good Fruit Grower, 105 South 18th Street, Suite 217, Yakima, WA 98901-2177.

© 2016 by Good Fruit Grower Printed in U.S.A.

105 S. 18th St., #217, Yakima, WA 98901
509/853-3520, 1-800-487-9946, Fax 509/853-3521

E-mail: growing@goodfruit.com

www.goodfruit.com



Last Bite

54 Young grower

Q&A with Eladio Gonzalez.

TJ MULLINAX/GOOD FRUIT GROWER

Good Point

8 Free trade should be fair

USApple Chairman Mike Wade discusses the controversy of Polish apple imports.

Also in this issue

10 Honeycrisp from Chile

Michigan company bringing 250,000 cases of popular variety to U.S. consumers

12 Enviro-weather watching

New fruit models, seamless data boost Michigan's weather monitoring system.

16 Dump tank food safety

Study looks into importance of monitoring microbial levels in dump tanks.

Good to Know

46 Testing for nutrients

Wine industry funded research can save growers money and lead to healthy soils.

Departments

5 Quick Bites

7, 44 Good Stuff

48 Good Deals

52 Advertiser Index

53 Good to Go

53 Classifieds

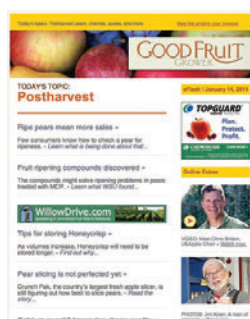
On the cover

"Road of Pear Trees"
Anjou, Asian and
Bartlett trees in
Parkdale, Oregon.

BY PALOMA AYALA,
HOOD RIVER, OREGON



©2016 NO REPRODUCTION OR DISPLAY WITHOUT WRITTEN PERMISSION.



On the Web

Sign up for eFlash.

Get Good Fruit Grower reports delivered right to your inbox.

www.goodfruit.com/
eflash-signup.

Good Fruit Grower is on
Twitter and Facebook.
Follow us @goodfruit
grower. Like us at
www.facebook.com/
goodfruitgrower.



QUICK BITES

People and industry in the news.

Read more Fresh Updates at
goodfruit.com/fresh-updates

Researchers seek to study safety in agriculture

Researchers at Washington State University Extension and the WSU College of Nursing are fact-finding for a research grant to examine safety issues in agriculture.

The proposed grant would entail development of health education materials and an intervention study to test the application of farm on-site showers and clothes-changing areas to reduce residue exposure. In addition to WSU Extension and the College of Nursing, participants would include growers, farm workers and others in the community.

Researchers are asking growers to complete an online survey (bit.ly/1R99DVg) about the number of workers at their farm and whether changing rooms or shower facilities are available for farm workers. The survey may be completed anonymously, but the researchers are also interested in finding growers who might be willing to partner in these projects.

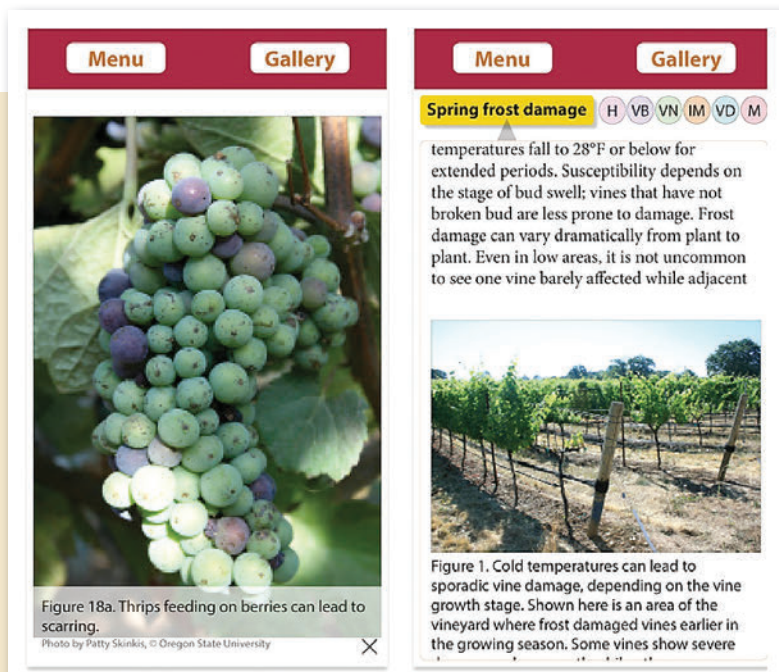
Interested growers should contact Dr. Gail Oneal at the WSU College of Nursing at goneal@wsu.edu.

Knappenberger joins Cornell Extension

Kim Knappenberger has joined the Cornell University Cooperative Extension team at Chautauqua County's Lake Erie Regional Grape Program (LERGP) in New York. She will work with the project research and extension team members in support of the \$6 million U.S. Department of Agriculture Specialty Crop Research Initiative.

Knappenberger earned a degree in biology from Thiel College in Greenville, Pennsylvania, and has three years of experience in viticulture through work with the Lake Erie Regional Grape Program in vineyard and hop IPM and production practices. She also created GIS maps for thousands of acres of vineyards across the Lake Erie Grape Belt, which are aiding growers to determine areas of a vineyard where alternative management strategies may be needed.

The LERGP Extension team provides research-based educational programming for commercial grape growers across the Lake Erie grape belt.



COURTESY OREGON STATE UNIVERSITY

OSU announces new publication with app

Oregon State University Extension has released a new publication and an accompanying, downloadable app for tablets and mobile devices that offers research-based guidance on stunted grapevines.

The publication, *Recognize the Symptoms and Causes of Stunted Growth in Vineyards*, explains how stunting from various causes affects the vine and shows what the effects look like across the vineyard. It guides growers in interpreting the symptoms and distinguishing one cause of stunting from another, and it provides links to other Extension resources that provide in-depth information on grapevine management and health.

Developed for iOS and Android tablets and smartphones, the free, easy-to-navigate app, called Vineyard Growth, offers research-based guidance from eight Extension field scientists, along with a wealth of color photographs to help growers accurately diagnose their vine-stunting problem and find the right solution.

To download the publication and the application, visit the Extension catalog at catalog.extension.oregonstate.edu/em8975.



CAMERON
Nursery, LLC

Call for:

- TREES
- ROOTSTOCK
- INTERSTEMS
- BENCH GRAFTS
- SLEEPING EYES
- ROYALTIES

HIGHEST
QUALITY FRUIT
TREES !

⇒ TOP QUALITY

⇒ VIRUS TESTED

⇒ VERY COMPETITIVE PRICING

**CONTRACTS for 2017
and beyond!**

**Custom Contracted
Apple, Cherry & Pear Trees**

**TIME TO
PLAN!**
2019 Tree Needs
2017 Sleepy Eyes



STACY GILMORE

509-266-4669

Stacy Gilmore • cnsales@fastmail.com

*We ship nationwide, so please call
for price and availability!*

cameronnursery.com

1261 Ringold Rd., PO Box 300 • Eltopia, WA 99330

QUICK BITES

People and industry in the news.
Read more Fresh Updates at
goodfruit.com/fresh-updates

WAWGG elects board, officers

John Derrick of Mercer Canyons Inc. in Prosser, Washington, has been elected to serve a three-year term on the board of directors for the Washington Association of Wine Grape Growers. Ken Lewis of Trail View Farm and Patrick Rawn of Two Mountain Winery also have been re-elected to serve three-year terms as well on the nine-member board.



John Derrick

Derrick is Mercer Canyon's vice president of vineyard operations. Lewis is a certified public accountant and worked for a range of companies before returning to the family farm in Prosser to manage 600 acres of diversified crops, including 120 acres of wine grapes. Lewis has served on the WAWGG Board since 2008. Rawn owns and operates Two Mountain Winery and Copeland Vineyard in Yakima Valley with his brother. He has been on the board since 2009.

Officers were also elected at the February WAWWG meeting, with Todd Newhouse as chair, Patrick Rawn as vice chair, and Ken Lewis as secretary/treasurer.



PHOTOS COURTESY OF WAWGG

The 2016 WAWGG Board, from left to right: Shane Collins, John Derrick, Mike Means, Lynne Chamberlain, Scott Williams, Julia Kock, Vicky Scharlau (WAWGG Executive Director), Ken Lewis, Todd Newhouse and Patrick Rawn.

SIZE MATTERS

Feed your trees a nutrient solution repeatedly proven to improve both yield and quality of cherry crops.



Caliper provides a unique combination of highly available plant nutrients, improving plant nitrogen metabolism due to its unique carbon composition.

Caliper's dry soluble micro-crystal formulation is easy to use, and can be applied in combination with existing foliar programs.

To help improve fruit set and fruit size, contact your local Genesis Agri Products distributor for rates and timing.

2517 Old Town Road, Union Gap, WA 98903
Doug Anyan: 509.949.9231



GOOD STUFF

A selection of the latest products and services for tree fruit and grape growers

Washington Fruit has new optical sorting platform

Compac has successfully deployed its new modular, upgradeable optical sorting platform at Washington Fruit and Produce Co.

The Spectrim platform incorporates breakthrough advances in defect detection, classification and operator ease of use, Compac says. Through advanced machine-learning algorithms, Spectrim automates complex tasks that operators normally have to conduct manually, and reduces the need for many labor-intensive, defect-related processes.

Spectrim has the ability to take up to 500 high-definition images of a single piece of fruit as it passes through the machine at a rate of 12 pieces of fruit per second, detecting external blemishes.

For more information, visit www.compacsort.com/spectrim.



COURTESY SEMIOS

EPA approves navel orangeworm pheromone

The U.S. Environmental Protection Agency and California Department of Pest Regulation have approved aerosol pheromone biopesticide products developed by Semios to disrupt the mating of the navel orangeworm.

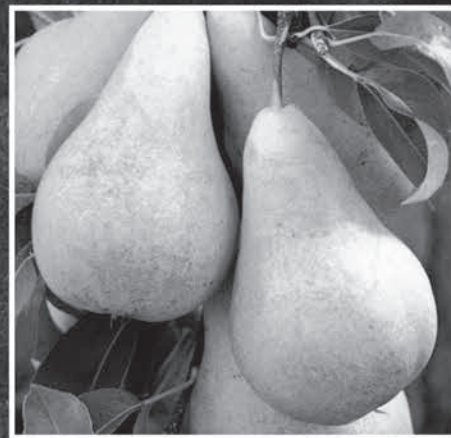
The Semios platform includes in-field camera traps that monitor the number of pests and flight strength, which when combined with wind, temperature and other environmental conditions measured and reported by Semios, optimize pheromone deployment.

Semios NOW Plus and Semios NOW Standard are available for control of Navel Orangeworm in orchards growing walnuts, pistachios, almonds, dates, figs, citrus and pome and stone fruits.

For more information, visit www.semios.com.

Good Stuff is continued on page 44.

Things to make sure you remember.



The first months of the year are very hectic with so many pressing obligations that you may tend to forget a very important, even crucial, fact of our industry: there is limited inventory of quality fruit trees for your planting schedule. And there will be for the foreseeable future.

We know it may sound like a broken record, but it is imperative you plan early and order early to help assure you receive the trees you need. Even if you wonder what is available, inventories can change daily, and you should call with any questions.

So PLEASE, don't dawdle, lollygag or dilly-dally. Place your orders...lickety-split.

C&O
NURSERY

PO Box 116 • Wenatchee, WA 98807.0116 • 509.662.7164 • FAX 509.662.4519 • 800.232.2636
tree@c-onursery.com www.c-onursery.com

*Patent information available upon request.



Free trade should include fair trade

After a period of relative stability regarding international trade in apples, there are things happening—both good and potentially not so good. On the positive side, the China market opened to U.S. apples in 2015, and about 1 million boxes have been shipped there already. That's great.

Looming on the eastern horizon, however, is a real possibility we may shortly see an increase in European apples landing in the U.S. This is not good news, particularly as U.S. exporters have already seen an increase in European apples competing in important markets like Southeast Asia, Latin America and Canada.

We have made the point that the apple industry has always supported free trade, so long as it's fair trade, but the EU/Poland situation is neither.

Many European Union member countries for years have had clearance to ship apples to the U.S. That's not news. Several years ago, those countries petitioned the U.S. Department of Agriculture to switch to a streamlined pre-clearance program to ensure their apples meet phytosanitary safeguards for insects and diseases. This process is allowed under the rules of the World Trade Organization under which the U.S. and our trading partners operate.

The potential impact of this request changed in 2014 when Poland asked to be added to the petition. Unlike the other countries, Poland has never had access to the U.S. market and has not been subject to a formal insect and disease risk assessment. When Poland's request became known, USApple immediately sent a letter to Agriculture Secretary Tom Vilsack voicing concern and insisted the USDA follow proper scientific procedures.

Poland is the world's largest apple exporter, and Russia had been its top market. When Russia encroached on the eastern Ukraine, western nations imposed a trade blockade as punishment and Poland sided with the West. In turn, Russia responded tit-for-tat by shutting out apples from Poland, the EU and the U.S. As a result, without the Russian market, Poland is now shipping more apples to other EU countries and Canada. But what Poland

You are likely asking, so what changed, and what is being done to stop this from happening? Both are reasonable questions, but it's complicated and bears some explanation, so let me try.



GOOD FRUIT GROWER ILLUSTRATION

really wants is access to new markets, meaning the U.S. market.

Polish government officials are ratcheting up pressure on the U.S. government to allow in their "freedom apples" just as Canada did when the initial request was made in 2014. The pressure has been applied as high as the White House, which wants to do all it can to keep the western block united against Russia and is, therefore, favoring the access.

Clearly, the potential for an increase in imports of European apples into the U.S. is not a desired outcome. However, due to WTO rules, the industry is limited in what it can do to mitigate the situation. This is particularly galling as the EU has effectively shut the U.S. out of its market through the use of nonscientific barriers. Consequently, the EU, which has historically been a top market for New York and other states, has been reduced to a minor outlet.

At a February 29 meeting in the White House, USApple President & CEO Jim Bair spoke directly to U.S. Trade Representative Ambassador Michael Frohman, a member of the president's Cabinet. During USApple's Capitol Hill Day on March 3, teams of growers and shippers met with 75 congressional offices to make this point and ask for support. Letters signed by the senators from Washington, Idaho, New York and Michigan pressed USDA to delay approving increased access for the EU until an analysis of the pest potential from Poland can be completed.

At USApple's Leadership Lunch on March 4, the guest speaker was Sharon Bomer Lauritsen,

agricultural trade negotiator in the White House office of the U.S. Trade Representative. We have made the point that the apple industry has always supported free trade, so long as it's fair trade, but the EU/Poland situation is neither. USDA has responded by announcing a 45-day extension to its approval process. That's good news.

During this extension period, the industry's Tree-Fruit Technical Advisory Council (TreeTAC) will review the pest profile of Poland. Formed in 2001 by the Northwest Horticultural Council and USApple, TreeTAC is composed of top plant pathologists from research universities throughout "apple country," including Washington State, Cornell, Michigan State, Penn State and others. TreeTAC provides scientific input to help USDA understand phytosanitary risks and to establish science-based policies to protect our orchards from invasive pests.

While it is not realistic to expect that we can stop the systems approach from going forward, we are pursuing all options and insisting that all proper procedures are followed and no foreign pests are allowed in with any EU apples. USApple will continue to draw attention to the fact we do not have a level playing field so long as we do not have access to their market while they are asking for increased access to ours.

Please do not hesitate to contact USApple or me with your comments, questions and feedback. ●

Mike Wade of Columbia Fruit Packers is chairman of the U.S. Apple Association.



Luna[®]



.....
Beautiful

FROM BUD BREAK TO PICKING



From bud break until harvest, Luna[®] fungicide protects apples throughout the growing season, improving plant health for beautiful crops and abundant apple yields season after season. As a breakthrough systemic fungicide, Luna provides unparalleled control of Powdery mildew, Scab and other problematic diseases. Make Luna a cornerstone of your fungicide program to consistently produce a high-quality crop – and more of it.

Find out what Luna can do for you at LunaFungicides.com/apple.

© 2016 Bayer CropScience LP, 2 TW Alexander Drive, Research Triangle Park, NC 27709. Always read and follow label instructions. Bayer, the Bayer Cross, and Luna are registered trademarks of Bayer. Luna is not registered in all states. For additional product information, call toll-free 1-866-99-BAYER (1-866-992-2937) or visit our website at www.BayerCropScience.us.

Honeycrisp from Chile COMING TO AMERICA

Honeybear Brands of Minnesota bringing in its largest crop from South America plantings.

by Dave Weinstock

This spring, Honeybear Brands of Elgin, Minnesota, is shipping its largest crop of Honeycrisp apples to the United States from Chile — more than 250,000 cases to the East and West coasts in late April.

Ten years ago, the company planted its first 20 trees in Chile. “Today, there are well over 500,000, making it the largest Honeycrisp holding in the Southern Hemisphere,” said Don Roper, Honeybear Brands vice president.

The apples’ northern journey begins after the U.S. Department of Agriculture pre-approves them in Chile before loading them onto the ship. It takes 17 to 19 days by freighter to arrive at their destinations in shipping containers.

Then the apples move to two third-party warehouses in Vineland, New Jersey, via Philadelphia, and to its own



TJ MULLINAX/GOOD FRUIT GROWER

While many consumers love to get their hands on fresh Honeycrisp apples — such as this one grown in Washington state — the 250,000 cases entering the market from Chile this spring are not expected to make a huge dent in the market.

Brewster, Washington, warehouses, via Seattle.

Priced at \$90 to \$95 a case f.o.b., the company plans to sell its product to its premium retail partners. That’s roughly double the cost of a 40-pound Honeycrisp box in the fall season, said Karina Gallardo, Washington State University Extension economist.

Despite the premium pricing, Roper said there was still plenty of room for retailers to make money. Selling apples in this second season, “when sales are relatively flat,” will give their partners a significant advantage over the competition.

Gallardo agrees having apples at that time of year is an advantage. “May, June and July is the time of year when supplies of apples are at their lowest,” she said.

Honeybear Brands’ partners include Wegmans, Big Y Foods, Walmart, Costco, Publix, HyVee, Meijer, Kroger, Target, Cub Foods and H-E-B. “It will take them 3 1/2 to 4 months to run out of them,” Roper said.

Even though Honeybear’s second season shipment may offer retailers an opportunity, the 250,000 cases, while significant, will not make a huge dent in the market.

According to the Washington State Tree Fruit Association, Washington shipped a little less than 6.7 million boxes in the 2014-2015 crop year. Honeybear Brands’ Chilean shipment would total a little more than 3.5 percent of last year’s crop.

Competitors aren’t concerned about Honeybear Brand’s second season Honeycrisp either. “I’m not worried,” said John Rice, vice president of Rice Fruit Co. in Gardners, Pennsylvania. “It doesn’t sound like an overwhelming number of boxes.”

Rice said he is more concerned about new varieties “fighting their way into the market.”

“There have been 70 apple varieties introduced in the last 10 years,” he said. “No supermarket is going to carry all 70, but nearly all of them carry about 10.”

The markets have room for another two or three varieties, and “everyone is fighting over providing the other two or three,” he said. ●

GROWING QUALITY



FRUIT starts with TECH-FLO®

Use TECH-FLO foliar nutrient products to improve FRUIT FINISH and increase SIZE by enhancing early cell division, even in adverse weather conditions.

TECH-FLO products can also reduce russet by improving early wax formation. Contact your Fieldman for your crop specific program.

SAFE, EFFECTIVE, and EASY TO USE, TECH-FLO products will provide the best VALUE for your nutrient investment year after year.



NUTRIENT TECHNOLOGIES

ASK YOUR FIELDMAN OR CALL NUTRIENT TECHNOLOGIES TOLL FREE (877) 832-4356

You can't shortcut the growing process. So, don't shortcut the protection.



Don't settle for anything less than the premier codling moth control of Assail.

As any apple grower will tell you, there's only one way to produce a healthy crop - with hard work, long hours and meticulous attention to their fruit. So it's no surprise that more growers trust Assail® insecticide from UPI.

Growers know from experience that Assail offers proven protection from codling moth damage as well as other harmful secondary pests like aphids, campylopus, apple maggot and more. And because application flexibility is so important, Assail is one of your softest choices when bees may be in the area. It's no wonder Assail has such high customer satisfaction and customer loyalty. Don't take short cuts, use Assail. To learn more, contact your local UPI distributor or area UPI representative.



Assail is a bee-friendly insecticide.



Always read and follow label directions and precautions. Assail® is a registered trademark of Nippon Soda Company. UPI logo is a trademark of United Phosphorus, Inc. ©February, 2016. UPI, 630 Freedom Business Center, King of Prussia, PA 19406. www.upi-usa.com.

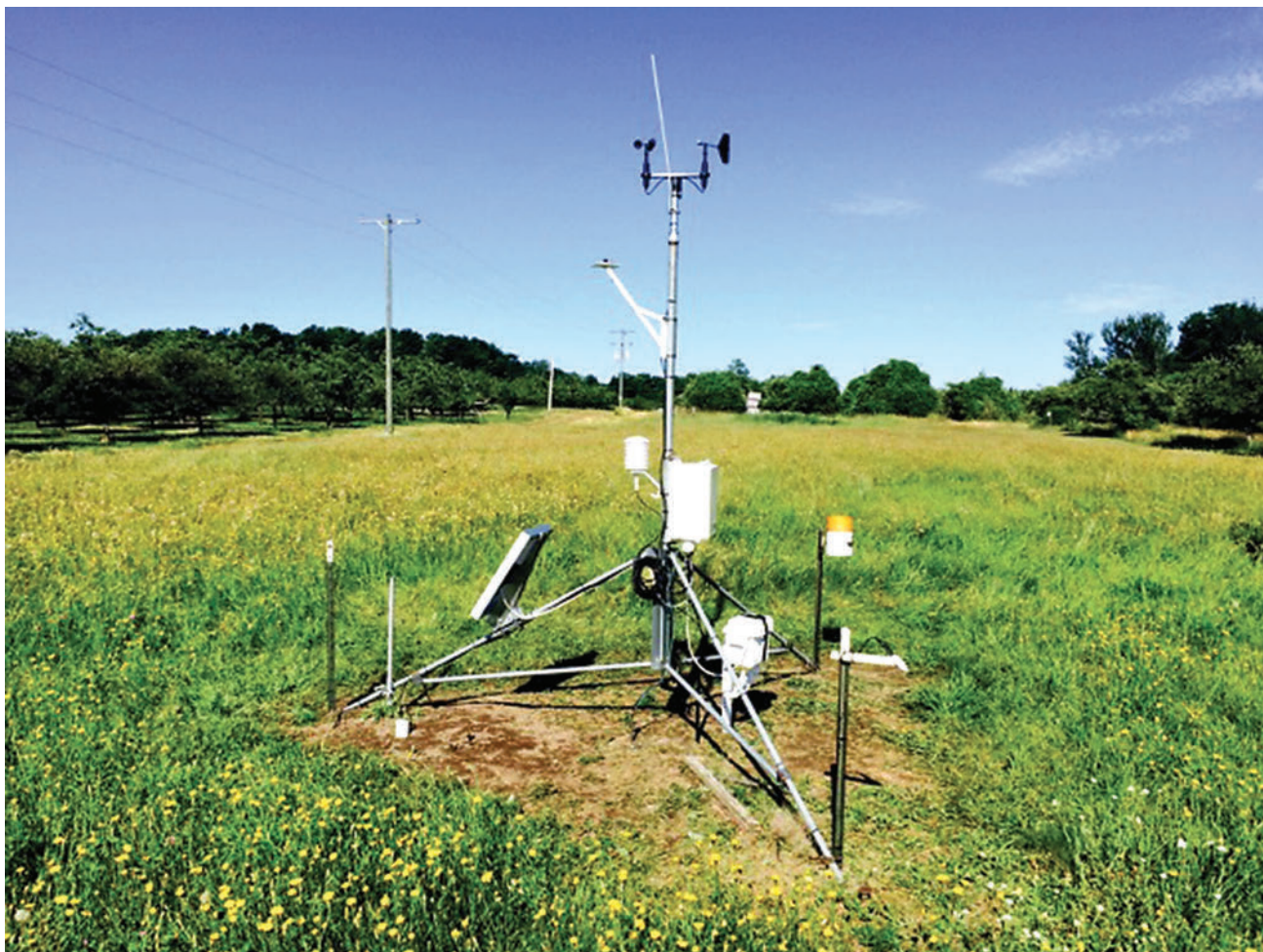


PHOTO COURTESY OF ENVIRO-WEATHER

Each Enviro-weather station has a standard set of 12 sensors to make a variety of measurements, including maximum, minimum and current air temperature; soil temperature at 2-inch depth, total precipitation, relative humidity, wind, solar intensity and leaf wetness.

Not your grandpa's WEATHER VANE

New fruit models, seamless data boost Michigan's Enviro-weather system.

by Leslie Mertz

For growers across Michigan and parts of Wisconsin, Enviro-weather continues to be the go-to website for following degree-days, predicting frost occurrences, finding rainfall totals, tracking pests, and planning the timing of insecticide and fungicide applications.

Part of what makes Enviro-weather so useful is that it is constantly expanding to provide new services that help growers make sense of the environmental conditions and how they ultimately affect their crops. In addition to an increasing number of weather stations — now topping 80 — Enviro-weather implemented two new peach-harvest tools in 2015 and hopes to soon expand similar tools for apples.

Researchers are also currently reviewing the possibility of enhancing its weather data so that it can provide

weather predictions in areas away from existing weather stations, down to within 2.5 kilometers (1.55 miles) of any location in the state.

Peach and apple tools

One of the new peach harvest tools predicts harvest dates for representative early-, mid- and late-season peaches (Garnet Beauty, Redhaven and Loring, respectively) in different regions throughout the state, while the second tool expands those predictions to include the majority of peach varieties — 76 of them — grown in Michigan and Wisconsin's Door Peninsula.

"The question that always comes up is, 'When is peach harvest going to occur?'" said Bill Shane, senior extension tree fruit specialist at the Southwest Michigan Research and Extension Center in Berrien County. That

“Being able to predict harvest timing is pretty important given that the start of the harvest for a particular variety can range over about two weeks from year to year.”

—Bill Shane

led him a few years ago to develop a predictive model for Redhaven harvest to be used in that part of the state. For that model, he used a regression analysis to determine the relationship between degree-days and the onset of Redhaven harvest that tapped data collected from the Southwest Michigan Center’s orchard since 1995.

The model worked well, so he decided to extend it to other regions and to other peach varieties. “Being able to predict harvest timing is pretty important given that the start of the harvest for a particular variety can range over about two weeks from year to year: Chain stores want to know when to anticipate the loads are coming in so their marketing people can plan their advertisements; out-of-state visitors want to know when the major part of the season might be so they can plan their trips; and growers have to anticipate when they will need the labor to harvest and also have to be able to communicate with their buyers when they are apt to have that crop.”

Shane combined his model for Redhaven with knowledge of other varieties’ harvest dates relative to Redhaven to generate the new peach tools, which Enviro-weather added late last spring.

“For Enviro-weather, the idea was to automate the model, and to expand it so it would function for other locations in Michigan beyond the couple of sites where I work, and for all of these other varieties beyond Redhaven,” he said. “The prediction is better for older varieties, but will improve for newer varieties as we collect more data.”

Growers can use either peach tool by going to the Enviro-weather website (www.enviroweather.msu.edu), clicking on “Fruit” in the menu bar, opening the Peach folder and clicking on the tool of choice. There, options are available for selecting the region of the state and the closest station to the orchard.

“These tools really give you a feel for the variation of time of harvest in the area,” said Beth Bishop, coordinator of Enviro-weather. She noted that Enviro-weather is a team effort that includes co-directors state climatologist Dr. Jeffrey Andresen, MSU professor of geography, and Dr. Larry Olsen, who is a professor in the MSU Department of Entomology, as well as “a small group of very dedicated and hard-working individuals.”

In a similar project, Bishop hopes to increase the scope of Enviro-weather’s apple-maturity tool in either 2016 or 2017, taking it from its current prediction of harvest dates for three varieties to one that forecasts maturity for many more.

“For apples, we’ve been using a bit more complicated of a model over the years than the one we have for peaches,” Shane said, explaining that the apple model is actually an averaging of three heat models developed by different fruit experts. That model predicts the harvest dates for three varieties: McIntosh, Red Delicious and Jonathan.

Shane and Phil Schwallier, MSU district horticulture agent and director of the Clarksville Horticulture Experiment Station, are hoping to upgrade the model to include 10 to 15 of the most common apple varieties grown in Michigan. “Again, we want to make it easy for growers to get that prediction for their own particular area and variety,” Shane said.

CIDETRAK[®] CMDA COMBO[™] MESO[™]



PROTECT WITH THE POWER OF DA

The Mating Disruption System for both MALE... and FEMALE Codling Moth, *Cydia pomonella*



CIDETRAK[®] CMDA COMBO[™] MESO[™] dispenser in use

CIDETRAK[®] CMDA COMBO[™] MESO[™] mating disruption dispensers contain a unique combination of Codling Moth pheromone **AND** a patented male **AND** female behavior modifying kairomone called DA. Designed to deliver long-lasting performance with remarkably fast application for apples and pears.

- **What it does:** The DA kairomone enhances the effect of the Codling Moth pheromone on male mating disruption. And, initiates female mating disruption through behavior changes in the female resulting in oviposition disruption, less mating, higher virginity and lower damage.
- **How to use it:** Fast hanging design, clips easily and securely onto branches, and eliminates lateral branch scarring.
- **Longevity:** Long-lasting performance.



Contact your local supplier and order now.
Visit our website: www.trece.com or call 1-866-785-1313.



INSECT PHEROMONE & KAIROMONE SYSTEMS

Your Edge – And Ours – Is Knowledge.

PLEASE: ALWAYS READ THE LABEL



© 2016, Trécé Inc., Adair, OK USA • TRÉCÉ, PHEROCON and CIDETRAK are registered trademarks of Trécé, Inc., Adair, OK USA

TRE-0869, 2/16



Created by You to serve You
Grower Owned Since 1964



Agronomy - Orchard & Vineyard - Energy
www.bleyhl.com

Enviro-weather
 MICHIGAN STATE UNIVERSITY | Weather-based pest, na and production manage

for: Field crops | Fruit | Trees | Turfgrass | Vegetables | More weather | Landscape & Nur

Show magnifier

Latest observations at Mecosta
 03/30/2016 02:00 PM (Station online).
 Measurements by 5-minute average or total unless otherwise indicated.
 52.6 FAir temperature
 0.0 in. Rainfall(03/30/2016)
 41.7%Relative Humidity
 30.0 FDewpoint
 SSW Wind Direction (hourly average)
 8.1 Windspeed
 mi./hr.
 0% Percent of last full hour wet - leaf wetness (tripod-mount)
 3% Percent of last full hour wet - leaf wetness (canopy)

MICHIGAN STATE UNIVERSITY

weather is a collaborative project between the Michigan Climatological Resources and the MSU Integrated Pest Management Program. Disclaimer and Terms of Use.
 Michigan State University Board of Trustees, East Lansing, MI 48824
 is an affirmative-action, equal-opportunity employer.
 sp | Privacy Statement

Contact info:
 Website or to c
 eweather@ms
 Data problems
 eweather@ms
 Stations:
 ewxserv@ms
 Subscribe to
 Find us on F

COURTESY MSU

With Enviro-weather (www.enviroweather.msu.edu), growers can easily navigate the website and access the many features to improve efficiency and productivity. For example, by hovering over the weather-station location on the map for a station in Mecosta County in west-central Lower Michigan, users can see current conditions at that station. By clicking on the location, users are taken to a separate page that includes weather patterns, as well as degree-day and water-use tools.

Filling in weather gaps

Harvest-date estimates aren't the only things that depend on comprehensive weather data. Everything from the need for supplemental irrigation and frost-protection measures to the timing of pesticide and fungicide applications relies on accurate and complete weather information for the grower's location.

Enviro-weather's network of weather stations do a wonderful job of gathering and automatically sending streams of key measurements to the centralized server and database, but gaps still exist, Bishop said. For instance, growers may not feel the nearest station gives a good approximation of the conditions at their particular orchards. This could result from the surrounding topography or the sheer distance to the nearest Enviro-weather station, particularly in northern and inland parts of the state where stations are sparse.

"Of course a solution would be to put a station on every farm, but that's not feasible with stations that cost \$7,000 just for the parts," she said. Even for orchards well served by existing stations, however, sensors may fail or batteries may die. Although they are quickly repaired, some data from that station is occasionally lost and that could affect summary data, such as degree-day accumulations.

The next best thing is to find a supplemental source

**Orchard Proven,
 University Tested**

BEE-SCENT



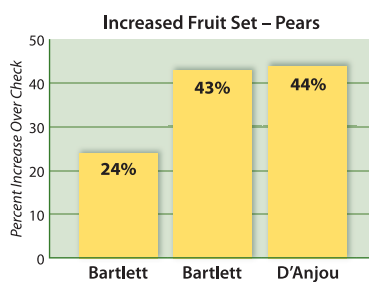
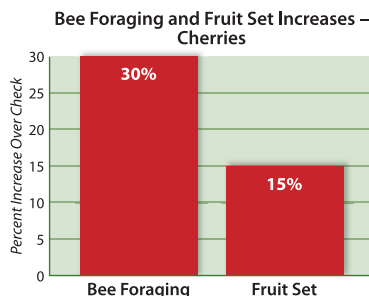
Bee-Scent's natural, non-toxic pheromone ingredient induces the foraging behavior in honey bees, increasing the number of bee-to-blossom visits at each tree. The result is a higher percentage of blossom set and increased fruit yields.

- **Increase Fruit Set on Pears, Cherries and Braeburn Apples!**
- **Increase Size Potential of Gala Apples by Increasing the Seed Complement!**
- **Conforms to National Organic Program Standards**
- **WSDA Organic Certified**

SCENTRY
 BIOLOGICALS INC.

610 Central Avenue
 Billings, MT 59102
 (406) 248-5856
 1-800-735-5323
www.scentry.com

**For more information, call 1-800-735-5323
 or visit www.scentry.com.**



Bee-Scent research data obtained from Dr. Dan Mayer, Washington State University

More than the weather

Enviro-weather does far more than provide the daily environmental conditions for Michigan growers. It tracks weather data and turns it into actionable information by layering on a collection of analytical tools and predictive computer models that can help make an operation more efficient and more productive.

Enviro-weather coordinator Beth Bishop provided a sampling of the resources available to fruit growers:

Reports on weather conditions. Growers can access weather reports for any of Enviro-weather's 81 weather stations (including two new ones added in 2015) for any time range. "One of our most frequently used applications gives you a daily temperature maximum and average for the dates you select; degree-day accumulations using the degree-day base you want; the rainfall for each day; and the total accumulation of rainfall since the beginning of the year," she said. "A lot of people use this application because they can really drill down to see the conditions for each of the days in that time range."

Insect models that calculate insect development. Based primarily on temperature, these models can help growers schedule pesticide applications to the best advantage. "Many of these insect models rely on the 'biofix,' which is the date of some observable occurrence that starts a countdown clock," Bishop explained. "For instance, the biofix for codling moth is the first sustained catch of adults in the pheromone traps that the growers put out. Once the grower gets that, the countdown clock for accumulating heat begins and that will ultimately predict when eggs are laid and when control is needed." On Enviro-weather, the grower can go to a chart in the codling moth application, locate his or her biofix date, and follow it down to find the date range that coincides with optimal pesticide application. Other insect-pest models include those for oblique-banded leaf roller, oriental fruit moth, plum curculio, apple maggot and grape berry moth. A model for cherry fruit worm is coming in 2016.



PHOTO COURTESY OF ENVIRO-WEATHER

The leaf-wetness sensor acts as a simulated leaf and measures dew.

Disease models that anticipate outbreaks. "Disease models are more complex than those for insects, because they have to take into account temperature as well as moisture," Bishop said. She noted that each weather station has a sensor to measure how long leaves remain dry or wet. Many diseases only progress under wet conditions when temperatures are warm, but prolonged periods of dryness can stop development in its tracks. "That's all taken into account in these models," she said. Some of the disease models include apple scab, fire blight, sooty blotch, flyspeck, cherry leaf spot and black rot of grapes.

In addition to these applications and models, Enviro-weather provides links to MSU Integrated Pest Management and other extension resources that deal with diseases, pests, and a wide range of topics including coping with freeze and drought conditions and fruit management strategies. —*L. Mertz*

of weather data that blankets the state more completely and can fill in any data holes. So-called "gridded data" from the National Weather Service may be the answer.

Gridded data is meteorological information from sophisticated computer models that are adjusted based on data from a variety of observational datasets, including weather-station and satellite observations, and then provided for every point on an equally spaced grid.

"Gridded data would help to not only temporally fill in a gap if one of our weather stations is malfunctioning, but also to spatially fill in a gap between stations," said Dr. Michael Kiefer, assistant professor in the MSU Department of Geography who works on projects through MSU's Climatologist's Office. He is analyzing the potential of Real-Time Mesoscale Analysis (RTMA) gridded data for use with Enviro-weather. RTMA data provides detailed weather information at 2.5 km intervals.

Such small intervals will be especially helpful in the Great Lakes region, where large weather fluctuations can occur over small areas.

Besides helping growers understand the weather at their specific orchards, the gridded data may help instruct Enviro-weather administrators about where they should consider a denser network of stations to provide a better picture of weather variability, Kiefer said.

Kiefer and his research group have been studying gridded data and its potential applications for Enviro-weather by comparing gridded data points with actual weather-station observations at 12 sites and over five years. They have found, for example, that the gridded data slightly underestimates daily maximum temperatures and overestimates minimums, but overall, they believe the gridded data is acceptable for use with Enviro-weather.

Bishop is similarly optimistic. "We're working toward incorporating gridded data to fill in the gaps this year,"

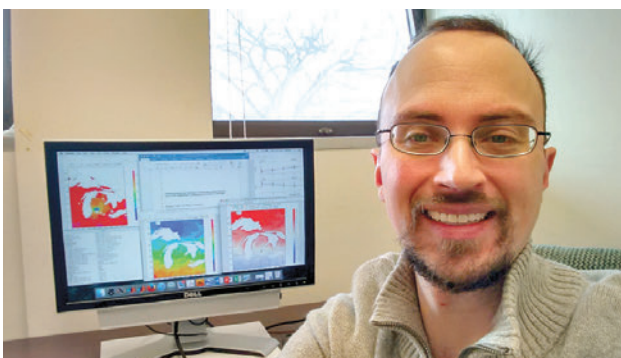


PHOTO COURTESY OF MIKE KIEFER

With a collage of gridded weather data on the monitor behind him, Mike Kiefer snapped this selfie in his office. He is examining whether such data can be added to the Enviro-weather system to provide a more complete picture of conditions.

she said. "We're really excited about it, because we think it will be a huge asset."

All in all, Enviro-weather is an online set of tools that can be a real boon to growers, Bishop said. "We have information about cherries, apples, peaches, pears, grapes, blueberries and other small fruit, plus all kinds of other crops. We have tools for harvest times, as well as for pests and diseases, which keep expanding. In fact, we're adding a tool for cherry fruit worm this year."

Just like the weather seems to change every five minutes in Michigan, Enviro-weather continues to transform to meet the needs of growers. Said Bishop, "We definitely have a lot of other ideas and things in the works." ●

Leslie Mertz, Ph.D., is a freelance writer based in Gaylord, Michigan.

Our Fields
are planted with the most popular seedling, semi-dwarf and dwarf varieties:

Prunus avium/P. mahaleb ♦ M.106/M.7/M.26/B.118
Gisela Series ♦ Kyrmsk Series ♦ OHxF Series
Geneva® Series ♦ M.9 Clones



We also grow a great selection of rootstock varieties for apple, peach pear and plum including:

APPLE ♦ MALUS ANTONOVKA
♦ MALUS DOMESTICA

PEACH ♦ PRUNUS PERSICA
'LOVELL'

PLUM ♦ PRUNUS Cerasifera
♦ PRUNUS MARIANA
♦ PRUNUS MYROBALAN

PEAR ♦ PYRUS CALLERYANA
♦ PYRUS COMMUNIS
♦ PYRUS USSERIENSIS
♦ PROVENCE QUINCE

Like our rootstock, our service will grow on you. All Fruit tree rootstock is Oregon certified virus-free.



CANBY, OREGON



WWW.WILLAMETTENURSERIES.COM
(503) 263-6405 TOLL FREE: (800) 852-2018



TJ MULLINAX/GOOD FRUIT GROWER

Apples from the 2015 harvest are washed and sanitized.

Monitoring the DUMP TANK

Study shows need to monitor microbial levels in dump tanks.

by Shannon Dininny

The increasing emphasis on food safety means changes are ahead for tree fruit packing houses. Among them: the requirement to demonstrate that their preventive practices are effectively controlling for microbial contamination.

It's not just about producing high-quality, safe fruit anymore; it's about proving that steps are being taken to prevent the pathogens that could lead to a food-borne illness and, ultimately, a recall.

Packing houses are still determining whether they will be required to meet standards of the Preventive Controls Rule or the Produce Safety Rule under the Food Safety Modernization Act. In the meantime, though, every step in the packing and storage system is under examination, including the dump tank, which was the subject of a two-year study funded by the Washington Tree Fruit Research Commission.

The study by Seattle-based iDecisionSciences collected and examined dump tank monitoring data from five Washington apple packing houses to determine whether dump tank water preventive controls are controlling microbial levels and meeting requirements of the companies' food safety plans.

"We used microbial water testing data to establish how effective those preventive controls are during the course of normal packing operations," said iDecisionSciences CEO Diane Wetherington. "Overall, we're finding a mixed bag. Facilities would benefit from examining

their individual operations in light of recently published industry research and determining how the science can best be applied to their individual operations."

Studying the dump tank

iDecisionSciences, a scientific consultant for the specialty crop produce industry, began this study by asking the five participating packers to complete a 70-question survey about their food safety plans, equipment, dump tank cleaning and sanitation, dump tank operations and monitoring, and chemical usage, among other things. Researchers then gathered water samples and took measurements from those packers' dump tanks during normal business.

The number of days the dump tank water was used prior to discharge varied by facility and was dependent on factors such as apple variety, appearance of the water and fruit inventory. The researchers evaluated each dump tank through two water cycles, meaning that if a packing house changed the water every three days, the researchers collected data for six days.

The first microbial samples were taken in clean water before fruit entered the dump tank and thereafter samples were taken at one-hour intervals throughout the day. Measurements for oxidation/reduction potential, sanitizer levels, pH, temperature, turbidity and conductivity were taken at 30-minute intervals until water was discharged from the tank.

Water samples were tested for total coliform, which

When you're talking to someone who will wait four years for a first crop, you're very careful using words like "long lasting."

Orchard farming is a business built over the long haul. When we say that one of our products works hard and lasts long, we know we need to mean it. Aprovia® fungicide gives longer, stronger protection against powdery mildew. And that's a claim we don't make lightly. To learn more about Aprovia, please visit SyngentaUS.com/Aprovia.



syngenta®

©2015 Syngenta. Important: Always read and follow label instructions. Some crop protection products may not be registered for sale or use in all states or counties. Please check with your local extension service to ensure registration status. Aprovia®, the Alliance Frame, the Purpose Icon and the Syngenta logo are trademarks of a Syngenta Group Company. Syngenta Customer Care Center 1-866-SYNGENTA (A) (796-4368). MW 14145013-11x14.5-PM 07/15

®

VAPOR GARD® FOR CHERRIES

A CONSISTENT PERFORMER



CONFIDENCE
Comes from 40 years
and over 150,000 acres
treated with VAPOR GARD.

*That's why many Growers, Consultants,
Pest Control Advisors and Packing Houses
understand VAPOR GARD's BENEFITS
and VALUE on CHERRIES.*

Ed Hanks: SP Farms, Toppenish, WA

"We used Vapor Gard on cherries every year it was needed for cracking prevention. I used it before rain and it seemed they didn't split as bad. We'd normally used it a couple times a year. I was always happy with Vapor Gard. I wouldn't grow cherries without it."

Ed Sherman: Sherman Orchard Inc., Quincy, WA

I have used Vapor Gard for years for rain protection with great results. No shipping restrictions and greener stems are a great plus. I see that my cherries stay firmer longer with Vapor Gard. Vapor Gard has more benefits than just rain protection."



- **Increased size & yield** with early application
- **Reduced splitting** from untimely rain
- **Increased shelf life** for greener stems



**MILLER CHEMICAL
& FERTILIZER LLC**
800-233-2040

SEE LABEL FOR ADDITIONAL INFORMATION
AND ALWAYS READ AND FOLLOW LABEL DIRECTIONS

measures biologic pollution in water that includes coliform species usually associated with fecal polluted water, and generic *Escherichia coli*. Generic *E. coli* tests are an indicator for contamination due to enteric pathogens, or those pathogens that live in an animal's intestinal tract.

Are preventive controls effective?

All of the facilities had samples taken from dump tanks using either calcium hypochlorite (chlorine) or peracetic acid (PAA) to sanitize the water. The time between water cycles varied from one day to three days. The unwashed fruit came either from storage or directly from the orchard and, on one packing line, washed fruit came from storage to be rerun.

The researchers collected samples over 180 operational hours at the five facilities over the course of two years — 368 total coliform tests and 74 generic *E. coli* tests.

Among all those tests, 35 percent of the samples from PAA tanks were positive for total coliform, and 17 percent were positive for generic *E. coli*, the study showed. In addition, 60 samples

— or 18 percent — were measured at PAA levels greater than the U.S. Food and Drug Administration's 80 parts per million limit for wash water, and 18 percent of these had levels greater than 100 parts per million. Overall,

"We used microbial water testing data to establish how effective those preventive controls are during the course of normal packing operations. Overall, we're finding a mixed bag."

—Diane Wetherington



DRAMMATIC®

Natural Fish Fertilizers for Organic Crop Production

Extremely
high levels of available
**Calcium &
Phosphorus**



FRUIT



VINEYARDS



ORCHARDS



DRAMM
Manitowoc, WI • U.S.A.
www.FishFertilizer.com



360.333.4044
Casey Schoenberger
Mount Vernon, WA

three of the four facilities that use PAA had positive total coliform samples.

PAA levels among the four facilities ranged between zero and 120 parts per million during the sampling periods.

For tanks with chlorine as the sanitizer, 19 percent of the samples were positive for total coliform, and 17 percent were positive for generic *E. coli*. Two of the four facilities that use chlorine had total coliform-positive samples.

Free chlorine levels ranged from 0.02 parts per million to 96 parts per million. Unlike PAA, the FDA has not set limits for chlorine.

Researchers also found that the oxidation/reduction potential (ORP), which is an indicator of how much active chlorine is in the system to control microbes, was the only predictor found to be significantly correlated to total coliform detection in tanks with chlorine. As ORP increased, total coliform concentration decreased. Chlorine concentration was not found to be a significant predictor for total coliform concentration.

However, ORP was not a good predictor of generic *E. coli* when using chlorine, Wetherington said. "You've got a number of things to consider when you're looking at how effective your dump tank preventive controls are and measuring ORP when using chlorine is just one variable in the equation. Since each facility is unique, establishing and monitoring sanitizer effectiveness requires companies to examine their individual operations and determine the appropriate preventive controls and monitoring program."

The findings were reversed for PAA tanks: The

concentration of PAA, ORP, pH, temperature and conductivity were collectively significant predictors for total coliform, the study showed. But only ORP was a good predictor of generic *E. coli*.

Keys to success

All five companies reported having food safety plans. However, in response to a question of whether the dump tank was considered a critical control point in their plans, one company responded yes, one company responded no, and the other three did not answer the question.

The research findings reflected some key areas of focus for packing houses going forward, iDecision-Sciences researcher Susan Leaman said, including monitoring for debris levels in the tanks and training programs for employees.

"Companies need to establish some way to determine if their training is effective," she said. "Have people in charge of certain preventive controls take those measurements and make sure they're doing it right. Have employees explain what they're doing — and why. Those kinds of checks are critical, and I'm not sure they're happening."

Leaman and Wetherington also noted the need for regular monitoring throughout the day, because workers in repetitive jobs can get bored by their work or perform it by rote, forgetting the importance of why they're doing it.

"For those who are going to fall under the Preventive Controls Rule, this is a good example of what the FDA is looking for in terms of process validation studies," Leaman said. ●

Frost Protection

Pure. Powerful. Protection.



1611 W Ahtanum Union Gap WA 98903
Phone: (509) 457-9196

3766 Iroquois Wenatchee WA 98801
Phone: (509) 662-2753



ORSat™

-- another innovative product from

Orchard-Rite®

We operate 14 wind machines on 325 acres of apples and cherries spread out over 3 miles. In the past it was difficult to confirm that our wind machines started, ran, and shut down appropriately during the course of a cold night. The ORSat System changed all that. Now we have the ability to start and stop our machines remotely, saving us money on fuel, labor and maintenance. ORSat also notifies us when the machines are starting and stopping via the Auto-Start, and warns us of any problems. The ORSat System gives us yet another layer of protection above and beyond the Auto-Start and the Wind Machines themselves.

"It provides us peace of mind on long, cold nights."

ORSat™ is a custom designed satellite communication network and service for managing, operation and monitoring of wind machines. ORSat™ allows growers to monitor and control wind machines, fuel tanks, and weather stations with just a few simple steps, via an Internet enabled device, and is the only solution available that integrates with the Orchard-Rite® Auto-Start. The overall goal of the ORSat™ system is to partner with growers to make frost protection more efficient, economical & effective than ever before.

Orchard-Rite®
PRODUCT REVIEW

NEW
APPLE
rootstock!

From the breeders of Bud 9:

B10®

cv. Mich 96 USPP 21,223

- Dwarfing
- Cold hardy
- Disease resistant
- Fireblight tolerant
- Vigor between M-9 T337 and M-9 Pajam®2
- Yield efficiency similar to M-9 T337

**Future contracts for cherries, pears, and apples;
ALL ROOTSTOCKS.**



Tree Connection

representing leading
nurseries since 1990

Services are
FREE
TO GROWERS!

Call us FIRST

for the largest selection of trees
and rootstocks available

1-800-421-4001

Phone: 503-538-2131 Fax: 503-538-7616

E-mail: info@treeconnect.com Web: www.treeconnect.com

VARIETIES FOR THE FUTURE

GALA | FUJI | HONEYCRISP

Willow Drive Nursery is committed to providing orchardists with quality trees and varietal selections that not only meet their needs today but in the future.

- Our Total Care System™ provides consistent quality you can depend on

- Our goal is to exceed your expectations with every tree

- Quality and service you can count on

- Apples, cherries, pears & stone fruit

- Finished trees and rootstock

Call for a complete and current listing of available inventory.



**Willow
Drive
Nursery**

3539 Road 5 NW
Ephrata, WA 98823

888 54-TREES
509 787-1555

www.willowdrive.com

Grapes

Herbicide resistance a growing CONCERN

**Researcher offers tips
for helping to control
weeds in vineyards.**

by Dave Weinstock

Grape growers tend to base weed control choices on what they used successfully in the year of their best yields. They may vary those choices somewhat to account for specific problems their scouts turn up, but usually there are two or three compounds they use year after year.

Instead of finding continued success and high yields, those “tried-and-true” weed control compounds are bringing two other things to vineyards: herbicide-resistant and herbicide-tolerant weeds.

When weeds are suppressed but not controlled — plants are partially wilted, for example — it usually means the weeds are naturally less sensitive to a control measure or herbicide-tolerant.

Herbicide resistance, meanwhile, is a plant’s inherited ability to survive following exposure; resistance may be naturally occurring or a result of genetic engineering. Over time, the few resistant plants can multiply into a much larger population.

It’s a natural process, virtually the same as drug resistance. The longer a herbicide is on the market, the longer the list of resistant weeds.

For example, according to the International Survey of Herbicide Resistant Weeds, there are 35 known weeds resistant to Roundup

(glyphosate). The site also reports 11 herbicide-resistant weeds found specifically in vineyards.

Tolerant and resistant species can develop in a vineyard in one region of the country and find their way to others hundreds of miles away. “Some seed, like horseweed/marestail, can fly very far,” Dr. Andy Senesac, Cornell University/Long Island Extension weed specialist, said at the Mid-Atlantic Fruit and Vegetable Convention in Hershey, Pennsylvania, this winter.

The best protection against resistance is to monitor vineyards after treatment. “If a post-emergent was used, look for a single, slightly injured or uninjured weed species,” Senesac said. “With pre-emergents, watch for a single species appearing soon after application.”

Late summer is prime time for spotting resistant species, Senesac said. Growers should look for the sudden

“If a post-emergent was used, look for a single, slightly injured or uninjured weed species. With pre-emergents, watch for a single species appearing soon after application.”

—Andy Senesac

35

RESISTANT WEEDS

30

25

20

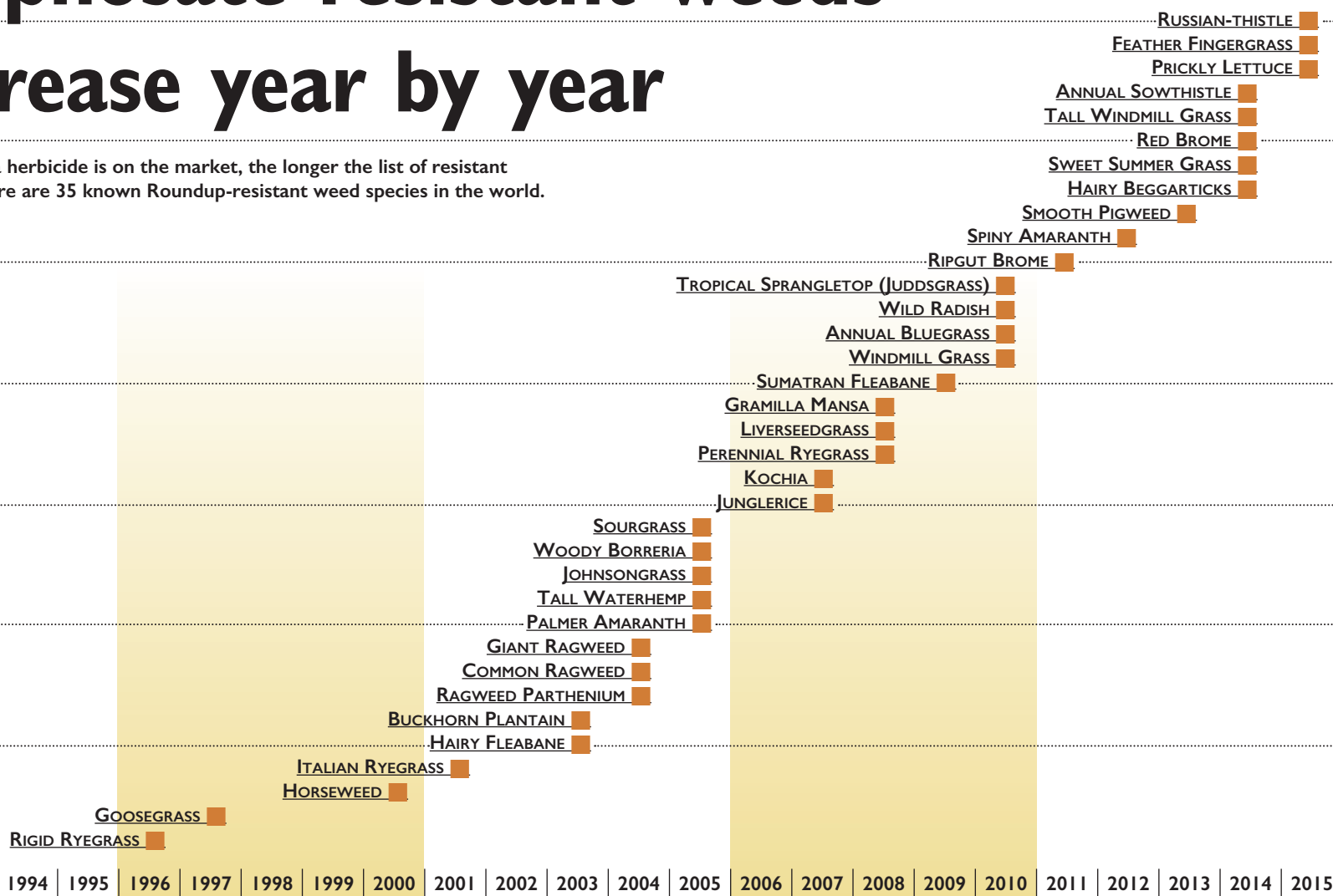
15

10

5

Glyphosate-resistant weeds increase year by year

The longer a herbicide is on the market, the longer the list of resistant species. There are 35 known Roundup-resistant weed species in the world.



SOURCE: IAN HEAP, WEEDSCIENCE.ORG

JARED JOHNSON/GOOD FRUIT GROWER

Secure The Future of Agriculture Today



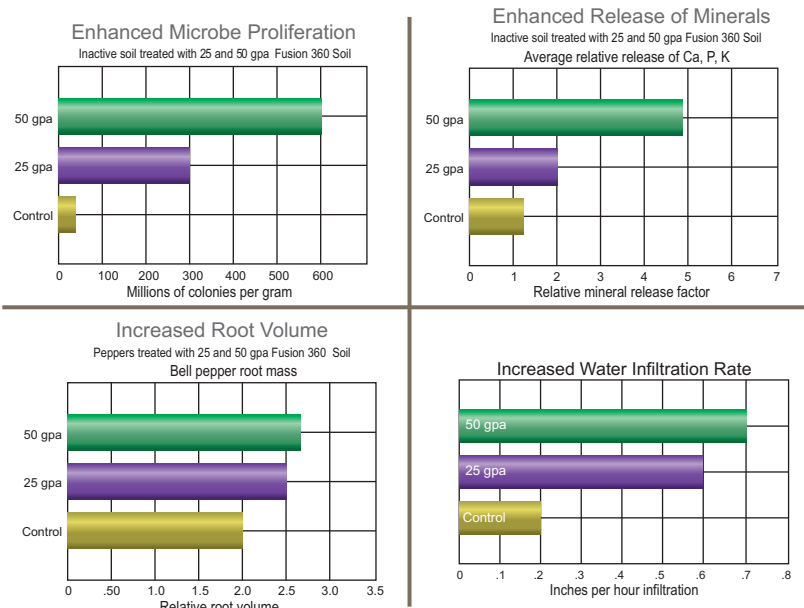
Specializing in products that offer growers

- An alternative to fumigation
- Superior foliar nutrition programs
- 30+ years of proven field results
- Local representatives and distribution points through out WA, ID, OR, and CA
- Conventional Solutions and WSDA/CDFA Registered Organic Input Materials

P
R
O
D
U
C
T
S
F
E
A
T
U
R
I
N
G

Fusion 360 Soil & Iota

Extensively cropped or fumigated soils are characteristically sterile. The beneficial microbial ecology, so representative of highly productive "virgin soils", is minimal to lacking. While in the past farmers have exercised the luxury for instituting soil-building rotations, the fast pace of agriculture minimizes this opportunity. Enter **Fusion 360 Soil & Iota** Technology and the ability to restore the coveted qualities associated with "virgin" soil.



CONTACT US TODAY TO SEE HOW A CUSTOM PROGRAM CAN ENHANCE YOUR CROPS

1-888-634-F360 ♦ www.fusion360inc.com ♦ customerservice@fusion360inc.com

SUPPRESS[®]

HERBICIDE EC

Effective Organic Weed Control

SUPPRESS Herbicide EC is registered as a broad spectrum contact herbicide for post-emergent, non-selective weed control for use in certified organic crop production.

- Has proven efficacy in over five years of university & field trials
- Non-volatile, emulsifiable concentrate provides rapid weed control
- Prevents weed resistance by rotating with chemical herbicides in an Integrated Pest Management Program
- Efficacy is comparable to conventional herbicides
- No pre-harvest interval



FOR ORGANIC PRODUCTION

Treated Field



4 hours post-application



72 hours post-application



Call today to learn more:
www.westbridge.com • (800) 876-2767

Pre-emergents can help control yellow nutsedge

Yellow nutsedge can be a particular difficult weed to control in Northeast vineyards because of its below-ground germinating tuber, though the weed tends to disappear once a vineyard is established.

Dr. Andy Senesac, Cornell University/Long Island Extension weed specialist, said the best strategy is to use pre-emergents.

The newest tool available, and also the most potent, is Zeus Prime XC (sulfentrazone). Solicam (norflurazon) and Devrinol (napropamide) also have indicated activity against the weed.

Another herbicide that can be effective is Matrix (rimsulfuron), Senesac said, which is labeled for potatoes, tomatoes and grapes. However, it is notorious for not getting into the plant when applied without an adjuvant. "You'll lose 20 percent of the control without one," he said.

The herbicide also shows some activity against hedge bindweed, though the compound is not labeled for use against it.

Thinking the need for adjuvants carried over to hedge bindweed, Senesac, conducted a trial applying Matrix to 6- and 12-inch hedge bindweed stands. At various application rates with and without non-ionic surfactants, Senesac achieved 31 percent control without adjuvants and control ranging from 74 percent to 99 percent with adjuvants.

In a laboratory study, he evaluated hedge bindweed control using Matrix and Chateau and a combination of non-ionic surfactant, methylated seed oil and spray-grade ammonium sulfate as adjuvants. Senesac found Matrix, used in combination with adjuvants, would suppress the weed's growth. —D. Weinstock

appearance of a weed that has been controlled for years; annuals with a high level of seed production should top the list.

Horseweed/marestail

Mother Nature designed horseweed, also known as marestail, to take to the air and fly long distances. It's this ability that makes horseweed a distinctive threat. The other reason: This annual broadleaf is Roundup-resistant.

Roundup-resistant horseweed biotypes developed in no-till, Roundup-ready corn 15 years ago. Seed spread is so widely dispersed, Senesac said, they are now scattered throughout the Midwest and Northeast. Each horseweed plant can produce 10,000 to 250,000 seeds.

Roundup cannot control the weed's fall-emerging seed rosettes. There isn't a good pre-emergence option — even though there are several effective control products — because the main germination flush does not begin until late summer, making these products impractical or unpermitted, Senesac said.

ROOTED IN INNOVATION...

PLAN TODAY FOR TOMORROW'S ORCHARD

We have high quality stock of almonds, apricots, cherries, nectarines, peaches, pears, and fresh and dried plums for great prices!

Order Early
For 2018



Call Us Today! (800) 675-6075
www.FowlerNurseries.com - Newcastle, CA

In the Pacific Northwest, growers looking to control horseweed in new vineyard plantings are limited to Trellis (isoxaben) or Goal (oxyfluorfen) as treatments before horseweed emerges and to glyphosate after the weed begins to show, according to Dr. Drew Lyon of Washington State University's Department of Crop and Soil Sciences.

In established plantings, Northwest growers have a list of compounds they can try pre-emergence: Karmex (diuron) and similar brands, Alion (indaziflam), Solicam (norflurazon) and Princep (simazine). Post-emergent applications include Aim EC (carfentrazone), Rely (glufosinate), Roundup, Venue (pyraflufen) and Gramoxone Inteon (paraquat), Lyon said. Several other products provide pre- and post-emergent control of horseweed in established plantings. These include Chateau (flumioxazin), Goal and Matrix (rimsulfuron). Alion and Matrix can be tank-mixed to provide pre- and post-emergence control as well.

Northeast growers looking to control seed spread should try a post-emergent application of Rely or Aim EC, Senesac said. Contact herbicides like Gramoxone are also an option.

But Senesac said he's found that the best means to control horseweed is Alion, the relatively new herbicide introduced to the market in 2013. It can be used on grapevines established five or more years. Alion inhibits cellulose biosynthesis, preventing cell walls from forming in plants, disrupting seedling development. It has very low volatility and low leaching potential.

"It can be applied anytime of the year on unfrozen soil," he said. "Its plant-harvest interval is 14 days."

Senesac said there are two reasons growers should consider using the compound.

One is the environmental load necessary to achieve control is very low; its application rate is 3.5 to 5 ounces per acre or .045 to .065 pounds per acre-inch. "That's the equivalent weight of four to six nickels," he said.

The second reason is its staying power. "It has the potential to remain active with a spring application long enough to inhibit horseweed seed germination into late summer and beyond," Senesac said.

Organic growers, meanwhile, can use Scythe (pelargonic acid) or Suppress (caprylic and capric acids), which is labeled for most food crops, including grapes. Senesac plans to run trials on Suppress this summer.

Field trial

In response to grower concern about Alion's effect on between-row cover crops, Senesac conducted a field trial. He seeded several field-grown ornamental plots with buckwheat 13 months after an Alion and Chateau (flumioxazin) application.

At 2.8 fluid ounces, a rate just below the labeled grape rate, and six weeks after seeding, 58 percent of the cover

remained. At 8 ounces per acre, Chateau left 54 percent of the cover crop.

"Neither prevented adequate establishment of buckwheat," Senesac said.

At lower rates, growers should not experience problems planting cover crops the following year, he said, though applying the compound at higher rates may prove otherwise. ●

Tolerant and resistant species can develop in a vineyard in one region of the country and find their way to others hundreds of miles away.

LOCATION LOCATION ROTATION

**The only FRAC
Group 13 fungicide**

Quintec® Fungicide for Powdery Mildew.

The unique mode of action of Quintec allows it to keep moving around leaf and fruit tissues long after application, forming a protective barrier as it moves in a vapor phase. You get up to 21 days of superior protection, even under high pressure. Plus, Quintec is literally in a class by itself – the quinolines – making it an important part of resistance management programs.



Dow AgroSciences

Solutions for the Growing World

*Trademark of The Dow Chemical Company ("Dow") or an affiliated company of Dow. Always read and follow label directions.



TJ MULLINAX/GOOD FRUIT GROWER

Cabernet Sauvignon grapes are ready for harvest at Cold Creek Vineyard in 2015. The vineyard has 132 acres in Cabernet clones. “We know clones bring different attributes that can contribute to different wines,” says vineyard manager Joe Cotta.

Wine grape growers weigh in on Cabernet Sauvignon clones.

by Shannon Dininny

Consumers want variety, and wine consumers are growing increasingly sophisticated. The trend is driving winemakers to seek new ways to differentiate their wines in a crowded marketplace.

Some are aiming to stand out by returning to their roots. Clonal selection is key to viral resistance and yield. The clone also can impart different characteristics to the grapes and wine, whether it's fruit size, acidity or tolerance to heat or cold.

As some wineries turn to naming the clone as part of their marketing plans, grape growers are examining the benefits and detriments of different clones in the vineyard. A panel of growers from four Washington wine grape growing regions shared their experiences with different Cabernet clones at the Washington Association of Wine Grape Growers conference in Kennewick, Washington, in February.

Their overall takeaway: Clone 8 produces the most consistent yields and fruit. And, despite the differences between clones, perhaps the bigger factor is soil and climate.

Red Mountain

Marshall Edwards, vineyard operations manager of Quintessence Vineyards in West Richland, Washington, oversees more than 300 acres of Cabernet, most of them

planted on Clone 8 in Warden silt loam, Hezel loamy fine sand and Starbuck loam. The vines have medium to good vigor and good production with good berry and cluster size, he said. The vines are color thinned.

Edwards leaves more buds and spurs to reach desired crop levels on Clone 21, planted in Warden silt loam, which produces small to average berry clusters and also has a color-thinning pass.

He also leaves more buds and spurs due to different soil types in a block of Clone 4, which sits in Warden silt loam and Hezel loamy fine sand. The vines have medium vigor and good set, producing good berries and cluster size.

More average production comes from Clone 191/33 in Warden silt loam and Hezel loamy fine sand, with good set but small berry and cluster size, he said. Clone 2, too, produces small berry and cluster size compared to all other clones, but has good set when compared to Clone 169.

That's the clone Edwards said poses the most struggles in the vineyard. It seems hard to set and produces small berries and loose clusters. It has the shortest growing period from veraison to harvest, he said, but it's always the first Cabernet picked.

“All of these clones, they make the vineyard more interesting and they also make the wine more interesting,” he said. “I think these clones have their place.”



The right size. The right shape. The right color. The right products.

Fine Americas, a leader in plant growth regulator technology, is pleased to add three new product innovations to our portfolio of trusted solutions for the fruit, vegetable and tree nut markets. From apples and cherries to tomatoes and walnuts, Fine Americas has a PGR that can help you grow them better and more efficiently.



NEW **exilis® 9.5 SC**

A next-generation formulation of 6-benzyladenine (6-BA), the highly effective post-bloom thinning agent for apples and pears that improves fruit size, quality and yield.

NEW **kudos® 27.5 WDG**

An advanced formulation of prohexadione-calcium delivers effective tree canopy management in apples and sweet cherries, and also shortens internode length in grass grown for seed and peanuts.

NEW **refine®**

With the proven active ingredient naphthaleneacetic acid (NAA), new Refine® provides excellent fruit thinning and stop drop in apples and pears, plus the promotion of return bloom in apples.

blush®

Featuring the active ingredient prohydrojasmon (PDJ), Blush® promotes red coloration in Fuji, Gala, Honeycrisp and other bicolor apple varieties.

falgro®

A very versatile gibberellic acid (GA3) PGR for use in table grapes, citrus, cherries and many other crops. OMRI-certified formulations available.

motivate®

A top-quality ethephon formulation that promotes earlier coloration and maturation in a wide variety of crops, including apples, cherries, grapes and tomatoes.

novagib®

A high-purity, OMRI-certified formulation of GA4 protects apples from russetting while improving overall fruit finish.

perlan®

An advanced formulation containing ultra-pure GA4 (GA4/7) + 6-BA designed to improve shape/typiness and increase fruit size in apples.

For the distributor nearest you, please visit www.fine-americas.com
or call 888-474-FINE (3463) toll-free.

Always read and follow label directions. Exilis®, Kudos®, Refine®, Blush®, Falgro®, Motivate®, Novagib® and Perlan® are registered trademarks of Fine Agrochemicals, Ltd. ©2016 Fine Americas, Inc.

 fine
Excellence in PGR Technology



THE RAIN IS COMING.
BE PREPARED!



***Better Performance,
Fewer Applications,
Better Cherries.***

Parka is a food grade, transparent and tasteless cuticle supplement. Adding Parka to your program has demonstrated to substantially reduce rain splitting and improve quality at harvest and beyond.

The unique elasticity of Parka allows a simple 2 application program starting at straw color while avoiding reactive sprays closer to harvest. Save time, money and headaches.

Visit **cultivaipm.com**
to find out more.



888.638.1955
www.cultivaipm.com
sales@cultivaipm.com

Parka can be purchased at your local retailer, contact us for more details.

Parka is a trademark of Cultiva, LLC. SureSeal is a trademark of Oregon State University. Always read and follow label directions. ©2016 Cultiva, LLC.



Wahlake Slope

Chateau Ste. Michelle Wine Estates' Cold Creek Vineyard, first planted in 1973 near Mattawa, Washington, underwent a 184-acre expansion from 2007 to 2014. Of that, 132 acres are in Cabernet clones, according to vineyard manager Joe Cotta.

"We know clones bring different attributes that can contribute to different wines," Cotta said, adding that despite the challenges, clones offer another tool to improve quality and gain an edge on the competition.

Clones planted at the site include 2, 4, 6, 8, 10, 15, 21, 33, 169, 412 and 685. For the most part, all are planted the same way: 8-by-5-foot spacing on VSP.

Overall, the most commonly preferred clones at Cold Creek have been Clones 6 and 8, which are the lowest and highest yielding clones at the vineyard.

"I'm grateful to have Clone 8. It makes up one-third of our Cab expansion, and it's just very versatile," he said.

Clone 6 produces the smallest cluster weight and very loose clusters. "If we struggle with any of them, we struggle with this one if we want to get a high yield, but obviously, it's highly preferred," he said.

Cotta advised against thinning these two clones, as they are very easy to predict.

Clone 10 is also assumed to make high tier wines every year, he said, and Clones 169 and 33 will compete more as the vines get older. Clones 8, 15, 21 and 685 are the highest yielding clones, and 2, 4 and 412 are all middle of the pack.

Cotta said his only do-over would be less Clone 2.

"We prefer different clones in different years — not across the board, but you do see that variability," he said. "The advantage is always there. There are always some clones that stand above the rest, and that allows you to improve your high-tier blend."

Horse Heaven Hills

Jake Cragin is viticulturist and assistant manager for Winemakers LLC's Horse Heaven Hills properties, Alder Ridge Vineyard and Canoe Ridge Vineyard, with about 421 acres dedicated to Cabernet. The majority of acreage is Clone 8, both for high-yield production and from feed-back from winemaker clients.

Other clones include 2, 21 and 33, with the latter proving the least successful. "It's been slow growing, we've



TJ MULLINAX/GOOD FRUIT GROWER

Cabernet Sauvignon grapes are mechanically harvested at Cold Creek Vineyard south of Mattawa, Washington.

had trouble getting it on the wire and getting any fruit, let alone quality fruit out of it,” Cragin said.

It also seems to be the preference for deer, he said. “It’s heavily depredated every year, and that doesn’t help when we’re already struggling with its growth, even with other Cabs nearby.”

Cragin said climactic and soil conditions — the vineyards have varying soils and geographic climates — seem to have a bigger effect than any clonal differences. “When we try to isolate the variability of the block for location uniformity, we feel there’s enough variability that it hides any evidence of clonal differences,” he said.

Walla Walla

Sadie Drury, viticulturist for North Slope Management, manages multiple vineyard sites that sit at different elevations, including 50 acres of Cabernet on six clones.

“Site often trumps clone, and clones do vary on site,” she said. “But we notice more variation from block to block, based on row orientation, slope orientation, more than anything else.”

For instance, Clone 8 at Ferguson Vineyard is nothing like Clone 8 at Seven Hills Vineyard, despite just being up the road. And yet it’s still that classic clone that all others are compared to, she said.

“Mostly, our old plantings are all Clone 8,” she said. “If you love an old vines bottle of wine, it’s probably Clone 8, and it’s probably what sets the bar in Washington.”

Meanwhile, Clone 6 is the winemaker’s clone, not the grower’s clone, she said. “It’s hard to get good yields; we struggle to get over 2 tons per acre.” To deal with that, Drury said they leave more buds — anything to get more fruit — and are increasing nitrogen and water.

Clone 191 has produced fruit-forward wines that winemakers seem to love, and Clones 338 and 685 are younger but big yielders, she said.

“At the end of the day, we ask ourselves why do we plant all these clones: We want to maximize the site, but I also think it’s important not to put all of your eggs into one basket,” she said. “There isn’t any one clone for any one site. The best wine is from different clones blended together.” ●



SUPPLEMENT THE CUTICLE

Protect from
dehydration and disease



REDUCE DESICCATION STRESS

Improve plant function



REDUCE PHYSIOLOGICAL DISORDERS

Russetting, cracking, splitting,
flecking, and lenticel marking



REDUCE MARKET LOSSES

Improve packouts with quality



INCREASE PROFITABILITY

Visit **cultivaipm.com**

to find out more.



888.638.1955
www.cultivaipm.com
sales@cultivaipm.com

Pomcho can be purchased at your local retailer, contact us for more details.

Pomcho is a trademark of Cultiva, LLC. SureSeal is a trademark of Oregon State University. Always read and follow label directions. ©2016 Cultiva, LLC.

Planting

Properly preparing the soil can help new plantings thrive.

by Shannon Dininny

photos by TJ Mullinax

There's a lot to consider when replanting an orchard: rootstock, scion, trellis type and irrigation method, to name a few. Soil type is another, and it's particularly important when matching specific rootstocks and scions to locations.

So imagine the complexities involved when you're planting hundreds of thousands of trees across several sites. That's the case for Washington Fruit and Produce Co., which is removing some underperforming orchards and replacing them with more desirable cultivars, as well as filling in existing orchards.

Orchard manager Dan Plath calls replanting a difficult puzzle, because, like many companies, Washington Fruit orders trees well in advance of planting. The company placed its tree orders with nurseries in 2014 without knowing exactly where any of those trees would be planted.

"Now, as we get to 2016, we're looking at the decisions we made in 2014 in terms of variety selection and how can we best match to the available sites, which is kind of backwards," he said. "Ideally, you have the site and you go out and get the right variety to plant on it, but it's just the way it works when you order trees, because the demand for trees far outpaces supply."

Low prices in 2014 prompted the company to accelerate plans to renovate some older orchards — that year saw an oversupply of Red Delicious, Golden Delicious and Granny Smith, and the company also saw an increase in the number of Fujis and Galas that didn't



Dan Plath



Stan Klabenes operates a large bulldozer in March across the slope of a new cooling and frost control pond at a future orchard owned by Washington Fruit and Produce Co.



FRENZY

ned by Washington Fruit and Produce Co. near Kittitas, Washington. Klabenes works for Seland Construction, Inc., based in Wenatchee.

THAT SPRAYER ISN'T GOING TO PULL ITSELF



NEW HOLLAND
AGRICULTURE

T4 UTILITY SERIES

12X12 POWER SHUTTLE TRANSMISSION
VISIONVIEW CAB™ **ELECTRONIC 4WD**
655TL FRONT-END LOADER

RESERVE YOUR
HARVEST
RENTAL
UNIT NOW



YAKIMA • WENATCHEE



BURROWSTRACTOR.COM
(888) 819-5045

©2016 CNH INDUSTRIAL AMERICA LLC. ALL RIGHTS RESERVED. NEW HOLLAND IS A TRADEMARK REGISTERED IN THE UNITED STATES AND MANY OTHER COUNTRIES. OWNED BY OR LICENSED TO CNH INDUSTRIAL N.V., ITS SUBSIDIARIES OR AFFILIATES.



meet target size — but the central motivation is to stay current.

“We’re constantly renovating older orchards to stay modern on genetics,” he said. “We’re maybe doing a little bit less expansion than we normally would had we not gone through the 2014 crop with those prices. The same thing very well could happen in 2016.”

A nutrient analysis at each of the five sites helps to determine the fertilizer program for the first year, which varies by baseline. “Deficiencies aren’t really a problem because you can fix it. But say the previous site used a lot of manure or particular fertilizer in certain areas of the farm, and you’re starting really hot, with high levels. That’s where it causes you to change your plan a little bit more,” Plath said.

Standard practice at any replant or planting site is for workers to rip the soil in two different directions, trying to dig at least 3 feet beneath the soil surface. They then go back and disk the soil to clean out any remaining debris, taking as many as four passes depending on what was previously planted there.

The company uses a three-row tree planter that has big shanks opening up the ground to plant the tree. It requires a crew of six, plus the driver and another crew bringing trees to the planter from the trailers.

“If there’s a lot of organic matter left in the soil, big chunks of grass or whatever it might be, it makes the tree planter very inefficient,” he said.

Here’s a rundown of how Washington Fruit approaches planting and replanting at multiple sites in one season.

To fumigate or not to fumigate?

Outside the small town of Plymouth, Washington, overlooking the Columbia River, Washington Fruit is pushing out an old, 80-acre block of Fuji and Gala apple trees that weren’t producing target fruit size, which is anywhere from 64 to 100. The site sits on sandy loam,

and with plans to replant there, Plath said fumigating the site was an easy call.

He recounted the advice of Washington State University Extension educator Tim Smith about fumigation: “Any time you are going from something with bark to apples, you need to fumigate. If there have been trees on the ground before, then we’re going to fumigate,” he said. If there haven’t been trees, then Washington Fruit tests the soil for nematodes and, depending on those levels, will make a determination about fumigating.

At this site, the company is planting Cripps Pink on Geneva 41 rootstock. In addition, the Plymouth site is where the company has elected to invest in cherries, because it’s one of the earliest sites to harvest with higher returns to the farm. Varieties being planted are Tieton cherries on Gisela 12 and Tieton and Santina cherries on Gisela 6.

Up the highway near Zillah, the company elected to fumigate 60 purchased acres that had not been planted in tree fruit for about 15 years.

“It was one that was kind of questionable, whether we fumigate it or not,” Plath said. “But if you’re going to invest \$40,000 to \$50,000 an acre, by the time you’ve brought it up to production where you can go cash-flow positive on it, there’s no reason to skimp on the last \$700 an acre.”

Also on sandy loam, the land sits in the Roza Irrigation District, which has a junior water right and faces water curtailments in drought years. That was a consideration in the decision to plant Grannys on Malling 9.337 and Cripps Pink on M9.337 and G.41. “You can farm those without overhead cooling,” he said.

Higher elevation

Overall, a large quantity of the trees ordered are on M9.337, followed by M.106, which has been popular for Reds. “We were planting Reds. Then we saw what happens when the industry has 50 million boxes of Reds, so our secondary variety selection for 106 is Honeycrisp,” he said.



Stan Klabenes, on bulldozer, talks with Joe Dobson about a new orchard pond being installed. At top, Dobson operates a large bulldozer to create a new cooling and frost control pond. The project site for the new orchard includes the land stretching off in the distance.

Cool Your Crops

with Proven Sunburn and Heat Stress
Protection Products

Surround®
Agricultural Crop Protectant

purshade®
Solar Protectant

SURROUND Crop Protectant and PURSHADE Solar Protectant reduce direct sunburn damage and keep plants cooler.



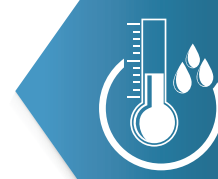
Modify
the Environment

Promote
Plant Health



When applied before periods of extreme heat, SURROUND and PURSHADE sustain photosynthesis and maximize yield and quality potential.

Cooler plants use water more effectively. SURROUND and PURSHADE are proven to keep plants more productive.



Increase
Water Use Efficiency

Suppress
Insects with SURROUND

OMRI



SURROUND delivers a bright white camouflaging effect that disrupts infestation, feeding and egg-laying among certain insects.

Contact your
crop advisor or
crop protection supplier
for more information.

NovaSource®
Tessenderlo Group

Visit our website at novasource.com



**Protection you can see.
Performance you can trust.**

NovaSource®, Surround® and Purshade® are registered trademarks of Tessenderlo Kerley Inc.
Pat. www.novasource.com/english/contact/Pages/disclaimer.aspx
©2016 Tessenderlo Kerley Inc. All rights reserved.





“Deficiencies aren’t really a problem because you can fix it. But say the previous site used a lot of manure or particular fertilizer in certain areas of the farm, and you’re starting really hot, with high levels. That’s where it causes you to change your plan a little bit more.”

—Dan Plath

That’s the target variety for two sites at higher elevations west and north of Yakima that are better suited for Honeycrisp. Both have heavier soils and were fumigated all or in part because trees had been planted there before.

North of Yakima, most of the 120 acres had been planted in alfalfa, though one chunk had been an orchard, since abandoned. The site is largely being planted to Honeycrisp on multiple rootstocks: Budagovsky 9, Bud.118, M.106, G.11 and M9.337.

Orchard manager Nick Plath, who is Dan’s cousin, said the irrigation had been shut down last year, due to drought, but there was a section of orchard that needed to be fumigated. Around mid-October, irrigators received water again and he said he scrambled to water the section that needed to be fumigated.

“I watered for a few weeks, then ripped it and disked it and had just enough moisture to fumigate it later in the fall, making it possible to plant this spring,” he said.

West of Yakima, the company planted about 100 acres of Honeycrisp on M.106 last year, and is planting another 28 acres of the same this year.

Royal City and Othello

Washington Fruit may be taking out Galas and Fujis at one farm, but the company is planting them at orchards near Royal City. The company bought this land, subject to a lease, about eight years ago, and took over farming parts of it as the leases expired. The planting this year is the last 55 acres from that purchase and the third phase of planting there. The orchards sit in sandy loam, where Galas and Fujis have done well, Dan Plath said.

Nearby in Othello, Washington Fruit planted Reds two years ago. The company has already grafted those over to Honeycrisp and plans to plant Honeycrisp on M.106 on an additional 6 acres purchased from a neighbor.

“Young orchards are funny, in that some varieties you get the best fruit that you’re going to get from the first couple of crops, like Galas, Fujis, Cripps Pink. You get the biggest, reddest fruit from the first couple of crops,” Plath said. “Other varieties, you get the worst fruit the first couple of crops, and Reds is one of them. So we looked at it: We have too many Reds and we have these producing orchards that are in good position, and we can try something else.”



Adrian Calderon installs anchors to support V-trellis systems for new Washington Fruit Fuji plantings on M9.337 rootstock north of Royal City, Washington.

Trellis

Washington Fruit uses a standard trellis across most of its apple orchards — a V-trellis with seven wires and a 10-foot middle — though there are changes in tree spacing by variety. For instance, Cripps Pink are 2-by-10, while Grannys are 1.75-by-10. Honeycrisp trees on M.106 and Bud.118 are on a vertical trellis and planted not as densely because the trees need a little more space with a more vigorous rootstock, he said.

“We think row spacing is more important than spacing between trees down the row,” he said. “The trees closer together will have higher yield, but further down the road, I think those yields will pretty well even out.”

Branches are formally trained onto the wires, setting the fruiting wall up for mechanization, should it occur. “That’s a bonus. We didn’t design it for mechanization,” Plath said. “We plant the orchards we think are, horticulturally, the right thing to do, and if mechanization comes along and works for it, great.” ●

CIDETRAK[®] DA MEC[™]

ENHANCED CODLING MOTH LARVAL CONTROL

Available in 10, 20 and 40 acre container sizes!



ENHANCED PROTECTION WITH
THE POWER OF DA

DECREASES DAMAGE!
40% Average Reduction Compared to Insecticide Alone.*



CIDETRAK[®] DA MEC[™] contains a novel, patented kairomone in a micro-encapsulated liquid formulation that influences the behavior of adult and larval Codling Moth, resulting in significant enhancement of the control of Codling Moth larvae when tank mixed with various insecticides. Additionally, Codling Moth adult control is significantly enhanced when mixed indirectly with airborne Codling Moth pheromone applied as a mating disruption treatment.

- **What it does:** Disrupts oviposition. Changes larval behavior: Stops/delays locating fruit; stops/delays fruit entry and reduces damage.
- **How to use it:** Simply tank mix with each insecticide application.
- **Longevity:** More than 14 days following application.



Contact your local supplier and order now.
Visit our website: www.trece.com or call 1-866-785-1313.

PLEASE: ALWAYS READ THE LABEL

*Based on USDA analysis global data base.



INSECT PHEROMONE & KAIROMONE SYSTEMS

Your Edge – And Ours – Is Knowledge.

Frost Protection

Pure. Powerful. Protection.

Pacific Distributing, INC.

125 S. Blair Woodlake, CA 93286

Phone: (559) 564-3114

Authorized Distributor of..

Orchard-Rite®

Wind Machines



"The grape vines under my wind machines yielded 6 tons per acre while my unprotected areas had less than 1 ton per acre."

-- Andy Timmons
Lost Draw Vineyard
Lubbock, TX, USA

Frost control has become very important to us. In the last 9 years, we have had 5 frost events that have significantly damaged our production. We decided to do something to help mitigate this so our production would be consistent. That's where Orchard-Rite® wind machines have come into play for us.

In mid April of 2014, we reached 24 degrees outside the vineyard, yet we were able to save 100% of the fruit under the machines. Outside of the coverage area, we lost almost all of the fruit. At harvest, we picked over 6 tons per acre in the protected area and less than 1 ton per acre in any unprotected vines.

The wind machines also reduced my vine damage. I put the wind machines on 10 year old vines and experienced minimal damage, but any unprotected 1 year old vines were completely decimated by the cold temperatures. In the future, when I set out a new planting, I will install Orchard-Rite® wind machines to provide protection for the following Spring. Damaging young plants is a huge expense not only in lost production but in extra management costs to replant and retrain damaged vines.

I believe that the wind machines will help our Texas wine industry grow consistent crops that our wine makers can depend on to produce superior wines and to reliably supply our markets.

Orchard-Rite®
PRODUCT REVIEW

Soils and Weed Management



PHOTOS BY LESLIE MERTZ

George Bird, Michigan State University professor and researcher, holds a handful of soil, which teems with bacteria and other microbes. He urges growers to use newer soil tests, which include data on microbes and other previously neglected aspects of soil health that are critical for productive orchards and vineyards.

"Soil health is a new concept, and encompasses indicators that grape growers and tree fruit growers are often not familiar with, but it is something I feel very strongly that they'll all be using within the next decade."

Soil gets a closer LOOK

Soil tests tell growers what they need to know.

by Leslie Mertz

A single handful of good orchard soil is teeming with about 7.5 billion microbes, including some 6 billion bacteria that are busy releasing minerals and other elements essential for healthy trees.

However, soil science for the past 50 years has mostly neglected this dynamic biological component. Instead, the science has taken primarily a chemical- and physical-driven approach with tests designed to determine the need for various fertilizers and how much to apply, said Dr. George Bird, who has spent years studying soil quality as a professor and researcher in Michigan State University's entomology department.

Recent soil tests, such as those that Cornell University, Haney (U.S. Department of Agriculture's Agricultural Research Service, or USDA-ARS) and Solvita have rolled out over the past few years, have begun to report these key biological parameters, but growers have yet to embrace the new tests, and

those who have are struggling to understand what the test results mean, he said.

"Soil health is a new concept, and encompasses indicators that grape growers and tree fruit growers are often not familiar with, but it is something I feel very strongly that they'll all be using within the next decade," Bird said.

Soil testing changes

One of the parameters recently added to the new tests is active carbon potential. Carbon bonds to most of the minerals essential to plants and their fruits, and a soil's active carbon potential is a measure

of how readily carbon releases those minerals for uptake by plants. Active carbon potentials differ from one soil to the next, and therefore can have different effects on the growth and development of plants, including vines and trees. "That means that active carbon is very important in relation to the health of orchard soil," Bird said.

Another vital component of soil health is nitrogen utilization. "Soil is a very nitrogen-deficient environment, but you need

nitrogen for growth and development of plants, because it's a significant component of nucleic acids, such as DNA, and proteins," he explained.

That's where bacteria and other



George Bird



Kalibrate™
Precision Potassium

Early Season

Kalibrate applied at planting time or side-dress is taken up from the soil along the length of young roots, particularly by root hairs. Potassium moves to leaves and fruit via the phloem and xylem, and is transported in all directions between plant organs in response to metabolic demand.

Mid-Late Season

Sure-K as a foliar application or fertigation enables the flexibility to provide available potassium, which is actively taken up by plant tissues. Sure-K enters the plant more effectively than conventional potassium fertilizers and has excellent crop safety. Once in the plant, Sure-K is rapidly transported and redistributed to areas of greatest metabolic demand. Sure-K can also be mixed with crop protection products, reducing the number of passes on the field.

Sure-K®

Provide the potassium your crop needs, when it needs it, by using the most efficient potassium nutrient products on the market: Kalibrate and Sure-K. These products provide available potassium to the plant at the right times in the growth cycle – despite the drought.

Learn more at agroliquid.com/Kchallenge

QUALITY & VALUE *you can* TRUST



Quality Firman Pollen Improves:

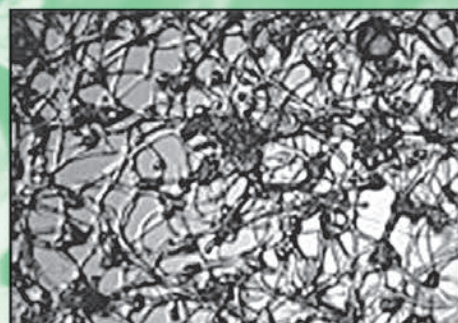
- ▶ Fruit Set
- ▶ Bee Efficiency
- ▶ Pollination Timing

Quality Pollination Improves:

- ▶ Yield Consistency
- ▶ Fruit Quality
- ▶ Fruit Storability

Trust Quality Firman Pollen

- ▶ Viability And Virus Tested
- ▶ Compatibility Matched
- ▶ Leaders in Application Technology



Our pollen is viability tested to assure quality.



Exclusive distributor of SCUMBY PUFFERS®. Accurate on any planting.

AREA REPRESENTATIVES:

WASHINGTON:

Columbia Basin and Yakima Valley
Brad Moore
509-452-8063
bradm@firmanpollen.com

Wenatchee/ Okanogan area
Tom, Kyle & Linda Batch
509-687-9670

Bleyhl Farm Service
Grandview 509-882-1225
Zillah 509-829-6922

CALIFORNIA:

Linden
John DeMartini
209-484-8502

Tulare & Kern Counties
Bob Cademartori
209-601-0754

800-322-8852

www.firmanpollen.com

301 N. 1st Avenue • Yakima, Washington 98902
509-452-8063, fax 509-453-6838

APPLE • PEAR • CHERRY • PLUM • APRICOT

microbes come in. They convert two forms of otherwise unusable nitrogen into types of the chemical element that plants can exploit. One form is atmospheric nitrogen, which bacteria convert through the process of nitrogen fixation, and the other is the nitrogen in soil organic matter, which bacteria, fungi, nematodes and other organisms convert through the processes of nitrogen mineralization and nitrification. "With some 6 billion bacteria in every handful of soil, bacteria are nitrogen-rich organisms," he said.

Soil tests may report nitrogen utilization data as "nitrogen mineralization potential" or as "micrograms of nitrogen per gram of dry weight of soil per week" depending on the soil test used, he said. "This information is something that you have not gotten back in the past four or five decades in a regular soil analysis, but it is a very important factor in soil health."

If he had to pick just one parameter to measure for soil health, Bird said it would be water-stable aggregates. "I like the water-stable-aggregates category because it integrates three things: the physical parameters of the soil, or the mineral matter; the biology, or the bacteria, fungi, and other microbes; and the chemicals that the microbes produce and that get those mineral particles to stick together and form a friable soil that will hopefully give you healthy orchards for a long period of time," he said.

To describe water-stable aggregates, he used the example of a little clod of soil added to a glass of water. If it falls to the bottom of the glass very quickly and is dissolved into all of its mineral matter, "I can guarantee you have soil that will be like concrete," he said. This is characteristic of soil with a low percentage of water-soluble aggregates.

In comparison, a clod of soil with the desirable high percentage of water-soluble aggregates will rumble down to the bottom of the glass, but it will remain in little clumps rather than dissolving. "In fact, I have some clumps — some water-stable aggregates — from Michigan soil that have been sitting in water for 10 years and still haven't dissolved," he said.

The future

Other parameters are coming to soil tests, he noted. Cornell has just added a soil-protein analysis. Two others that are being added are nitrification and carbon mineralization.

Soil-protein analysis and nitrification are both indicators of nitrogen utilization, and carbon mineralization measures the amount of carbon dioxide that soil microbes give off, thereby estimating how many bacteria are present in the soil and how active they are.

"There are other indicators that are being constantly evaluated, too," he said, noting that scientists are currently working on microbe indices for beneficial microbes and for problem organisms, such as root-lesion nematodes, that can be added to soil test results and will have practical applications for orchardists.

Growers will be hearing about new soil-test parameters more and more frequently as the nation's emphasis on soil-health research expands, Bird said. As an example, he pointed to the USDA's Natural Resources Conservation Service, which created a Division of Soil Health and added soil staff last year. Several universities are also either starting or expanding their soil-health programs.

"It's becoming a high research priority, and hopefully we can get it to snowball," he said. "The soil is an interactive, biological, living system that participates in the food web and provides the nutrients for the plants, and the more we know about how this system works, the better we're going to be able to utilize that knowledge on the farm." ●

Leslie Mertz, Ph.D., is a freelance writer based in Gaylord, Michigan.



PHOTO BY LESLIE MERTZ

After giving two tubes of soil and water a gentle shake, Michigan State University professor and researcher George Bird compares how particles dissolve and how quickly the water begins to clear. This is a measure of water-stable aggregates, which he says is an especially good indicator of soil health.

Is my soil healthy?

Putting definitive numbers on measures of soil health is a tricky business, because what's good for one soil type may not be good for another.

"I wish I could say we have set limits, but we can only give our best expert opinion at the moment," said Dr. George Bird, a soil researcher at Michigan State University.

Currently, the "best expert opinion" is in a state of flux because the whole concept of soil health is a new area that is in need of more research, including testing in commercial orchards.

In the meantime, however, growers need some standards against which they can gauge their soils and determine how to manage them for the coming season. With that in mind, Bird offered the following ranges for the coarse-textured orchard soils common in Michigan, but acknowledged that they are indeed estimates and demand additional field validation:

—Percentage of water stable aggregates: greater than 45 percent

—Soil moisture potential: greater than 0.175 g/g

—Surface hardness: less than 150 psi

—Subsurface hardness: less than 300 psi

—Soil organic matter: usually greater than 3.5 percent

—Active carbon for nutrient mineralization: greater than 450 ppm

—Nitrogen mineralization potential: greater than 10 µgN/g of dry-weight soil/week

—Appropriate levels of all other chemical elements for crop growth and development: phosphorus (5-25 ppm), potassium (45-75 ppm), magnesium (greater than 33 ppm), iron (less than 25 ppm), manganese (less than 50 ppm), and zinc (less than 25 ppm).

Regardless of their soil type, all growers should start using the new and more detailed soils tests that are available and log the resulting data from season to season, Bird said.

"You really need to use one of these electronic tracking devices — not a napkin from the local coffee shop — and record the parameters so you can follow your soil health over time," he said.

From there, growers can analyze the data so they can make informed decisions about strategies that will either maintain or improve the health of their soil, and consequently, increase the health and productivity of their orchards and vineyards.

—L. Mertz

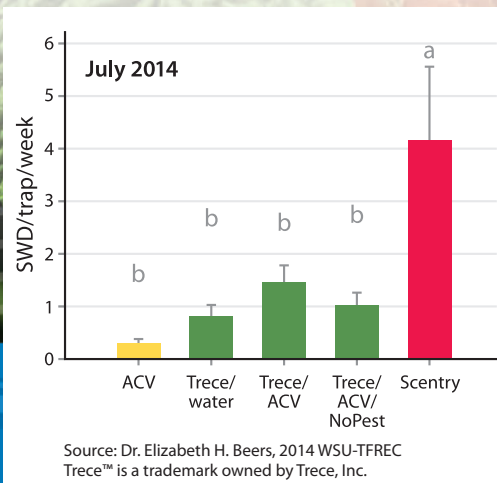
A new standard in spotted wing drosophila detection



SWD LURE & TRAP SOLUTION

- **Early** detection in low population density
- **Superior** attraction in wide range of crops and locations
- **Extended** field life
- **Scentry SWD Lure** performed better than competing lure systems in recent field trials

SCENTRY



Contact your local distributor or call 1-800-735-5323
Visit our website, www.scentry.com



PACIFIC GRO

SEAFOOD FOR THE SOIL

Liquid Shrimp & Crab - mmmm Good!
The chitin and high fish oil content are a feast for the soil, especially for beneficial fungi. Also an excellent foliar. Screened to 200 mesh.

I have been impressed by my cherry orchard's response to Pacific Gro's hydrolysate. Regular feeding of the product by foliar and fertigation during the season has promoted vigorous branch and root growth, increased fruit size a half to full row, made fruit significantly firmer and also helped trees recover from a devastating freeze this past winter. I have found that post-harvest feedings, which we apply up to leaf drop, are of critical importance to improving next year's crop. One surprising thing we have

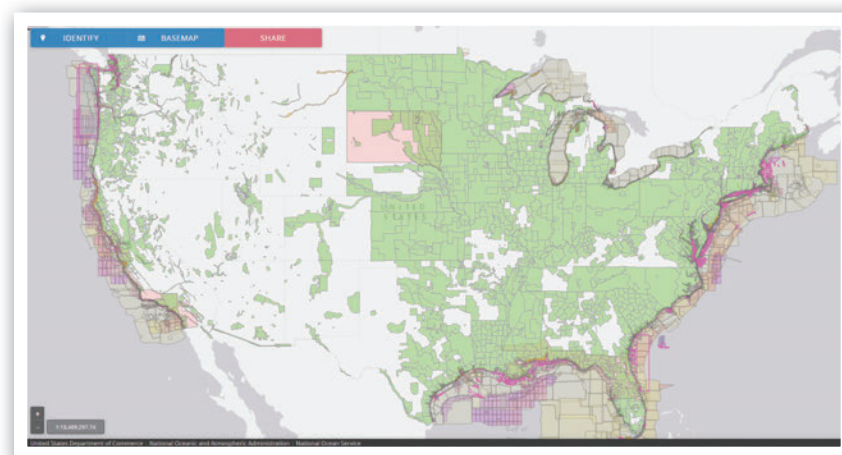


found that really excites us is that powdery mildew was significantly reduced in our orchards after we started using Pacific Gro's hydrolysate - even in highly susceptible varieties like Sweetheart.

Mike Omeg, The Dalles, Oregon

CREATIVE AG PRODUCTS • www.pacificgro.com • 503 867-4849

High-tech MAPPING



NATIONAL OCEANIC AND ATMOSPHERIC AGENCY

The green regions on this map represent the areas for which LiDAR data is available for use with Agren's SoilCalculator to create on-farm soil erosion management plans.

Soil-mapping web tools available to growers.

by Dave Weinstock

Growers who want to expand and need more information about the soil underfoot have some key resources available with soil mapping tools for anyone with a smartphone, tablet, desktop or laptop.

Some of the mapping tools are free.

The tools provide accurate information about what a land parcel can and cannot deliver, with data derived from two of the federal government's more comprehensive, publicly funded soil survey projects.

The first task in assessing a parcel's potential usually begins with soil tests, which can take a considerable amount of time.

Researchers at University of California, Davis aimed to ease that load with SoilWeb, an application capable of mapping the soil to depict soil type and provide profile information, soil taxonomy, erosion ratings and soil fertility.

Dr. Toby O'Geen, a UC-Davis Cooperative Extension soil resource specialist, and Dr. Dylan Beaudette, now of the U.S. Department of Agriculture's

Soil Resource Service, developed it at the UC-Davis California Soil Resource Lab three years ago from data mined from USDA's National Cooperative Soil Survey.

"Traffic to the site totals 500 to 1,000 visits a day," O'Geen said.

Although the information provided by SoilWeb isn't a substitute for a soil test, the program can deliver preliminary data in the form of geographic, system-positioned soil profiles in an instant.

Originally, it was a standalone mobile app. "Mobile operating systems were changing so quickly we had trouble

SHADE FABRIC & STRUCTURES

- Superior fabrics
- Best price
- Structure experts

YAKIMA Steve Kuhn 509-728-1929	WENATCHEE / BASIN Bill Johnson 509-728-0664	PASCO Matt Blevins 509-728-0570
ZILLAH / MEXICO Juan Pinon 509-728-1339	OREGON Jake Williams 541-490-7002	CALIFORNIA Chris Siems 507-301-5106 Aaron Sherer 805-550-2022

wilson
ORCHARD & VINEYARD SUPPLY

Providing growing supplies for over 25 years.

MAKE CIDER WITH EASE

Commercial quality at a family price—the **AVALON CIDER PRESS**

MeadowCreature.Com®
Or Give Us a Call
360-329-2250

MEADOW CREATURE

keeping up with new versions. It became too costly, so we migrated it back to the web,” O’Geen said.

Now it can be accessed via a website (bit.ly/1MxM2LH), with three components based on national data and one limited to California. All are accessible by desktops, laptops, tablets and mobile devices.

The original app, SoilWeb, provides a description of the soil either underfoot, by map coordinates or street addresses. It also supplies soil information for adjacent areas. Clicking through soil types yields graphics on the mineral content, pH, drainage, organic matter and other data.

“The new SoilWeb essentially uses aerial photo images from Google Maps with soil survey map overlays that click through to soil data and properties in an interactive display,” O’Geen said.

SoilWeb Earth, the second program, uses Google Earth to display SoilWeb data in a 3-D geographic display.

The other two apps, taken together, provide information allowing California growers to select the best possible site for an orchard or a vineyard, based on soil types and characteristics.

Soil Series Extent Explorer allows users to input soil types to see where they occur throughout the country. It depicts the number of acres with that particular soil type on a map of the United States as well as the soils that usually occur with them.

In the Soil Properties App, users can click on various land characteristics — soil holding capacity, drainage class, land use and productivity — to see where they occur. The data in this app is currently limited to California.

Erosion program

Anyone who farms on slopes or hills knows erosion is the enemy. An ex-USDA soil scientist who wasn’t satisfied with how his agency determined soil conservation practices for farms made his own more exacting tool.

Tom Buman, owner of Agren Inc. of Carroll, Iowa, founded his company in 2006 to begin building soil conservation software. One of the commercial software modules he developed for agricultural use is called SoilCalculator and is used to



ONLINE

SoilWeb: bit.ly/1MxM2LH

Agren: www.agrentools.com

create erosion management plans.

Instead of using soil survey data, his program uses LiDAR data. The acronym for Light Detection and Ranging, it is a remote sensing method used to examine the Earth’s surface.

It works similar to sonar, except it uses light instead of sound. Usually done with aircraft, a sensor is mounted on the underside of a plane, which emits a light pulse as it flies over the region it is mapping.

LiDAR map data is public information because it was generated through matching federal funds from USDA and state and local governments. Its map data covers a surprising amount of the continental United States and a good deal of the regions where fruit is grown.

“It used to take upwards of 30 hours to engineer soil erosion plans,” Buman said. “Now, with the sensor information in hand, it takes only seconds.”

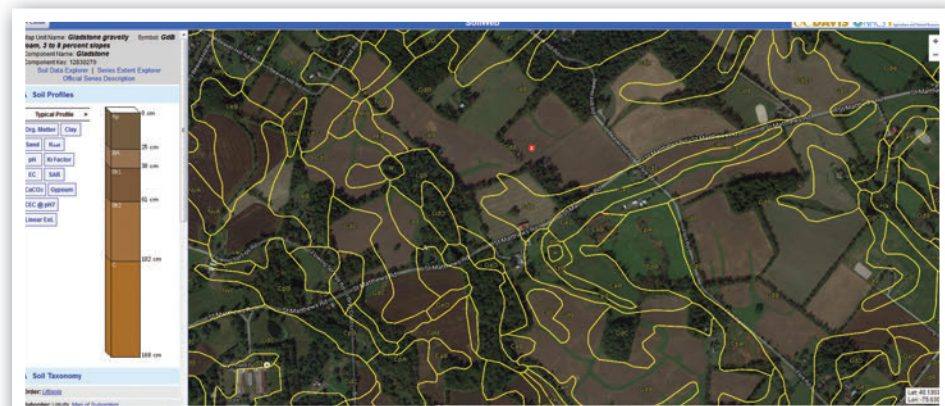
The database will certainly be expanding soon. “Now there are LiDAR sensors that can be attached to drones,” Buman said.

SoilCalculator, which is currently being coded to be tablet-compliant, can be used to create erosion management systems for any kind of agricultural operation. Instead of basing plans from one part of a farm like the federal agencies do, Buman’s program is based on multiple samples taken from farms.

“We use 30-foot-by-30-foot sensor grids to map land parcels,” he said. “This allows us to be able to identify the hotspots on a property, where erosion potential is critical.”

The program shows how erosion is distributed, constructs various scenarios based on conservation practices and cropping methods. It also computes the cost of erosion losses over time.

Buman’s customer base currently lies in Iowa, Nebraska, Minnesota and Ohio. Owing to the extensive LiDAR mapping already accomplished, Buman said, the company will expand to wherever they have customers. ●



UC-DAVIS

Clicking within the yellow boundaries anywhere on this SoilWeb map provides a report similar to the one on the far left side of the screen. Clicking on the boxes in the report will show graphs and charts illustrating the range of numbers for each of the soil characteristics typical of the profiled soil.



For over 40 years, growers have been enjoying the fruits of our labor.

At ProTree Nursery, experience has taught us to select the best varieties, graft only the highest quality rootstocks and grow hearty trees. As one of the leading suppliers of apple and cherry varieties to orchard growers, our customers have come to depend on our trees and our service. You can too, call us today.

ProTree
Nursery, LLC



10500 Brentwood Blvd., Brentwood, CA 94513
800.634.1671 or 925.634.2191
(Alison Clegg or Richard Chavez)
877.457.6901 (Henry Sanguinetti)

www.protreenursery.com

MEMBER OF
INN INTERNATIONAL
NEW VARIETIES
NETWORK

Apples

Aztec Fuji®
(DT-2 cv)

Banning Red Fuji
(USPP 16,624 P2)

Buckeye® Gala
(USPP 10,840)

Cosmic Crisp™ **NEW!**
(USPP 24,210)

NEW! **EverCrisp®** (cv. 'MAIA 1') PPAF

Firestorm™ Honeycrisp

Honeycrisp™
(USPP 7197)

Lady in Red*
(USPP 18,787)

Royal Red Honeycrisp® **NEW!**
(USPP 22,244)

September Wonder™ Fuji
(USPP 11,193)

Ultima™ Gala
(USPP 13,753 P2)

Available on B10®, B-118, EMLA, Geneva®, M-9 T337, NIC-29™, or Pajam #2.**

*Trademark license for Pink Lady® brand available upon request.

Cherries

Benton™

Bing

Black Tart

BlackPearl®

Brooks™

BurgundyPearl®

Chelan™

Coral Champagne

Cristalina™

EbonyPearl®

Lapins

RadiancePearl®

Rainier

Selah™

Skeena™

Sweetheart™

Tamora

Tulare™

Vans

Available on Colt, Gisela®, Krymsk®, Mahaleb, or Mazzard.**

** Not all varieties are available on all rootstocks. Call for specific grafting information.





PHOTOS COURTESY OF USDA-ARS.

U.S. Department of Agriculture-Agricultural Research Service (USDA-ARS) research microbiologist Michael Lehman takes a soil-core sample on David Gillen's South Dakota farm. Among other things, such samples can be tested for the diversity and activity of soil bacteria, fungi, algae and other microorganisms.

Soil biology is critical to life, but still largely unknown.

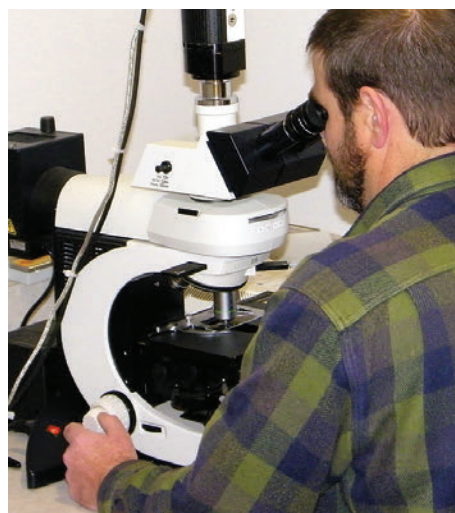
by Leslie Mertz

Space may be the final frontier, but soil biology is the *next* frontier. Researchers are only beginning to understand the richness, diversity and complexity of the bacteria, fungi, algae and other microbes thriving in the ground underfoot, and just how critical soil health is when it comes to keeping the Earth's overall ecosystem intact.

"Without microbes, life doesn't work," said U.S. Department of Agriculture-Agricultural Research Service (USDA-ARS) research microbiologist Michael Lehman, who collaborated with 14 other soil experts on a major, overarching article in 2015 that described the yawning chasm between what we know about soil microbiology and what we need to know.

A large part of that gap results from an inability to examine the microbial world in soil.

"In well-studied systems, scientists have been able to ask questions and get answers, and that's why those systems are well-studied," said Lehman, who is stationed at the North Central Agricultural Research Laboratory in Brookings, South Dakota. "For instance, if you wanted to look at trees in a certain forest, you could go out there, actually count every individual tree, and probably identify every



Unnoticed by the naked eye, the soil is alive with microorganisms that support plants. "Without microbes," says Lehman, "life doesn't work."

single individual tree to species. We can't possibly do that with the organisms in the soil."

New technological tools, however, are beginning to shed some light on soil microbes. These include such technologies as the burgeoning DNA and RNA sequencing capabilities, stable isotope probing and various gene-expression

techniques that can assist in identifying these microbes and the roles they play, Lehman said.

"With these technological advances, we've already discovered so much more than we ever thought in terms of diversity and numbers alone, and with the incredible complexity of this system, it's become clear that we are really primitive in our fundamental knowledge of the physiology and ecology of nearly all these organisms," he said.

As an example of the lack of understanding about soil biology, Lehman pointed to nitrogen-fixing bacteria.

"For 50 to 60 years, soil microbiologists have measured the activity of two or three organisms and their potential to convert nitrogen from ammonia to nitrate. But in the last five years, it's been found that totally unrelated microorganisms actually might be doing most of that nitrogen conversion in soils," he said. "These are microorganisms that had never been known before, (and they include) nitrogen-fixing bacteria that don't fit into the conventional nodulating-rhizobial model, but are just living in the roots, fixing nitrogen and giving it to plants."

Additional new research indicates that other microbes can help make

Tips to improve your soil

Although the study of soil microbiology is barely out of the starting gate, U.S. Department of Agriculture-Agricultural Research Service (USDA-ARS) research microbiologist Michael Lehman said growers can already take steps to reduce and even reverse soil degradation:

—**Disturb the soil as minimally as possible.** One of the main consequences of disturbance is the destruction of the soil structure, which disrupts soil habitats for valuable microbes and removes organic carbon from the soil faster than it is naturally replenished.

—**Keep something growing on the soil all year round.** “This is kind of a big deal, because plants will take about 25 percent of what they fix as carbon from their photosynthesis and inject it into the soil,” Lehman said. “By doing that, they’re providing an organic source for the organisms that live near the plant and therefore maintain the biomass of microbes, their activities and also their diversity.”

—**Maintain diversity where possible.** For fruit growers, this could mean growing a diversity of plants as cover crop between tree rows or in adjacent plots. Research has linked the diversity of plants to increased nitrogen and carbon retention provided by soil microbes. A mix of perennials could be a good option, because they have deep roots that stabilize soil, access nutrients and water from deeper in the profile, and stimulate microbes through a greater cross-section of soil, he said.

—**Avoid heavy inorganic-fertilizer use.** “There’s plenty of literature out there and more research still coming out, that suggests that if you add high levels of inorganic phosphorus and nitrogen, you can suppress certain populations of microbes that would otherwise be beneficial to the plants,” Lehman said. He acknowledged that firm guidelines are not yet available for fertilizer use, and may not be forthcoming anytime soon. “Today’s fertility recommendations were made under a standard set of conditions that did not optimize soil biology,” he said, adding that the recommendations are for “average” conditions so they may not apply well to every orchard or vineyard. “To translate the new understanding of soil biology into recommendations is going to take a long time.”

—**Use compost and manure.** Organic compost and manure trump inorganic fertilizers, he said. “They increase the health of soil by adding carbon in the organic form that stimulates biological activity in a way that inorganic doesn’t. With inorganics, you’re putting out a pool for plants to uptake. With organic forms, you’re stimulating the biological cycle so it can provide the nutrients to the plant.”

—L. Mertz

phosphorus, potassium and various trace nutrients more available to plants, and if those microbes are encouraged, the need for fertilizer could potentially be reduced.

“So we’re learning that there are all kinds of ways that the microbes support plants,” he said.

Two U.S. efforts are under way to chip away at the vast mystery of soil biology. One is the National Corn Growers Association’s Soil Health Partnership (soilhealthpartnership.org), which is studying soil-management practices at 60 demonstration farms, 20 of which will be added in 2016. The other is a national soil-health assessment to be spearheaded by the newly launched Soil Health Institute (soilhealthinstitute.org) based in Research Triangle Park, North Carolina. Similar studies of soil health are underway in the European Union, Brazil, Argentina and Australia.

Said Lehman, “Soil biology has

become a global interest, and I think studies like these will yield important advancements about how farm practices can positively influence soil health.”

Lehman and his co-authors wrote their paper to stimulate interest and awareness of soil biology to everyone from scientists and crop producers to policy makers and nonprofit organizations, he said.

“We wanted to reach a lot of different audiences to illustrate how little we know about soil health, how far we need to go, and what we need to do to get to that endpoint,” he said. “We also wanted to try to spur additional efforts, whether they are government or nonprofit initiatives that are coordinated across regions, or individual investigator-led projects.”

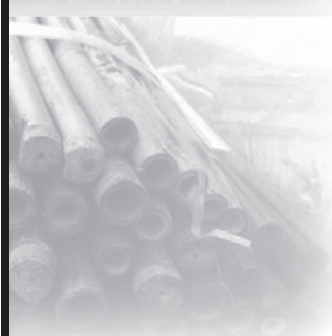
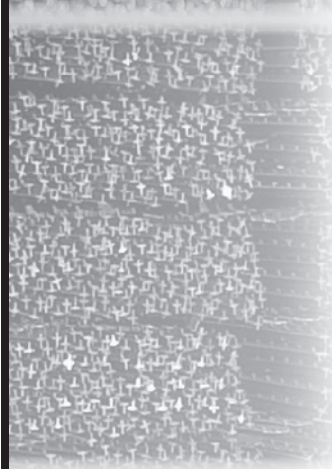
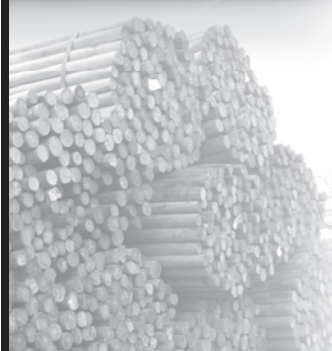
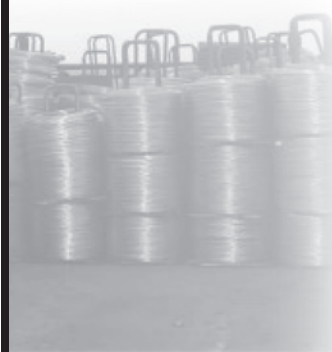
The main point, he added, is that soil biology is too important to ignore. “If it weren’t for the microbes in the soil, life wouldn’t exist. Period.” ●

ONLINE

Lehman, R. M., et al. “Understanding and Enhancing Soil Biological Health: The Solution for Reversing Soil Degradation,” Sustainability 2015, available at bit.ly/1Veh1CH

WE KNOW TRELLIS!

Oregon and Washington’s First Choice
for Quality Trellis Supplies!



**Proudly offering the
highest quality trellis
supplies and customer
service in Oregon
and Washington
for over 30 years!**

- Domestically manufactured premium wood and steel posts
- In-stock inventory with convenient delivery
- Quick turnaround on project orders
- Variety of wire options
- Cross arms, stakes, anchors, tensioners, clips, grow tubes and milk cartons
- Wind screen, landscape fabric and shade cloth



100% Employee Owned & Operated

**Aurora, McMinnville, Medford & Salem, OR
Lynden & Pasco, WA**

Growers Supplies • Equipment • Service & Parts • Full Agronomic Services

ML910-01-129845-6

(800) 653-2216 • www.ovs.com

Soils and Weed Management



COURTESY OF ROBERT ORPET, TFREC

Woolly apple aphids, a pest that lives both in trees and underground, is increasing in Washington orchards. The aphids leave behind tell-tale waxy fibers that resemble wool.

Woolly SURGE

Researchers, looking for answers to hold back woolly apple aphids, find some promise in sandy soils.

by Ross Courtney

The woolly aphid, a plant-sucking pest that produces waxy fibers resembling wool or cotton, is surging in Washington, evading the few available pesticides by living in both trees and soil and leaving researchers scratching their heads about what to do.

"In the past 10 or so years, we've had an increase in problems with the woolly apple aphid," Robert Orpet, a Washington State University graduate student, told growers in January at the North Central Washington Apple Day in Wenatchee, Washington.

Like most researchers, Orpet admitted he has no silver bullet, but he advised growers to consider planting aphid-resistant Geneva rootstocks, to use caution while grafting, to spray Ultor (spirotetramat) when necessary and, perhaps, to preserve their earwigs.

Ultor applied to a tree kills woolly aphids both on the branches and down to the roots, but growers often don't know when trees are infected if bugs are underground. Pruning away infected branches only sends the insects scurrying to the ground to hide. Heavy root infestations can cause yield losses up to 5 percent, Orpet said, and the pests quickly attack grafting points, as well as winter damage or pruning wounds.

Most of the damage is long-term to the trees, but when they're really bad, they leave in their wake a waste that sometimes attracts sooty mold, a black fungus that builds up in the stem of the fruit.

"It's becoming a major pest for us, and we're looking for answers," said Tim Welsh, president of Columbia

Fruit Packers in Wenatchee, Washington.

Using grants from the Washington State Department of Agriculture and the Washington Tree Fruit Research Commission, Orpet spent two years surveying woolly aphid populations in 20 central Washington orchards, some of them Welsh's, while interviewing orchardists about management techniques and sampling for other characteristics such as soil nutrition, other bugs and cankers. He found few correlations. They seemed to thrive equally in both organic and conventional orchards regardless of soil quality, nitrogen levels and the presence or lack of perennial cankers.

However, a few things stood out in his research, which will continue into 2016.

One, sandy soil seems to hold them back. Sand, more fluid than loam, fills in cracks in the ground and may prevent the woolly aphids from moving around as freely. The three sites he surveyed with low woolly aphid populations had a high percentage of sandy soil. Earlier studies have come to the same conclusion, he said.

Two, the earwig might be an "underappreciated" natural predator, he said.

Presence of the earwig, an omnivore sometimes considered a minor pest in and of itself, seemed to dampen the population of woolly aphids. Woolly aphids tend to surge in the spring, fall back in the summer with temperatures over 90 degrees and resurge in the fall. But orchards Orpet surveyed with a lot of earwigs didn't have nearly as many woolly aphids in the fall as those with few earwigs.

In the future, Orpet aims to conduct trials with different mulches to mimic the benefits of sand and conduct DNA testing on earwig guts to find out what they eat — specifically, if woolly aphids were on the menu.

In the meantime, he asked growers to consider earwig conservation efforts like cutting back on the use of Sevin (carbaryl) and Success or Entrust (spinosad), which are both toxic to earwigs. ●

since 1951

SIERRA GOLD TREES

Cherries

on Krymsk® 5,
Krymsk® 6, Gisela® 6,
Gisela® 12
Mazzard,
Mahaleb &
EMLA-COLT

Apples

on M-9 T337,
M-9 PAJAM 2®,
EMLA 26, Geneva® 41,
Bud 118 & Bud 10

Pears

on OHxF-87,
& Pyro 233

SG

Sierra Gold Nurseries

sierragoldtrees.com

1-800-243-4653
or Tree Connection, Inc. at
800-421-4001

Making the most of MULCH

Tests show mulch tops organic herbicides for weed control in pears.

by Ross Courtney

Organic herbicides don't match mulch for pear growers.

That's the conclusion of University of California Cooperative Extension farm advisor John Roncoroni, who determined through a series of trials that mulches hold back weeds in organic pear orchards better than organic-approved herbicides.

"Available organic herbicides are relatively ineffective, especially for perennial weeds, but can reduce weed growth to tolerable levels with multiple applications," he wrote in a report to the California Pear Advisory Board.

Roncoroni, a Napa County farm advisor, tested three organic herbicides in a young orchard in Kelseyville, California, about 120 miles northwest of Sacramento. He compared the results against and in combination with traditional tree mulch, a mulch mat made from recycled paper and no treatments at all for a control. The three herbicides were acetic acid; BioLink, a caprylic and capric acid-based product now named Suppress; and Matratec, a clove oil product.

He came away with three major findings:

—Organically registered herbicides are ineffective as a standalone form of weed control, and a second year of treatments did not improve effectiveness.

—Mulch derived from wood chips or shredded paper is a more effective form of organic weed control.

—Organic herbicides provided little, or no, long-term improvement to mulch treatments.

In Roncoroni's trials, a water-porous mat made from recycled paper worked the best, providing a 6.5 level of weed control on a visual rating scale of one to 10. Tree mulch alone came in second with a 4.25 level of control. Combined, the mulch and mat were less than the

sum of their parts, yielding 3.5 level control because the mulch caused the mat to break down, Roncoroni said in a follow-up email to *Good Fruit Grower*.

The three herbicides ranged from

2.25-2.75, barely higher than no treatment at all.

"Organic herbicides have not as yet proven to be a reliable, cost-effective standalone weed control solution in

orchard crop production, and provided little, or no, long-term improvement to mulch treatments," Roncoroni wrote in the 2012 report. Roncoroni conducted the research in 2011 and 2012. ●

MULTIPLE PESTS LURK. COINCIDENTALLY, DELEGATE® CONTROLS MULTIPLE PESTS.



Delegate® Insecticide.

Insecticide applications may target a single pest, but other pests are likely residing in your orchard. With Delegate, you can control multiple pests at once, including:

- Codling moth
- Thrips
- Leafroller
- Leafminer
- Spotted wing Drosophila
- Cherry fruit fly
- Pear psylla

Pests are controlled by contact and ingestion. And the translaminar movement (into the leaf) of Delegate helps reach pests out of the direct line of spray. To learn more, visit www.DelegateInsecticide.com.



Dow AgroSciences

Solutions for the Growing World

®Trademark of The Dow Chemical Company ("Dow") or an affiliated company of Dow. Always read and follow label directions. www.dowagro.com

"Available organic herbicides are relatively ineffective, especially for perennial weeds, but can reduce weed growth to tolerable levels with multiple applications."

—John Roncoroni

GOOD STUFF

A selection of the latest products and services for tree fruit and grape growers

Rhyzo-Link fertilizer designed to promote Rhizobacteria

Nachurs Alpine Solutions of Marion, Ohio, has partnered with Pathway Biologic, LLC of Plant City, Florida, to announce a new advancement in fertility, Rhyzo-Link fertilizer.

Rhyzo-Link is a combination of premium fertilizer with a blend of eight unique strains of plant growth promoting Rhizobacteria (PGPR).

The company says this combination immediately goes to work in the root zone or on the leaf surface to increase nutrient availability and enhance nutrient uptake. Rhyzo-Link stimulates plant and root growth and has the natural ability to increase overall tree and vine health, as well as activate plant defense mechanisms.

Three formulations are being introduced initially. Rhyzo-Link will stay in solution and remain viable for at least 18 months.

For more information, visit Nachurs online at www.nachurs.com.

Sentinel system issues alerts, status updates for crops

The Sentinel system from Sensaphone helps vineyard directors, viticulturists and other fruit growers monitor conditions that can damage delicate fruit.

When the Sentinel system detects a problem such as temperature changes, humidity fluctuations, water leaks and power outages, it immediately sends alerts by phone, text or email over a standard Internet connection. This instant notification allows personnel to take quick, corrective action and save valuable crops. In addition, operators can check status conditions from mobile devices, reducing the number of daily field inspections.

Only one Sentinel unit is required to monitor up to 12 different environmental and equipment status conditions, including temperature, humidity, water detection and power failure. No software is required.

For more information, call (877) 373-2700, email sales@sensaphone.com or visit www.sensaphone.com.

EPA approves label expansion for Luna fungicides

The U.S. Environmental Protection Agency has approved an expanded label for Luna fungicides permitting use on a larger group of fruit, nut and vegetable crops.

Once approved in relevant states, these label expansions will be effective across a broad geographical range of markets from California and the Pacific Northwest to Florida.

The Luna fungicide portfolio includes Luna Sensation, Luna Experience and Luna Tranquility.

The new labels expand the Luna registration to crops such as citrus, table and raisin grapes, berries, leafy vegetables, tomatoes, pome and stone fruit, and a variety of other fruits and vegetables. Specific registrations vary by state. Product labels should be consulted for detailed information.

For more information, visit www.cropscience.bayer.us.

New soil adjuvant for resistant weed control

ORO-RZ, a new soil adjuvant, has been introduced by Oro Agri Inc. to boost control of tough, Roundup-resistant weeds.

ORO-RZ has shown encouraging results in boosting pre-emergent herbicide control of tough broadleaf weeds, the company says. In two consecutive years of university research field trials, the addition of ORO-RZ to popular, pre-emergent herbicide treatments significantly reduced the infestation of certified Roundup-resistant marestail in soybeans.

ORO-RZ's spreading and penetrating ability helps the pre-emergent herbicide lay down a uniform blanket of protection to control germinating weed seedlings, according to Riley Reynolds, Oro Agri director of sales and marketing.

ORO-RZ is not currently registered for use in California. For more information, including field trial results, go to www.oro-rzusa.com.

Diamond K Gypsum



Increase crop yield and improved quality... Diamond K Gypsum can provide the right products to succeed!

- Premium 97 Solution Grade Gypsum Improves soil structure and drainage through profile (Spreadable Gypsum Available)
- Ultra Fines Sulfate of Potash 0-0-50 Helps increase sugar content, enhances color and appearance, for a more evenly ripened crop
- KMS 0-0-22 22% K₂O 11% Mg 22% S Helps balance soil fertility.
- Aquadrive Loosens soil surface tension, driving your water to root areas where it belongs



Fertigation Solutions for the Orchard and Vineyard

Take the guesswork out of fertigation application with the revolutionary Diamond K Applicator.

This patented applicator blends water and Diamond K's quality products into a solution for distribution by your irrigation system. There is an applicator size to fit every need.



Please contact Heath Tankersley

Pacific Northwest Sales Rep at 208-995-6459

with product questions and for your nearest Diamond K Gypsum Dealer

**For More Product Details
Visit Our Website: www.diamondkgypsum.com**



**SAFE FOR
HONEY BEES**

There are many good reasons for growers to use NU FILM®

NU FILM has been used as a spreader-sticker on apples and tree fruits for over 45 years. During this period, it has demonstrated one very important thing:

Consistent & Reliable Performance

NU FILM is the best value insurance you can buy to protect expensive pesticides and help them perform properly under various weather conditions. Since it is gentle to the crop, NU FILM has not caused russet or other problems.

Others may say they have similar products, but put your trust in those company consultants that recommend NU FILM. They are watching out for your bottom line.



For additional information or for the phone number of your local Miller representative, call:

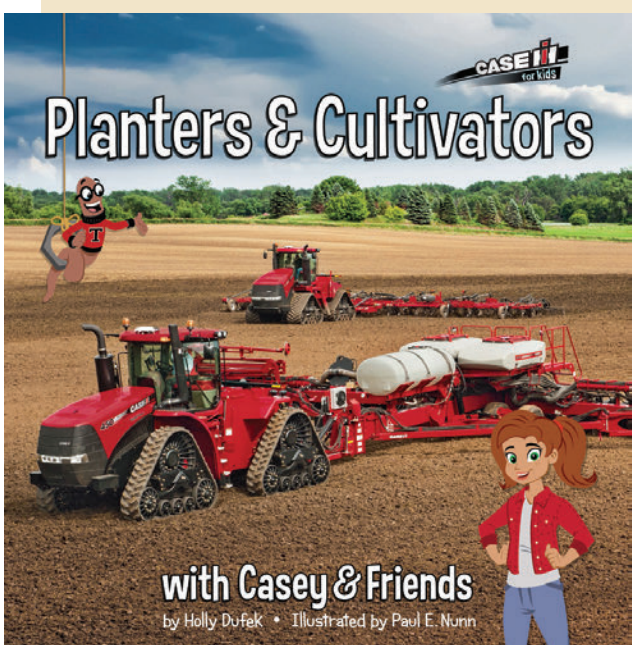
800-233-2040

Miller Chemical & Fertilizer, LLC

Hanover, PA 17331

ALWAYS READ AND FOLLOW LABEL INSTRUCTIONS





Book teaches children the science of planting

A new book in the Casey & Friends series, geared for children ages 4 to 8, teaches children about the science of planting seeds and caring for plants.

Planters & Cultivators combines real action photographs with bright illustrations and a cast of cartoon equipment characters. The book follows Tammi the Tiller, Evan the Earlier Riser Planter and Peter the Patriot Sprayer as they work together to make this year's crop bigger than ever.

For more information on the book, as well as complimentary Casey & Friends lesson plans, visit OctanePress.com.

Nixalite of America Inc. updates website, catalog

Nixalite of America Inc., manufacturer of bird control products for 66 years, has debuted a new website and released an updated product catalog.

The website features a user-friendly design that allows visitors to shop for products by specific pests, view product videos and read Nixalite product case histories and customer testimonials. The website also features estimate worksheets and installation instructions.

The 2016 catalog features detailed product information, estimating information, expert advice and more. For more information on the East Moline, Illinois, company and its products, visit www.nixalite.com.

Resistor helps reduce fruit cracking

KWS Distributing has developed an exclusive formulation and program to help reduce rain-induced cherry cracking and cracking in other fruit.

Extensive research and four years of trials resulted in the CultivAce brand Resistor, which is specially formulated to supply nutrients to the plant to minimize the incidence of fruit cracking, according to Wayne Sledge, KWS and CultivAce president.

CultivAce is a division of KWS Distributing, a distributor of agricultural products and fertilizers. For more information, visit CultivAceGrowth.com.

CHAMBERLIN AGRICULTURE

◆ EST. IN 1949 ◆

ReflexSun

Reflective Film for Orchards

Fruit Color

Crop Quality

Earlier and Homogeneous Harvest

Affordability

Reflective Mulch for Vegetables

Pest Control

Weed Control

Very Impermeable Film (can reduce amount of fumigant)

Moisture Retention



Contact us to learn more about our ReflexSun products or to place an order:

509.663.7151

info@chamberlinag.com

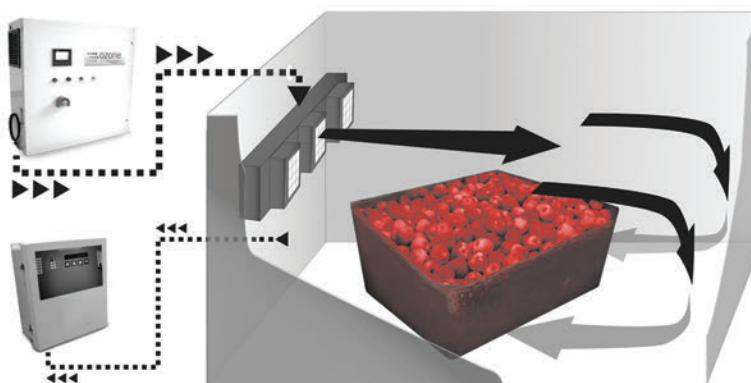
www.chamberlinag.com

Reflective Film Increases Profitability!



ensuring the quality and safety of food

Ozone for Post-Harvest Treatment



National Service Team

"Pay As You Go" Lease Model

- Increase Pack-Out
- Control Sporulation & Pathogens
- Prevent Cross-Contamination & Nesting
- Real time dosage control

24 Hour Remote Monitoring & Logging

o3international.com

206.780.5552

info@o3international

Test for nutrients before spending BIG MONEY

Wine industry funded research can save growers money and lead to healthier vineyard soils.

by Melissa Hansen

You walk through your vineyard and see suspicious-looking red leaves. Before you assume the worst — grapevine leafroll or red blotch disease — consider that your vines could have a nutritional imbalance.

Dr. Joan Davenport, soil scientist for Washington State University, recently completed nutrient management research funded by the Washington State Wine Commission that resulted in recommendations on how to best apply phosphorus leading to healthy vineyards. The project is part of Davenport's overall effort to develop guidelines for nutrient management of irrigated wine grapes in eastern Washington.

In wine grape cultivars, red leaves can indicate several possible stress disorders. Previous research by Davenport documented that in eastern Washington, red grape cultivars exhibit low phosphorus though red leaf discoloration in the older leaves of the vine, and in white cultivars, low phosphorus shows up as a slightly darker green color in the older leaves. Red leaves — with green veins — are also associated with grapevine leafroll and red blotch diseases.

When you find red leaves, Davenport says you should first determine if the color is a result of a nutritional deficiency. "Take nutritional samples first to learn if

phosphorus levels are adequate," she said, adding that nutritional samples are less expensive than PCR (polymerase chain reaction) testing used for diseases. "If nutritional levels are adequate, then run samples for diseases."

Soil application effective

A key finding of Davenport's research was to determine the best way to apply phosphorus to wine grapes.

Because phosphorus has very low solubility and dispersion in soils, Davenport wanted to learn if soil applications, applied as liquids through drip systems, would be as effective as foliar applications. Additionally, she wanted to compare the amounts of phosphorus needed to remediate a low phosphorus vineyard.

In comparing foliar and soil applications, she found that soil application of phosphorus was just as effective as foliar — but without the potential for leaf burn. "We didn't have any better results with foliar versus soil applications," Davenport said.

Her experiment involved two vineyards of Cabernet Sauvignon and Merlot cultivars for a total of four trial blocks. Soil and tissue samples were taken in the four locations two years before the study was initiated to ensure the sites were deficient in phosphorus. In the 2014 and 2015 growing seasons, four rates of phosphorus were applied: zero, 12, 25 and 37 pounds per acre. The rates were divided across three applications made at bloom, one month postbloom and veraison. Applications were made through the drip system as fertigation or as a foliar application sprayed directly on the leaves.

There were no differences in crop yield or quality factors between the fertilizer treatments in either year, according to Davenport. Yield reflected the difference in management of the vineyard blocks. However, after two years of the same phosphorus fertilizer treatments, all trial plots had sufficient levels of tissue phosphorus.

She reported that there were slight differences in response between the two vineyards that were initially low in phosphorus. On the Cabernet 2 trial, leaf phosphorus reached the desired level of greater than 0.15 percent from all treatments, but was slightly higher with the foliar applications than the soil applications. On the Merlot 2 trial, all phosphorus treatments achieved the desired level except in the lowest foliar rate of 12 pounds per acre.

"While we didn't quantify leaf burn as part of the experiment, we did see leaf burn from the foliar applications in the first year from all the foliar applications," Davenport reported. "Any time you're putting on a foliar application, there is potential to lose leaf area."

Overall, the results suggest that either soil or foliar fertilizer treatments are effective. Although both types of applications worked, she recommends the soil application method as the better option because it avoids potential for leaf burn.

New nutrient guidelines are coming for wine grape growers

Dr. Joan Davenport, soil scientist for Washington State University, will soon culminate much of her career's work in the publication of nutrient guidelines for Washington wine grape growers.

Davenport's nutrient evaluation research dates back to the late 1990s. She has spent years developing meaningful nutrient guidelines for irrigated vineyards in the Inland Pacific Northwest. Her research, supported by the wine industry, involved surveying nutrient levels in grape tissue samples, field fertilizer plots and a series of studies that included taking more than 5,000 photos of vines grown in containers with adequate nutrition or induced nutritional disorders.

She is collaborating with the International Plant Nutrition Institute to optimize the format and delivery of time-lapse photos that illustrate the visual symptoms of nutritional disorders in both red and white wine grapes.

Up to now, Washington wine grape growers have relied on guidelines from other regions, like those developed by the University of California, Davis, that are based on very different climates than the Northwest. Eastern Washington soils are relatively dry and can be cold in the spring. Although vineyards are irrigated, Davenport explained there's very little plant-available soil moisture in wine grape vineyards because the soil moisture is tied up tightly.

An example of major differences between the Northwest and California is in how tissue samples should be taken. California growers commonly use petioles for tissue analysis. She found that under Northwest conditions, growers should use the whole leaf when sampling plant tissue. Timing of the sample — which she recommends be done at veraison — is also different, since tissue samples are generally taken at bloom in California.



COURTESY OF JOAN DAVENPORT

Healthy Cabernet Sauvignon leaves are on the top; bottom leaves show phosphorus deficiency.

Research data also suggest that 25 pounds per acre of phosphorus, split three times during the growing season for two years, will bring deficient phosphorus levels into the adequate range.

The project was originally intended for three years, but data collected (four different fields for two years) represented eight site years and was sufficient to address the research issues.

The frequency of phosphorus deficiency in wine grape vineyards has increased in the last few years, according to Davenport. There are several reasons this could be occurring. One is that older vineyard blocks that had phosphorus fertilizer applied pre-plant have run out of the nutrient and current supplemental programs are not supplying enough. Another could be varietal, as nutrient needs vary by variety and clone. ●

Melissa Hansen is research program manager for the Washington State Wine Commission and former associate editor with Good Fruit Grower.

"We did see leaf burn from the foliar applications in the first year from all the foliar applications. Anytime you're putting on a foliar application, there is potential to lose leaf area."

—Joan Davenport

Frost Protection

Pure. Powerful. Protection.



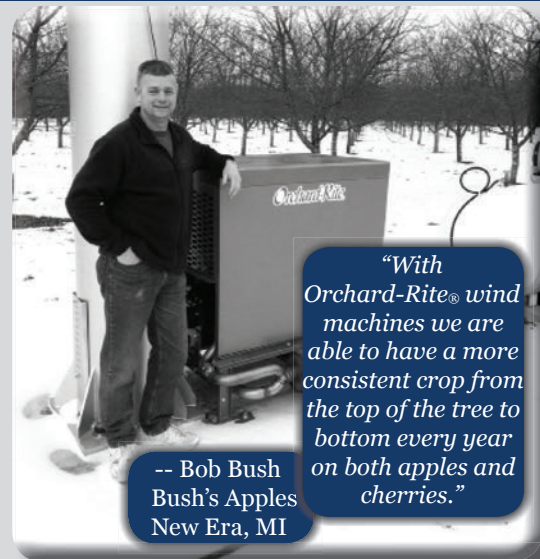
SUPERIOR

WIND MACHINE SERVICE, INC.

6919 Kraft Avenue Caledonia, MI 49316

Phone: 616-971-8177

Fax: 616-971-8178



"With Orchard-Rite® wind machines we are able to have a more consistent crop from the top of the tree to bottom every year on both apples and cherries."

-- Bob Bush
Bush's Apples
New Era, MI

"One year after I watched my neighbor save most of his apple crop with Orchard-Rite® wind machines (while I lost three quarters of mine), I decided I should do something on my farm to help ensure that I have fruit to sell every year. I purchased three Orchard-Rite® wind machines and placed them where I had good trees but couldn't set good crops because of frost. One year the tart cherry orchard where I have a machine that covers the lower two-thirds of the orchard yielded 3 times more cherries than the one-third of the orchard that was not covered. That one machine in that one year paid for itself and half of another. We were able to raise the temperature 4 to 5 degrees (Fahrenheit). We have since added four more machines. With Orchard-Rite® wind machines we are able to have a more consistent crop from the top of the tree to bottom every year on both apples and cherries.

We are very pleased with the service we get on the wind machines.

The **Superior Wind Machine Service** guys give them the once-over every year, keeping them in top-notch condition for the upcoming season!"

Orchard-Rite®
PRODUCT REVIEW

GOOD DEALS

GOOD DEALS... products and services for progressive growers

HIGH DENSITY

PRESSURE TREATED TRELLIS
POSTS
 DEPENDABLE QUALITY & SUPPLY

Order Now...
509.833.3486
www.sourcenetltd.com

SourceNet
 Connecting supply & demand worldwide
 Yakima, Washington

UNIVERSAL TRELLIS CLIP

More uses than just apple trees...

- Hold Irrigation Tubing
- Support raspberries and other canes
- Save on labor! Reusable! Easy to use!
- Available in Two Sizes!

Evans Manufacturing Company, LLC
 Phone: 360.652.4200/Fax: 360.654.0600
frontdesk@evansmfgco.com
www.appletreeholder.com



INSURANCE



Northwest
 FARM CREDIT SERVICES
 INSURANCE AGENCY

800.743.2125
northwestfcs.com

This institution is an equal opportunity provider and employer.

Leavitt Group
 Sloan-Leavitt Insurance Agency
800-439-7533
www.sloaninsurance.com

Crop & Farm Insurance

ORCHARD SUPPLIES

The NUTRI-CAL Difference

UNLOCKING THE KEY TO CALCIUM

NUTRI-CAL

Significantly improves quality, firmness, storage

QUALITY

CELLWALL INTEGRITY

Nutri-K
 The Potassium Solution



TRANSLOCATION

ABSORPTION

Visit our Web-site for more information:
nutri-cal.com

C.S.I. CHEMICAL CORP.

800-247-2480 10980 Hubbell Ave., Bondurant, Iowa 50035

PACIFIC NORTHWEST:

Walt Grigg:

509-952-7558

STOKES

The Stokes ladder is second to none for quality of construction.

- Aircraft Grade Aluminum
- Never A Plastic Part

Contact us for a catalog.

Call Today
800-843-7775

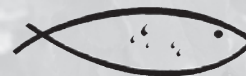


NEW
 Anti-Wear
 3rd Leg
 Pivot Hinge
 Eliminates
 Wear of Hinge

Family Owned
 and Operated
 for over 50 Years.

www.stokesladders.com

Crocker's Fish Oil



Crocker's Fish Oil, a superior Sticker/Spread, is a proven Blossom Thinner.

- Certified Organic
- Rich in Nutrients
- Non Phytotoxic

Leading growers use Crocker's in their Orchards.

Time tested by successful conventional and organic growers alike.

Crocker's Fish Oil, Inc. • P.O. Box 333 • Quincy, WA 98848
 Visit our website
www.crockersfishoil.com **1-800-700-4983**



The essential resource

goodfruit.com

POLLINATION



Antles BRAND
EST. 1929

Featuring **Vericet Gold!**



G O L D

www.antlespollen.com
p: 855-POLLEN8 (765-5368)
209-595-2056 (David) 425-466-5631 (Brian)
WENATCHEE • YAKIMA • MODESTO

NUTRIENTS

Reduce Frost Impact (depending on temperature duration)

**Potential of 10% (or more)
reduction in frost damage**

The right nutrients at the right time

- True Bio-Nutrients among smallest molecular weight
- Improve the health of your trees
- Increased photosynthesis
- All the while improving production

**For three years in a row, improved the health
of an orchard and nearly eliminated bitter pit.**

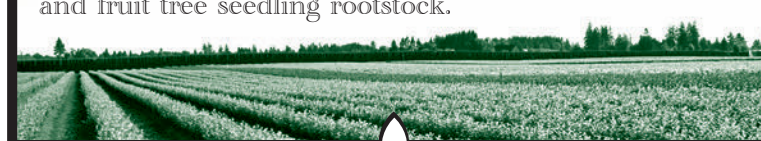
Call Robert Gruschow 585-410-2665
Gruschowinternational@gmail.com

NURSERY STOCK

Our fields are planted
with the most popular
semi-dwarf & dwarf varieties:

M.7/M.26/M.9 EMLA ■ BUD 9 ■ M.9 NAKB T-337
NIC® 29 ■ PAJAM 2® ■ GENEVA 202/30/16/11

Specializing in clonal fruit tree rootstock and cuttings,
and fruit tree seedling rootstock.



Come see us at the
Farwest Show - Booth #18015

**LIKE OUR ROOTSTOCK,
OUR SERVICE WILL GROW ON YOU.**

ALL FRUIT TREE ROOTSTOCK IS
OREGON CERTIFIED VIRUS FREE.



WILLAMETTE
NURSERIES
CANBY, OREGON

SEE OUR NEWLY UPDATED WEBSITE, WITH ALL OF OUR OFFERINGS &
AVAILABILITIES AT WWW.WILLAMETTENURSERIES.COM

503-263-6405 TOLL FREE 1-800-852-2018

CopenHaven Farms Nursery



Quality Oregon-Grown Rootstock
& Seedlings for Fruit, Flowering,
and Shade Trees.

Since 1982, Specializing in Apple,
Cherry, Plum, and Pear Rootstock.

email: copenhavenfarms@comcast.net www.copenhavenfarms.com
12990 SW Copenhaven Road • Gaston OR PH 503-985-7161 • FAX 503-985-7876

Brandt's Fruit Trees, LLC®



Growing apples, pears, and cherries
for your commercial orchard needs.

CONTRACT GROWING AVAILABLE

CONTACT TYLER, KEVIN, OR THERESA

509-248-4315

bftnursery@brandtsfruittrees.com • www.brandtsfruittrees.com

YOUR ONE-STOP SOURCE FOR TREE FRUIT VARIETIES AND ROOTSTOCKS!



TRECO
OREGON ROOTSTOCK AND TREE CO. INC.

**Premium Quality
Oregon Rootstock**

The foundation of your orchard starts here...TRECO®

Call Toll Free: 1.800.871.5141 Fax: 503.634.2344
Email: Rootstocks@treco.nu
TRECO®-Oregon Rootstock & Tree Co. • 10906 Monitor McKee Road NE • Woodburn, OR 97071

Banning
ORCHARDS & NURSERY



**Quality
Fruit
Trees**

We have over 55 years
of experience
in the nursery business.
Now taking growing contracts
for the following varieties:

- Ultima Gala USPP #13,753
- Banning Red Fuji USPP #16,624
- Honeycrisp™ USPP #7197

Your variety...Our roots

Most all rootstocks!

4000 Grant Road, East Wenatchee, WA 98802
509-884-7041

**Best trees!
NO fees!**

2016, 2017, 2018
APPLES
APRICOTS
CHERRIES
NECTARINES
PEACHES
PEARS
PLUMS

ORDER NOW 2016, 2017, 2018
BENCH GRAFTS or FINISHED TREES
Representing leading nurseries

cell: **509-961-7383**
e-mail: mbarr5@aol.com
From Grower to Grower

**MARK BARRETT
TREE SALES**

IRRIGATION AND FROST CONTROL

AgHeat Inc.
Crop Protection
in Orchards & Vineyards

Create 30% MORE useable heat with 50% LESS Fuel



RUSS SWYERS: 541-490-1928
JESS MUNOS: 541-400-4875
PO Box 1322 • Hood River, OR 97031
www.agheat.com

PACIFIC SOUTHWEST IRRIGATION

Serving the Northern San Joaquin Valley and South Sacramento Valley

EQUIPMENT & PARTS
BUY • SELL • RENT
NEW • USED

Stockton 209-460-0450 Turlock 209-634-0450 Dixon 707-678-4277

The Climate Stress Solution
Anti-Stress — 550® —


Improve Plant & Crop Performance

Frost & Freeze • High Temperatures
Transplanting • Water Stress

800.678.7377 • customerservice@polymerag.com • www.polymerag.com
Helping growers for over 25 years

**IRRIGATION/
FACILITY PONDS**

Your Single Source Geosynthetic Supplier!



Northwest Linings & Geotextile Products, Inc.

Geomembrane Liners, Floating Covers, Baffles, and Installation.
Geotextiles, Geogrids, and More!

"Helping to Protect the Environment"

253-872-0244

21000 77th Ave S
Kent, WA 98032
www.northwestlinings.com

SUPERIOR WIND MACHINE SERVICE, INC.

6919 Kraft Avenue • Caledonia, MI 49316 • 616-971-8177 • Fax: 616-971-8178

Distributor of... **Orchard-Rite® WIND MACHINES**

Sales: Lee DeLeeuw Cell: 616-893-4507
"Dependable Frost Protection"
Service: Brad DeLeeuw Cell: 616-299-3992

For your nearest Orchard-Rite representative, visit our website: www.orchard-rite.com

CASCADE WIND MACHINE SERVICE

Distributor of... **Orchard-Rite® WIND MACHINES**

Sales: Virgil Anders • 509-945-3046 YAKIMA VALLEY, TRI-CITIES, OREGON
Dana Morgan • 509-421-3494 WENATCHEE, OKANOGAN, N. COLUMBIA BASIN

Service: Darren Cort • 509-457-9196 ext 101 YAKIMA VALLEY, TRI-CITIES, OREGON
John Vickrey • 509-662-2753 ext 201 WENATCHEE, OKANOGAN, N. COLUMBIA BASIN

For your nearest Orchard-Rite representative, visit our website: www.orchard-rite.com

PACIFIC DISTRIBUTING, Inc.

125 SOUTH BLAIR ROAD, WOODLAKE, CALIFORNIA 93286

Distributor of... **Orchard-Rite® WIND MACHINES**

SALES: Randy Quenzer CENTRAL CA 559-805-8254
Jeff Thorning NORTHERN CA 559-972-9937
Chad Hymel SOUTHERN CA 559-909-0008

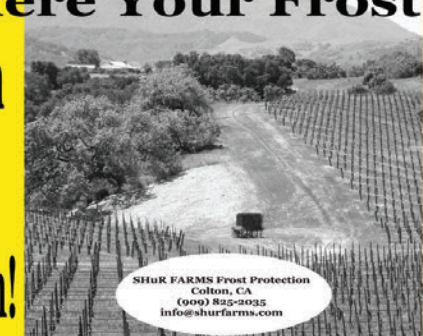
"Dependable Frost Protection"

SERVICE: Justin Landers 559-564-3114

For your nearest Orchard-Rite representative, visit our website: www.orchard-rite.com

Put Your Money Where Your Frost Is!

Precision Frost Protection! Target Those Frost Pockets!



SHUR FARMS Frost Protection
Colton, CA
(909) 825-2035
info@shurfarms.com

READ ALL ABOUT IT !
www.shurfarms.com

Drive Change
Donate a vehicle today!



Tax Deductible & Free Towing!

We accept old cars, trucks, farm equipment, tractors, boats, trailers, and RV's.

 Washington Apple Education Foundation
www.waef.org/give/#auto-donation

GRAFTING

Whitney's Grafting Service

If you need
bench grafts
or field
grafts...
**we can
do it!**



Using
proven
techniques
and quality
materials...
Since 1948

**ORCHARD
GRAFTING
SERVICES**

"Your Success Is Our Success!"

Call DAN: 509-930-1420

509-930-1420 mobile • 8521 Naches Hts. Rd. Cowiche, WA 98923

GROWER SERVICES



Earthworm Casting & Earthworm Casting Tea

Earthworm castings are the purest and perfect form of soil enhancement for plants. They are completely natural, safe for the environment and easy to use. The beneficial bacteria and microbes within the castings assist plants to suppress diseases and other stress.

- Balances pH and helps retain moisture, reducing water usage
- Nutrients readily available for plant uptake
- Rich in beneficial bacteria and microbes
- Improves soil structure and fertility
- Reduce exposure to harmful chemicals



661-770-6594 | www.vermisterra.com | pviss75652@aol.com



TREPANIER EXCAVATING, INC.

Joe Trepanier, Owner

"Serving farmers for 45 years"

Tree & Stump Removal

- Vineyard Removal • Digging Mainline
- Land Clearing • Ponds • Demolition
- General Excavating • Anchor Holes
- Track Hoe • Backhoe
- Track & Rubber Tire Loader
- Dump Trucks • Clam Shell Buckets
- Fans for Burning • Free Estimates

509-952-8684

509-678-4587

Member of Better Business Bureau

COMPOST

Midvale Organic

CREATING
CONSISTENT QUALITY
MANURE COMPOST

- WSDA certified for application on organic crops
- Meets G.A.P. requirements
- Highest NPK and micro-elements available in the industry
- Increased organic matter and water retention
- Reliable and dependable source
- Delivery available



Turned and monitored
under W.O.R.C.
guidelines and
W.S.D.A. requirements



Orchard & Vineyard
**SPREADING
AVAILABLE**

**Midvale
Organic**

A Division of Midvale Cattle Co. LLC

Call Today:

509-840-4509 or 509-837-3151

1691 Midvale Road Sunnyside, WA 98944

midvalecattleco@gmail.com

PRUNING



FREE ESTIMATES FOR ORCHARD REMOVAL/RENEWAL/EXCAVATION

Serving farmers for over 30 years

- Pull—Pile—Burn • All Excavation Types • Immediate Deep Replant Ripping

BOB MEYER / FMF EXCAVATION

509-848-2550 • 509-949-2601



Fruit Grower Tools

Tying | Harvest | Pruning | Grafting | Safety
www.zenportindustries.com

888-556-7756

Battery Powered Pruners

- 1.25-inch and 1.5-inch cutting capacity models
- 15,000 pruning cuts per battery charge
- Includes lithium battery, harness, holster and carrying case

Grafting
Tools

Harvest Bags

Tying Tools & Supplies

Stem Clippers

COATINGS

GREAT WESTERN COATINGS

AN INDUSTRIAL SERVICES COMPANY

GWC

COOL ROOF COATING APPLICATORS

WWW.GREATWESTERNCOATINGS.COM 425-750-4250

- ✓ Solution For Every Roof
- ✓ Pacific Power Authorized
- ✓ Energy Rebate Certified
- ✓ No Roof Tear Off
- ✓ Outstanding Durability



**Providing Soil
Amendments
and Consulting to
Improve Soil Health**

- Pescadero Gold Mustard Seed Meal
- Mighty Mustard Cover Crop Seed
- Farm and Soil Consultation

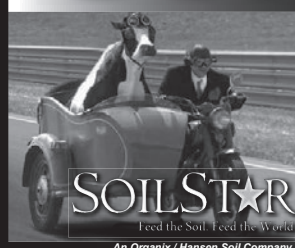


Visit us online at:
www.farmfuelinc.com

Call us!

831-763-3950

COMPOST



Tested & Certified!

WSDA, OMRI, GAP, SQF

Delivered & Spread!

30 or 30,000 tons • Orchard, Vineyard, Hops, Crops

SOILSTAR
Feed the Soil. Feed the World.
An Organic / Hansen Soil Company

509.527.0526

EQUIPMENT

AD INDEX

Blueeline USED GRAPE HARVESTERS

NAIRN 680 Pull Type
Rebuilt. New electric controls **\$43,000**

GREGOIRE G60 Pull Type
Rebuilt **\$69,000**

KORVAN 312 Self Propelled
1100 Hrs. Very clean **\$68,000**

GREGOIRE G117 Self Propelled
Cab, 4wd **\$72,000**

GREGOIRE G8 Self Propelled
Cab, 4wd, 700 Hrs, 4 yrs old **\$225,000**

Call Blueline Equipment
Today For More Details ... **509 248-8411**



MOWERS

www.vanwamel.nl

Rotary
Orchard
Mowers
4'7"-12'6"



3-point hitch
and trailed
Swing Arm
Mowers
7'3"-11'2"



Variable
Width
Mowers
4'11"-14'5"



Flail Pruning
Choppers
3'11"- 8'11"



Brush
Sweepers

Contact Blueline Equipment for your
nearest dealer: 509-248-8411

Distributors: N.M. BARTLETT: Beamsville (Ont.), (905) 563-8261 FARMCO
SALES: Kelowna, (B.C.), (250) 765-8266 AGTEC CROP SPRAYERS: Plymouth
(IN) (800) 704-4292 BLUELINE LLC: Yakima (WA), (509) 248-8411 CAL-AG
ENTERPRISES Fowler (CA) (559) 834-1588

VAN WAMEL B.V.

Energieweg 1 - P.O. Box 4
6658 ZG Beneden-Leeuwen
HOLLAND
Tel. +31 (0)487 592944
Fax +31 (0)487 592970
E-mail perfect@vanwamel.nl

Your fruit growing
partner SINCE 1947

QUALITY • LONG LIFE • SERVICE

Row Mulch Spreaders For All Growers



Whatcom Manufacturing's Mulch Spreaders are specifically engineered for fast, easy and precise mulch application. Whether it's for moisture evaporation, weed control, amendments or enhancing soil tilth, the Whatcom Manufacturing Mulch Spreader saves time and money.



Created with your needs in mind, they are available in multiple sizes with numerous options and features. They are built to accommodate all applications using mulch, sawdust, shavings, manure, solids, gypsum, organic compost, wood chips, etc.



Whatcom Manufacturing Inc.
Lynden, Washington
Phone: 360.354.3094
Internet: www.whatcommfg.com
Email: info@whatcommfg.com

CUSTOM BUILT EQUIPMENT
Built to Last



Vineyard/Orchard Weed Control

Cut or Eliminate Your
Chemical Weeding Costs!

See for yourself at:
WonderWeeder.com

AgHeat	50
Agro Liquid	35
Agro-K	55
Antles Pollen	49
Banning Orchards	49
Bayer	9
Bleyhl Farm Service	14
Blueline Equipment	52
Bob Meyer/FMF Excavation	51
Brandt's Fruit Trees	49
Burrows Tractors	30
C & O Nursery	7
Cameron Nursery	5
Cascade Wind Machine Service	19, 50
Chamberlin Agriculture	45
CopenHaven Farms	49
Creative AG Products	37
Crockers Fish Oil	48
CSI Chemical	48
Cultiva	26, 27
Diamond K Gypsum	44
Dow AgroSciences	23, 43
DRAMM	18
DuPont	2
Evans Manufacturing	48
Farm Fuel	51
Fine Americas	25
Firman Pollen	36
Fowler Nurseries	22
Fusion 360	21
G.S.Long	6
Great Western Coatings	51
Gruschow International	49
J L Organics	51
Mark Barrett Tree Sales	49
Meadow Creature	38
Midvale Organic	51
Miller Chemical	18, 44
N.W. Farm Credit	48
Northwest Linings & Geotextiles	51
NovaSource (TKI)	31
Nutrient Technologies	10
Oregon Vineyard Supply	41
Organix (SoilStar)	51
Ozone International	45
Pacific Distributing	34, 50
Pacific Southwest Irrigation	50
Polymer Ag	40
ProTree Nursery	39
Scentry Biologicals	14, 37
Shur Farms Frost Protection	50
Sierra Gold Nurseries	42
Sloan-Leavitt Insurance	48
Source Net (Greg Benner)	48
Stokes Ladders	48
Superior Wind Machine Service	47, 50
Syngenta	17
Trec'e	13, 33
TRECO	49
Tree Connection	19
Tree Logic (Greg Benner)	51
Trepanier Excavating	51
UPI Assail	11
Van Wamel B.V.	52
Van Well Nursery	56
Westbridge	22
Whatcom Manufacturing	52
Whitney's Grafting	51
Willamette Nurseries	15, 49
Willow Drive Nursery	20
Wilson Orchard & Vineyard Supply	38
Wonder Weeder	52
Zenport Industries	51

CLASSIFIED

509-853-3520
800-487-9946
509-853-3521 fax
getit@goodfruit.com

BINS

OVS MACROBINS. The original PNW distributor offering the full range of MacroBins. 800-653-2216 Ext. 1, www.ovs.com.

BIRD CONTROL

WILSON IS THE LEADER in custom bird netting programs for all types of crops. Full line of bangers and bird irritant items. Call 509-453-9983.

NATURAL CONTROL. The American Kestrel Falcon will give you LOW COST bird control. Call Ben at Orchard Guard: 509-910-6598, www.orchardguard.com.

BLUEBERRY PLANTS

BLUEBERRY NURSERY STOCK. Our focus is customer success. Best variety selection. Plants available now. Impeccable service and grower support. Fall Creek Nursery, www.fallcreeknursery.com, 800-538-3001.

CA STORAGE

CA STORAGE AVAILABLE, 10 West Mead, Yakima WA: 18 CA rooms with storage for 24,420 bins. Call Roger Ellis at 509-945-1718 or 509-673-5371.

EMPLOYMENT AVAILABLE

CORNERSTONE RANCHES is seeking a full-time Production Manager to help organize, supervise and implement practices that ensure the upmost quality in its 1,100 acres of hops, apples and grapes. The ideal candidate would have at least a bachelor's degree in Crop Management or Agronomy, however, practical skills and experience will be considered in lieu of academic qualifications. Good communication skills and analytical thinking is a must. Responsibilities would include interacting with different company field men, growers, and chemical consultants and adhere to team planning. Monitor and maintain soil and plant fertility. Implement irrigation practices. This is a salaried position with benefits. Contact Brenda Martinez, 509-865-2958, brenda@cornerstoneranches.com.

FROST PROTECTION

FROST OR FREEZE protection got you down? Warm up with AgHeat's propane heaters to protect your crops. Call or e-mail, agheat@gmail.com, 541-400-4875. www.agheat.com.

FRUIT TREES

TREES STILL AVAILABLE for 2016, 2017, & 2018. Supplies are going to be very limited, so order today! Representing the nation's PREMIER fruit tree nurseries. Stan Peterson Fruit Tree Sales, (cell) 231-499-9292, 888-333-1464. stan@fruit-treesales.com, www.fruit-treesales.com. 2574 S. Benedict Road, Lundington, MI 49431.

QUALITY TREES for quality growers, sales agent for Van Well Nursery and C&O Nursery. Mike Anderson, 509-952-3538.

FUMIGATION

TRIDENT AGRICULTURAL Products, Inc., specializing in soil fumigation for orchards, vineyards, hops, berries, nurseries, and other crops. Hood River or The Dalles, 971-563-8848; Yakima and Wenatchee, 509-728-2004; Columbia Basin, 509-731-5424; Okanogan Valley, 509-828-0691; Northwest Washington, 360-630-4285.

CUSTOM ORCHARD Fumigation Re-planting? No job too small. Call now to schedule your applications. 509-687-9572. Serving all of Washington. Visit us at CustomOrchardFumigation.com.

GRAFTING

SALVADOR ZARAGOSA professional grafting, chip budding, and budding bench grafting. We guarantee 95% take. Mobile, 509-961-2986.

PROFESSIONAL GRAFTING and service. Small and large acreage. 20 years' experience. Jose Mendez, 509-584-0034 or (mobile) 509-949-1321.

GRAFTING AND BUDDING supplies. Two types graft machines, waxes, budding rubbers. Top of the line grafting knives, online www.wilsonnirr.com, 509-453-9983.

GARY McMONAGLE Grafting, growing for 30 years with over 20 million field grafts of experience, including millions of chip buds and bench grafts. 509-669-1686.

ERNIE'S GRAFTING, professional service. 17 years quality experience. Immediate and long-term satisfaction guaranteed. 509-689-0569 or 509-322-2325 (mobile).

SCIONON® GRAFTING TOOLS, Bio-Graft™ tape, Bud Clips and other innovative nursery, grafting supplies and equipment. Exclusive US/Canada distributor. Download our catalog and view our YouTube videos at www.GraftingSystems.com. Toll free 800-386-5600. Cell 269-921-6892. Ask for Matt Moser.

ZAMORA'S GRAFTING. Many Central Washington growers satisfied with our unsurpassed results. Over 30 years experience. Contact Ramiro Zamora at 509-689-6932 or 509-733-2754.

GROWER HOUSING SUPPLIES

STURDY METAL BUNK beds and mattresses for H2A farm worker housing. Two week lead time from order to delivery. Free on-site delivery with larger orders. Call Crown Furniture, Wenatchee, WA, 509-663-4814 or 509-670-4011; fax 509-663-6326; or e-mail crown1@nwi.net today for a quote.

ORCHARDS FOR SALE

PROSSER, 18 ACRES cherries, shop and wind machine. Wine Country Road, 295K, serious inquiries only. 509-760-5484.

ORCHARD LEASE WANTED

LEASING FARMS? Dedicated and experienced farmer interested in leasing apple, cherry, and pear farms in Eastern Washington. Call 509-480-2196.

ORCHARD SUPPLIES

WILSON IS YOUR SOURCE for all types of fabric and plastics used in farming. Shade, wind screens, greenhouse films, and mulches. 509-453-9983.

WILSON'S HIGH Spanish style greenhouse tunnels. Early and increased production and crop protection. www.growtunnel.com. 800-232-1174.

TRELLIS SUPPLIES. Largest manufacturer direct selection available: Planting guidelines, trellis designs and products and more. Visit www.ovs.com to download your free copy!

ORCHARD REMOVAL

PUSH, PILE, BURN. Services for orchard and tree removal, also ripping and discing available. Yakima Valley 509-379-1166.

PACKING EQUIPMENT

USED PACKING EQUIPMENT: We specialize in meeting your needs for used cherry, apple, and soft fruit packing and hydro cooling equipment. We custom fabricate as well. Call 206-321-8378.

PORTABLE HYDROCOOLER and small cherry line with sizer and cluster cutter, could be used as Rainier line. 206-321-8378.

COMPLETE CHERRY packing line from destacker to printers. Will sell all or parts, including Van Doren cherry baggers. 541-354-2365.

ROOTSTOCKS

TRECO® ROOTSTOCKS mean quality. Buy from the industry leader. TRECO has supplied 60 percent of the nation's malus rootstock needs to the nurseries for more than 70 years. Go directly to the source and buy the rootstocks trusted and preferred by the major nurseries: TRECO; PO Box 98, Woodburn, OR 97071. Ph: 1-800-871-5141; fax: 503-634-2344; e-mail: rootstocks@treco.nu or website: www.treco.nu.

CARLTON PLANTS, LLC is a quality grower of virus-certified rootstocks and seedlings for fruit, flowering, and shade trees. Apple: M9-NIC, M26, M7, M25, MM106, MM111, domestic. Cherry: Mazzard, Mahaleb. Pear: calleryana, communis. Plum: M29C, St. Julian. For questions or to place an order, please call our sales department, 800-398-8733 or fax 800-442-1452.

COPENHAVEN FARMS NURSERY. "We're at the Root of The Business." Quality Oregon-grown rootstock and seedlings for fruit, flowering, and shade trees. Specializing in virus-free apple, cherry, plum, and pear rootstock since 1982. Christopher and Marilyn Dolby 503-985-7161; Fax: 503-985-7876. E-mail: copenhagenfarms@comcast.net, www.copenhagenfarms.com.

FIRDALE NURSERY, certified apple rootstocks: EMLA.7, EMLA.106, EMLA.111, M.9 (337) and BUD 9. Beaverton, OR. 503-628-2755.

WILLAMETTE NURSERIES offers Oregon-grown, virus-certified fruit tree rootstock, including popular M.9 clones and other dwarf and semi-dwarf varieties, and fruit tree seedlings (apple, cherry, pear & plum.) Excellent quality, reasonably priced. Outstanding service. Visit us at: www.willamettenurseries.com. Willamette Nurseries, 25571 S. Barlow Road, Canby, OR 97013. 800-852-2018, 503-263-6405. E-mail: willamette@canby.com.

CERTIFIED VIRUS FREE M9-T337/ other rootstock for Spring 2017 delivery. Order now while supply lasts. Call Greg Benner, TreeLogic USA, LLC at 509-833-3486 anytime to reserve your stock! Since 1972.

SPRAYERS

COMPLETE LINE of sprayers. Swihart Sales Company, Quinter, KS. 800-864-4595, www.swihart-sales.com.

STAKES / POSTS / POLES

QUALITY PAYS—Princeton Wood Processors pressure-treated posts, poles. Quoted by truckload. P.O. Box 1269, Penticton, B.C., VOX 1W0 Plant phone: 250-295-7911; toll free, 877-797-7678. E-mail: elizabeth@pwpost.com. Web: www.pwpost.com.

PANHANDLE FOREST PRODUCTS: Quality posts, poles, and stakes. CCA pressure-treated, with delivery. Partial loads. 888-289-7678; www.panhandle.com.

POSTS, POLES, AND STAKES: Pressure treated in the USA. Various sizes and lengths. Untreated available for organic growers. Jasper Enterprises, Inc., P.O. Box 102, Chattaroy, WA 99003; phone 800-238-654, or e-mail sales@jasper-inc.com.

STEEL APPLE and grape trellis. Custom systems available. Bamboo, treated wood, top of the line quality and service. Online catalog. Wilson Vineyard and Orchard Supply, Yakima, WA. 509-453-9983, www.wilsonnirr.com.

TRELLIS SUPPLIES. Largest manufacturer direct selection available: Jim's Supply, Euro posts, organic wood, PWP Wood Posts, Davis Wire, Tough-Strand Fencing, bamboo and more. 800-653-2216 Ext 1, www.ovs.com.

TREE SPREADERS

BEST PRICING: notched and nailed. Wilson, 509-453-9983.

"V" SPREADERS. treeform@sympatico.ca, 519-599-2299, or John DeMartini, 209-484-8502 and ryan@firmanpollen.com (western contacts).

TREE TRAINING

TREE TRAINING and trellis supplies online at www.wilsonnirr.com.

TRELLIS SUPPLIES

LARGEST MANUFACTURER direct selection available: Planting guidelines, trellis designs and products and more. Visit www.ovs.com to download your free copy!

WIND MACHINES

CHINOOK WIND MACHINES, sales/service. All makes, new/used. H.F. Hauff Company, Inc., 509-248-0318.

CASCADE WIND MACHINE Service, distributor of Orchard-Rite® wind machines. P.O. Box 9308, Yakima, WA 98909, phone 509-457-9196; Wenatchee, WA 509-662-2753; British Columbia, 250-495-7245.

WIND MACHINE SALES: sales/service, new and used wind machines. 509-877-2138.

WINE GRAPE PLANTS

WINE GRAPE PLANTS for sale. Cabernet Sauvignon #8, Syrah Phelps clone. 509-832-2066, Jeff.

CLASSIFIED ADS are \$1.29 per word per insertion. Ads up to ten words are charged a minimum of \$12.00. Include name, address, and phone number in figuring the cost. Count hyphenated words as two words. Count each initial, abbreviation, symbol, whole number, as one word. State and zip code count as two words. **BLIND BOX SERVICE** is available for additional \$10.00 per issue (plus word count). Replies forwarded daily, postage paid.

GOOD TO GO

For complete event listings, check the Calendar at www.goodfruit.com

MAY

May 18-20: Washington State University Viticulture and Enology Program's British Columbia Okanagan Valley educational tour, wine.wsu.edu. For more information, email Theresa Beaver at tbeaver@wsu.edu.

JUNE

June 1-2: Pear Bureau Annual Meetings, Portland, Oregon, usaappears.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/PTShortCourse.

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.

LAST BITE

More Young Growers at goodfruit.com/yg

Eladio Gonzalez

grower / Selah, Washington

age / 31

crops / Apples, cherries, wine grapes

business / Orchard manager of G.S. Long test orchards

family background / Eladio, a second-generation farmer from the upper Yakima Valley, worked alongside his father, Miguel Gonzalez, in orchards and now manages several test orchards in Naches, Washington.

How did you get your start?

“I got into the industry as a little kid watching my parents working in orchards. Both migrated from Mexico to the U.S. in the early '80s. Working in the ag business is all they've known. My siblings and I would be out with them helping out doing little things like moving water jugs and food for them. I was in and out of the orchard all the time because I loved it. Growing up I always said I wanted to be like my dad and do the work. Now that I am, I know I wouldn't do anything different now.

What changes do you see in the future orchard?

“Drought is going to be a future issue, and we're working to waste less water, like electrically operated valves that are triggered by a computer to zone in on your dry spots. These valves and manifolds will help you dial in what you're putting in the ground so you aren't irrigating the old-style way of watering for 12- or 16-hour sets. Now you can change sprinkler heads to micro-sprinklers that can help you water in half the time, or put water probes in the ground to help minimize issues. Back in the day we were farming 18-foot rows. Now we have these new high-density trellis systems. New trellis systems mean more trees in the ground per acre; it's amazing to see these systems produce. Sometimes you hear about farms that are picking 160 to 170 bins per acre, when they were only able to produce 60 to 80 bins per acre on a lucky day on the older orchards. That's just how the industry is evolving.

What are some things you are bringing to the orchard?

“If I can help make people aware of work-related risks, it will help cut overall labor costs. When you train someone about something as basic as wearing safety glasses in the field, things like that will go a long way. You never know when you'll get poked in the eye and if they aren't wearing glasses, they'll be down for maybe the rest of the year. What does that do to everyone's pocketbook?

“I didn't expect any freebies starting out. ...everything was so interesting and new.

by TJ Mullinax

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

SPONSORED BY



G.S. LONG COMPANY

www.gslong.com



PLAY



scan to watch the interview

goodfruit.com/yg



Sysstem-CAL[®]

The Perfect PGR Partner

Apple growers need to do many things early season at the same time to ensure quality fruit at harvest. Four of the most important early seasons tasks are 1) maximizing calcium uptake into the developing fruit, 2) improving fruit size 3) managing terminal growth and 4) managing tree fruit load. Sysstem Cal from Agro-K can improve the performance of the most important PGR tools used for sizing, thinning and managing terminal growth that are critical to maximizing fruit quality and grower profitability. **Now you can do all these critical tasks while also supplying systemic calcium during peak demand. Sysstem-CAL[®], Agro-K's foliar calcium is the perfect apple PGR tank-mix partner.**

Effects of Sysstem-Cal & Maxcel on Size of McIntosh Apples

Treatments		
Petal fall	10 mm	fruit wgt (gr)
Untreated Control	Control	156 c
Carbaryl 1 lb/100 gal + NAA 7.5 ppm	Carbaryl 1 lb/100 gal + MaxCel 100 ppm	191 b
Carbaryl 1 lb/100 gal + NAA 7.5 ppm + Sysstem-CAL 2 qts/100 gal	Carbaryl 1 lb/100 gal + MaxCel 100 ppm + Sysstem-CAL 2 qts/100 gal	255 a

Trial conducted by Duane Greene, University of Massachusetts 2010

Effects of Sysstem-Cal on Size of Gala Apples

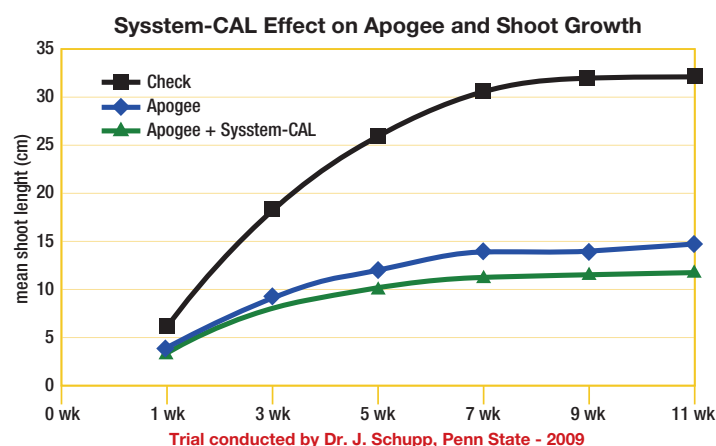
Treatments		Fruit Size		
Petal fall	10-13 mm	<2.75"	2.75" -3"	>3"
Carbaryl 24 oz	Carbaryl 24 oz + Maxcel 2qts	46.0	41.0	13.0
Carbaryl 24 oz + Sysstem-Cal 2qts	Carbaryl 24 oz + Maxcel 2qts + Sysstem-Cal 2qts	39.0	37.0	24.0

Trial Conducted by Reality Research, Wayne Cty, NY - 2010

Large, firm apples, free from bitter pit generate the highest per acre return. Private and university research shows Sysstem-Cal's positive effects on size. Dr. Duane Greene, UMass stated, *"clearly Sysstem-CAL when combined with MaxCel[®] had a profound effect on increasing fruit size."* Not only does Sysstem-CAL aid in maximizing fruit size, but it also supplies needed calcium at the same time for better firmness and storage life.

In 2011 Dr. Fallahi (Univ. of ID) saw similar results as Dr. Greene (UMass) and had these comments: *"Un-treated controlled had smallest fruits. But those with Sysstem-CalTM 2Qts + MaxCel[®] 128oz at 5-10mm@200G/A had the largest fruit of any of the*

treatments. Fruit from trees receiving Grower's Treatment (Sevin and NAA) had lower firmness at harvest as compared to control and the Sysstem-CalTM and MaxCel[®] treatments. Enrichment with Ca from Sysstem-CalTM could have also contributed to higher firmness in Sysstem-CalTM-treated fruits."



Apples need early season calcium for best quality. Growers want early applications of Apogee[®] to manage terminal growth, but calcium can be antagonistic to Apogee[®]. University research from WSU, Penn State and UMass as well as private researchers have documented that Sysstem-CALTM does not interfere with Apogee[®], allowing it to control terminal growth and help growers manage fire blight more effectively.

The unique formulation of Sysstem-CAL links calcium to a highly systemic phosphite. This patent-pending technology provides rapid calcium penetration and translocation into the fruit where calcium is most needed. Sysstem-Cal maximizes calcium and cell wall development, resulting in reduced bitter pit and improved pack-out while maximizing storage and shelf life. Call **800-328-2418** or visit **www.agro-k.com**.

Science-Driven NutritionSM

Effects of Sysstem-CalTM (Sys) and MaxCel[®] (Max) Yield and Fruit Quality

Treatment	Avg. Weight (g)	Yield Kg/Tree	Sunburn %	Firmness 2.5mths Storage	Rotten %	Ca (ppm)
Control	188.2	29.77	8.2	6.950	5.82	5.45
Maxcel 128oz PF	217.7	29.67	11.1	6.953	8.04	6.02
Sysstem-Cal + Maxcel 128oz 5-10mm	227.1	46.17	6.7	6.699	5.56	6.25
Grower Std.(Sevin & NAA)	221.6	36.78	8.4	6.146	10.71	6.05

Dr. Essie Fallahi, Univ. of Idaho, 2011



AGRO-K CORPORATION

8030 Main Street, NE • Minneapolis, MN 55432

800-328-2418 • www.agro-k.com

Available NOW for Spring Delivery

APPLES on EMLA 106



Adams Apple®

- Adams Apple® Red Delicious
- Auvil Early Fuji®
- Rock Island Red Fuji™

APPLES on EMLA 111

- Adams Apple Red Delicious



Ginger Gold®

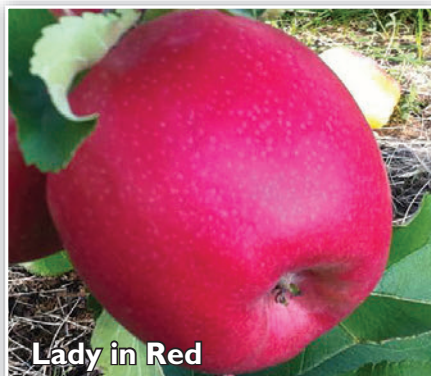
- Ginger Gold®
- Liberty
- Lodi
- Redfield® Red Braeburn
- Scarlet Spur II Red Delicious
- Snapp™ Red Stayman

APPLES on EMLA 26

- Gale Gala®

APPLES on EMLA 7

- Idared
- Macoun



Lady in Red

- Lady in Red
- Royal Court™



Redfield® Red Braeburn

- Redfield® Red Braeburn

APPLES on Bud 118



Scarlet Spur II

- Scarlet Spur II Red Delicious

APPLES on Geneva® 202



Gale Gala®

- Gale Gala®

APPLES on M 9 (337)

- Rock Island Red Fuji™

CHERRIES on Giesela® 12

- Bing
- Skeena

CHERRIES on Mazzard

- Attika®
- Black Republican
- Chelan™



Early Robin®

- Early Robin®
- Lapins
- Skeena
- Stella
- Sweetheart™

APRICOTS on Seedling



Goldbar™

- Goldbar™
- Goldstrike™



Van Well Nursery® Grown in the U.S.A.
HELPING GROWERS GROW™ | WENATCHEE, WASHINGTON

P.O. Box 1339 Wenatchee, WA 98807 PHONE 509/886-8189 FAX 509/886-0294
WEB vanwell.net EMAIL vanwell@vanwell.net

If you don't see what you need, CALL US! | 800/572-1553



CONTACT YOUR NEAREST VAN WELL FIELDMAN

Ramiro Avilez MOBILE 509/433-8701 or 509/886-8189 Phil Doornink MOBILE 509/833-3605

*Visit our website for Complete Cultivar, Variety and Plant Patent Information.

