

# Whatcom Ag Monthly

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# EXTENSION CELEBRATES 100 YEARS OF SERVICE

2014 marks the 100th anniversary of the Smith-Lever Act that established the Cooperative Extension Service. The Whatcom County office technically opened its doors in 1917, but we are celebrating along with the other County and State offices this long-term partnership that has engaged people of the state of Washington. Our focus and activities have been wide-ranging and long-lasting to advance knowledge, the economic well-being and quality of life of our state's residents. We have provided and will continue to provide programs in the areas of agriculture, gardening, economic development, parenting, nutrition, sustainable development and more.

To find out more about WSU Extension's history by going to:

<http://ext100.wsu.edu/anniversary/>.



**Extending Knowledge and Changing Lives**

[ext100.wsu.edu](http://ext100.wsu.edu)



# SWD SEASON HAS BEGUN

Colleen Burrows  
WSU Whatcom County Extension

The warmer days of May bring with it the threat of increasing Spotted Wing Drosophila populations. Most insects, including SWD, develop at different rates depending on temperature which allows the use of degree days (a measurement of temperature above a certain threshold over time) to predict when certain life stages will occur.

Amy Dreves and Len Coop at Oregon State University have developed a degree day model for SWD; they wrote an article in the March 2013 Whatcom Ag Monthly ([http://whatcom.wsu.edu/ipm/swd/documents/Article\\_DDMModel.pdf](http://whatcom.wsu.edu/ipm/swd/documents/Article_DDMModel.pdf)) that gives details about the tool.

Several weather stations in Whatcom and Skagit Counties are integrated into the degree day model. WSU Whatcom County maintains a website with current degree days and the resulting predictions for SWD egg laying and adult emergence, which is updated twice weekly through the end of July (<http://whatcom.wsu.edu/ipm/swd/ddmodel.html>). This tool is most helpful early in the season to predict early populations that may impact a crop.

The information from the website is also available as a bi-weekly email. Send an email to Colleen Burrows ([cburrows@wsu.edu](mailto:cburrows@wsu.edu)) to sign up for this SWD Degree Day email.

Sample email:



### Spotted Wing Drosophila Degree Day Update

Below is information about degree days that have been achieved by different locations in Whatcom and Skagit Counties and corresponding predictions for SWD life stages. See the website for more explanation.

[View this email in your browser](#)

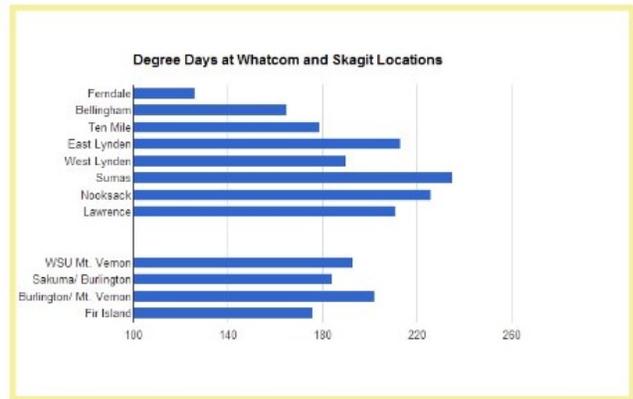
Please send an email to [Colleen Burrows](mailto:Colleen.Burrows@wsu.edu) ([cburrows@wsu.edu](mailto:cburrows@wsu.edu)) if you do not wish to continue receiving this email.

Twice a Week Degree Day Model Updates  
5/13/14

[Go To the Website](#)

Whatcom County Station Area	Degree Days as of 5/13/14	DD relative to 2013	DD relative to 2012	DD relative to 30 yr average	Predicted 1st egg lay by OW females	Predicted peak egg lay by 1st gen. females	Predicted 1st egg lay by 1st gen. females	Predicted Peak adult emergence - 1st gen.
02013 Farnoka	126	3 days behind	8 days ahead	8 days ahead	5/20/2014	6/30/2014	7/5/2014	7/30/2014
02408 Bellingham	160	1 day behind	7 days ahead	7 days ahead	5/27/2014	6/25/2014	6/30/2014	7/10/2014
AW330028 Ten Mile	179	3 days behind	8 days ahead	8 days ahead	6/05/2014	6/22/2014	6/28/2014	7/13/2014
AW330025 West Lynden	190	2 days behind	9 days ahead	9 days ahead	6/23/2014	6/21/2014	6/27/2014	7/12/2014
03829 East Lynden	213	4 days behind	8 days ahead	7 days ahead	6/18/2014	6/17/2014	6/22/2014	7/8/2014
TSUMA Sumas	235	3 days behind	2 days ahead	7 days ahead	6/16/2014	6/14/2014	6/19/2014	7/5/2014
AW330081 Nooksack	238	0	8 days ahead	7 days ahead	6/16/2014	6/15/2014	6/20/2014	7/6/2014

Skagit County Station Area	Degree Days as of 5/13/14	DD relative to 2013	DD relative to 2012	DD relative to 30 yr average	Predicted 1st egg lay by OW females	Predicted peak egg lay by OW females	Predicted 1st egg lay by 1st gen. females	Predicted Peak adult emergence - 1st gen.
AW330101 WSU Mt. Vernon	193	1 day behind	8 days ahead	8 days ahead	6/21/2014	6/20/2014	6/26/2014	7/13/2014
AW330159 Sakumai/Burlington	184	0	8 days ahead	4 days ahead	5/23/2014	6/22/2014	6/27/2014	7/13/2014
KBVS Burlington/Mt. Vernon	202	3 days ahead	9 days ahead	9 days ahead	6/21/2014	6/20/2014	6/26/2014	7/13/2014
AW330221 Fir Island	178	2 days behind	4 days ahead	12 days ahead	6/25/2014	6/28/2014	7/4/2014	7/22/2014



# WEED CONTROL IN THE SUMMER

Tim Miller

Weed Scientist, WSU Mt. Vernon Research and Extension Center

It's mid-spring and the berry crops are advancing quickly, as are the weeds. Last fall, I wrote an article in the Whatcom County Extension Newsletter about winter annual and perennial weeds, and autumn weed control. In this article, I'll talk about other weed species, and a bit about herbicides for use in the summertime. In each plant description are the pages in the 10<sup>th</sup> edition of *Weeds of the West* on which you can find photos of these species to verify your identification.

## Summer Annual Weeds

**Wild Buckwheat (sometimes called bindweed, *Polygonum convolvulus*)** is a twining, viny plant that is becoming more prevalent in red rasp-

berry production. Look for strap-shaped cotyledons followed by distinctly heart-shaped leaves. Stems quickly



wrap around the stems of adjacent plants (or anything else that is close!). Flowers are quite small and greenish-white, and followed by tiny, three-sided, dark brown, hard fruits. The plant

resembles hedge bindweed (see description below for that perennial weed), but remember that wild buckwheat comes from seed each spring, so you will always see cotyledons on the young seedlings (absent from most hedge bindweed shoots) and the watery juice that comes from a broken leaf/stem contrasts with hedge bindweed's thinly milky sap. Hedge bindweed bears very showy, white, funnel-shaped flowers, much different than those of wild buckwheat. See *Weeds of the West* pages 500-501

**Common Lambsquarters (*Chenopodium album*)** is one

of the most widespread weed species in North America. Arriving from Europe shortly after the founding of the American Colonies, common lambsquarters is now found in every state in



the union. Cotyledons are strap-like, and followed by triangular-shaped, smooth leaves. The upper surfaces of the cotyledons and early leaves are usually whitish with wax, looking a

bit like a dusting with flour; undersides are often reddish-purple. Plants grow to 4 feet tall and produce tiny greenish, waxy but rough clusters near the tips of the stems that bear the inconspicuous flowers and the flat, circular, wax-covered black seeds. *See Weeds of the West pages 264-265*

**Powell Amaranth (*Amaranthus powellii*)** is a rank-growing plant that germinates in late spring. Cotyledons are linear, dark green in color on top and dark red beneath. Leaves are lance-shaped to ovate and are borne on petioles;

they have very distinct venation and are usually a bit rough to the touch. Stems are about 3 feet tall and bear in-



conspicuous flowers among a multitude of spiny bracts at their tips. The root of this plant is usually pink to red, as in the closely-related redroot pigweed (*A. retroflexus*). Seeds quickly follow the flowers, with each being lens-shaped, shiny black, and only about 2 mm in diameter. *See Weeds of the West pages 12-13*

### **Biennial Weed**

**Bull Thistle (*Cirsium vulgare*)** is a widespread thistle that occasionally is found in berry crops.

It produces a large rosette of roughly hairy, spiny leaves in the first year of growth. Rosettes can be as wide as 2 feet, although most



are only a few inches across. After going through the winter, the second-

year plant sends up a main flower stalk that may reach 5 feet tall, with side stalks making the canopy up to 3 feet wide. Flower heads are about the size of a ping-pong ball and intensely spiny, with purple flowers emerging at the top of the head. Unlike its cousin, Canada thistle (*C. arvense*), bull thistle does not spread by creeping roots. Instead, each individual plant grows on a single taproot and it spreads exclusively by the plumed seeds that are produced so heavily in late summer. *See Weeds of the West pages 120-121*

### **Perennial Weeds**

**Hedge bindweed (*Calystegia sepium*)** is a viny plant that twines over, around, and through whatever plants grow in the same spot. Leaves arise from the perennial rhizomes in spring, are smooth, up to about 3 inches long, and distinctly heart-shaped.



They are often tinged with red when growing in full sun. Flowers are funnel-shaped and large: up to 3 inches across at the mouth. This species is more common locally than the closely-related field bindweed (*Convolvulus arvensis*), which bears smaller (1-inch) arrowhead-shaped leaves and smaller (1-inch) funnel-shaped flowers that are either fully white or white with pink/red. See *Weeds of the West* pages 278-279 for Hedge and 280-281 for Field Bindweed

**Dandelion (*Taraxacum officinale*)** and **Common Catsear (*Hypochaeris radicata*)** are two similar plants with some subtle, but important, differences. Bright yellow dandelion heads are very familiar to most everyone as an early spring flowering plant, at which time they compete for the interest of bees placed to pollinate



berry plants. These flowers are followed by the fuzzball seedheads that blow seeds with the wind. Common catsear flowerheads are borne on tall stalks rather than singly as are dandelions, and catsear flowers are usually not produced until mid-summer. Common catsear flowers also grow into fuzzballs, although they have a different look than dandelions, being a whitish-tan in color and not appearing to be as dense. See *Weeds of the West* pages 186-187 for dandelion and 146-147 for common catsear

**Creeping buttercup (*Ranunculus repens*)** is a ground-covering plant that generally stays green even in winter. Leaves are often slightly variegated with silver markings, whose 3 (or sometimes 4) lobes give the leaves a roughly "square" outline. Bright yellow flowers are



borne solitary on long stems in mid-spring. Each flower has 5 glossy petals, shining like they had each been "battered". Plants spread by stolons that root at the nodes and grow in all

directions, resulting in a thick mat of vegetation that excludes most other species. See *Weeds of the West* pages 526-527

**Watson's Willowweed (*Epilobium ciliatum*)** is a native plant whose leaves usually stay green (or red!) most of the winter. Look for the smooth, shiny leaves that are longer than wide and reminiscent of willow leaves. Multiple stems grow from the crown, obtaining heights of 3 to 4 feet. Flowers are pink to rose-purple, with four petals each about ¼-inch long borne at the tip of the slender reddish-purple fruit. The fruits continue to grow after

the petals fall, ending up about 3 inches long and 1/8<sup>th</sup> inch thick. The mature fruits split into four pieces and release the tiny plumed seeds that blow far and wide. There are two annual species of willowweed (panicle willowweed, *E. brachycarpum* [see *Weeds of the West* pages 392-393] and little willowweed, *E. minutum*), both common in our area, as is the closely-related perennial fireweed (*Chamerion angustifolium*; see *Weeds of the West* pages 394-395).

These are a few of the common weed species found in our area. If you have other weeds that you want to get identified, bring a sample in to the Extension office, or email me a digital photo and we'll get an ID for you ([twmiller@wsu.edu](mailto:twmiller@wsu.edu)).

### **Spring/Summer Herbicide Options:**

**Strawberry.** Very few herbicides are available after established strawberries begin growth. Some products can, however be used following berry harvest at bed renovation, while some are registered for use in newly-planted strawberry:

2,4-D. Certain formulations may be applied during renovation, check the individual labels for which products are registered for use in strawberry and for the directions for their use. This herbicide may cause some epinastic symptoms on the first leaves regrowing from strawberry plants.

Aim (carfentrazone), Gramoxone (paraquat), as well as acetic acid and other natural herbicides. Apply only between strawberry rows to actively growing weed seedlings; any herbicide that contacts the crowns can damage non-dormant strawberry plants. These products will have little lasting effect on established perennial weeds.

Chateau (flumioxazin) can be used 30 days prior to transplanting or between rows at renovation. This herbicide can cause defoliation of sprayed leaves of both strawberry and weeds.

Devrinol (napropamide) can be applied after planting or during renovation. There must be adequate rainfall shortly after application to prevent photodegradation and to activate the herbicide. This herbicide will not control emerged weeds, so strawberries must be clean-cultivated prior to application. On new plantings, some growers apply a partial rate, and follow with another application in the fall.

Prowl H2O (pendimethalin) can be applied between strawberry rows at renovation. Rainfall incorporation or irrigation is necessary to activate the product. This herbicide will not control emerged weeds, however, so row middles must be clean.

Spartan (sulfentrazone) can be applied pre- or post-transplant and after mowing during renovation in summer.

Simazine can be applied at renovation, although most producers tend to use it in the fall.

Sinbar (terbacil) can be used during bed renovation, or later in the fall after newly-planted strawberries have been established for at least 6 months.

Grass herbicides include Select (clethodim) and Poast (sethoxydim). These only control emerged grasses and must be applied with surfactant. Poast usually only suppresses quackgrass.

**Raspberry and blackberry.** Herbicides are generally not applied to caneberries after cane

burning [using Aim (carfentrazone), Goal (oxyfluorfen), and/or Gramoxone (paraquat)] due to potential for injury to re-growing primocanes. Spot treatment of perennial weed patches using a backpack sprayer is possible, however, and will pay dividends next year.

Glyphosate can be wiped on perennial weed growth using a wick applicator. Take care to not accidentally wipe raspberry leaves, however, as severe injury to those canes can result.

Contact herbicides such as Gramoxone (paraquat), acetic acid and other natural herbicides may be applied as spot applications, but will have little lasting effect on established perennial weeds.

Grass herbicides include Select (clethodim) and Poast (sethoxydim). These only control emerged grasses and must be applied with surfactant. Poast usually only suppresses quackgrass. Note pre-harvest intervals for spring-applied herbicides.

In addition, the following may be used on new plantings of raspberry or blackberry:

Aim (carfentrazone), Gramoxone (paraquat), as well as acetic acid and other natural herbicides. Apply only between caneberry rows to actively growing weed seedlings; any herbicide that contacts the crowns can damage non-dormant caneberry plants. These products will have little lasting effect on established perennial weeds.

Chateau (flumioxazin) can be used after transplanting but before foliage begins growth. This herbicide can cause defoliation of sprayed leaves of both caneberries and weeds.

Devrinol (napropamide) can be applied after transplanting after soil has firmed. There must

be adequate rainfall shortly after application to prevent photodegradation and to activate the herbicide. This herbicide will not control emerged weeds, so caneberries must be clean-cultivated prior to application.

Simazine can be applied at transplanting, but lower rates are used than when the product is used in the fall. Rainfall incorporation or irrigation is necessary to activate the product.

Surflan (oryzalin) can be applied after transplanting after soil has firmed. Rainfall incorporation or irrigation is necessary to activate the product. This herbicide will not control emerged weeds.

Trellis (or Gallery; isoxaben) or Snapshot (isoxaben + trifluralin granules) may be used after transplanting after soil has firmed. Rainfall incorporation or irrigation is necessary to activate these products. These herbicides will not control emerged weeds.

**Blueberry.** Blueberries often benefit from fall herbicide applications, given the bare soil beneath the bushes, especially once blueberry leaves fall.

Glyphosate can be wiped on perennial weed growth using a wick applicator. Take care to not accidentally wipe blueberry branches/leaves, however, as severe injury to those bushes can result.

Contact herbicides such as Gramoxone (paraquat), acetic acid and other natural herbicides may be applied as spot applications, but will have little lasting effect on established perennial weeds.

Grass herbicides include Select (clethodim) and Poast (sethoxydim). These only control emerged grasses and must be applied with

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surfactant. Poast usually only suppresses quackgrass. Note pre-harvest intervals for spring-applied herbicides.

Several products noted above in newly-planted caneberries may also be used in newly-planted blueberry, including [Devrinol](#), [Snapshot](#), [simazine](#), and [Surflan](#). In addition, [Solicam \(norflurazon\)](#) may be used immediately after planting blueberry plants.

[Matrix \(rimsulfuron\)](#) and [Sanda](#) ([halosulfuron](#)) may be applied to emerged weeds in established blueberry during the growing season. These products should be applied as a directed spray to emerged weeds in the row, being careful not to overspray blueberry leaves. Apply to dry foliage and allow 6 hours of contact time for best results. PHIs are 21 days for Matrix and 14 days for Sandea.

# HYBRID POPLARS SHOW PROMISE FOR BIOFUELS IN WESTERN WASHINGTON

Shiba Kar

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## Advanced **Hardwood Biofuels** Northwest

In the quest for locally produced renewable energy, a new poplar-based bioproducts and biofuels initiative is taking place in the Pacific Northwest (PNW). In western Washington, these poplar-centered biochemicals and fuels efforts are being demonstrated at the Pilchuck Demonstration Site, near Stanwood, Washington. The Pilchuck site is one of four poplar demonstration sites in the PNW where the management of poplar grown as a biofuel feedstock is being researched and evaluated (Figure 1).

With increasing demand for liquid transportation fuels, we are bound to run out of our limited reserve of fossil fuels sooner or later. Cellulosic biofuels, produced out of inedible plant materials, wood chips, and other waste products, are widely accepted as renewable and nearly carbon neutral alternatives to fossil fuel. Cellulosic biofuels can be processed to be chemically equivalent to traditional fossil fuels, making them fully compatible with existing engines and infrastructure. Producing high-



Figure 1: Hybrid poplars are grown as a short-rotation energy crop in Pilchuck site

value biochemicals along with the biofuels can also reduce our dependence on fossil fuels and make the biofuels more price-competitive.

Fast growing, short-rotation hybrid poplars are a leading feedstock for renewable transportation fuels and bioproducts in the PNW. To support biofuel production, the Advanced Hardwood Biofuels Northwest (AHB) initiative, led by University of Washington, was established in 2011 to develop a PNW biofuel industry that utilizes hybrid poplar as the primary biofuel feedstock. AHB includes five PNW universities and two industry research partners working together to complete the necessary research and development to support a system that converts hybrid poplar trees into bioproducts and liquid biofuels, including diesel, jet fuel, and gasoline. These fuels will be direct replacements for existing fossil fuels, certified to run in conventional car, truck, and aircraft engines. The AHB initiative will help ensure regional energy security and revitalize rural economies through job creation and economic development opportunities.

The PNW is an ideal place to develop a poplar-based biofuel system. The region's isolation from other US fuel pipelines, the abundance of suitable lands to grow hybrid poplars, and the availability of existing infrastructure are some of the key considerations. Moreover, the unique characteristics of hybrid poplars such as wide site adaptability, higher clonal variation, and lower lignin with higher cellulose content make them a very attractive feedstock for biofuels.

With advancements in conversion technology, hybrid poplars show great promise as a renewable energy crop for biofuels. A key challenge is providing a continuous feedstock supply to potential biorefineries. Different varieties of hybrid poplars, as a short rotation woody energy crop, are being tested to see which are best as an energy feedstock. Growing and harvesting technologies, assessments of biomass yields, production costs, and environmental impacts are also being researched as part of the AHB project. The project's industry partner, Greenwood Resources, Inc., has established the four bioenergy demonstration farms across the PNW to investigate the production and management issues of poplar energy crops.

The 95-acre Pilchuck Demonstration Site, near Stanwood, Washington demonstrates how poplar can be commercially produced to ensure a steady supply of feedstock is available to biorefineries in the Puget Sound region. The Pilchuck site was established with 12 different clonal varieties of hybrid poplar, which are evaluated to determine the growth and yield of poplar on underutilized agriculture land in Western Washington. The demonstration site was originally forested land that was converted into hay fields. The goal is to determine which varieties and production systems will provide the best biomass yields.

The poplar cropping methods being developed at the Pilchuck site are very different from the hybrid poplar production systems

used for the pulp and paper industry over the past several decades. The poplars for biofuel production are grown on very short 2 to 3 year rotations as an energy crop and are harvested using a modified forge harvester. Poplars for pulp and paper were grown on 12 to 15 year rotations and conventional logging equipment and methods were used for harvesting. The very short rotation poplar energy crops are chipped as they get harvested and then the chips are trucked to the biorefinery where they will be converted into biofuels and bioproducts. After harvest, multiple new shoots come out from the poplar's cut stumps that can be harvested again in future years.

Determining optimum biomass yields is an important aspect of the Pilchuck demonstration site. After the first growing season, the hybrid

poplar clones were measured to determine growth rates and potential yields (Figure 2). The first harvest is anticipated in the fall of 2014, after the site's second growing season. First harvest yields are expected to be lower because the trees are still establishing their root systems. Higher yields are expected after the first harvest, when the trees will resprout with vigor. With innovative technology and equipment, harvesting will be most cost effective and efficient on larger acreages or on several small-acreage sites that are close together.

Different sustainability criteria are also being monitored to investigate poplar farm's environmental, economic, and social impacts. Researchers are evaluating poplar's effects on soil, water, and wildlife. Economic sustainabil-

ity is being assessed through the development of comprehensive economic models. AHB's Feedstock Team is also determining site-specific clonal selection and management scenarios that achieve targeted yields and make the most economic sense. Social researchers are surveying community stakeholders to determine their support and concerns for bio-

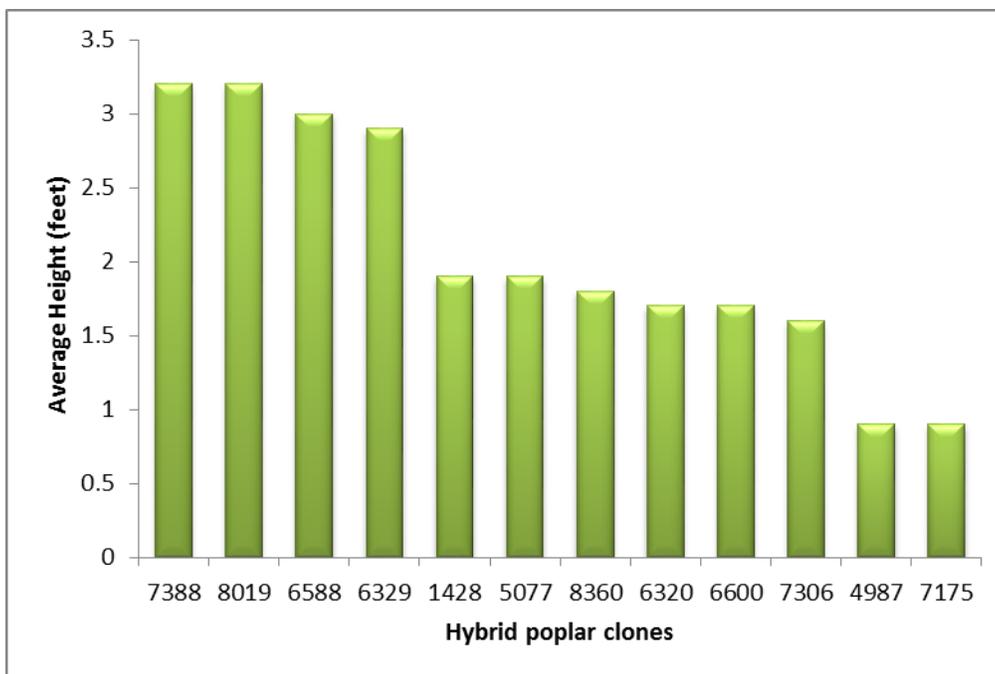


Figure 2: Growth after first growing season at Pilchuck site

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fuel production in their area. To ensure a strong workforce for future biofuel industries, the Education Team is developing educational opportunities for a range of students from the elementary to graduate level. In addition, AHB's Extension Team from Washington State University Extension is working to educate potential popular growers, policy-makers, and the public about AHB's renewable fuel vision for the PNW.

The Pilchuck Demonstration Site and the ongoing outreach efforts will help ensure the success of a sustainable biofuels and bioproducts industry in the PNW. You can learn more about the hardwood biofuel developments during AHB's Pilchuck Demonstration Site tour this summer, which will be held on July 17, 2014. More information is available on our website: <http://hardwoodbiofuels.org/event/pilchuck-field-tour/>.

# IT PAYS TO FARM

Karin Wessman and Chris Elder

Whatcom County Planning & Development Services

What is the value of farmland? How valuable is that same farmland when buried beneath foundations and roads of new home developments? Certainly people have a right to a home, but the location of that home is a question that Whatcom County has been deliberating for years.

Whatcom County farmers are feeling the pressure; of rising land costs, rising operating expenses, and the pressure to develop. For many farmers, their land is their retirement plan or their financial buffer. The sale of a 40 acre or greater tract of land to the right buyer could stabilize an aging farm couple in the form of an instant retirement package. The sale of a parcel could reinvigorate a struggling farm enterprise. There are few options as attractive as an immediate cash injection.

However, there are other options. National Resource Conservation Service (NRCS) programs will help farmers cover the cost of cover-cropping, installing buffers, and even support the repair of manure management systems. Whatcom Conservation District helps de-

velop farm plans and pays farmers for implementing Conservation Reserve Enhancement Programs. These programs are not fully supported or endorsed by farmers throughout the county, but they do equate to federal, state, and local dollars being invested into the land and the property owner.

Another option for landowners, and one that has not been fully supported or endorsed by the farming community is the Whatcom County Purchase of Development Rights (PDR) program. Simply, this program pays farmers to keep farming. Do you own property in R5, R10, or Ag zones? Is the property actively being farmed or has it been farmed up until recently? Would you like to see that property farmed by your kids, grandkids, or by some other future farmer?



Figure 1. Whatcom County Council visit with local farmers and Whatcom County Planning & Development Services

The County's PDR program offers money for your residential development rights. Whatcom County hires an independent appraiser to come and survey your property to determine the value with development rights and the value with no development rights. The difference between the two values is what you are offered. The result of the transaction is a permanent agricultural conservation easement that is placed on your property. You are still the owner of the property and it is still yours to farm. The development and maintenance of farm infrastructure is allowed to an extent as defined in your easement. Typically 2% of impervious surface on a conserved property is the national standard, but small acreage parcels or farms planning on significant infrastructure expansion can potentially expand their maximum impervious surface percentage.

The agricultural conservation easement is permanent and is currently monitored by the Whatcom Land Trust. Staff from WLT will visit the property once per year to confirm that the conservation easement has been honored. Beyond this, there is no further obligation to the property owner, and no other interaction is required with governmental or non-governmental entities.

Since the program's inception in late 2001, Whatcom County has supported the purchase and enactment of 15 agricultural conservation easements. 118 residential development rights have been extinguished and just over 826 acres have been permanently dedicated to farming.

Property owners have been paid an average sales price **per acre** of **\$5,000** (ranges from 2,000 – 12,000), and an average sales price **per development right** of **\$40,000** (ranges from 20,000 to \$120,000). Typically development rights in the Ag zone are valued higher than in the rural zones as they impact larger acreages, though the price paid per acre is very similar.

Whatcom County is a farming county and a farming community. The farmland is rich and productive. Our ancestors moved here for the abundance that this environment provided. People continue to move here to enjoy the beauty of the farmscape, often not realizing that they are impacting farmer viability and the ease of farm function. Farmers find themselves in a more and more constricted position. Large farm operations can't find enough land to practice responsible crop rotation. Small farm operations can't find affordable farmland. These new county residents often don't understand the amount of labor required, the number of work hours required, the challenge of efficiency, or the smell of fertility in the morning.

Whatcom County farmers and property owners can help ensure that farming remains an option well into the future and ensure that farmers remain financially secure today.

Please contact Karin Wessman or Chris Elder with the Whatcom County Purchase of Development Rights Program with questions and interest in the program. We are available to

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help you determine whether the PDR program  
is a good fit for you and your property.

To contact Whatcom County Planning &  
Development Services (360)676-6907 OR

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PDR Outreach Coordinator

# WSU PUYALLUP PLANT & INSECT DIAGNOSTIC LABORATORY

Jenny Glass

WSU Puyallup Research and Extension Center

## What services does the Diagnostic Lab provide?

The WSU Puyallup Plant and Insect Diagnostic Laboratory provides general plant problem diagnosis, arthropod identification, and weed identification. The diagnostician at WSU Puyallup, Jenny Glass, has over 14 years' experience working with the diagnosis of abiotic (nonliving) plant stresses, fungal diseases, and bacterial pathogens as well as with insect pests of plants. She has worked with over 10,000 samples during her time at the laboratory. Many samples will also receive additional input from our network of WSU specialists in the fields of Christmas tree and ornamental pathology, vegetable pathology, entomology, small fruit horticulture, weed science, and vertebrate pest problems.

## What services are not provided?

The laboratory has few resources to test plant tissue for the presence of specific viral particles. We do stock a number of commercially-available test kits to confirm the presence of a certain common viruses, such as cucumber mosaic virus, impatiens necrotic spot virus, and tomato spotted wilt virus. The lab also has only limited expertise related to nematode identification but will report if stylet-bearing nematodes are observed in the sample. We can then recommend labs for further exploration of these specialties.

The laboratory is not equipped to provide analytical testing of soil and plant tissue for nutrient analysis or pH. Nor can the laboratory test

plant tissue or soil for chemical residues.

Please see the WSU database at <http://puyallup.wsu.edu/analyticallabs/> for a list of providers of these services.

We no longer have any direct laboratory personnel undertaking active research relative to plant diseases or plant pests.

We do not provide plant inspections for regulatory purposes.



Figures 1 & 2. Proper sample packaging is critical to good diagnosis (plastic bag (above) and sample pressed in paper (below)).

## What should a sample consist of?

The sample submitted should demonstrate the range of symptoms observed on the plant or crop. Oftentimes, the pathogen or pest damaging a plant is found at the margin between the damaged tissue and the healthy tissue so be



Figure 3. WSU diagnostician, Jenny Glass, preparing a sample for diagnosis.

sure to include this area when collecting a sample. In addition, it may be important to include several parts of the plant, such as the roots, in order to capture within the sample the place where the problem is developing.

## What information should the grower provide?

Many of the clues relative to achieving a diagnosis are found in the onset of the problem, the distribution of symptoms throughout a crop, and whether or not there is spread of the problem. Background information on the care of the plant/crop including irrigation, fertility, and recent weather may be crucial to identifying the origin of the problem. This information can be provided by thoroughly completing our plant problem diagnosis form and/or by providing pictures of the appearance of the problem on

the plant, or in the field or crop.

## How is your sample diagnosed?

Observations as to the plant symptoms and the pathogen and pest signs on the samples are made relative to the information provided about the problem and the care of the plant or crop. Samples are typically examined using magnification. Examination of symptoms, arthropods, and some fungal structures is done with the use of a stereo or dissecting microscope that provides 8x to 40x magnification of the unaided eye. While to observe the small pathogen structures, such as fungal spores or bacterial cells, plant or pathogen tissue must be examined using a compound microscope, where magnification generally starts at 100x the unaided eye. If no evidence of a primary pathogen is observed initially, the work to determine the cause is continued through incubation of the sample in a moist chamber and plating plant tissue onto sterile laboratory agar to promote the growth of fungal and bacterial organisms.

Your sample is compared to past experiences of problems found on that plant or crop. We have an extensive diagnostic library and make good use of online resources as well.

## How long will diagnosis take?

The standard response of anyone trained in Extension to questions like "How long" is "It depends". Turnaround times can be as short as upon arrival of the sample to weeks of work completed without a definitive answer. We work hard to provide accurate and timely diagnosis but often our available staffing level is not sufficient to keep up with the flow of samples and other laboratory and teaching responsibilities. Feel free to call/email to check on the status of your sample if time has



Figure 4. Bacterial damage on rhubarb.

passed and you haven't been contacted.

The diagnostician is also responsible for teaching so there will be times throughout the year where the laboratory may be closed temporarily for diagnosis.

### **What will the diagnostic results include?**

When possible, your diagnostic response will include a description of the cause of the problem, the basic methods used to determine the cause, and the integrated pest management suggestions to help resolve the problem. If no diagnosis can be reached, you will usually receive a list of ideas that may be associated with the problem, as well as ideas considered and the reasons they were ruled out. The laboratory welcomes the resubmission of samples if no diagnostic answer has been determined.

Many of the information and management resources will come from the PNW Plant Disease or Insect Management Handbooks. Other extension research, including the American Phytopathological Society and Entomological Society of America, may be consulted for management information.

Information on registered pesticides can be

found at the Pesticide Information Center Online (PICOL) at <http://picol.cahe.wsu.edu/labels/Labels.php>.

At this point, our diagnostic responses are unlikely to include pictures of the symptoms or signs. When staffing allows in the future, we hope to add this photo service to increase the educational nature of the diagnostic response.

### **How to package a sample for mailing?**

The specimens should be protected from damage during transit. Try to place samples in a sturdy box for mailing. If sending an entire plant, please wrap the root zone in plastic to keep any soil from contacting the foliage. Feel free to shake much of the soil off roots so as to reduce costs with mailing. Samples of thin branches or foliage can be placed between layers of dry newsprint. Do not add additional moisture to the sample. Detached leaves alone rarely give sufficient information to be diagnostic.

Insect submissions can be frozen to kill and then gently packed into a container or vial to minimize damage. Soft-bodied insects, such as aphids, can be preserved in alcohol but since mailing flammable liquids is prohibited by mail, please drain off the alcohol before shipping.

### **Where should you mail a sample?**

Mailing address:

WSU Puyallup Plant & Insect Diagnostic Laboratory  
2606 W Pioneer  
Puyallup WA 98371

If environmental conditions are mild, as occurs through much of the year in Western WA, then you can typically mail samples out anytime in the week without the concern of sample dete-

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rioration. In extreme weather conditions, try to keep the transit time short. When possible, ship so the samples arrive early in the week.

The laboratory is also open to direct walk-in submission of samples Monday to Friday between 9 am and 4 pm.

The WSU Department of Plant Pathology in Pullman has a Plant Pest Diagnostic Clinic run by diagnostician Karen Ward for problems occurring on plants and crops east of the Cascade Mountains. Contact information: 509/ 335-3292 or [plant.clinic@wsu.edu](mailto:plant.clinic@wsu.edu) or <http://plantpath.wsu.edu/diagnostics/>

### **What does the diagnostic service cost?**

Basic diagnostics start at \$25 for informational inquiries and arthropod identification. Most plant problem diagnosis costs \$40. This fee covers the cost of materials used in the diagnosis of the sample. Additional testing, for example the use of PCR identification protocols or DNA sequence analysis, may incur additional diagnostic fees. While it is preferred that diagnostic fees accompany the sample, we can send an invoice with the diagnostic results.

### **For more information:**

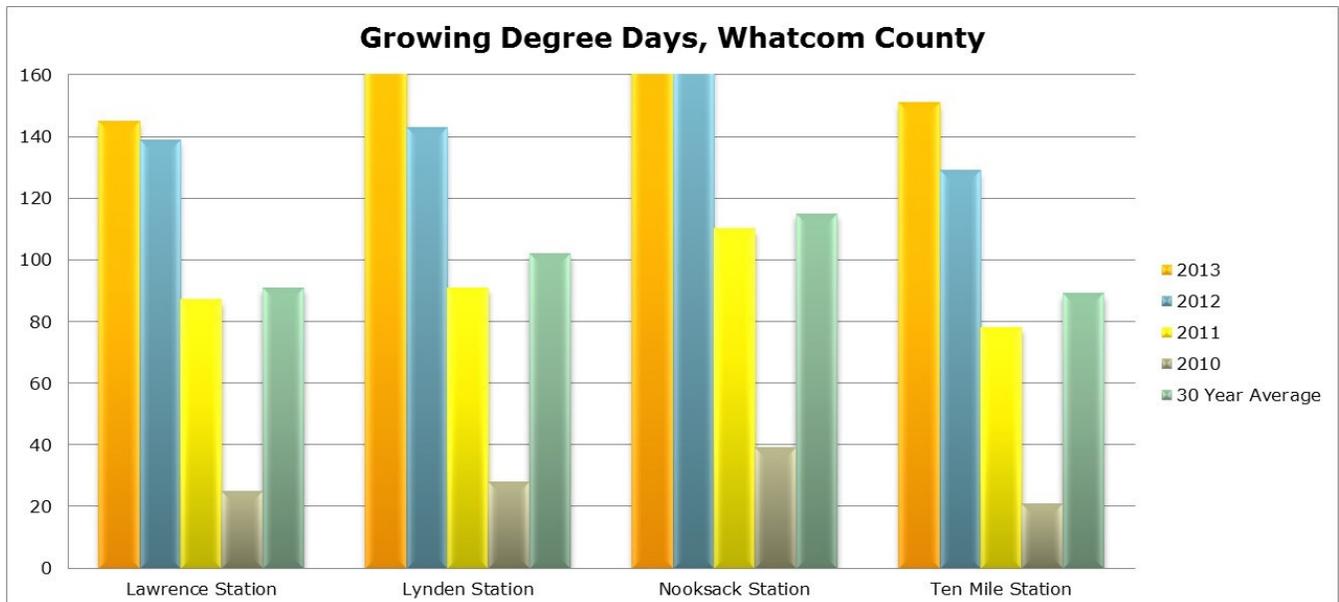
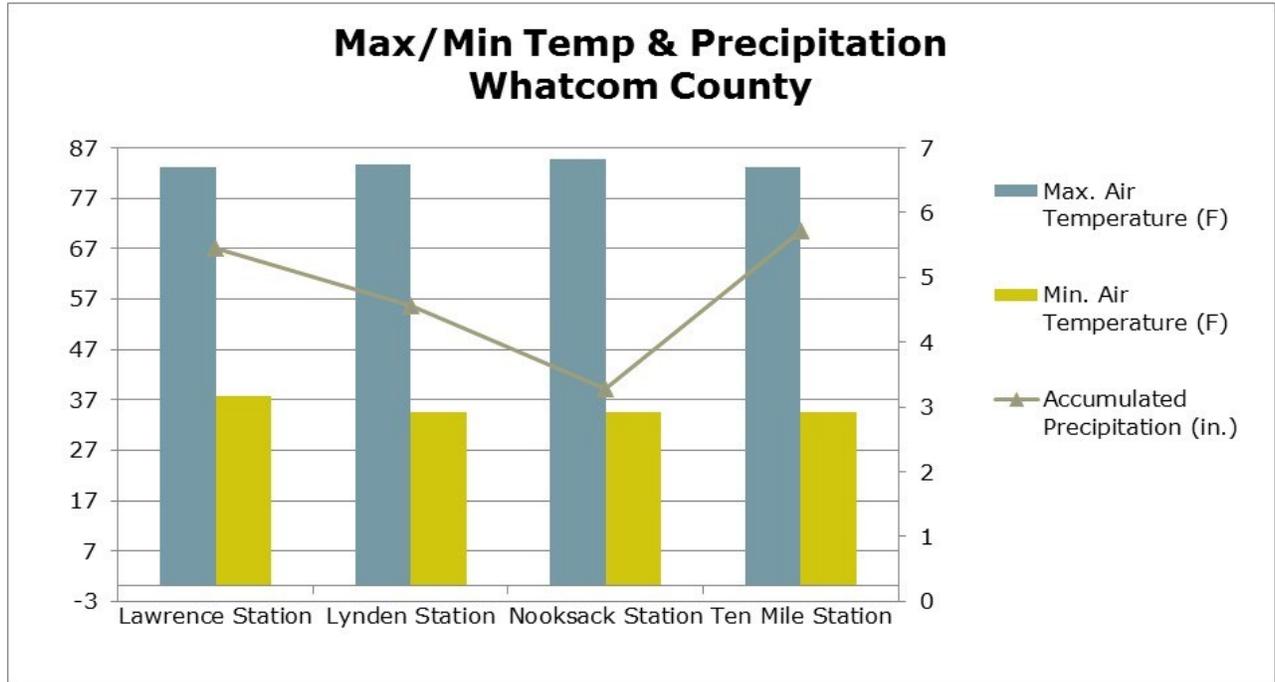
WSU Puyallup Plant & Insect Diagnostic Lab website:  
<http://puyallup.wsu.edu/plantclinic/index2.html>

Email the diagnostician at:  
[jennyglass@wsu.edu](mailto:jennyglass@wsu.edu) or  
[puy.plantdiagnostic@wsu.edu](mailto:puy.plantdiagnostic@wsu.edu)

Telephone: 253/445-4582  
Fax: 253/445-4569

# 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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*The views expressed are not necessarily those of Washington State University*

# Upcoming Events

## May

### 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.

### Managed-intensive Grazing in Western Washington

May 21st, June 20th, July 24th  
Thurston County

In a series of three classes which blend classroom learning with hands-on site visits, livestock producers big and small will learn how to customize a management system that will enable their pastures – and their livestock – to reach their maximum production potential, while also maintaining or promoting native habitat. If managed appropriately, high pasture productivity translates to enhanced profits, healthier environments, and happier livestock.

### Workshop for Machine Har- vesting Fresh Market Blueberries

May 21st  
9:00 am - 4:00 pm  
Aurora, OR

This workshop aims to introduce a potential new blueberry production system by using the wild *Vaccinium arboreum* species to improve machine harvesting of fresh market blueberries. The workshop will be conducted by a research and extension team from University of Florida, Oregon State University and Auburn University. The topics include breeding a blueberry tree, physiology, nutrition, and propagation of *Vaccinium arboreum* plants, field performance of blueberry trees, and the economics of adapting such a new production system

### Management Tools for SWD

May 22nd  
9:00 am - 1:00 pm  
Aurora, OR

The introduction of spotted wing drosophila (SWD) has brought drastic changes to many cropping systems in the Pacific Northwest as growers have fought to defend their crops against damage. This workshop aims to educate growers about several very important issues regarding this serious pest, and a short discussion will follow the

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# Upcoming Events

presentation of each of the main topics, to allow for feedback and the sharing of ideas

## **June**

### **BC Blueberries Spring Field Day**

May 31st

12:00 pm - 3:30 pm

Delta, B.C.

This field day will discuss pollination, weed management, SWD, weevils, nutrient management, bird management, and more.

### **OSU Strawberry Open House**

June 11

1:00 pm - 4:30 pm

Aurora, OR

Focus of this workshop is on the OSU breeding and research program.