UTAH PESTS News

Utah Plant Pest Diagnostic Laboratory and USU Extension Vol. IV, Fall 2010

UTAH PESTS Team Welcomes New Faculty

After more than a year without an extension plant pathologist and turf/field crop entomologist, we are pleased to announce that these two key positions in our Utah Pests group have been filled. We welcome Claudia Nischwitz (plant pathology) and Ricardo Ramirez (entomology) to the team.

Claudia Nischwitz joined the Department of Biology at USU as Extension Plant Pathologist August 1. She grew up in a small town near Heidelberg, Germany and after finishing her undergraduate degree moved to the United States for her M.S. and Ph.D. degrees. She received her Ph.D. from the University of Idaho in 2005 where she worked on several projects with hyperparasites of forest trees. Following her Ph.D., Claudia held a post-doctoral research position at the University of Georgia Coastal Plain Experiment Station in Tifton. She managed the virology lab and conducted research on tomato spotted wilt virus of tobacco and peanut, iris yellow spot virus of onion (identification of the origin of Georgia IYSV strains) and *Pantoea ananatis*, a bacterium that causes center rot of onion.

Before joining USU, she worked as a post-doc for Dr. Mary Olsen, Extension Plant Pathologist at The University of Arizona, on curtoviruses of beets and spinach and conducted diagnostics.

Her responsibilities at USU are all pathogens on all crops. Her current research projects are management of iris yellow spot virus of onion, management of fire blight on apple and pear, and identification and management of root-knot nematodes on turfgrass. She looks forward to working with growers, county agents, and golf course superintendents across the state. During her spare time Claudia enjoys hiking, traveling, and collecting fossils.

Ricardo Ramirez also started in his new position as Extension Entomologist on August 1. He grew up as a "military brat" in Germany, Alaska, and Texas. He received his Ph.D. in entomology at Washington State University, where he examined how biodiversity among soil organisms affected microbial control of the Colorado potato beetle, and how these interactions were impacted by cultural practices such as the use of green manures and organic fertilizers. Ricardo comes to us from Texas A&M University, where he was a post-doctoral researcher examining how defensive chemicals produced by cotton plants and insect predators interacted to improve the suppression of insect pests in cotton.

At USU, Ricardo will be continuing his work in field crops, and has already started collecting pest and beneficial insects in alfalfa for research in his lab. Ricardo will be working primarily with alfalfa, turf, and organic grower groups, however, his interests are broad and he looks forward to meeting and working with producers and county extension agents throughout the state. In his free time, Ricardo enjoys hiking and playing the guitar.

What's Inside

News Highlights

NEW *UTAH PESTS* **FACT SHEETS**

The following can be found on our website:

Turfgrass Cultural Practices and Insect Pest Management

Spotted Wing Drosophila

www.utahpests.usu.edu

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COOPERATIVE EXTENSION

Spotted Wing Drosophila Detected in Utah

This summer, we conducted a survey for spotted wing drosophila (*Drosophila suzukii*), a pest of local concern, in ten northern Utah orchards and berry fields. This pest is of concern to our fruit and vegetable growers because female SWD have serrated ovipositors that allow them to attack fruit earlier than other drosophila species, often before the fruit ripens. Hosts of SWD include all tree fruits, small fruits, and vegetable fruits such as tomatoes and peppers. Introduced to California in late 2008, SWD has since spread throughout California, Oregon, and Washington. Due to a separate introduction in 2009, SWD has also spread from Florida to Louisiana, North Carolina, and South Carolina.

In late August, SWD was detected for the first time in Utah in a trap in raspberries in Kaysville. To date, a total of 50 SWD have been trapped at the site in raspberries, blackberries, and tart cherries. SWD has not been detected at any other survey site. We do not know how SWD was introduced, but it is likely that it was brought in via infested fruit from a state where SWD already occurs. The Cooperative Agriculture Pest Survey program will intensify monitoring of SWD in 2011 to 50 sites to determine if there is spread from the detection site or additional introductions.

A fact sheet is now available to provide more information on monitoring, identifying, and controlling SWD (click here). As described in the fact sheet, cheap traps can be made using plastic cups and a lure of yeast and sugar solution. Male SWD are identified by the presence of a single black spot on each wing. Other, similar flies have spots on their wings, but only those with a single spot per wing are suspect. If you believe you have found an SWD, you can forward it to the Utah Plant Pests Diagnostic Lab for identification. Instructions for doing so can be found by clicking here.

Male SWD's have a single spot on each wing.

G.Arakelian

Female SWD's have a serrated ovipositor.

Martin Hauser, CDFA

We do not know if this insect is able to overwinter in northern Utah, but to be safe, concerned commercial growers should make sure that the insecticides that are already being applied for other pests are effective against SWD. Product recommendations can be found on the SWD fact sheet. When choosing a product, remember that pyrethroids, malathion, and carbaryl can flare spider mites. You should also consider re-entry intervals, pre-harvest intervals, and maximum residue limits.

-Cory Vorel, USU CAPS Coordinator

Glyphosate Injury to Nursery, Landscape, and Orchard Trees

Glyphosate is one of the most highly used herbicides in the world because it is economical, easy to use, broad-spectrum, and kills quickly. A downside is that very low doses of late season applications to non-target plants can have adverse effects that are not immediately apparent, but can last for years. These include reduced winter hardiness that leads to bark splitting and canker diseases, and greater susceptibility to soil borne plant pathogens. Replicated studies on these non-target effects are still continuing.

Glyphosate is a systemic herbicide that travels through the phloem and accumulates in meristematic tissues (primarily in roots). It kills plants by inhibiting the synthesis of a critical enzyme used in the shikimate pathway, which is needed for plant growth and survival. It is a strong chelator that binds to calcium, manganese, copper, iron, nickle, and zinc. Although this chelating action may inhibit the growth of soil microbes that depend on these essential nutrients, it also serves to immobilize the pesticide in the soil, preventing leaching. As a result, glyphosate can accumulate in soils and perennial plants for several years.

Fig. 1. Injury symptoms from sub-lethal doses of glyphosate may be present for up to two years after absorption, and include witches brooming, stunting, loss of apical dominance, dieback, chlorosis, and death.

Fig. 2. Applications of glyphosate near tree trunks may lead to bark splitting due to decreased winter hardiness at the point of herbicide penetration into the bark.

Glyphosate-killed weeds or tree stumps exude small amounts of the chemical into the soil through the roots. Glyphosate released into the soil has been shown to affect growth of microorganisms in the vicinity of the roots and in the zone of application. Woody plants may absorb the chemical via root to root contact or when root hairs contact the exudates from treated plants. Once inside the non-target plant, it may persist for several years while disrupting the shikimate pathway, reducing plants' defenses and leading to a variety of symptoms (Figs. 1 and 2). Several studies have shown that plants exposed to glyphosate are more susceptible to soil borne pathogens such as *Phytophthora* and *Fusarium*.

Dr. Hannah Mathers at Ohio State University has led research on the high incidence of bark split of landscape and nursery trees. She found that bark splitting occurs when drift from late season applications is absorbed into thin or pigment-barked trees. Glyphosate deteriorates the bark structure and reduces the winter hardiness of the plant. Mathers found that glyphosate products with added surfactants (a chemical that helps the glyphosate bind to the target plant) caused the greatest reduction in winter hardiness due to the increased uptake. She estimates that losses from bark cracking via glyphosate approaches $6.6 million a year in the nursery and landscape industry.

Plant pathologists, fruit specialists, and apple growers in New York, Michigan, and other locations have seen an increase in bark damage, dieback, and basal cankers of several varieties. Based on Mathers' research, they are now hypothesizing that glyphosate-induced cold injury may be a culprit because affected orchards all received glyphosate applications at least once/year.

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Glyphosate Injury, continued from previous page

Many of these apple trees are being attacked by opportunistic pathogens at the point of winter injury, which occur as basal or stem cankers (Figs. 3 and 4). Michigan pathologists found at least six different species of pathogenic fungi in stem cankers. In New York, they are primarily seeing one pathogen, *Botryosphaeria dothidea*. Normally these pathogens are not a problem in healthy apple orchards.

The severity of damage seems to be variety-dependent, mostly affecting newer McIntosh cultivars, Macoun, Cortland, and Honeycrisp. The relationships between trunk cankers and herbicide injury or infection by opportunistic pathogens remains to be proven in Michigan and New York, but the widespread death of these particular varieties is still occurring, and is a concern.

Recommendations

- Avoid glyphosate applications in Macoun, Cortland, and Honeycrisp apple orchards.
- Do not use glyphosate for sucker control or apply glyphosate to freshly cut sucker stems.
- Limit glyphosate applications near trees to spring or early summer.
- Use glyphosate products that contain no surfactants (known as "adjuvant loads" on the product label). Examples include: Backdraft, Campaign, Expert, Extreme, Fallowmaster, Fallow Star, FieldMaster, Glypro, Landmaster BW, Land Star, ReadyMaster ATZ, Rodeo, Roundup Custom and RU SoluGran.

-Marion Murray, IPM Project Leader

Figs. 3 and 4. Basal canker on a 'Gala' apple in a Utah orchard. The cause may be related to roundup applications and reduced winter hardiness.

References:

Sundin, G., A. Irish-Brown, and T. Proffer. 2010. Dieback issues in McIntosh cultivars in Michigan. Michigan Fruit Crop Advisory Team Alert, August 10.

Daniel, K., H.M. Mathers, and L.T. Case. 2009. Effect of postemergent herbicide on sucker removal/injury of field tree liners. HortScience. Vol. 44, no. 4: American Society for Horticultural Science: 2158.

Johal, G.S., and D.M. Huber. 2009. Glyphosate effects on diseases of plants. Euro. J. Agron. 31:144-152.

Rosenberger, D., M.M. Sazo, C. Kahlke, H. Mathers, and C. Watkins. 2010. Potential non-targeted effects of glyphosate on apples. Scaffolds Fruit Journal. Volume 19 No. 20.

Proper Submission of Samples for Disease Diagnosis

There are many causes of plant diseases including biotic (fungi, bacteria, viruses, nematodes etc), abiotic (temperature, frost, irrigation, pesticides, herbicides, etc.), or a combination of both. To efficiently diagnose a diseased plant, it is important that the Utah Plant Pest Diagnostic Lab (UPPDL) receives a proper sample and detailed information about the situation.

SAMPLE SUBMISSION EXAMPLES

1. ***Tree with dieback of some shoots or branches***: Send at least two symptomatic shoots (if possible cut them off where the shoot is still green) and two healthy looking shoots. It is OK to cut a shoot in half to fit in a Ziploc bag. For conifers, collect two branches that have both green healthy needles and symptomatic needles.

The two branches on the left are examples of samples that are not useful for diagnoses. The far left branch is too dry, making it impossible to isolate a living pathogen from the tissue. The middle branch is also dry, and has no leaves. The branch on the right is freshly cut, allowing us to isolate and identify the causal agent.

2. ***Wilting or dying tree***: Send as a slice of wood or, for smaller trees, a segment of a branch (no longer than 2 feet) as well as some roots. The roots should at least be pencil-size. Also, if you see any fungal fruiting bodies (such as a conk on the stem, shown at right, or mushrooms at the base), include them with your sample.

3. ***Vegetables or non-woody ornamentals:*** Send the entire plant (if less than 2 ft in size), or parts that include leaves, roots, and shoots.

4. ***Turf grass:*** Cut a segment from your lawn where the problem occurs (about 4 x 4 inches) including roots, shoots, and soil. Cut an additional segment from an area where the grass looks healthy.

SAMPLE COLLECTION and PREPARATION

Collect the samples either the same day or the day before you plan to mail or hand-deliver them to the UPPDL or county extension office. Place samples in a Ziploc bag ***without*** a moist paper towel, and keep them refrigerated until they are ready to be shipped. The Ziploc bag will keep the sample moist enough on its own, preventing it from drying out. Samples that have dried out or that have been stored in the refrigerator for days or weeks before they are sent make it impossible for us to identify the cause of the problem.

Overnight delivery of all plant disease samples is best. If you collect a sample on a Friday (and are not hand-delivering it), keep it in the refrigerator and wait until Monday to mail it so that we can receive and process it before mold and other microorganisms grow on the sample and inhibit diagnosis.

SAMPLE INFORMATION

All samples should include a completed UPPDL sample information form, which can be found on our website (click here). You can fill it out online and then print it out. The more information you can provide us with, the better, including location, plant age, fertilizer and pesticide applications, and irrigation. This information will help us narrow down the possible causes of the symptoms. Information on the location (city) allows us to determine if weather such as an early frost could have caused the symptoms.

PHOTOS

Providing photos of the symptomatic plant, both close-ups and more distant images, helps us to determine the problem. This is especially important when environmental factors such as pavement or salt application in the winter could be behind the problem. You can either email the images or include prints when shipping the sample.

Proper sample submission gives you and us the best chance to identify the cause of the problem.

NOTE: *Please do not send soil as we cannot test soil for mold or fungi.*

-Claudia Nischwitz, Extension Plant Pathologist

Mosquitoes and West Nile Virus in Utah

Mosquitoes are one of the most medically important insects because several species are capable of transmitting disease-causing organisms to humans and animals. West Nile Virus (WNV), a disease most commonly transmitted by Culex mosquitoes, was first detected in North America in 1999 in New York City. Since then WNV has moved west and was recently detected in Utah.

Fig. 1. Culex mosquito eggs are deposited vertically forming a raft of eggs that floats on water.

Mosquitoes are small, slender flies that have four distinct life stages (egg, larva, pupa, and adult) associated with aquatic habitats. Female Culex mosquitoes will lay eggs in rows directly on the surface of pooled, slow-moving or stagnant water. Interestingly, the eggs hold together by surface tension and form a raft that floats on the water (Fig. 1). Mosquito larvae hatch from eggs and live in the water (Fig. 2), feeding on micro-organisms and decaying plant and animal matter. Larvae then develop into non-feeding pupae that also live in water (Fig. 3). The adult mosquito emerges from the pupal case at the water surface and prepares itself to begin flying.

It is important to note that only the adult female mosquito bites, as she requires a blood meal to lay eggs. Male mosquitoes, on the other hand, feed on plant nectar. Female mosquitoes may live for several weeks biting every few days. Mosquitoes become carriers of WNV after biting infected birds that serve as a reservoir for the virus. Birds infected with WNV maintain viable virus particles in their blood for 1-4 days. Some bird species are highly susceptible to the virus and die, while other bird species develop immunity. A mosquito that has bitten an infected bird has the ability to transmit the virus to humans and other mammals. In particular, horses are highly susceptible to WNV. Symptoms of WNV develop 3-14 days after being bitten by an infected mosquito. WNV particles, however, never build up to high enough levels in the blood of infected humans or horses to be taken up by mosquitoes.

Most people with healthy immune systems that are infected with WNV will never show symptoms. Mild symptoms similar to the flu occur in approximately 20% of people infected with WNV. One in 150 people infected with the virus develop severe symptoms (including high fever, stiffness, tremors, disorientation, and vision loss) and may also experience serious complications (such as swelling of the brain or spinal cord), requiring hospitalization. People over the age of 50 and those with compromised immune systems have the highest risk of severe illness from WNV.

Figs. 2 and 3. Mosquito larvae breathe air at the water surface using an anal tube (top). The pupa (bottom) develops into an adult and uses siphons to breathe at the water surface.

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Raspberry Horntail Research Update

Raspberry horntail, *Hartigia cressonii*, is one of the most damaging pests of raspberries in Utah. The horntail exclusively attacks first-year growth (primocanes). The upward tunneling of young larvae in the cambium and heavy feeding of larvae near the tips of canes can cause the cane tip to soften, wilt, and die back. The downward tunneling of older larvae in the center pith can cause structural damage to the canes. Damaged canes have reduced fruit yields. For more information and images, see the Utah Pests Fall 2009 issue.

Research at the USU research farm in Kaysville in 2009 and 2010, in summer- and fall-bearing raspberries, showed that cane wilting was first detected in late June to early July (Fig. 1). Young larvae tunneling upward in canes were present earlier, but visible symptoms were not evident until this time. Horntail densities peaked in early July in both years, and then declined by mid August.

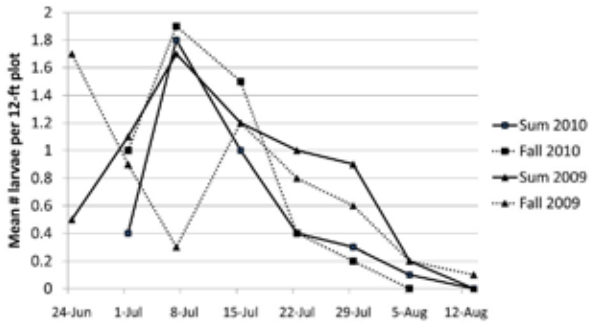

Fig. 1. Raspberry horntail abundance in summer- and fall-bearing raspberries in 2009 and 2010, Kaysville, UT.

Several species of parasitic wasps were found attacking horntail larvae within canes. Parasitism rates peaked at 33-100% in late July in both years, and were slightly higher in 2009 than 2010 (Table 1). Parasitism of horntail larvae infesting summer-bearing raspberry canes was higher than for fall-bearing raspberries in both years.

There was a wide range in susceptibility of raspberry varieties to horntail, and variability among the two years (Table 2). For 17 summer-bearing varieties evaluated, Royalty, Cascade Dawn, Cascade Delight, and Moutere were the least susceptible in the two years of study, while Canby, Willamette, Reveille, and Saanich were the most susceptible. For 10 fall-bearing varieties, Polana, Caroline and Summit had the fewest horntail and Jaclyn, Himbo Top, and Anne had the most, especially in 2010.

The primary control tactic for horntail has been to prune cane tips when tip-wilting is evident, which removes fruit-producing buds. For fall- or ever-bearing varieties, pruning canes at ground level in the spring will remove larvae that have overwintered in the previous year's canes, and help reduce populations. Using an insecticide against adults in the late spring may reduce egg-laying and cane infestation. In 2010, several commercial raspberry fields were treated with insecticides in early June when adult horntail wasps were first observed, and resulting control levels were moderate to good. Research is ongoing to better define the adult emergence period and improve predictive timing for control.

A variety of species of parasitoids were found inside the raspberry canes, but have not yet been identified. The top images shows a pupa of a parasitiod wasp, and the bottom image shows a larva.

Table 1. Parasitism rates of raspberry horntail larvae in 2009 and 2010, Kaysville, UT.

	% Parasitism of larvae			
	Summer varieties		Fall varieties	
Date	2009	2010	2009	2010
June 24	0	-	9.1	-
July 1	-	0	-	25.6
July 8	35.1	25.8	41.7	20.0
July 15	32.1	21.7	25.5	44.1
July 22	-	73.1	-	47.1
July 29	98.4	59.1	100	33.3
August 5	61.5	80.0	25.0	0
August 13	70.0	-	40.0	-

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Raspberry Horntail Research, continued from previous page

Table 2. Susceptibility of 17 summer- and 10 fall-bearing raspberry varieties to raspberry horntail in 2009 and 2010, Kaysville, UT.

Summer Variety	Mean # Larvae 2009	Mean # Larvae 2010
Royalty	2.8	0.3
Cascade Dawn	1.5	2.0
Cascade Delight	1.8	2.8
Moutere	3.0	2.0
Coho	4.8	1.8
Cowichan	4.3	2.3
WDNV2	6.3	1.0
Georgia	4.3	4.8
Chemainus	5.5	3.8
Tulameen	5.8	3.8
Titan	5.3	5.3
Cascade Bounty	6.0	6.8
Lauren	10.8	2.0
Canby	8.5	5.8
Willamette	12.0	4.3
Reveille	10.3	6.5
Saanich	7.0	12.3

all Variety	Mean # Larvae 2009	Mean # Larvae 2010
Polana	3.0	1.8
Caroline	4.8	2.0
Summit	5.5	3.3
Heritage	8.3	1.5
Ruby	5.3	4.5
Joan J	3.3	7.3
Polka	7.5	3.3
Jaclyn	4.3	6.8
Himbo Top	3.0	8.3
Anne	5.5	11.3

-Diane Alston, Entomologist

West Nile Virus, continued from page 6

Local and state agencies work together to detect the activity of WNV. The surveillance of WNV in Utah involves testing mosquitoes collected from traps and surrounding water sources, taking oral swabs of live and dead birds, and monitoring blood samples of humans, horses, and chickens. WNV was first detected in Utah in 2003. Utah had its highest activity of WNV in 2006 which spanned the Wasatch Front in populated areas of Salt Lake and Utah Counties. Unfortunately, in 2006 there were 158 human cases of WNV detected and 5 resulted in death. Activity of WNV appears to have decreased since 2006 with only 2 human cases reported in 2009. Although no human cases of WNV have been reported to date in 2010, four counties (Davis, Salt Lake, Uintah, and Washington) have tested positive for WNV from mosquito and horse samples. As a result, people should remain vigilant and take the proper precautions to reduce their exposure to mosquitoes.

In order to reduce the risk of getting WNV, use protective methods to prevent mosquito bites. Make sure the seals and screens for windows and doors around the home are secure. Avoid using incandescent lights outside of the home that attract mosquitoes. Stay indoors during peak mosquito activity at dawn, dusk, and early evening. When outdoors, discourage mosquitoes from biting by wearing long-sleeve shirts and long pants, or use mosquito repellent. Finally, reduce mosquito breeding grounds around homes and neighborhoods by not allowing water to stagnate in places like birdbaths and pools and eliminate standing water from sources like containers and tires left outside and clogged roof gutters.

-Ricardo Ramirez, Entomologist

References:

Hodgson, E. 2007. West Nile Virus in Utah. Utah State University Extension Fact Sheet. ENT-105-07.

http://www.ncpmc.org/NewsAlerts/westnilevirus.html

Utah Department of Health, Bureau of Epidemiology http://health.utah.gov/els/index.html

Farm Bill Programs that Support Increasing Pollinator Habitat

Approximately 75% of the world's flowering plants, including two-thirds of all crops, must be pollinated in order to reproduce. Bees are the primary providers of pollination services, and although honey bees are the most well known and widely managed pollinators, other bees, including bumble bees and solitary bees, are also very significant. Unfortunately, according to a recent report by the National Research Council of the National Academy of Sciences, all pollinators are in decline as a result of habitat loss, deterioration, and fragmentation, in addition to the adverse effects of pesticides. Previous newsletter articles discussed the value of native bees on the farm and how their populations can be increased.

Congress has recognized the importance of pollinators, and the 2008 Farm Bill supports several programs which provide funding for growers, particularly specialty crop producers, who implement conservation plans and consequently increase bee habitat. Many of these programs are shown below. Eligibility for each program varies; additional information about individual programs and application procedures is available on the USDA Natural Resources Conservation Service website (www.nrcs.usda.gov/programs).

Farm Bill conservation programs that can be used to increase pollinator habitat on farm land
(reproduced from USDA-NRCS Technical Note No. 78)

Program	Purpose	Land eligibility	Type of assistance
Conservation Reserve Program (CRP) State Acres for wildlife Enhancement (SAFE) Click here for more information.	Land retirement program encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover such as tame or native grasses, wildlife plantings, trees, filter strips, or riparian buffers. Addresses issues raised by state, regional, and national conservation initiatives.	Highly erodible land, wetland, stream side areas in pasture land, certain other lands. Eligible wetlands must have been cropped 3 of 10 previous years, highly erodible cropland 4 of 6 previous years. **Pollinators are high priority species under the CRP conservation practice called State Acres for wildlife Enhancement (SAFE).** (Click here for more information on SAFE.)	50% cost-share for establishing permanent cover and conservation practices, and annual rental payments for land enrolled in 10- to 15-year contracts. Additional financial incentives are available for some practices. CRP is administered by FSA; NRCS provides technical land eligibility determinations, conservation planning, and practice implementation. Contact NRCS or FSA state or local office.
Conservation Stewardship Program (CSP) (formerly Conservation Security Program) Click here for more information.	Addresses resource concerns comprehensively by 1) undertaking additional conservation activities; and 2) improving, maintaining, and managing existing conservation activities. The CSP encourages farmers to broadly improve their conservation effort to protect water and air quality, improve soil quality, add wildlife habitat, conserve water, and save energy.	Private and tribal agricultural land, and forested land incidental to agriculture. Land converted to cropland since 2008 is not eligible.	Annual payments based on expenses, foregone income, and environmental benefits; 5-year contracts renewable for another 5 years. Contact NRCS state or local office.

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Farm Bill Incentives, continued from previous page

Program	Purpose	Land eligibility	Type of assistance
Environmental Quality Incentives Program (EQIP) Click here for more information.	Promotes agricultural production and environmental quality by helping eligible participants install or implement structural and management practices.	Land on which agricultural commodities, livestock, or forest-related products are produced.	Up to 75% cost-share for installed conservation practices or 100% of foregone income; contracts run 1 year past last practice installation, up to 10 years. Up to 3 years of incentive payments for certain management practices. **Special payment consideration for practices that promote pollinator habitat.** Contact NRCS state or local office.
Grassland Reserve Program (GRP) Click here for more information.	Helps owners and operators protect grazing uses and related conservation values by restoring and conserving eligible land through rental contracts, easements, and restoration agreements.	Historical grassland used primarily for grazing that has high conservation, ecological, or archeological value.	50% cost-share for restoration; annual payment up to 75% of the grazing value of the land for 10-, 15-, or 20-year rental contracts, or easement payments no greater than fair market value less the encumbered grazing value for permanent easements or easements for the maximum duration allowed under state law. GRP is jointly administered by NRCS, FSA, and U.S. Forest Service. Contact NRCS or FSA state or local office.
Wetland Reserve Program (WRP) Click here for more information.	Land retirement program to restore, protect, or enhance wetlands on private or tribal lands.	Farmed wetland or wetland converted to agriculture before 1985, together with functionally dependent adjacent land, or cropland or grassland that was used for agricultural production prior to natural flooding.	Private lands: 1) permanent easement payment equal to forgone value plus 100% of restoration costs; or 2) 30-year easement payment (75% of forgone value) plus 75% of restoration costs; or 3) restoration cost-share agreement (usually 10 years) with payment of 75% of restoration costs. Tribal lands: restored through any combination of 2 and 3. Contact NRCS state or local office.
Wildlife Habitat Incentive Program (WHIP) Click here for more information.	Develop wildlife habitat on private and tribal lands.	High-priority fish and wildlife habitats, especially habitat for declining species, otherwise unfunded beneficial practices, or locally determined fish and wildlife priority habitats.	Up to 75% cost-share for conservation practices under standard 5- to 10-year contracts, or higher cost-share for a limited number of 15-year contracts. Contact NRCS state or local office.

-Cory Vorel, USU CAPS Coordinator

References:

National Resource Council of the National Academies. 2007. Status of Pollinators in North America. National Academies Press, Washington, D.C.

USDA-NRCS, Xerces Society for Invertebrate Conservation, and San Francisco State University. 2008. Technical Note No. 78: Using Farm Bill Programs for Pollinator Conservation.

Xerces Society for Invertebrate Conservation, 2008 Farm Bill: Benefits to Crop Pollinators. http://www.xerces.org/pollinator-conservation

Are Hobo Spiders of Medical Concern?

The hobo spider is one of Utah's most feared indoor pests. The question is, why are people so concerned about them? One reason is that people believe hobo spiders have a flesh-eating (dermonecrotic) bite. New research, however, suggests that the idea that hobo spiders cause dermonecrotic lesions is based on circumstantial evidence. So, where did this belief originate and should we still be concerned about hobos?

Hobo spiders (*Tegenaria agrestis*) were introduced into the Pacific Northwest (PNW) from Europe in the early 1900's. Since then, these spiders have spread south and eastward into Utah, where large populations now exist. Physicians began diagnosing patients experiencing dermonecrotic lesions as bite victims of brown recluse spiders (*Loxosceles reclusa*). Arachnologists refuted this claim, because the brown recluse's range does not extend into the PNW. A survey of PNW homes, however, found hobo spiders and instead of brown recluse spiders. This finding led to the belief that hobos were actually responsible for the necrotic lesions. As a result, the hobo spider became known as the "aggressive house spider," due in part to the fact that the hobos specific name is "*agrestis*." In reality "agrestis" means "of the field," which describes its natural European grassland habitat.

In 1987, Darwin Vest published research in which he forced male hobo spider envenomation (bites) of New Zealand white rabbits. In his study, the bites resulted in dermonecrotic lesions. This result, coupled with numerous unverified reports of hobo spider bites causing dermonecrotic lesions, and one verified bite leading to necrosis on a woman suffering from phlebitis (a disease that predisposes patients to necrotic ulcers) are why hobo spiders are considered medically significant.

The rabbit study sounds like strong evidence; however this study was anecdotal and had a small sample size. Interpreting the results from rabbit assays in the context of human reaction to hobo venom is invalid. One cannot assume that humans will react similarly to hobo envenomation as rabbits. The only conclusion that can be drawn from the study is that male hobo spider venom may have greater effects on New Zealand white rabbits than do female hobos. To this day, no one has replicated the results of Vest's study, which begs the question, why hasn't this experiment, one of relatively simple design, been replicated with similar results?

Just because people have necrotic lesions and happen to have a hobo spider in their home does not implicate the spider. In order to have a verified bite one must actually see the spider biting, catch the spider, and then have it identified by a qualified arachnologist. Except for the phlebitis patient mentioned earlier, this has never happened. Many residents of northern Utah have had hobo spiders in their home at some point. Given our huge hobo population and their frequency in homes, at least one verified bite leading to skin necrosis should have been reported by now. There are over 40 causes of necrotic skin lesions (viruses, fungi, bacteria, etc.); bites from arthropods are very low on the list.

In Europe, hobo spiders are not considered medically significant. Since U.S. hobos originated in Europe, how can they be considered medically significant here and not there? To answer this, researchers collected spiders from England, Switzerland, and the state of Washington. They analyzed and compared the chemical components of their venom and found that hobo venom composition between the U.S. and England populations was remarkably similar. In both populations, male hobos spiders produced 3 to 4 times the amount of venom as females, whereas the venom in males was less potent than females. The venom of Swiss hobo spiders was different from the U.S. and English populations, suggesting that the latter two have been reproductively isolated from the Swiss population. One major difference between U.S. and European populations is in their habitat. In Europe, hobos live outdoors in fields and disturbed sites, while U.S. populations frequently occur indoors. This closeness of U.S. hobos to humans may result in a greater frequency of bites than occur in Europe where hobos rarely interact with humans. It is important to note that in Europe, the giant house spider displaces hobos as the major house-dwelling spider. A close relative of the hobo, it too has been introduced into the PNW and may make its way into Utah. The giant house spider is not considered medically significant.

With over 40 causes of necrotic skin lesions it seems unreasonable to implicate hobo spiders as a primary cause. Doctors' misdiagnoses of necrotic lesions as hobo spider bites may preclude the finding of a serious medical problem. A lesion diagnosed as a hobo spider bite that is instead caused by bacteria, fungi, or a medical condition could lead to dire consequences. The belief that hobo spiders cause dermonecrotic bites is based on shaky, circumstantial evidence. Decide for yourself how to interpret the information above. If a spider has bitten you, please send it to the Utah Plant Pest Diagnostic Lab for diagnosis.

-Ryan Davis, Arthropod Diagnostician

Grasshopper Forecasting and Suppression in Utah

By Clinton E. Burfitt, Plant Industry, Utah Department of Agriculture and Food, Salt Lake City, UT. Clint serves as Survey Entomologist and CAPS Coordinator for UDAF, where he has worked for 10 years.

Each year the Utah Department of Agriculture and Food and USDA-Animal Plant Health Inspection Service conduct grasshopper and Mormon cricket surveys in Utah. The surveys determine nymph populations in spring, adult populations in summer, and sometimes, egg surveys are conducted in the fall. Information from these surveys is used to forecast the following year's population densities. Results of this year's surveys show that we should see a slight decrease in statewide populations in 2011, although some counties could still have higher than average grasshopper activity.

Grasshopper and Mormon cricket (*Anabrus simplex*) outbreaks occur throughout the western U.S. states, and they have the potential to significantly impair Utah's $289 million forage crop industry. Along with mammals, grasshoppers are the most important grazing herbivores in the world's temperate grasslands.

Although most species are found in the tropics, there are over 1,000 species of grasshoppers found north of the Panama Canal in North and Central America. Some species of grasshoppers are also called locusts, which are differentiated by their nomadic behavior and their ability to form large destructive aggregations.

Species of grasshoppers that regularly become pests in Utah are migratory grasshopper (*Melanoplus sanguinipes*), two-striped grasshopper (*M. bivatattus*), pasture grasshopper (*M. confusus*), Packard grasshopper (*M. pakardii*), clearwinged grasshopper (*Camnula pellucida*), bigheaded grasshopper (*Aulocara elliotti*), and valley grasshopper (*Oedaleonotus enigma*). A list of species fact sheets can be found at the University of Wyoming's Grasshoppers of Wyoming and the West website.

Because of the large amount of federally administered lands in Utah (67.1 %), grasshopper suppression is primarily conducted by USDA-APHIS, which is authorized under the Plant Protection Act to protect rangeland from economic infestations of grasshoppers. The UDAF administers a federally funded cost-share program. The suppression strategy that is most effective in mitigating outbreaks consists of forming cooperative treatment areas. This involves coordinating a grasshopper spray program with landowners and representative agencies within an infested area. On rangeland, insect growth regulators in conjunction with Aerial-Applied Reduced Agent and

Grasshoppers line an irrigation wheel (top) and oat blades (bottom) in Millard County, summer 2010.

Area Treatment Strategies lower the risk to native plant and animal species and reduce the cost of control programs.

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In the National News

DEVELOPING TOXIN-RESISTANT CORN LINES

Aflatoxin is a human and animal carcinogen that is produced in corn by the fungi *Aspergillus flavus* and *A. parasiticus*. Corn infected with Aspergillus is devalued and most times, unmarketable, with annual losses estimated at $192 million. USDA-Agriculture Research Service geneticists in Mississippi are developing corn germplasm lines that are showing resistance to these fungal aflatoxins. Three lines are currently showing great promise, with two of them also resistant to another toxin called fumonisin, caused by a Fusarium species. The same research group has also developed germplasm lines that are tolerant of fall armyworms and corn borers, whose feeding damage can lead to Aspergillus infection. The germplasm lines are being used in plant breeding programs across the country.

NEW BIORATIONAL FUNGICIDE REGISTERED WITH EPA

Tenet (SipcamAdvan) is one of the newest biorational fungicides receiving EPA registration. The active ingredient is a mix of two fungi, *Trichoderma asperellum* and *T. gamsii*, which have been found to be active in a variety of temperatures and humidities. The Trichoderma fungi protect plants against root rot by feeding on and competing with soil-dwelling pathogenic fungi, including Phytophthora, Rhizoctonia, Pythium, and Fusarium. It is available for a wide range of crops, including vegetables.

ALDICARB TO BE TERMINATED

EPA's recent study of toxicity data on aldicarb, a broad-spectrum carbamate, found that the insecticide/nematicide no longer meets the agency's food safety standards. Aldicarb, a restricted use pesticide, is sold as Temik by Bayer CropScience, and is used on a variety of agricultural crops, including citrus, potatoes, cotton, sugar beets, and soybeans. The most significant risks are on citrus and potatoes, and Bayer will end use on those commodities first. Aldicarb at high levels in food has the potential to cause sweating, nausea, dizziness, blurred vision, abdominal pain, vomiting, and diarrhea. Aldicarb will be phased out of production by late 2014. All remaining aldicarb uses will end by 2018.

GLYPHOSATE-RESISTANT WEEDS ARE A GROWING PROBLEM

David Mortensen, a Penn State weed scientist, has called upon the federal government to restrict use of herbicide-resistant crops ("Roundup-Ready" corn, soybean, and cotton), and to impose a tax on biotech seeds that would fund agricultural research. The reliance on a single chemical, glyphosate, for weed control has increased dramatically due to the Roundup-Ready crops, which has led to at least 19 weed species that are resistant to the herbicide. Resistant weeds now infest close to 11 million acres in the U.S., double the amount in 2009. Mortensen says that the cost of forestalling and controlling herbicide-resistant weeds is estimated to cost farmers an additional $10-20 per acre. One concern is that geneticists are now looking to develop lines that are also resistant to other herbicide chemicals such as dicamba and 2,4-D. If these new crop introductions occur as reported, herbicide use could continue to increase and a significant proportion of those added herbicides will be older and less environmentally benign compounds.

NEW PESTS STOPPED AT ARIZONA PORT OF ENTRY

Customs and Border Protection (CBP) agriculture specialists working the Mariposa cargo facility discovered three significant pests, two of which have never before been found in the U.S., and the third of which has only been found once before. During inspections on Aug. 11, CBP agriculture specialists discovered an adult weevil with pineapples and Persian limes from Mexico. The weevil was identified by the USDA National Identification Service as *Pantomorus uniformis*, a pest that occurs in southern Mexico and northern Central America. On Sept. 6, a specialist discovered two adult shield bugs, *Euschistus crenator* subsp. *orbiculator*, on a commercial shipment of fresh corn entering from Mexico. It was the first time either of these pests have been intercepted in the U.S. That same day, specialists discovered an adult hemipteran insect, *Calocorisca tenera*, with tomatoes from Mexico.

Useful Publications and Websites

- A new website on pesticide stewardship has been developed for people that use, store, mix, make recommendations about or sell pesticides. Topics include avoiding drift, preventing runoff and leaching, and pesticide resistance management. The site is located at pesticidestewardship.org.
- A new online international, peer-reviewed journal focused on the practice and applied research interests in agriculture has recently been established (www.agdevjournal.com). The Journal of Agriculture, Food Systems, and Community Development publishes articles by professionals and academics in agriculture and food systems. The Journal features a companion website, AgDevONLINE, with maps and articles that are intended to support the work of a wide range of professionals, academics, and activists who focus on agriculture and food issues.

Featured Picture of the Quarter

In the summer of 2010, we saw some unusual insect activity, including a simultaneous, large hatching of leaf-footed plant bugs across much of northern Utah. In late July, we had reports of thousands of bugs on homes, golf courses, and natural settings from Cache, Salt Lake, Utah, and Wasatch counties. Many plant bug species use aggregation pheromones for overwintering and feeding, and it is possible that large aggregations of adults formed this spring, and that egg laying/hatching was delayed due to the cold and moist weather.

-photo by Marion Murray

Calendar of IPM Events

October 20-23, PestWorld 2010, Conference for Pest Management Professionals, Honolulu, Hawaii www.npmapestworld.org/pestworld2010

October 25-29, Second Invasive Species in Natural Areas Conference, Coeur d'Alene, ID, www.nripc.org/conferences

October 31-Nov 4, America Society of Agronomy / Crop Science Society of America / Soil Science Society of America International Annual Meeting, Long Beach, CA, www.acsmeetings.org/meetings

November 3-4, Southern Utah Green Conference, St. George, UT, www.utahgreen.org

November 9-10, Western Plant Diagnostic Network Regional Meeting, Davis, CA

November 16-18, 25th Tomato Disease Workshop, Wimauma, FL, 2010tdworkshop.eventbrite.com

December 1-3, Lawn Care Summit 2010, Atlanta, Georgia, www.landcarenetwork.org/cms/lcs

December 12-15, Entomological Society of America's 58th Annual Meeting, San Diego, CA, www.entsoc.org/am/fm/2010

January 10-14, 75th Annual Purdue Pest Management Conference, Lafayette, ID, extension.entm.purdue.edu/urban/Urban_Info

January 24-26, 2011, Utah Green Industry Conference & Trade Show, South Towne Expo Center, Sandy, Utah, www.utahgreen.org

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NPDN National Plant Diagnostic Network

WPDN Western Plant Diagnostic Network

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