

Horticulture 2018

72nd Lake Chelan Horticulture Day Wrap Up

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Fire blight identification, prevention, management explained



Gwen Hoheisel demonstrates calibration of a sprayer.

Photos courtesy of Tianna DuPont, WSU Extension

BY ERIN ROSSELL, STAFF WRITER

CHELAN – Fire blight, a disease effecting apple and pear trees, is caused by *Erwinia amylovora*, a rod-shaped bacterium. The bacteria grow by dividing, with a rapid division rate in temperatures 70 degrees and above. The disease can be detrimental to first and second leaf fruit trees and can overwinter in the

blight canker with 20 to 50 percent of the pathogen cells surviving into the next bloom period. The prevention and management of the disease was the focus of the presentation led by Tianna DuPont, of WSU Extension, during the Lake Chelan Horticultural Meeting, Monday, Jan. 15 at Chelan High School PAC.

One to two weeks after petal fall, visible symptoms appear on infected blossoms

resulting in a dull, gray-green appearance on the floral receptacle, ovary and peduncles. In infected shoots, rapid wilting may be visible and can “often show blackening along the midrib and veins before becoming fully necrotic,” according to the WSU Tree Fruit website, which also pointed out the key indicative feature of infected shoots being the clinging of the shoot “firmly to the host after death.” The

bacteria from the infected flower cluster move in the phloem of the plant tissue, explained DuPont, “much more quickly than you actually see symptoms.”

So, now the bacteria are moving in the phloem and you’re getting more and more infection, DuPont stated, “you’re concentrating in the shoot tips because the phloem is moving that direction.”

SEE BLIGHT ON PAGE B2

Proper weed I.D. is critical for maximum herbicide control

BY MIKE MALTAIS, STAFF WRITER

CHELAN – Weeds, while a nuisance to most agriculturalists, are highly adaptable living species in their own right and require an arsenal of research, identification, and understanding to best determine how to control their presence in crop environments.

Lynn Sosnoskie, a WSU weed scientist began her discussion at the 72nd Lake Chelan Horticulture Day with a primer on the various methods used to identify weeds.

One way is by growth form, whether a grass species or broadleaf species, said Sosnoskie. Another way is by life cycle; annual,

“The strategies that we use to manage weeds differ based on their life cycle,”

Lynn Sosnoskie, WSU weed scientist

biennial, or perennial. An annual weed, such as common lambsquarters, completes its life cycle within a single year.

A biennial, like wild carrot, occurs over two years, with a rosette forming the first year, dormancy over the

SEE WEED ID ON PAGE B2



Photo courtesy missouristate.edu

Common lambsquarters completes its life cycle within a single year.

Proprietary Variety Management team provides Cosmic Crisp updates for growers, consumers

Consumer, retailer excitement for the apple is out of this world

BY ERIN ROSSELL, STAFF WRITER

CHELAN – Washington State’s newest pride and joy in the apple varieties, the WA 38 “Cosmic Crisp”, has been a big topic throughout not only Chelan Valley, but all of Washington State, and was the basis of the presentation provided by Proprietary Variety Management (PVM) Vice-President Kevin Brandt and Director of Marketing and Operations Kathryn Grandy.

The Cosmic Crisp apple variety has been in the development process since 1998, when seeds were germinated and raised in a greenhouse until planting and eventually budding in 1999. The Enterprise-Honeycrisp offspring offers the beautiful red coloration that Washington Apples are well-known for, and the sweet crunch found in the honeycrisp. The pleasantly balanced sweet and tart taste of the Cosmic Crisp is not the only an excellent tasting apple, but it also maintains freshness longer, taking slower to brown when cut and

“maintains its texture and flavor in storage for more than a year,” according to the Cosmic Crisp website.

Brandt began the presentation with updates on the grower’s side of the spectrum, focusing on the purchasing, growing, sale and distribution of the Cosmic Crisp. A limited number of trees for WA 38 were made available to Washington State growers in 2017, whom were chosen by way of a drawing. There were only a limited amount available because there were only a limited number of budwood to grow trees, explained Brandt, “2018 is open to any Washington State grower, right now we have 5 million trees in the books.”

PVM has the rights to commercialize WA38, and in doing so has given the exclusive propagation rights to the Northwest Nursery Improvement Institute (NNII). At this time, the trees



Kevin Brandt, vice-president, Proprietary Variety Management (PVM)

can only be purchased through a participating NNII member nursery, in which 11 of the 13 member nurseries are participating in growing, propagating and selling the WA38 ‘Cosmic Crisp’ trees, he emphasized to the audience. You’re

allowed to propagate your own trees outside of purchasing from the NNII nurseries, Brandt explained, “but we have to do so in a specific manner,” he expressed, explaining, “what you have to remember is this is not an open variety ... it’s a managed variety. It’s patented, it’s trademarked, and it’s only available to Washington State growers for the next 10 years.” The propagation material, he continued to explain, can only be taken out of G1 through G4, that references certified material. “Once that leaves the nurseries and is put out into the orchards, that’s no longer considered



Photos courtesy of Kevin Brandt, Proprietary Variety Management

Cosmic Crisp apples.

certifiable,” he said, “the state does not certify anything that’s placed in the commercial orchards, so we can’t take any propagation off of that. We can take it off the trees in the nurseries, and the certifiable material.” If you’re considering propagating, you would need to obtain a one-time propagation agreement, said Brandt, “that one-time propagation agreement is given directly to you, you

can use that agreement to go to another nursery if you want.”

The budwood from the WA 38 is used in three ways. First, and most importantly, it is used to produce trees within the NNII network to supply the industry, then leftover budwood is used for grafting, and lastly, anything after that goes out to anyone who interested in individual tree propagation. There are no

propagation fees, explained Brandt, but there is a 25-cent industry support propagation fee “to give back to the research and industry”. You can also expect the standard budwood collection fee from the nurseries, that’s standard, but there’s nothing on top of that. Other fees that you may come across include a \$1 royalty fee. “That’s straight across,” he expressed, “when

SEE COSMIC ON PAGE B3



Researcher Jared Dean, with Tianna DuPont's lab team of WSU Extension, inoculates fire blight in order to look for new management tools.



Photos courtesy of Tianna DuPont, WSU Extension
A young branch of leaves displaying signs of a fire blight infection.

BLIGHT

CONTINUED FROM PAGE A1

The young, one to two-year-old tissue is susceptible and that's where you're getting those shoot tip infections, she explained. It could take weeks, or even up to two months after the shoots have those initial infections until you will be able to noticeably see a lot of blight in that block, and weeks until a canker in the infected area will be visible. Wind, hail and abrading can make it so the shoot tips are more likely to directly get infected from the bacteria, not from the cluster infection itself. "So, when you're out there pruning or braiding, that tender tissue," she began to explain, "when that tissue gets damaged is when that bacteria can directly infect, so that can be happening too, and you want to limit the abrasion

of that tissue as much as possible."

In the event of infection, first and second leaf trees/plants are generally best to just be pulled up, as opposed to treating and pruning. Due to the immaturity of the tree and the rapid growth of the younger plants, the infection is more likely to spread at a highly rapid rate. "If it's a really young tree, one to two years old, you're probably going to want to just cut that tree out because it's already moved through the phloem of the tree and it's probably not going to survive," DuPont



Tianna DuPont, WSU Extension

emphasized. On more mature plantings, the rule of thumb is to cut 12-18 inches below the visible canker, she pointed out, "but it depends on the variety and how young the tree is." If the space doesn't allow to cut that far below the canker, "consider making a stub cut or a dirty cut," DuPont suggested, "leaving four or five inches when you're cutting away from the main, central leader from the trunk." This will promote new growth which will receive the infection, instead of the central leader, in which case

you'd have to cut that tree out, she said. In addition to cutting out the cankers, DuPont recommends treating with Actigard, a systemic acquired resistance (SAR), in addition to cutting out the infection and pruning. "This isn't a silver bullet," she expressed, "nothing is a silver bullet, but if we look at 10 years now of research, a couple things that it can be helpful with is reducing the total amount of wood needing to be cut out of a block, by about 80 percent," she said, then added, "the other thing that was impressive was looking at the number of trees that were killed by the fire blight. When they were just cutting and doing all the good pruning, but weren't using the Actigard, they were losing about 25 percent of the trees, and only about 10 percent of the trees when Actigard was used." DuPont clarified the

purpose of using Actigard, stating that it doesn't actually kill or cure the bacteria, but rather, acting as an immune system stimulator for the plant, it helps the plant to be stronger and fight off the infection.

After block treatment and cutting out the canker, you definitely want to be thoughtful about what you spray with, explained DuPont. "Oxytetracycline in particular," she began, "the way it works is that it's slowing down the bacteria from multiplying," but in younger trees, she advised using soluble coppers because "those actually do kill bacterial cells when they come into contact with them." Once the block has been treated, the canker has been cut out and the plant has been sprayed, focus on ensuring a complete clean-up to prevent chances of the bacteria returning.

Burning the cuttings, if possible, is best. However, if you are unable to burn, DuPont suggests removing the cuttings from the orchard or as far away from the block as possible and cover with a tarp.

The life span for fire blight in wood can vary based on the diameter of the tissue branch," she explained, "when the fire blight is in living tissue it can continue to live, but once that tissue is completely dried up and dead the fire blight cannot live in that anymore." For organic orchards, DuPont suggested fixed copper at delayed dormant, lime sulfur at early bloom, blossom protect or bloomtime biological.

More information on fire blight is available online at www.treefruit.wsu.edu or email questions to Tianna DuPont at tianna.dupont@wsu.edu.

WEED ID

CONTINUED FROM PAGE A1

winter, and a flowered seed stalk the second year.

A perennial, like quack grass, has a life span that exceeds two years.

Sosnoskie explained the importance of knowing these weed differences: "The strategies that we use to manage weeds differ based on their life cycle," said Sosnoskie. "Our strategies aren't equally

effective against all weed species."

Since herbicides differ in their selectivity, the spectrum of weeds they can control, a sound knowledge of the weed type under consideration is essential for effective results. And it gets even more technical. Weed species, even closely related ones like purple nutsedge and yellow nutsedge, can vary in their sensitivity to herbicides.

Sosnoskie recommended two books she prefers as

reference tools to help growers identify weed species.

- Weeds of the West published by the University of Wyoming Agricultural Extension is a guide to weeds in Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington and Wyoming. Its 900 color photographs show both early growth and mature plants and which ones complete with crops and those poisonous to people and livestock.

- Weeds of California and Other Western States (2 volumes) provides full description of 451 species plus an additional 361 plants. Shortcut identification tables, grass identification keys, and more than 60 tables comparing difficult-to-distinguish weedy species help the user navigate the many aspects of habitat, seed dispersal, methods of reproduction, longevity and

many other traits.

An ID Weeds App, created by the University of Missouri for smartphones is also now available. The app allows the user to input weed characteristics such as grass or broadleaf, where found, leaf and stem details, and other data and then pulls up images and information about possible matches. It also allows searches for specific weed species from an alphabetized list.

Another phone app, Pl@ntNet App, developed in France, allows the user to upload a photo of a leaf, flower, fruit or bark for comparison against a database of images.

Closer to home, Sosnoskie revealed some distinguishing characteristics between two major classes of weeds in Washington State: grasses and broadleaves. Her explanations, while easy to follow with the help of visual aids that focused on specific plant parts and patterns, emphasized the importance of dedicated dirt time paired with a comprehensive reference manual if one is really determined to understand and identify the world of weeds.

A perennial, like quack grass, has a life span that exceeds two years.

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Photo by Mike Maltais
Lynn Sosnoskie is a weed scientist with the WSU Extension Service.

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COSMIC

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you buy that tree, when you propagate that tree, it's \$1." When you take it into the packing house, however, there is a 4.75 percent (of total box sale price) production fee, which only applies "if it's \$20 or higher," said Brandt, "if it's below \$20 then there's no production fee. The total production fee amount will be deducted from the packing house returns to the grower, which is configured through a database used by the packers, so the growers will not need to figure the fee out themselves. "The reason for that (the fee or waiving of the fee), is that the growers need to make money and the industry needs to make money," he explained.

Washington State grown fruit is unrestricted with marketing, including marketing for the Cosmic Crisp apple. Brandt explained that the fruit can be marketed anywhere in the world with the appropriate licensing. "There will be peer-to-peer marketing," he began, "we will need to make sure we have (trademark) protection in those other countries though." If you choose to sell your own fruit, rather than going to a packing house, you can do so by checking a box within the grower agreement. The selling "of one's own fruit is termed 'farmgate sales' within the WA 38 grower agreement," explained Brandt. The grower will still be receiving the standard \$1 royalty fee per tree, however because a packing house isn't being used and a production fee is not being charged by the packer, the grower will instead see a production royalty fee of \$2 per tree, per year. The production royalty fee differs from the production fee from a packing house in that it is a flat \$2 per tree rate, as opposed to a fee of 4.75 percent of the selling price of each box over \$20.

When you bring your fruit to the packer of your choice, as long as they are in Washington State, you will need to bring your grower agreement with you and present it to

the packer. Your grower's agreement, which is generated at random by the Idyia database system and specific to you, will track how much fruit you're bringing in and calculate the 4.75 percent growers' royalty fee, so there's no need for manual calculation, eliminating the chance of cost error. The Idyia database "works with all ends of WA 38," Brandt stated, "all the way from production to the marketing desk." So, when a grower orders from the nursery, they will input all the information, such as type and quantity of rootstock ordered, and generate a license number that is specific to you. So, every time you order, it will track how many of the rootstock you have purchased to date. The database system, as well as informative seminars for growers on regulations, rules and trademarking help protect the intellectual property on Cosmic Crisp.

Concluding his portion of the presentation, Brandt expressed his excitement for the new apple, "together, through the nurseries, the grower, the packer, the marketing desk, we think we've got something put together for a truly premium variety, so we can actually get some really good premium prices."

Kathryn Grandy, Director of Marketing and Operations with PVM then took the stage and provided an update on the marketing and public relations (PR) aspect of acquiring demand for the produce. "As you can see from Kevin's presentation," she began, "we are going to have a very large volume of Cosmic Crisp to the market, very quickly. So, my responsibility is to create a very dynamic marketing system to support the growers' efforts in Washington, and to raise consumer awareness

and consumer demand very quickly for Cosmic Crisp, as well as work with the sales and marketing companies in the state of Washington to create trade and retail programs." Represented by nearly 95 percent of the apple industry in the state of Washington, the marketing advisory group meets quarterly to discuss items such as marketing, growing and quality standards for the Cosmic Crisp. Within the marketing committee is a subcommittee specifically for focusing on quality standards, explained Grandy. "The industry has made the decision to manage the variety as an industry," she said, and the growers, with the assistance of Washington State Department of Agriculture as well, are working with the group to create quality standards for Cosmic Crisp. One of the industry standards includes the branding of Cosmic Crisp. "Right now, 38.5 percent of products within the produce department are branded," Grandy explained, "and that's a huge growing trend, but the disconnect is that 55 percent of shoppers go into the store without a specific brand in mind." There's a lot of competition for the "shelf space" in shopping markets with all the new apple varieties, she stated, adding that will the competitive knowledge, the marketing committee decided to proceed with a standard brand across all companies. After completing consumer focus groups and sensory testing, the Cosmic Crisp name and logo were developed. "It's the first apple brand ever developed by consumers," Grandy expressed, "and the industry took that and



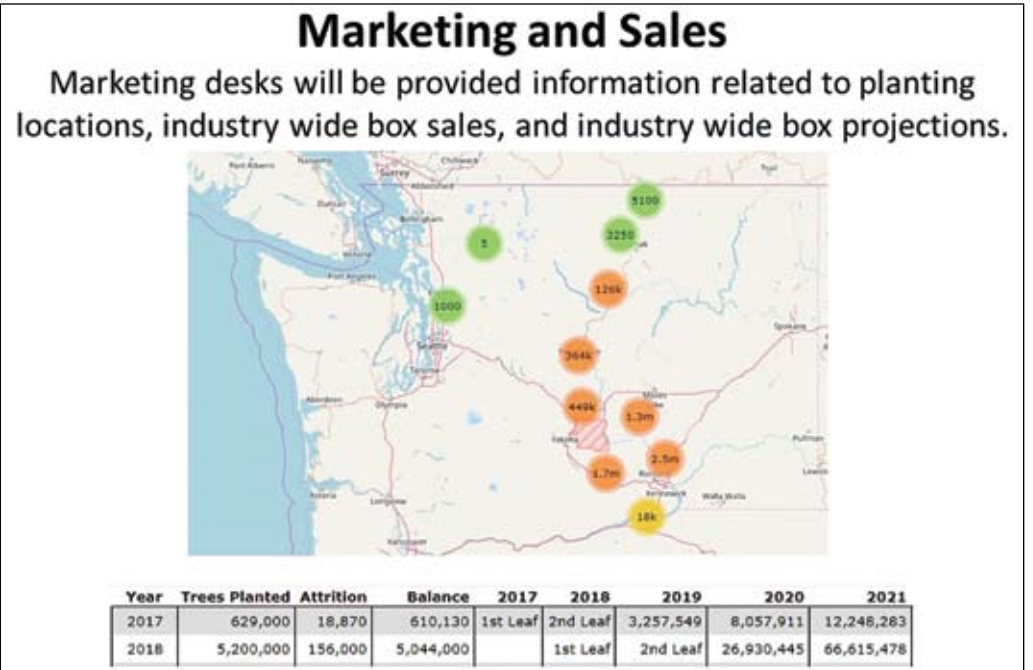
Kathryn Grandy, Director of Marketing and Operations, Proprietary Variety Management

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Kathryn Grandy, Director of Marketing and Operations, Proprietary Variety Management



Photos courtesy of Kevin Brandt, Proprietary Variety Management

The Idyia Database will be able to provide marketing desks with information related to planting locations and industry wide box sales and projections.

said we're going to have a custom price look up (PLU) codes, packaging and we're going to be uniform across all sales companies, so there's a tremendous collaboration." The PLU has been submitted, but the marketing advisory group has asked for an exception, she explained. Typically, international standards do not give PLUs unless this apple has been at retail, however the Cosmic Crisp will not be at retail until fall of 2019. "So, with the support and letters of Wal-Mart, Costco, Albertson's and Safeway," she stated, "which is also unprecedented to have that kind of support, we're very hopeful to get the PLU within the next few weeks."

The apple has been a tremendous success with PR, said Grandy. After a broadcast on national radio, the day the broadcast came out the Cosmic Crisp website "went crazy," she stated excitedly, with around 3,500 hits "which was a lot for us." There have since been articles in grower magazines such as Good Fruit Grower and American Fruit Grower, and even on the cover of the Seattle Business Journal. "That article (in the Seattle Business Journal) was very favorable to Washington State and really seen all over the country," she said. The apple is, in fact, getting very high-level PR with cooperation from influential icons in media such as the Produce Mom, "who is the industry advocate for marketing and promoting produce ... (and) has national relationships with retailers such as Kroger and Wal-Mart," Grandy supplied. After a trip to New York, the apple has also earned the interest of Martha Stuart, Chef Emeril, various digital agencies and consumer magazines including 'Good Housekeeping', which has the nutritional seal of approval

and has already committed to publishing a teaser article this fall and a major article the fall of 2019, when the Cosmic Crisp is set to go to retailers. "We're working very hard not only to contract good media," Grandy explained, "but also get earned media that we don't have to pay for ... there is a lot of consumer excitement out there now and the retailers feel like it's an exceptional apple and they can't wait to get it in their hands." For more information on Cosmic Crisp, visit the website at www.cosmiccrisp.com. If you're interested in purchasing the WA 38 Cosmic Crisp trees or for inquiries, email NNII at nwnurseryii@gmail.com or visit the website at www.nniifruittrees.org.

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Training, growth, characteristics of Cosmic Crisp Apple discussed
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Woolly Apple Aphid: The presence, the damage, the earwig

BY ERIN ROSSELL,
STAFF WRITER

CHELAN – The woolly apple aphid is an apple tree pest that is most commonly found feeding at the base of leaf axels, tree trunks and branches, explained Robert Orpet, with WSU Entomology during his presentation. The woolly apple aphids can essentially be found wherever there is a type of wound or cut on the tree, at the base of trees feeding on roots, and most importantly they're found underground feeding on the roots, "and that's the major problem," he emphasized. The aphid exists both above ground and below ground, year-round. "What you have is females that are reproducing by giving birth to clones of themselves," he explained. They have also been seen in a winged form, but the wings are not necessarily important for dispersal, Orpet said, "because the offspring of the winged aphid normally can only survive on elm trees." The woolly apple aphid is believed to spread mostly by crawling and by human mediated transport, such as moving tools. "I've seen large amounts of winged aphid," explained Orpet, "but if you take a close look, they're woolly, but they're not the woolly apple aphid. When I look at them they're also the smoky-winged ash aphid, which is not a pest, they're migrating to ash trees."

Wherever they feed, either above ground or below ground, they induce the formation of root galls. These galls interrupt nutrient and water distribution throughout the tree, explained Orpet, which can greatly reduce the growth of the tree. "Because these are an indirect pest, not feeding on fruit, it's very difficult to measure damage," he said, "that's why there are no established economic thresholds for this pest, but the scientific evidence that is available suggests that root feeding is a more important type of damage they cause."

By utilizing a resistant root stock, you can minimize, if not eliminate, the woolly apple aphid presence on your roots. Some of the new Geneva series rootstocks are resistant to the aphid,

supplied Orpet, so you'd likely have no or very few aphids on the roots. The question has to whether or not a resistant root stock would decrease the amount of the woolly apple aphid above ground was the basis of an experiment Orpet performed. To test the theory, he used six, 12-tree sections that he used sticky bands on, which were made of a substance called tanglefoot and known for its stickiness. He compared this section's results to another six, 12-tree sections that didn't have the sticky bands. Each week, the number of aphids from the west side of all the trees were counted, as well as the number of aphids present below the sticky bands, where Orpet had also placed a layer of double-sided sticky tape. "So, when the aphids come up, some of them get trapped on that tape," he explained on his process, "I can collect the tapes and count the number of aphids in the laboratory." The results showed that blocking the woolly apple aphid movement up had "no effect on aerial population dynamics," he concluded, adding, "there were actually even more aphids in the sticky band tree sections, and this was despite the thousands of aphids that were trapped on the tape." Orpet's conclusion was that resistant root stocks are highly important because they prevent aphid population on the roots, however, eliminating the population at the roots showed no effect on the above ground populations. The aphids can overwinter above ground, he explained, and survive in the summer, returning without any apparent influence from the roots. During Orpet's experiments in 2014 and 2015, he also discovered that in testing with both Gala and Fuji apples, the Fuji apple tended to have more of the woolly apple aphids.

Chemical control options may help with above ground populations, Orpet suggests that "these will do nothing for below-ground populations, for that you need a systemic insecticide," he explained. The important thing about insecticides is that you need to apply it early so that the leaves absorb it, he emphasized. Trying this method in an outbreak of



Photos courtesy of Robert Orpet, WSU Entomology

A large woolly apple aphid colony on a fruit tree branch
BELOW: Earwig shown nestled in an apple stem split

the aphids however, will not be effective. "The main goal (in chemical control) is to not disrupt natural enemy populations," he stated.

The studies conducted by Orpet in 2014 and 2015 looked at both conventional and organic orchards, and despite the lack of presence of chemical tools in the organic orchards to manage the aphids, they didn't show to be any more of a problem in organic orchards than in conventional orchards. "Perhaps because biological control is very important in attacking these aphids," suggested Orpet. Different things can be attacking the aphids, he said, such as lady bugs, lace wings and beetles, but he wanted to focus on the European earwigs, which are commonly found within apple orchards, as a biocontrol agent. "Studies suggest it's a key predator and also earwigs in general can feed on many other pests," he stated, "so, perhaps they're an underappreciated beneficial insect."

There has been a lot of concern from growers on the perceived negative effects that earwig populations have on fruit. Orpet, however, voiced that he feels the earwig isn't appreciated enough. This prompted another experiment. One focusing on the earwig as a biocontrol agent on the apple woolly aphids, and if the presence



or absence of earwigs showed any changes in the amount of damages to apples. "I wanted to critically test for both the positive and negative effects, experimentally," he explained. Orpet divided up an orchard into sections, removing earwigs in some sections while adding earwigs to another and leaving the remaining section completely untouched. Discovery of the earwigs is easy to do using rolled pieces of corrugated cardboard, he stated, because of the preference for tight

spaces. Once they move into the corrugations, he is then easily able to shake them out and count them. Each section was 30 meters apart, the distance based on studies showing that earwigs don't generally move more than 30 meters within a month's period. "I was successful in having different earwig levels in each section," he explained on his results, "and more earwigs resulted in fewer woolly apple aphids." In the high earwig sections, with five or more earwigs

per tree, Orpet stated that there was a very low level of aphids, and never more than one colony per tree. In the low earwig situations, the average number of colonies discovered on a tree was six, "some trees would have no colonies while others would have a lot more than six," he stated. Feeling that his experiment successfully showed the effectiveness of earwigs suppressing the woolly apple aphids, he then looked at approximately 12,000 apples from the same sites and categorized them. The inspection of the apples showed that it was just as likely to find good apples in the high earwig populated section as it was in the earwig removal areas. "Side tracks were equally likely, as well as limb rubs and small and large holes," said Orpet, "but I want to discuss stem hole splitting, which is very common especially on Gala apples when they're ripe or over ripe." At times, these splits seem to be expanded or rounded off, and were more likely in the earwig augmentation areas, he explained, but they were still very uncommon with only 17 out of 6,000 apples. "But if you consider those as a type a split and you group those out together," he suggested, "the occurrence of any type of split was equal between both styles." He then suggested that perhaps earwigs are not causing the splits, but rather attacking them where they've already occurred, as they attempt to nestle in the tight space. They're exploiting the damage but not causing or creating, he said, "so, I call that a horticulture issue, not an entomology issue ... I would suggest thinking about including earwigs in your integrated management plans for the woolly apple aphid," he suggested before concluding his presentation, "(but) keep in mind, the earwig only has one generation per year, so if they're eliminated for any reason their population could be really slow to recover."

Contact Robert Orpet with any inquiries by email at robert.orpet@wsu.edu or look for his videos from his experiments on youtube <https://www.youtube.com/watch?v=sSFakIgfMI>.

WSU Libraries to host national agriculture information conference

SUBMITTED BY WASHINGTON STATE UNIVERSITY

PULLMAN – Washington State University Libraries will host the 16th U.S. Agricultural Information Network Biennial Conference May 13-16 in Pullman — the first time members will convene in Washington state.

"This conference has never been hosted west of Arizona, so it's a big opportunity for WSU to

showcase Washington state agriculture," said WSU agriculture librarian and conference chairwoman Lara Cummings. "Approximately 100 agriculture and science librarians from around the nation will attend."

U.S. Agricultural Information Network provides a forum for information professionals to:

- Discuss food and agricultural issues.
- Influence the formation

of a national information policy related to food and agriculture.

• Make recommendations to the National Agricultural Library (NAL) on agricultural information matters.

• Promote cooperation and communication among its members and with other organizations and individuals.

Keynote speaker for the conference will be Carolyn Ross, associate professor

and director of WSU's Food Science Sensory Laboratory. One of WSU's top food scientists, Ross has studied waste streams in food production and worked to look at the influence of long-term ozone exposure on the nutritional and sensory properties of different crops. She has conducted sensory studies on the biodynamics and organics of fruits and vegetables through her lab.

NAL director Paul Wester also will speak at the

conference. Prior to heading NAL, Wester worked for the National Archives and Records Administration and was the U.S. government's first chief records officer. The NAL is one of four national libraries and houses one of the world's largest collections devoted to agriculture and its related sciences.

For more information about the 2018 conference, visit: <http://libguides.libraries.wsu.edu/usain2018>.



Carolyn Ross, associate professor and director of WSU's Food Science Sensory Laboratory



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Research continues potential controls for Spotted Wing Drosophila

By MIKE MALTAIS,
STAFF WRITER

CHELAN – Like the brown marmorated stink bug (BMSB), the Spotted Wing Drosophila (SWD), is an invasive fly species first discovered in Eastern Washington State in 2010.

Molly Darr, an WSU entomologist spoke about SWC control measures at the 2018 Lake Chelan Horticulture Day last January.

“Trapping is essential, so we can determine exactly what is going on in that specific year,” said Darr of SWD populations. “We can do O.K. with pesticidal control for now, but we have begun to see some incidence of resistance popping up, so we want to move more toward varied IPM (Integrated Pest Management) strategies.”

Darr outlined population variances of SWD numbers from 2015 to 2017, with 2015 reflecting the highest number and traps counts in 2017 significantly lower. The variance was confirmed with help from the Washington State Department of Agriculture packing house inspections.

Darr said the variable in SWD density offers and

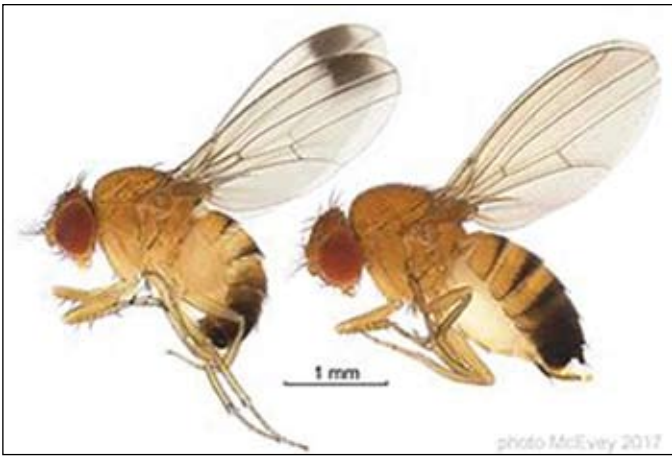


Photo courtesy of en.wikipedia.org

Spotted Wing Drosophila

opportunity to change control strategies.

Darr explained how the attracticide GF-120, which is a combination of attractant and toxicant, did not prove to be a good stand-alone treatment for SWD because there was still evidence of damage in the field after its use.

We tried some other attractants,” said Darr, “and combined all them with Entrust so we could use that as a control variable and we could see the effects of the attracticide itself. We then compared that result standard with a full year canopy spray

of Entrust.”

While GF-120 showed results almost as effective as the full year spray of Entrust “the other attractants we used were not quite as good, so we need to continue with the studies to see if we can get any positive results,” Darr said.

Darr said products coming onto the market to treat SWD are being tested for the control efficacy and to expand the choice of effective suppression remedies. Those include Dimlin, Rimon, and Ecotrol and liquid baits like Dros’Attract and Suzukii Trap.

“We may not be able to kill

the female,” said Darr, “but if we can prevent her from ovipositing then we’ve really done the work that we need to do.”

Darr reviewed some of the products currently being tested to address ovipositing females. “We need to think about multiple control tactics instead of just a single treatment.”

Methyl benzoate, discovered recently by USDA researchers was another deterrent tried. Combined with Ecotrol, methyl benzoate was found to result in significantly lower oviposition.

Selective lures designed to attract SWD but proved to be very effective in luring all other species of Drosophila.

The average amount of Spotted Wings caught per trap was three,” said Darr noting that more than 5,000 other Drosophila were also trapped. “So, you have to go through this pile of flies that are all the same size, shape, color – except for the spots on the wings – and it’s difficult to sort through the flies in the field when this is what you’re looking at.” Darr said.

Darr’s associate, Elizabeth Beers, WSU Professor of Entomology, posted research results on such aspects



Photo by Mike Maltais

Molly Darr

of SWD life cycles as lure efficacy, chemical control, and oviposition deterrence.

Significant finds following two years of research reveal:

- Ecotrol and methyl benzoate deterred SWD females from ovipositing in fruit.

- Dimlin and Rimon residues completely shut down fly emergence.

- Entrust gave high levels of mortality for 21 days.

- Two liquid baits Dros’Attract and Suzukii Trap are more selective for SWD but capture fewer flies.

Training, growth, characteristics of Cosmic Crisp discussed

By ERIN ROSSELL,
STAFF WRITER

CHELAN – Concluding the day’s presentations on the WA 38 ‘Cosmic Crisp’ was a characteristic and horticultural update on the apple given by Stefano Musacchi with WSU Horticulture.

The Cosmic Crisp tree is a type four tree, like that of the Granny Smith, Musacchi explained. The tree tends to have long branches with blind wood production near the trunk of the tree, and “is a reasonably vigorous variety which can be managed with cropping.” During bloom, the tree produces a lot of secondary lateral bloom, which can be up to 40 percent of the total cluster. A lateral blossom, as explained in Musacchi’s Characteristics and Horticulture handout, “forms along the developing shoot at the base of the leaf blade.” The bloom period for this apple is mid to late season, he explained.

The Cosmic Crisp “is a very exceptional variety,” expressed Musacchi, “and it is a very large fruit ... and the color is more of a bi-color variety than it is more of a red variety.” The training system the grower chooses to use will affect the amount of light that the apple receives, which in turn will affect the coloring of the fruit, as it requires uniform light exposure to develop a good coloring. “Low light locations in the canopy will produce a poorly colored fruit,” he explained, “it is important to match the tree training, pruning and thinning techniques as well as pollinizers to the tree habit.”

The Cosmic Crisp will perform well at any elevations in Eastern Washington if the right rootstock is used, and its bloom period and harvest period are suitable for both early and late districts.

Bi-Axis, Spindle and European V training types were tested for the Cosmic Crisp. The Bi-Axis system is based on two axes (leaders), which can result from the heading back of the tree in the field or budding two buds on the nursery rootstock. The trial on the Bi-Axis system occurred after initially heading back the tree to a 1.5-foot-high trunk immediately after planting, explained

The Cosmic Crisp “is a very exceptional variety, and it is a very large fruit ... and the color is more of a bi-color variety than it is more of a red variety.”

Stefano Musacchi with WSU Horticulture

Musacchi. After the emergence of shoots, the stem was headed back once again, at about one foot, “removing the strong vertical shoot and leaving two shoots in the lower portion of the trunk that generally exhibited a more open crotch angle,” he stated, “in both cases the two axes are grown as small, independent spindle trees.” Having two axes generally reduces vigor in comparison to a single spindle. The Bi-Axis system tends to have a high early yield and light exposure and doubles the axes/fruitlets units without doubling the cost. The Cosmic Crisp performs well in the Bi-Axis system, explained

Musacchi, and results in a good fruit coloring for the apple. Trunk spacing for the Bi-Axis WA 38 would be 4 X 10 foot to 4 X 11-foot spacing.

The Spindle system “is designed to maximize profitability through early yield, improve fruit quality, reduced spraying, pruning and training,” Musacchi began.

The trees are planted at “high density on dwarfing rootstock,” he explained, but no permanent limbs are inside the canopy, rather renewal cuts are made, removing limbs to large in diameter for the canopy. Spindle spacing for the Cosmic Crisp should be 3 x 8 foot to 3 x 12 foot. “On a thin spindle ... 60 to 90 percent of fruit with good color has been harvested.

Lastly, the European V system. This system “consists of staggered spindle trees grown at 10 to 15-degree angles,” Musacchi explained. In trials, the Cosmic Crisp was planted at 1.5 feet X 10-11 feet. This system, however, was the least favorable for the apple, resulting in shade in the lower areas due to the canopy, and difficulty pruning and cropping inside the ‘V’. Because of this, the Bi-Axis or spindle systems are recommended over the European V system.

Due to the Cosmic Crisp susceptibility to blind wood,

Musacchi recommended does not recommend this training method for Cosmic Crisp. The Cosmic Crisp apple boasts exceptional storage capability and retains its crispness and flavor. The apple is described as “red, symmetrical with red-striped blush (55 to 80 percent), attractive with prominent lenticels and a medium to large size,” explained Musacchi. Typically, 80 to 90 percent of the fruit fits into four different class sizes due to its narrow size profile and is not sensitive to bruising.

Typical storage time to maintain freshness is six or more months in refrigerated air storage, however, in a controlled atmosphere can keep its appearance and taste up to 12 months, without any of the storage disorders found in other apples such as water core, internal browning, sensitivity to carbon dioxide or low oxygen, superficial scald, chilling injury or shrivel. The occurrence of stem bowl splits is low (below five percent), but “can rise drastically if harvested too late,” he expressed.



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The BMSB is coming

Stink bug study sheds light on movements, numbers and controls

By Mike Maltais, Staff Writer

CHELAN – It turns out that a stink bug is an interesting creature to more than just another stink bug.

Take stink bugs in orchards, for instance. When it comes to their attraction and populations in fruit trees, stink bugs get attention from Adrian Marshall, an Entomology Ph.D. student at the Tree Fruit Research and Extension Center at Washington State University.

Marshall devised some ingenious experiments to help determine how, when, and in what numbers stink bugs invade orchards. In one case, he constructed barriers six feet wide and nine feet high with sticky traps every foot and one on the ground.

The idea was to catch the stink bugs as they were flying in to determine how high they travel. The results were interesting. Almost no stink bugs were trapped at ground level. The majority were caught between two and eight feet off the ground.

That tells us that we don't need a barrier that sticks all the way into the ground," said Marshall. "You can pretty much start at a foot high though



we don't know the maximum height yet so we're going to test that in future years."

He also added a flap to the barrier wall and discovered that stinks crawling up the wall will not progress past that flap.

Marshall found that stink bug numbers fluctuate at different times of the season, some helpful information for orchardists trying to determine when to apply control measures.

"Even in early June we have a huge spike in stink bugs that seem to be moving into the orchard," said Marshall. "Then another one around mid-July and another one around August and another one around September."

Stink bugs also migrate out of orchards several times a year, "so a single timed spray won't be effective against them," Marshall said.

Several other configurations of barriers and complete enclosures were used to not only measure the effective of artificial barriers but also see what effect they had on the natural predation cycle.

Marshall will conduct future tests to refine and reveal more details about effective measure against stink bugs. In the meantime, his initial studies have produced some helpful insights on the bugs' behavior:

Stink bugs move into orchards as early as June, so growers are advised to begin control measures earlier rather than later, but only when adult bugs are present.

The folds or flaps added to in the large barriers trapped stink bugs from climbing over the barrier and into the orchard. Future tests might show that the fold feature might actually stop the bugs from moving in.

Stink bugs have a number of natural predators including the lacewings, tachinid fly, praying mantis, and assassin bug, among others that attack the pest in the egg, nymph and adult stages.

Marshall had some practical spraying advice for orchardists trying to control stink bugs. He recommended that spraying be delayed until actual adult stink bugs are found. The infestations change from year to year depending on the amount of heat, said Marshall. To find adults he suggested orchardists inspect nearby vegetation such as mullein,



Photos courtesy of Adrian Marshall
Full enclosure barriers like this one helped Marshall study the stink bug controls both inside and outside the barrier. LEFT: A stink bug clings to a barrier wall.

elderberry bush or other plants that have fruiting bodies and stink bugs will be found.

"Wait until they are adults," said Marshall, "If you're finding nymphs out there, they are not causing damage in your orchard."

Marshall also reminded growers that if there are no apples on the tree yet there is no need to spray because the stink bug only attacks the apple.

Marshall also addressed a new larger invasive threat, the brown marmorated stink bug (BMSB), that was first found in Washington in 2012 in the Vancouver area. Since that time the pest has spread along the major highways and Columbia River. The five counties with BMSB include Clark, Yakima, Walla Walla, King and S. Chelan around Wenatchee and Leavenworth.

The BMSB is fast-moving and can fly 70 miles a day. It produces two generations a year rather than one that is typical of our native varieties.

"It affects a ton of source crops," said Marshall. "It can be found in more than a hundred different source plants, so it eats everything we eat."

Fruit crops at greatest risk include apples, pears, grapes and peaches/nectarines. At

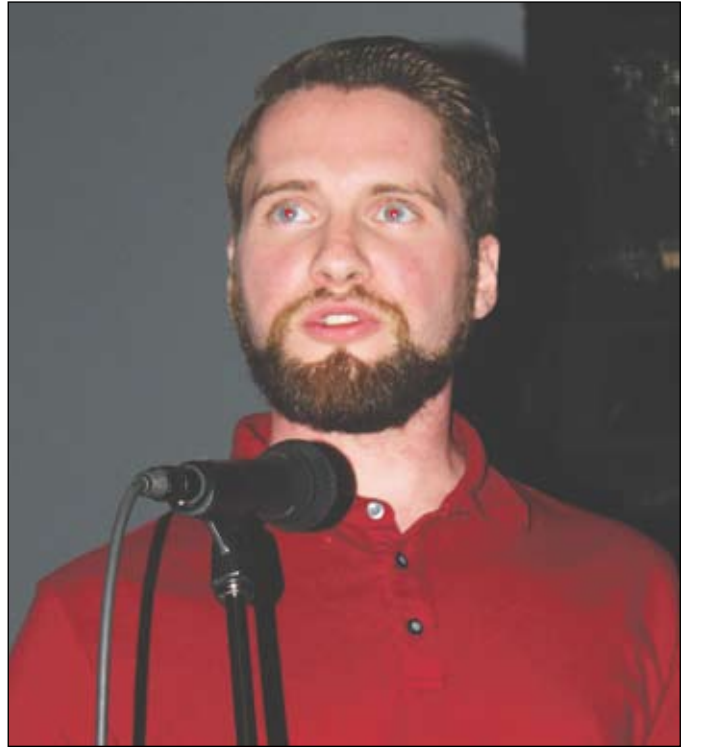


Photo by Mike Maltais
Adrian Marshall is a Ph.D. student of Entomology at the WSU Tree Fruit Research and Extension Center.

moderate risk are apricots, cherries and blueberries. Fruit varieties that are late blooming and remain on the tree longer are particularly vulnerable.

Marshall and his crew continue to work on control options for the BMSB, ranging from mechanical measures to biological

Marshall said that while the BMSB has not yet appeared in Chelan, he asked growers to be vigilant for the presence of the invader and report any findings.

Late blooming and on the tree longer meaning it's the only remaining food source later in the season.

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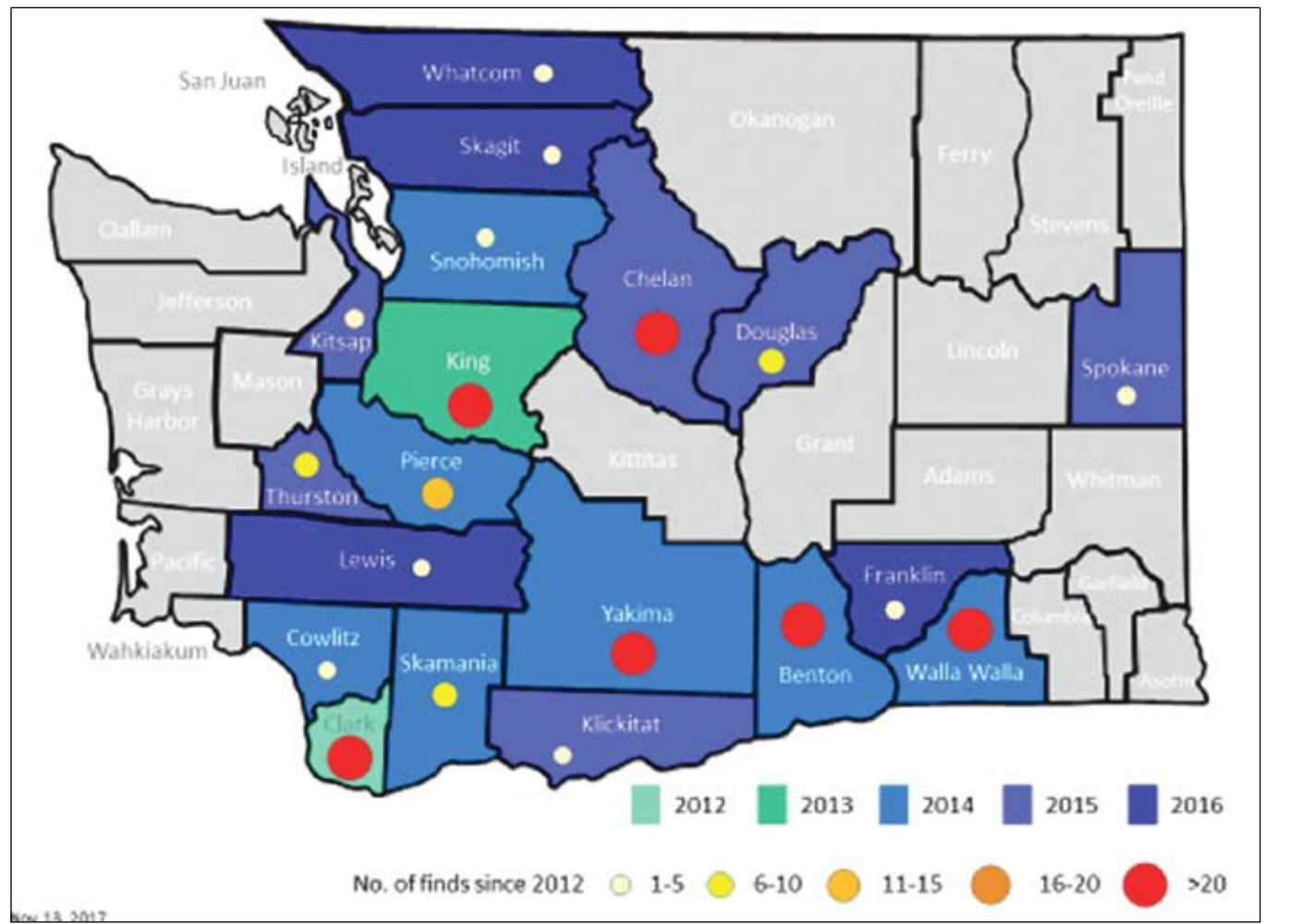
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The Brown Marmorated stink bug (BMSB) have been found in at least five counties in Washington State (red dots).

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Proper spray application is a technique perfected by practice

By MIKE MALTAIS, STAFF WRITER

CHELAN – One statement by Gwen Hoheisel, WSU Regional Extension Specialist, sums up her dedication to an aspect of orchard horticulture: “I am extremely passionate about sprayers,” Hoheisel said and describes her job as “I evaluate, I educate, and I recreate.”

Hoheisel said her goal at the 72nd Lake Chelan Horticulture Day presentations was to show orchardists “how to match the air to the canopy and how to assess and control your air and to inspire you while there is still snow on the ground to think about this.”

Hoheisel’s rationale to get growers to give spray operations some early attention was logical.

“Come March, you’re running,” said Hoheisel, “and really none of you grow trees because you like sprayers.”

Hoheisel used slides taken from a sprayer research project done on an Omak orchard to demonstrate the way spray applications change according to the demands of different types and sizes of fruit and the trees on which they grow. She also shared some survey results from other growers and what parts of the spray process they wanted to improve.

Hoheisel stressed that despite their wide variety, there is no perfect machine; all can be operated perfectly or poorly and much of the difference has to do with a properly maintained machine. What makes a sprayer effective is the degree of upkeep on the machine and attention to details like tractor speed, air control and direction and outside wind speed.

Sprayer pressure gauges, hoses and filters need to be inspected and replaced regularly. Tire pressures need



Photo courtesy of Gwen Hoheisel, WSU Extension Wind forms a boundary layer, like these leaves around a parked pickup, that can help growers understand how the same principle works when applying pesticide to fruit.



Gwen Hoheisel

to be checked to ensure that rate application controllers tied to correct tire pressure are working in synch.

Water pH should be tested and spray chemicals correctly mixed and properly loaded.

Hoheisel stressed optimizing air control to increase the amount of pesticide that hits the intended target and to reduce drift.

“Air flow controls where you place the drops,” said Hoheisel. “too much and you blow through and miss the target.”

In addition to the dollar cost of wasted pesticide, missing the target results in more culls and increased resistance to pest control. Hoheisel showed some research lab video clips to demonstrate how air responds to target size. She also explained how a boundary

layer that forms around an object is affected by the size of the fruit.

Hoheisel also discussed techniques to monitor air flow, direction and volume in an orchard setting. One technique utilizes ribbons tied to the fan guard to measure the force and speed of air flow. Ribbons blowing straight out can be in indication of too much force while ribbons not moving can indicate too little or no air flow.

Donuts and shrouds attached to the fan guard can help reduce and direct air to the desired target. Gearing up the tractor while throttling down can also reduce the fan speed to prevent over-flowing the target.

In summary Hoheisel said that there are easy and inexpensive ways to monitor and control air flow. One of those is to keep the equipment properly maintained so that all the components necessary to effective pesticide application are working as they should.

Tractor speed and air flow volume needs to be adjusted during the season to account for aerodynamics of boundary layers and canopy barriers.

“Air controls where we put – or don’t put – the droplets,” Hoheisel said.

Breaking down fiber: Nutritionists gives insight into the nation’s understanding of fiber

SUBMITTED BY PEAR BUREAU NORTHWEST

PORTLAND, OREGON - Fiber is considered an under-consumed nutrient and nutrient of public health concern according to the current Dietary Guidelines for Americans. While the nation’s need for increased fiber intake is well established, education is needed in order for people to better understand fiber and fiber needs. For an inside look into how registered dietitian nutritionists and the patients, clients and communities they counsel view fiber, Pear Bureau Northwest surveyed over one thousand dietitians from across the nation to tap into a cross-section of their experiences.

In sharing their experiences as they relate to fiber, dietitians revealed the following takeaways:

Education is needed on fiber

Most dietitians have a similar experience when it comes to talking about fiber with their patients. 50% or less of the individuals/communities they counsel seem to understand the benefits of fiber. Moreover, dietitians shared that 50% or less of the people they counsel understand how to include fiber in their daily diets, and the same amount, 50% or less, take action to include fiber into their daily diets.

Fruit takes the lead

In practice, dietitians recommend fruit more often than any other high-fiber food. When recommending ways to increase fiber, dietitians stick with whole foods, while fiber-enriched foods and fiber supplements are recommended least often.

When it Comes to Fiber, Pears Rank Higher

With 6g of fiber in one medium pear providing 24 percent of daily fiber needs,



With 6g of fiber in one medium pear providing 24 percent of daily fiber needs, pears are a top choice among dietitian recommendations to increase fiber intake.

pears are a top choice among dietitian recommendations to increase fiber intake, and it’s no surprise why. Pears are an excellent source of fiber and have vitamin C with only 100 calories per serving. Plus, pears are sodium free, fat-free and cholesterol free.

Preparation is Key

The most common roadblock dietitians have found to prevent people from getting enough fiber is a lack of knowledge among those they counsel about how to prepare high-fiber foods. Additionally, more than half of dietitians have encountered a dislike of high-fiber foods as a major barrier to proper fiber consumption among individuals/communities they counsel.

Pears are in season now and plentiful at grocers nationwide, making this the perfect time to enjoy the many varieties of pears. To help overcome the preparation barrier commonly encountered with high-fiber foods, try the following tips to enjoy pears and their nutrition benefits:

The best way to judge the ripeness of a pear is to Check the Neck™: Apply gentle pressure to the neck of the pear with your thumb. If it yields to pressure, it’s ripe.

Leave firm, unripe pears at room temperature so that they can ripen. Once a pear is ripe, it can be refrigerated to slow the ripening process and saved for use up to five days.

If you find yourself with a few too many overripe pears, blend them into smoothies, soups, sauces and purees.

Pear Bureau Northwest continues to pursue opportunities to better understand the health benefits of pears and their ability to contribute to a healthy diet. Visit www.usapears.org for additional pear research, nutrition resources and recipes.

About Pear Bureau Northwest

Pear Bureau Northwest was established in 1931 as a nonprofit marketing organization to promote the fresh pears grown in Washington and Oregon. As the nation’s largest pear-growing region, 900 grower families produce 88% of all fresh pears commercially grown in the United States. Pears grown in these two Pacific Northwest states are distributed under the “USA Pears” brand. Pears are an excellent source of fiber (24% DV) and a good source of vitamin C (10% DV) for only 100 calories per medium-sized pear. Sweet and juicy with no fat, no sodium and no cholesterol, pears are a perfect choice for snacking and make a great addition to any meal. For more information, visit www.usapears.org, www.facebook.com/USAPEARS, and follow @USAPEARS on

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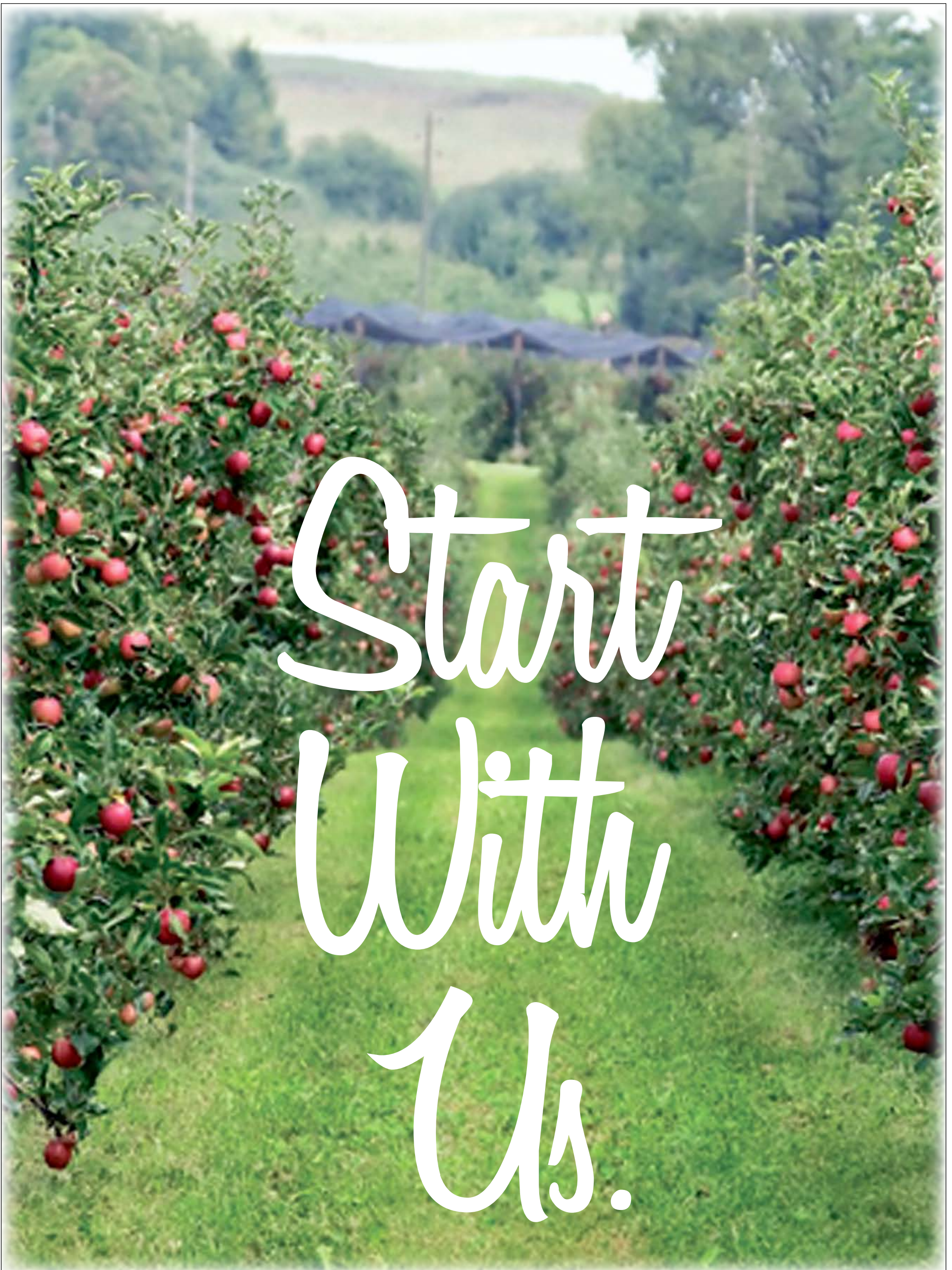
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