

*IN THIS ISSUE:*

WHEAT: THE VALUE ADDED COVER CROP— THE WSU BREAD LAB

2013 WESTERN REGION BLUEBERRY PESTICIDE DECLINE  
EVALUATIONS

NEW AND UPDATED RASPBERRY AND STRAWBERRY CULTIVARS FOR  
THE PACIFIC NORTHWEST

LIVESTOCK SPRING HEALTH CONCERN: GRASS TETANY

PORCINE HEALTH CONCERN

WEATHER UPDATE

UPCOMING EVENTS

# WHEAT: THE VALUE ADDED COVER CROP?

Jessica Shaw

WSU Whatcom County Extension

Typically in western Washington farmers incorporate grains into their field rotation to break disease cycles or as a cover crop to reduce erosion. Recently, farms have gained very little return on this investment due to factors such as poor selection and availability of grain varieties and being unable to compete at small scales in the commodity marketplace. As Steve Lyons, WSU agronomist put it, the saying of these farmers is sometimes, "we grow wheat for fun and sometimes profit." Now farmers in northwest Washington may be able to change their tune because of the "Bread Lab."

The Bread Lab is housed at WSU's Northwest Research and Education Center (NWREC) and was initiated in 2009. Steve Jones, wheat breeder and lab director states its mission as "facilitating the re-invigoration and strengthen-

ing of local grain economies and systems."



The facility is interdisciplinary in nature, where grain varieties from all over the world are run through a gambit of tests in the field, lab, and bakery. The holistic research approach of the Bread lab connects and considers needs of farmers, millers, and bakers, in a craft baking setting.

Farmers now have more information about consumer desires, and varieties for optimal production in western Washington. WSU agronomist, Steve Lyons, and a team of graduate students annually conduct thousands of variety tests which include rye,





wheat, barley, oats and buckwheat. From these variety tests data is collected in the field and in the bread lab. In conventional and organic cropping systems, information on yield, disease resistance, lodging and other production factors are gathered from the fields and presented to farmers to aid crop selection.<sup>1</sup> Grain from variety trials is then milled and tested in the bread lab facility to establish characteristics of the flour. Both sources of information are used to choose the next steps for developing desirable varieties through breeding. For example, breeding is underway to cross older varieties such as Renan and Red Russian wheat (which have high scores in taste tests) with rust resistant varieties. These efforts will add value to the wheat product and improve the success of the farmers' production.

Testing the flour quality can not be understated. Some degree of grain quality is associated with environmental growing conditions such as localized climate, day length, and soil. Therefore, one variety may take on a very different taste whether it is grown in western Washington, eastern Washington, or even locations at opposite ends of a county. Though the lab does not have the manpower or space to test thousands of samples of individual farms, it does often test flour from mills.

The needs of millers and bakers are addressed by connecting them with desired products from local grain producers. One result of the bread lab has been that Fairhaven Organic Flour mill (Mt. Vernon, WA) has increased its support of local farmers. Over the last three years the amount of processed Washington

grown grains has increased from 10 to 60% of their overall production.

The physical lab component of the “Bread Lab” is comprised of two halves, the Resident baker, Jonathan Bethany-McDowell, shows me. “The two halves are like two halves of the brain. There is an analytical side and a creative, experimental side,” Bethany-McDowell explains as he first points to a row of laboratory equipment one side of the room and then a bakery on the other, complete with stacked oven, industrial mixer, and shelves of flour.

The bakery facility allows craft bakers to test new products and milling equipment without shutting down production lines. The day I stopped by, the bakery was being used by professional bakers from King Arthur Flour Company (Norwich, VT). Kelsey Fairfield and Lucas Diggle were testing the quality of flour used in making baguettes 14, 7, and 2 days after milling. Experimentation with timing of flour use after milling would help discover how the addition of a mill to the bakery would be incorporated into their production scheme.

The analytical equipment is able to test the overall quality of the flour by assigning numbers to enzymatic activity (important for determining flour activity and fermentation), gauging the elasticity of the dough, and calculating

mixing tolerance. Generating the numbers is a way to transform a baker’s subjective description of the behavior of the flour to a standardized “baking language.” Numbers generated from the analysis enable bakers to predict the behavior of the flour before they test it out. Normally, the cost of this type of analytical equipment is out of reach to anyone but large factory bread producers (who often have private labs). In fact, the Bread Lab facility is one out of only a handful of independent labs in the entire nation. Our local community benefits tremendously by connecting this type of technology to the small scale market and allows for their increased competition in the marketplace.

If you are looking for quality craft bakery products or local millers, you can find more information on the Bread Lab’s website: <http://thebreadlab.wsu.edu/>



# 2013 WESTERN REGION BLUEBERRY PESTICIDE DECLINE EVALUATIONS

Vince Hebert and Jane LePage<sup>1</sup>, Bev Gerdeman, Lynell Tanigoshi<sup>2</sup>, Wei Yang<sup>3</sup>, and Steve Erickson<sup>4</sup>

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<sup>4</sup>PanAmerican Berry Growers, Salem, OR

International pesticide maximum residue level (MRL) issues remain a major concern for blueberry growers seeking effective season-long spotted wing drosophila (SWD) control. Although many US and foreign agricultural agencies are working towards global MRL harmonization, political and cultural differences could be difficult to overcome. In the meantime, developing an effective resistance management spray program is an ongoing priority for our Pacific Northwest growers, especially when exporting to the Pacific Rim where vastly different MRL requirements exist. Understanding season-long insecticide field declines is the best insurance to avert crop rejection concerns. Designating a field for a particular export country allows a tailored management program specifically suited, with little risk of exceeding tolerances. For blueberry growers with smaller acreages, initially adopting a more restrictive rotational spray program designed to fit multiple potential export countries, may be more feasible. Either way, knowledge of insecticide decline curves is essential to berry exporters.

To better understand season-long field decline in blueberries, a weekly insecticide application program was performed on late-season 'Aurora' highbush blueberries, from July through late

September 2013, as part of a program to control SWD at Pan-American Berry Growers, Salem, OR. Multiple applications of the most utilized insecticides for SWD control: Malathion 8 Aquamul, Mustang<sup>®</sup> Maxx and a single late season Danitol<sup>®</sup> application, were conducted at commercial rates. Previous research indicated application methods (helicopter, airblast and chemigation/mistigation) result in different MRLs. This insecticide decline study examined pesticide residues on marketable fruit af-



**Fig. 1.** Airblast sprayer application to mature 'Aurora' blueberry, 50 gpa at 100 psi.

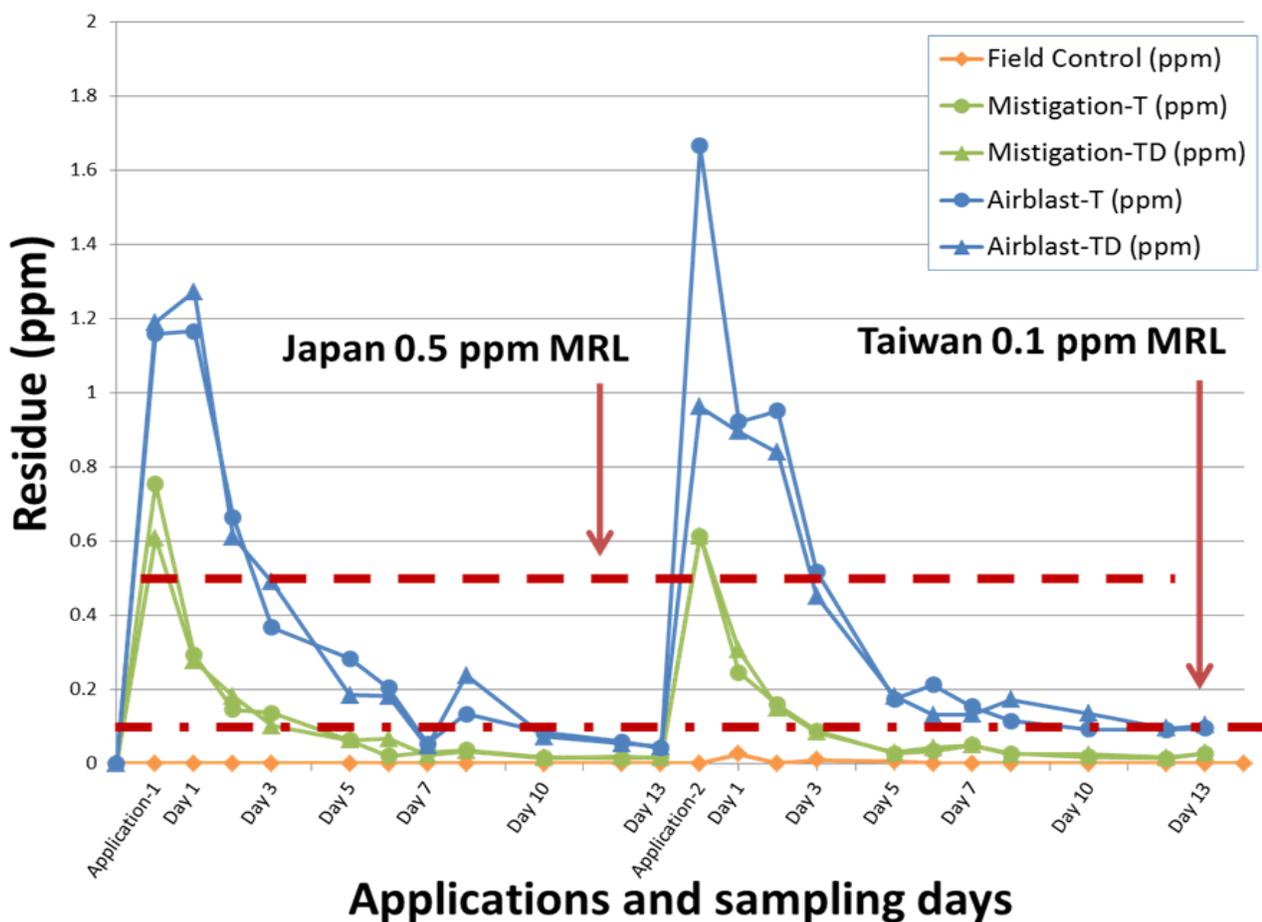
ter pesticide application by two commercial application techniques being used by the grower, chemigation using Netafim<sup>™</sup> nozzles (mistigation) and airblast sprayer (Fig. 1).

Both application methods were conducted on the same day to compare residue decline differences due to application method. For this study, marketable berries were sampled before chemical application (-1), and at 0, 1, 3, 5, 7, 10, and 14 days after treatment (DAT) (Fig. 2). Danitol residues were sampled through 24 DAT because of its anticipated longer decline curve. The berries were chilled in the field at sampling, stored at  $-10^{\circ}\text{C}$ , and then transported by refrigerated shipping to the WSU Food Environmental Quality Laboratory (WSU-FEQL) in Richland, WA for residue determination. A strict protocol, field documentation, and many quality control provisions were instituted to assure sample integrity and good science from field collection



**Fig. 2.** Sampled berries and leaves were taken at three positions (upper, middle, lower) from multiple sites on both sides of the selected row to minimize field variability.

**Fig. 3.** Field decline of malathion residues in/on blueberries after two applications spaced at two-week intervals during the 2013 spray season.



through chemical analysis.

**MRL and Field Decline Results.** Figure 3 shows malathion field residues before and after applications in late July and early August 2013. For this study, the two applications of Malathion 8 Aquamul were conducted at 1.25 pts per acre.

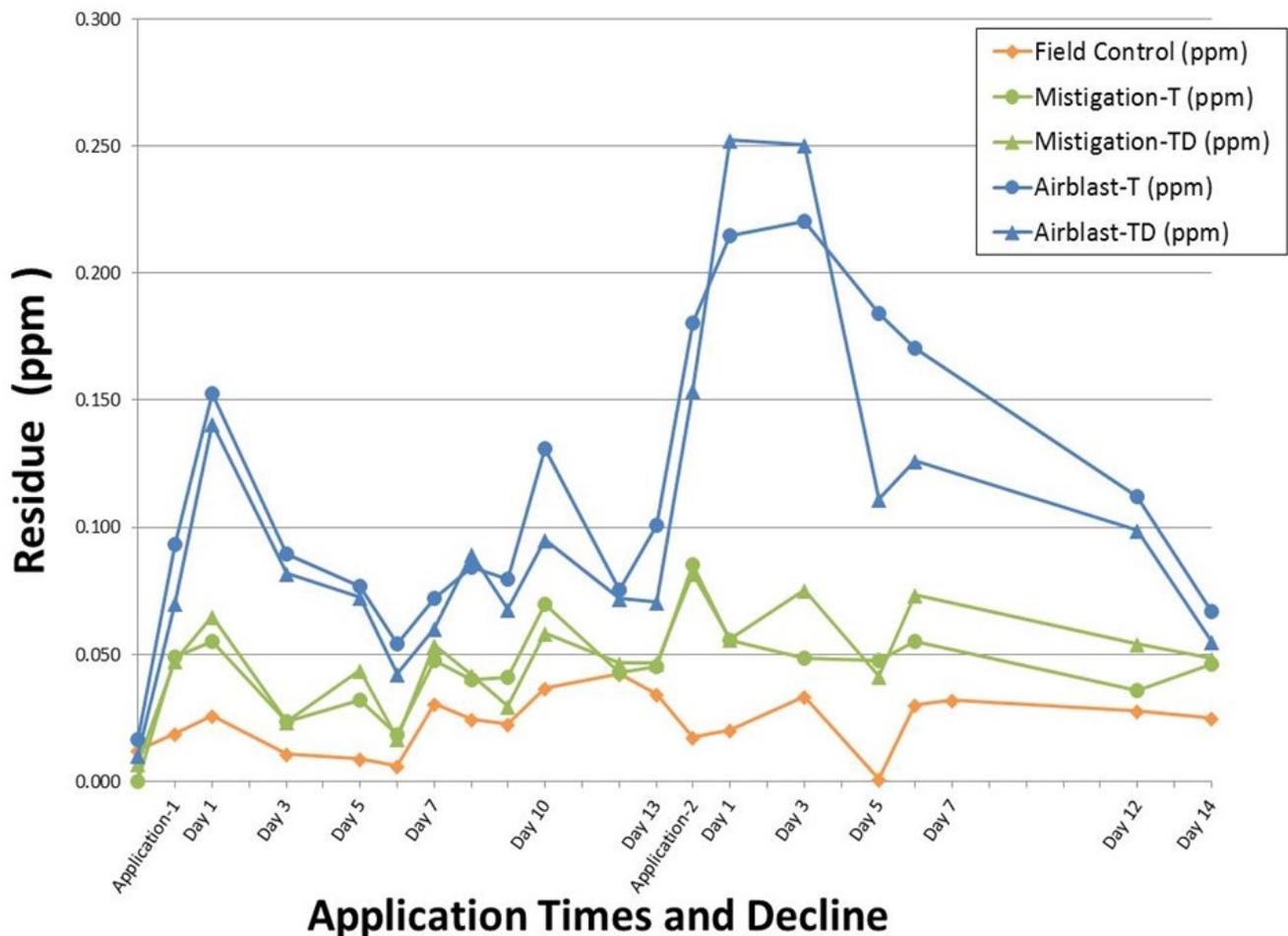
Malathion was observed to rapidly decline after repeated applications. The US MRL tolerance for malathion is 8 ppm. Korea's tolerance for malathion is favorable at 10 ppm. However, exporting malathion treated berries picked at the current 1 day PHI to Japan (0.5 ppm) would be

risky and to Taiwan (0.01 ppm) not advisable (Fig. 3). Delaying harvest to 3-5 days after application for Japanese market customers may be a tactic to further reduce residue levels but carries some risk.

**Mustang Maxx.** Figure 4 shows field residues before and after Mustang Maxx applications in early to late August 2013 at a rate of 4 fluid oz per acre.

Mustang Maxx berry residues were lower than US (8 ppm) and Korea and Japan MRLs (10 ppm and 0.5 ppm respectively). Taiwan does

**Fig. 4.** Field decline of Mustang Max (zeta cypermethrin) residues in/on blueberries after two applications spaced at two-week intervals during the 2013 spray season.



not post a tolerance for the active ingredient in Mustang Maxx (zeta cypermethrin) and any detected residue could result in a violation. The much slower rate of field residue decline compared to organophosphate insecticides is typical of pyrethroid insecticides. We consistently observed higher levels of Mustang Maxx residues after the second airblast application. For this reason, growers should be cautious about making too many consecutive applications of this active ingredient, especially if planning to export to countries with lower MRLs.

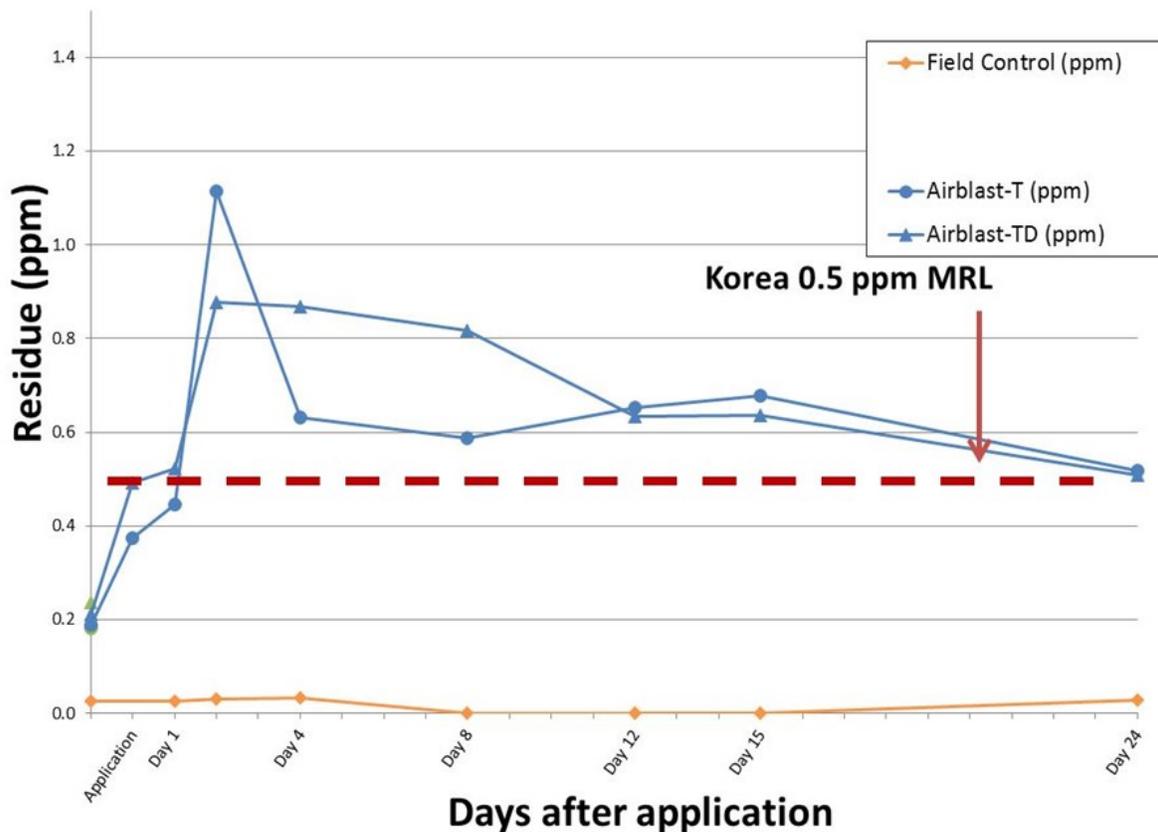
**Danitol.** Danitol (fenpropathrin) has been underutilized by the blueberry industry. This research highlights its long field residual and how

it could potentially reduce the number of seasonal sprays for SWD control (Fig. 5). Currently Danitol can be applied twice during the growing season at a rate of 16 oz per acre. In our study, it was used in late August as a clean-up application to insure protection of high-cash value, late season berries, as the flies slowly transition towards the overwintering phase.

**Cumulative Season-long Field Residues.**

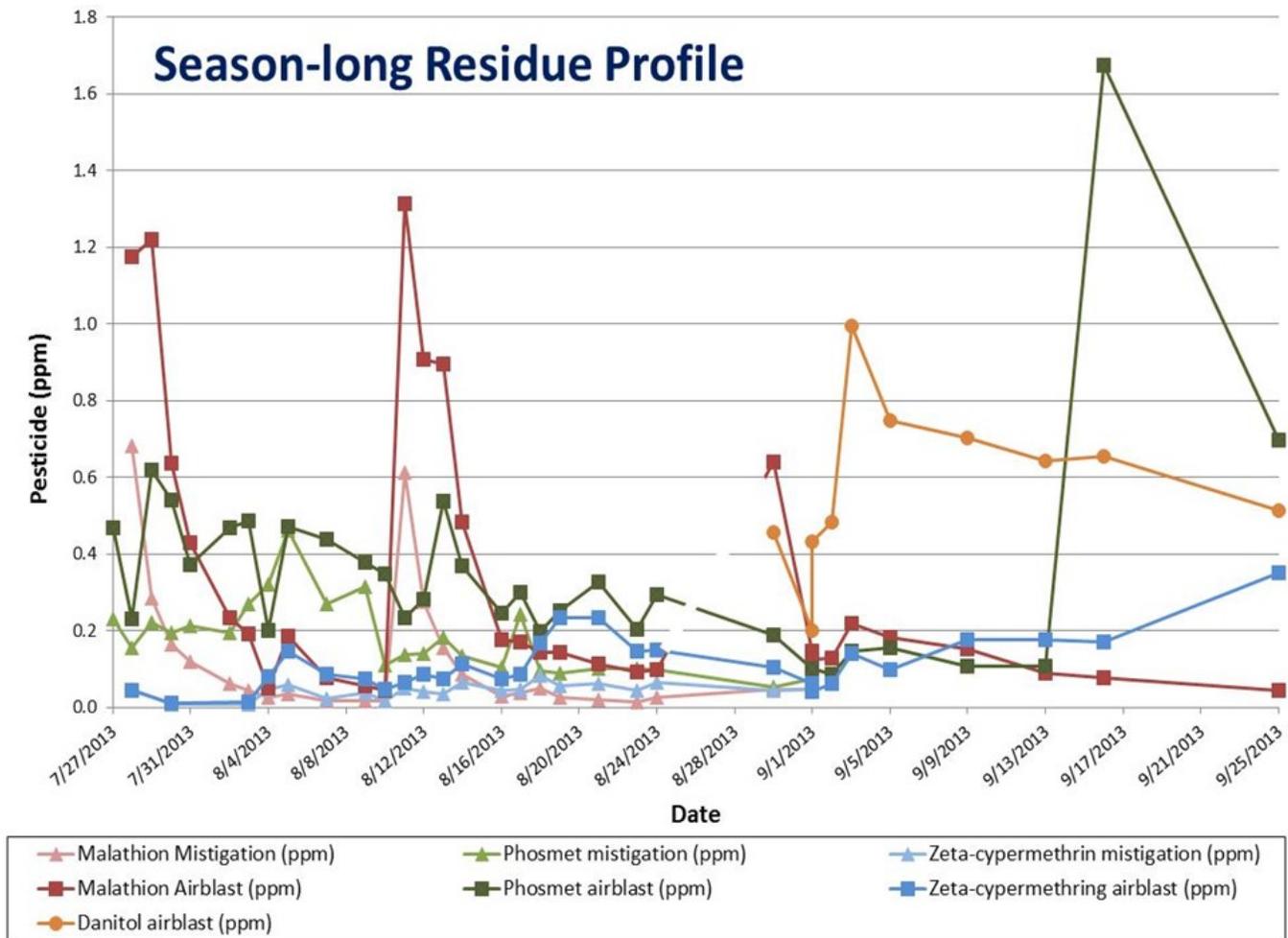
Malathion, Mustang Maxx, and Danitol blueberry residues were measured in the field on 32 separate sampling events from late July through mid-September. Residues of Imidan 70-W (phosmet) at a rate of 1.33 lbs per acre

**Fig. 5.** Field decline of Danitol (fenpropathrin) residues in/on blueberries one application by air blast during the 2013 spray season.



were also assessed over the 48-day spray period. Figure 6 provides the residue data for the 4 compounds. This profile illustrates how residues can accumulate, resulting in an increase in efficacy as the season progresses. SWD has been part of the blueberry landscape for nearly 5 years, since 2009 and growers remain challenged but increasingly confident in managing this first direct pest. This confidence allows research to further refine SWD control through development of spray reduction programs.

**Fig. 6.** Season-long cumulative residues in/on blueberries.



# NEW AND UPDATED RASPBERRY AND STRAWBERRY CULTIVARS FOR THE PACIFIC NORTHWEST

Patrick Moore and Wendy Hoashi-Erhardt  
WSU Puyallup Research and Extension Center

The WSU raspberry breeding program in Puyallup began in 1928 as a response to a need of local raspberry growers to identify decline in the raspberry cultivar Cuthbert. The diagnosis, sensitivity to winter damage, spurred efforts to develop new cultivars with lower sensitivity to damaging temperatures, as well as other traits. Strawberry breeding was added in 1940. Thirteen raspberry cultivars and twelve strawberry cultivars have been released by WSU, which enjoys strong support from Washington and Oregon berry commissions, as well as close cooperative relationships with the two other public berry breeding programs in the region, USDA-Corvallis and Agriculture Agri-Food Canada in BC. Today, the focus is on new raspberry cultivars for the Pacific Northwest that combine machine harvestability, root rot tolerance, raspberry bushy dwarf virus (RBDV) resistance with favorable fruit characteristics of flavor, color and processing characters.

**Cascade Harvest** (WSU 1507) is the newest release from WSU, and represents a great advance in the level of machine-harvestability in the breeding population.

### *Fruit quality*

Compared to 'Meeker', 'Cascade Harvest' fruit is similar in firmness and generally larger.

'Cascade Harvest' is lighter in color and lower in anthocyanins than 'Meeker', but similar in soluble solids, pH and titratable acidity.

### *Yield*

Cascade Harvest has had yields about equal to or exceeding that of Meeker in hand harvested plots in Puyallup. In machine harvested planting in Lynden that included both 'Meeker' and 'Wakefield', 'Cascade Harvest' has been among the highest yielding over two years.

### *Season and Marketing*

'Cascade Harvest' had a midpoint of harvest from 2-6 days earlier than 'Meeker' at Puyallup. There currently are few options for early season cultivars and 'Cascade



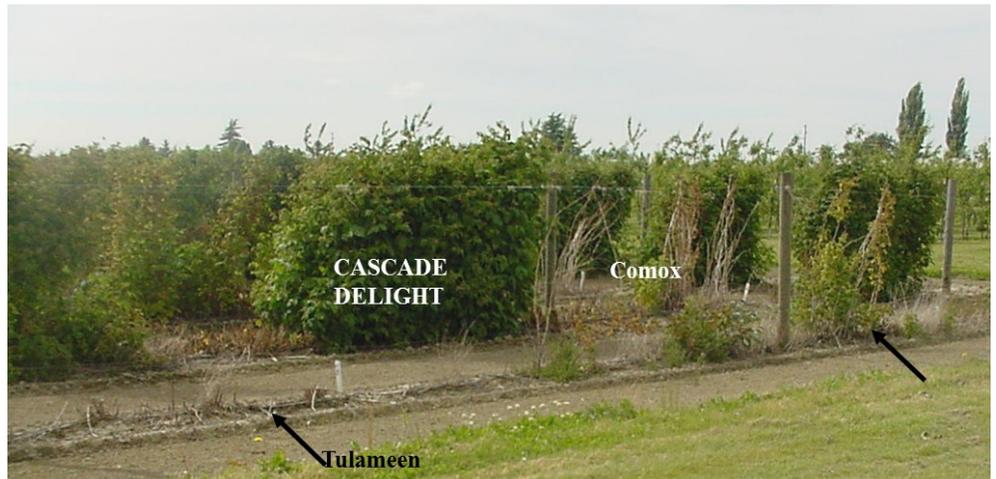
Harvest' may provide an additional option. 'Cascade Harvest' is well suited to processing. Its capabilities for IQF product have not been tested.

#### *Disease resistance*

'Cascade Harvest' shows very good resistance to phytophthora root rot over several years of high pest pressure. 'Cascade Harvest' appears to be resistant to raspberry bushy dwarf virus (rbdv) after continuing to test negative for the disease after graft inoculations and exposure to virus infected pollen in the field at WSU Puyallup for over five years.



**Cascade Delight** (WSU 1090) was released in 2004 and continues to be an excellent cultivar for the fresh market.



#### *Fruit quality*

Fruit of 'Cascade Delight' is about 1.5 times the size of 'Meeker' raspberries. Compared to a common fresh-market raspberry 'Tulameen', 'Cascade Delight' is larger and firmer, both before and after 8 days of cold storage. 'Cascade Delight' berries are known for their good flavor and attractive conic shape.

#### *Yield*

'Cascade Delight' generally yields more than 'Tulameen'. It is not suited to machine-harvesting, however, as its long laterals interfere with equipment and can be broken.

#### *Season and Marketing*

'Cascade Delight' has a slightly shorter season than 'Tulameen', with midpoint of harvest very similar to that of 'Tulameen' or 'Meeker' at Puyallup. 'Cascade Delight' has been successfully grown under organic management.

#### *Disease resistance*

'Cascade Delight' shows good resistance to phytophthora root rot over several years of high pest pressure, and is a good cultivar for sites known to be infested.

'Cascade Delight' is susceptible to RBDV.

**Cascade Gold** (WSU 991) was developed from



a cross made in 1979, but was only released in 2010 because eradication of raspberry leaf mottle virus from planting stock was difficult and time-consuming.

#### *Fruit quality*

The fruit of 'Cascade Gold' is large, glossy, firm and longer than wide. The fruit releases easily from the receptacle at a lightly colored stage of development, but for optimum flavor the fruit should be more mature. Compared to other raspberries, 'Cascade Gold' is larger than 'Meeker' and 'Anne' and 'Goldenwest' both yellow-fruited cultivars. The fruit has moderate to high soluble solids and high titratable acidity, resulting in tart but well balanced flavor.

#### *Yield*

In general, 'Cascade Gold' has yields equal to or greater than 'Meeker.' However, on sites with high root rot pressure, yields are lower.

#### *Season and Marketing*

The harvest season for 'Cascade Gold' is early, similar to 'Willamette' and about 7 days earlier than 'Meeker'. 'Cascade Gold' has been successfully grown in western Washington and shipped

to eastern US markets. It is best suited to fresh market use.

#### *Disease resistance*

'Cascade Gold' is susceptible to phytophthora root rot in infested sites. 'Cascade Gold' also sometimes exhibits high levels of Botrytis fruit rot. Grafting tests indicate that 'Cascade Gold' is resistant to raspberry bushy dwarf virus. In the trials conducted in British Columbia, 'Cascade Gold' supported few aphids.

### **Strawberry**

For many years, the goal of the strawberry breeding program has been to develop June-bearing strawberry cultivars with emphasis on fruit suitable for processing. We continue this effort while also recognizing the increasing importance that fresh-market and day-neutral strawberry production in the region.

**Puget Crimson** (WSU 2833) is a very large-fruited late season strawberry released in 2010. It has 'Puget Summer' as one of its parents and is expected to replace that cultivar.

#### *Fruit quality*

The exterior fruit color of 'Puget Crimson' is slightly lighter than 'Puget Summer', but can

darken quickly in the field and after harvest. Average fruit size is similar to or slightly smaller than 'Tillamook', about 17 g, although the size of primaries is often over 25 g. Fruit firmness for 'Puget Crimson' is also similar to or slightly less than 'Tillamook'. 'Puget Crimson' has excellent and intense fresh flavor.

#### *Yield*

'Puget Crimson' is usually the highest yielding cultivar in replicated studies conducted in Puyallup, with yields equal to or higher than 'Puget Reliance' or 'Tillamook'. In Aurora, OR, yields of 'Puget Crimson' were somewhat lower than other cultivars such as 'Tillamook'.



#### *Season and Marketing*

'Puget Crimson' has a very late season similar to 'Puget Summer' and ripening 7 to 10 days after 'Tillamook'. It is suited to processing or fresh use, with care taken to harvest fruit before it overripens in the field. It has been grown successfully under organic management, especially when care is taken to prevent overly vigorous growth and lower humidity in the leaf canopy as a cultural precaution against foliar and fruit disease. The late season of 'Puget Crimson' does make the fruit more susceptible to attack by spotted wing drosophila, as populations of the pest build as the season advances.

#### *Disease resistance*

'Puget Crimson' is a vigorous and durable plant, and appears to withstand moderate levels of weevil pressure and root pathogens. Like its parent (Puget Summer), it is susceptible to powdery mildew.

All of the cultivars highlighted above are available at area nurseries, including Norcal Nursery, Lassen Canyon Nursery, Spooner Farms, and Northwest Plants. A key component of developing new machine-harvestable raspberry cultivars with excellent fruit characteristics is input from growers and processors at annual field days. These field days are held at the farm of the cooperator-grower where select raspberry plants and machine-harvested fruit are on display for discussion and comment. Additionally, we work closely with Peerbolt

Crop Management to conduct grower trials of advanced breeding selections (<http://berriesnw.com/>). Observations and data from these activities are vital to the continued work of improving raspberry and strawberry for the challenging production climate that growers face. We invite growers and processors to share their experiences with us at these field days, in on-farm trials, or in person.



# LIVESTOCK SPRING HEALTH CONCERN: GRASS TETANY

Dr. Susan Kerr

WSU Regional Livestock and Dairy Extension Specialist

Grass tetany or grass staggers is a fairly common springtime disease of livestock, especially cattle. The cause is debatable. For simplicity, this condition will be described here as low blood levels of magnesium in affected animals due to low levels or low availability of magnesium in feed or poor absorption by the animal.

## Cause

Lush spring growth may have low magnesium content and therefore be associated with this disease. However, grass tetany can occur if cattle are ingesting too much potassium, are deficient in salt or the diet is changed rapidly from hay to lush pasture.

## Signs

Animals with abnormally-low blood magnesium levels may appear fine until stressed by calving, movement or transportation. Mildly affected animals will twitch their face and ears, carry their tail up, walk with a stiff "goosestep" and act more wary or wild than usual. As the condition worsens, animals become more excited. They may bellow, stagger and appear blind. Without treatment, affected animals go down and begin a repetitive, stiff-legged paddling motion with all four legs. Death is likely without prompt treatment and down animals may do serious secondary injury to themselves. Livestock producers may first realize they have an "outbreak" of grass tetany when they find dead animals that have paddled into the dirt before they died.

## Treatment

Treatment consists of intravenous magnesium preparations. Due to potentially-fatal cardiac complications, treatment should be administered by a veterinarian. Restraint is critical because unlike the near-coma induced by milk fever, grass tetany cattle can be hyperexcitable and dangerous.

## Prevention

To prevent grass tetany, supplement winter hay and early spring pasture with magnesium oxide in salt, mineral or grain mixes. Try to deliver about two ounces of magnesium oxide per head per day during high-risk early spring grazing. Consumption can be encouraged by placing mineral feeders near water sources and loafing areas. Molasses magnesium blocks are specifically made to prevent grass tetany; they are handy but expensive. Commercially-prepared mineral mixes have been developed to feed when risk of grass tetany is increased--feed according to the manufacturer's label instructions. Feed hay before animals are let out on lush spring pastures to transition them over to pasture slowly. Grass tetany is also associated with deficient ration energy levels and calcium:phosphorus ratios less than the desired 2:1, so be sure to examine and balance rations in advance of grass tetany season. Magnesium can be increased in deficient soils by using dolomite limestone if soil pH is low or by adding magnesium to fertilizer mixes.

# PORCINE EPIDEMIC DIARRHEA

Source: The Pig Site [edited]: <<http://www.thepigsite.com/swineneews/36342/first-ped-outbreak-reported-in-virginia>>

Following the 1st report of an outbreak of porcine epidemic diarrhea (PED) in the state, the state veterinarian has advised livestock show managers and exhibitors to observe strict biosecurity. Dr Richard Wilkes, state veterinarian with the Virginia Department of Agriculture and Consumer Services (VDACS), has announced that Virginia has just received laboratory confirmation of its 1st case of PED.

In light of this case, which coincides with the beginning of the exhibit season for 4-H members, FFA [Future Farmers of America] students and other livestock exhibitors, Dr Wilkes says strict biosecurity is the most effective and most practical way to prevent the spread of PED and many other livestock and poultry diseases. He is encouraging every person involved in showing livestock to enhance their biosecurity efforts. He said: "We always urge livestock owners who show animals and managers of show and exhibition facilities to keep biosecurity uppermost in their minds but with swine, it is even more important now that Virginia has experienced its 1st case of PED. Good biosecurity can help keep the disease from spreading."

Any time animals are co-mingled at events, there is a risk they may be exposed to an infectious disease agent. Some states have cancelled pre-show weigh-ins or other animal commingling events to try to prevent PED infection of swine. Virginia show managers may want to consider voluntarily cancelling some of the higher risk activities.

The PED virus is highly contagious, and commonly spreads through pig manure. Consuming pork continues to be safe and the disease does not affect humans, but is often deadly to piglets. Practicing and implementing sound biosecurity measures is critical in keeping the state's animals disease-free and marketable.

Dr Wilkes said that good biosecurity and advance planning will reduce the chances of spreading an infectious disease by people, animals, shoes and clothing or equipment. Show managers should have a proper biosecurity plan ready to execute in the event that an animal disease is introduced at a major stock show or event.

VDACS offers the following guidelines to help minimize risk at events where animals co-mingle. Note that these general recommendations also apply to diseases that can be spread between humans and animals.

## **Biosecurity for animal exhibitors:**

- consult your veterinarian to establish an appropriate vaccination program for your livestock prior to attending an event;
- before stalling your animal at an event, make sure the stall has been cleaned and disinfected and use clean, fresh bedding;
- minimize direct contact with other animals;
- use your own water and feed buckets. Avoid letting your animal(s) drink from a communal water trough. Fill water buckets from a faucet, not a shared tank;
- wash your hands thoroughly after handling other animals to minimize the risk of transferring a disease back to your animal;
- before returning home from an event, clean and disinfect your equipment (boots, tack, grooming supplies, buckets, etc) to help reduce the risk of transporting an infectious agent back home;
- isolate your returning animal(s) for 2 weeks or prevent contact with your other animals and watch for signs of illness in all of your animals.

When you come home from a fair/exhibition be sure disinfect your trailer;

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- consult your veterinarian concerning these and other steps you can follow which may reduce the risk of your animal acquiring an infectious disease while travelling.

**Biosecurity for event organizers:**

- minimize contact between animals where possible;
- minimize spread by human hands (limit public access, provide hand sanitizer, establish restricted areas in front of stalls and trailers, post handwashing signs);
- minimize spread by shared equipment and post signs advising participants not to share equipment);
- where practical, provide solid, high-walled stalls to minimize spread of infectious nasal droplets.

**Biosecurity when visiting an animal exhibit such as a fair or petting zoo:**

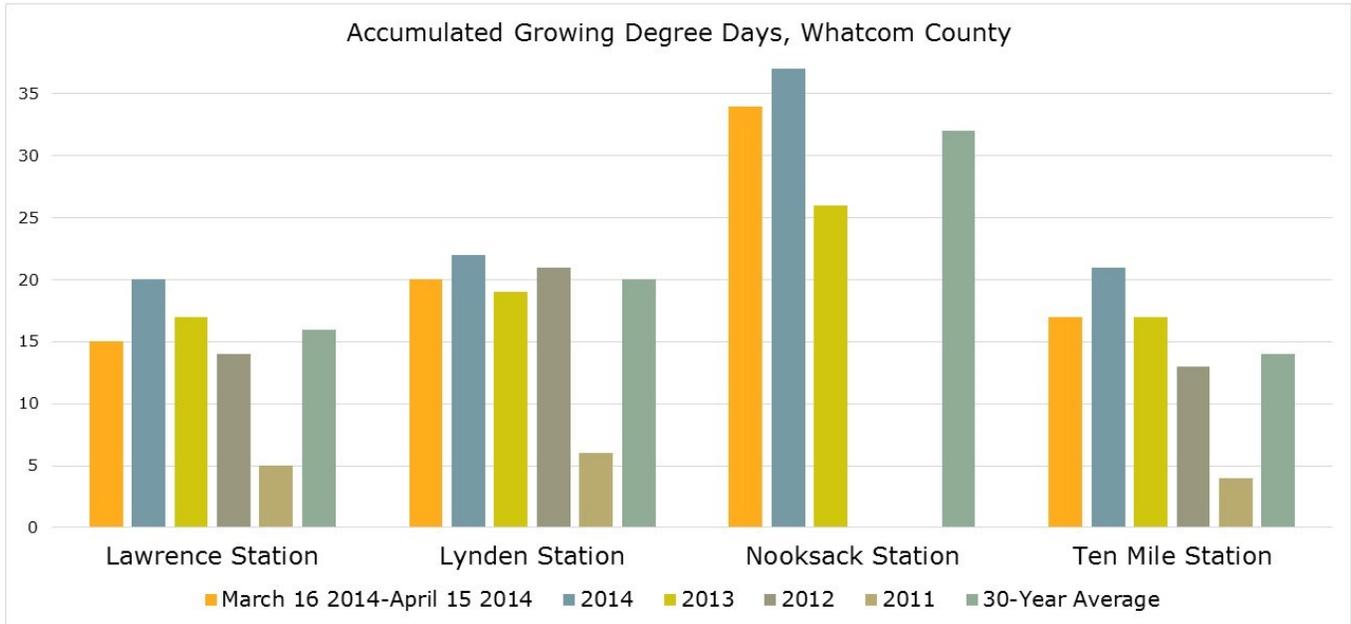
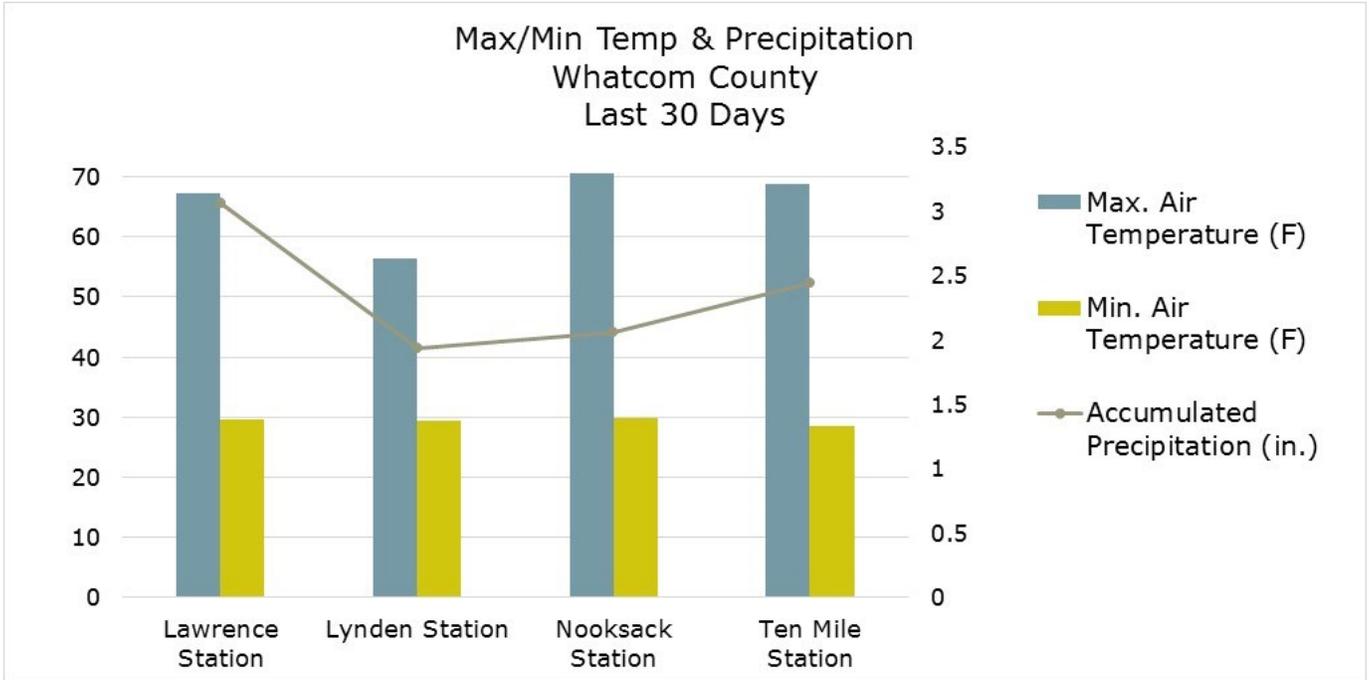
- locate handwashing stations and use them often. Always wash your hands after petting animals or touching the animal enclosure, especially before eating and drinking;
- use running water and soap whenever possible. Use hand gels if running water and soap are not available;
- keep food and drinks out of animal areas;
- never allow children to put their hands or objects such as pacifiers in their mouths while interacting with animals.

"Livestock exhibitions are an enriching and rewarding experience for our youth," said Dr Wilkes.

"Implementing simple biosecurity measures to prevent disease spread and having an established plan of action to address disease outbreaks if they occur protects that experience for exhibitors and event managers alike."

# WEATHER UPDATE

All information here is derived from the four weather WSU AgWeatherNet stations (<http://weather.wsu.edu/awn.php>) in Whatcom County. Current weather conditions can be found at: <http://whatcom.wsu.edu/ag/currentdata.html>. Station information can be found [here](#).



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**Cover Image:**

Red raspberries leaves  
open up for spring.

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# Upcoming Events

## **April**

[Whatcom Dairy Speaker Series:  
Options for Managing Nuisance  
Wildlife](#)

Thurs. April 17th

12:00 - 1:00 pm

Lynden, WA

USDA implements multiple tools in implementing a comprehensive wildlife control program throughout Washington State. Their purpose is to help protect resources such as livestock, property and human health and safety. Matt and Henry will discuss USDA Wildlife Services' starling and beaver trapping programs in Whatcom County over the past 15 years.

[Tools, Equipment, and Horsepower  
for the Small Farm: a Practical Look  
at What Works](#)

Sat. April 26th

9:00 am - 3:00 pm

Warm Beach, WA

Presentations will cover hand-, tractor-, and horse-powered equipment, including how to determine the best match between farm, farmer, and tool. Attendees will gain the knowledge needed to make the most of future equipment purchases. In addition, those wishing to look closely at using draft horses on their farm will have the opportunity to work hands-on with an experienced team and teamsters.

## **May**

[Proper Handling and Care  
Keeps Livestock Healthy and  
Happy!](#)

May 3rd & 4th

Snohomish, WA

Hands-on workshops with live animals include topics such as hoof trimming, injections, dehorning, halter training, nutrition, fencing, and more! Taught by award-winning graduates and seniors from the WSU Snohomish County 4-H Livestock Program, workshop instructors have the experience and expertise needed to raise and show prize-winning livestock. In addition, all attendees will receive a take-home CD-ROM loaded with resources for all species.

[Late Spring/Summer  
Orcharding Workshop](#)

Sat. May 17th

9:00 am - 5:00 pm

Mt. Vernon, WA

Cutting edge information in a dynamic 1-day workshop featuring a team of experienced professionals led by Dr. Andrea Bixby-Brosi and Alix Whitener of WSU Tree Fruit Research and Extension Center/Wenatchee. WSU NW Research Center/Mt. Vernon will provide experts in Entomology and Weed Control and be joined by local orchardist Gary Moulton.