



UTAH PESTS News

Utah Plant Pest Diagnostic Laboratory and USU Extension

Vol. IX, Winter 2015

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URBAN AND SMALL FARMS CONFERENCE

Vegetable production, irrigation, good agricultural practices, marketing, organic research and more!

February 18 - 20 at the Viridian Center, West Jordan, UT. For more information and to register, to go: diverseag.org.

NEW FACT SHEETS

[Damping-off](#)

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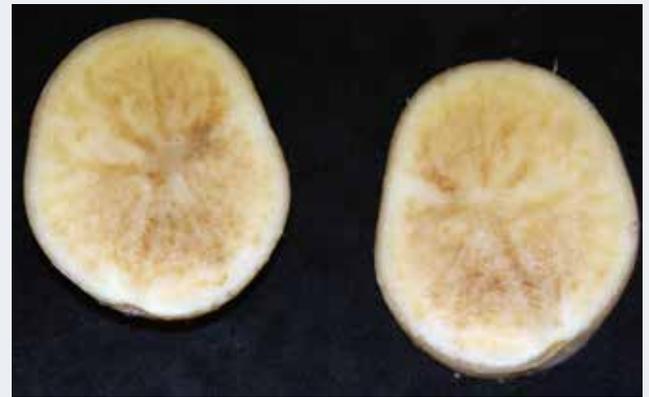
utahpests.usu.edu

A New Disease of Potato and Other Solanaceous Plants Reported in Utah

The non-culturable bacterium '*Candidatus Liberibacter solanacearum*' is a pathogen that causes zebra chip disease of potato. The bacterium is transmitted by potato psyllids (*Bactericera cockerelli*). These insects are very small and look like black, winged aphids. They have characteristic white bands on their backs that can be seen with a hand lens or dissecting microscope. In the field, a hand lens is also required to see the eggs and nymphs. The potato psyllids have been present in Utah for a long time, but the bacterium was detected for the first time in a potato sample in 2013, and again in 2014.

The exterior of potato tubers affected with zebra chip appear perfectly healthy. It is not until the tubers are sliced for cooking that the typical brown striations can be seen. They are even more pronounced when fried, giving this disease its name.

Aboveground symptoms can be more noticeable. Foliage will become chlorotic (yellow)



Top: Zebra chip disease causes brown striations in potato tubers, and is most pronounced on fried chips.

Middle: Diseased pepper plants will have small, deformed fruit and pale yellow-green leaves.

Bottom: Foliage of infected tomato plants will be chlorotic, especially toward the top of the plant.

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New Potato Disease, continued from page 1

and sometimes takes on a pink-reddish discoloration that could be mistaken for nutrient problems. The reddish foliar discoloration is caused by a toxin produced by the potato psyllids.

In the last few years, this same bacterium has been found in tomatoes and peppers in New Zealand and in some states in the U.S. In summer 2014, the disease was confirmed on commercial pepper plants from one field in northern Utah.

Symptoms on peppers include stunted plants, small fruit, and pale yellow-green leaves. On tomatoes, foliage can become deformed while the fruit may have a “strawberry” shape and the terminal

growth will be chlorotic. In some cases, interveinal chlorosis is observed. Some of these symptoms are caused by potato psyllid feeding.

Control of the disease is through control of the potato psyllids early on in the season with application at planting of imidacloprid. Later in the season, products containing abamectin can help.

I will be conducting a survey next summer. If you have any suspicious plants, please contact me via email: claudia.nischwitz@usu.edu.

-Claudia Nischwitz, Plant Pathologist

IN THE SPOTLIGHT...

Emerald Ash Borer Update

Dawn Holzer is the Pest Survey Specialist for the states of Utah and Nevada. The USDA Animal and Plant Health Inspection Service, Plant Protection and Quarantine program, provides Pest Survey Specialists for every state. This person gives technical support to the State Survey Coordinators in planning, executing, and reporting annual surveys and coordinating pest detection activities with neighboring states.

You may remember reading about the exotic invasive beetle, emerald ash borer (EAB), in the Winter 2014 edition of *Utah Pests News*. At that time *Agrilus planipennis* had just been discovered killing trees in Boulder, Colorado. It is now known to occur in 24 states and has been declared “the most destructive forest pest ever found in North America”. Just this year, it has also been found to be widely distributed in Georgia and Arkansas.

EAB is virtually 100% fatal to all species of native North American ash trees (*Fraxinus* spp.). It is estimated to have killed over 50 million trees and is rapidly expanding its range. Unfortunately, it is very difficult to detect before it becomes well established and begins causing tree

mortality.

Many state and federal agencies, including the Utah Department of Agriculture, USU Extension, USDA Animal and Plant Health Inspection Service, and State Lands and Forestry, have recently joined forces to form an EAB Outreach Committee to get the word out about the threat to our ash resources. While Utah does not have a native ash component to our forested areas (other than the small shrubby singleleaf ash—*Fraxinus anomala*—that occurs sporadically in southern Utah and velvet ash—*Fraxinus velutina*—in SW canyons), various planted ash species make up a substantial component of our urban forests throughout the state. Ash comprises up to 30% of the urban canopy in many Utah communities.

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Emerald Ash Borer Update, continued from previous page

When EAB was first discovered in the U.S. in 2002, killing trees near Detroit, Michigan, there was not much known about this insect. Tree mortality occurred so quickly (within 3 to 5 years of infestation) that it was difficult and costly to conduct timely removal of the hazardous dead trees. The spread of EAB to additional urban and suburban areas over the next 10 years is projected to cost \$10 billion or more for tree removal and replacement or chemical treatments.

Since EAB's arrival to North America, we have learned a lot and there are now many tools available to help owners of ash trees make management decisions. One of the most important things that we can all do now before the arrival of EAB in Utah is to educate ourselves about the impacts and management options.

Some of the things that we can do now to minimize the impacts of EAB include:

1. Inventory and assess tree health to develop a management plan for when EAB arrives. Emeraldashborer.info is the best resource for finding cost calculators, decision making tools, latest research, insecticide options, and more.
2. Do not include ash in any new plantings. Remove any ash that is not in optimal health or in poor sites. Treebrowser.org can be used to select ash alternatives and has been updated to include notes about EAB.
3. Be aware of the signs and symptoms of EAB infestation. For more details see the [USU Extension Fact Sheet on EAB](#). The earlier we can detect it the more management options will be available to us.
4. Be aware of established pests that can be confused with EAB in ash trees, such as the lilac-ash borer ([see fact sheet here](#)).
5. Report anything suspicious to the appropriate people found [on this webpage](#).
6. Don't move firewood from EAB quarantined states to Utah. Burn it where you buy it. [Dontmovefirewood.org](#) contains a variety of outreach materials.

There are some insecticide treatments available to protect higher value trees. They are not effective once EAB has become established in a tree. These include soil drenches that can be used by homeowners and systemic trunk injections that must be performed by commercial applicators. Treatments may need to be repeated annually to protect trees during potential EAB invasions.

USDA has also been working to develop biological control agents to help slow down the EAB. Utah has applied for



Kelly Otam, North Carolina Forest Service, Bugwood.org



Leah Bauer, USDA Forest Service Northern Research Station, Bugwood.org

Top: Serpentine galleries under vertical bark splits are characteristic of emerald ash borer (EAB) larval feeding

Bottom: Thinning in the upper canopy of ash trees is an early sign of EAB infestation.

permits to release the tiny stingless parasitoid wasps once EAB arrives here. Stay tuned for more information about biocontrol in the next edition of *Utah Pest News*.

Our Favorite Things: Websites, Books, and Apps

The following list is a compilation of our most-used resources in entomology, plant pathology, and IPM. They help us to get our jobs done, and you may find them useful, as well. The list is in no particular order, and the text in orange is clickable.

WEBSITES

University of California IPM Online

The UC IPM Online website provides a wealth of information on agricultural and landscape pests, treatment recommendations, degree day models, and more.

Pacific Northwest Insect Management Handbook

Bookmark this online handbook. It is updated each year by several universities, and provides up-to-date commercial and homeowner management information for agricultural and ornamental crops. Although the focus is on the Pacific Northwest, much of the information applies to Utah.



Pacific Northwest Disease Management Handbook

This is the “sister” handbook to the insect version, and is just as handy.

Orchard Pest Management Online

This website is an online version of the popular print edition. It covers insect pest and natural enemy identification and general management information for all pests that affect fruit trees in Washington. It covers most pest problems that occur in Utah.

bugguide.net

An online community of naturalists who enjoy learning about and sharing observations of insects, spiders, and other related creatures through identification help, images, and more.



IPM Institute School IPM Bibliography

The IPM Institute is an independent 501(c)3 non-profit organization formed in 1998 to foster recognition and rewards in the marketplace for goods and service providers who practice IPM. This area of the website is a much-used resource of school IPM information.

Insecticide Resistance Action Committee and Poster

The Utah Pests group encourages switching pesticide groups, but even we cannot remember all the group names

or the insecticides that belong to them. The poster is a handy reference. The IRAC provides a coordinated industry response to prevent or delay the development of resistance in insect and mite pests.

CDMS Label Search

CDMS provides a huge searchable database of pesticide labels for agricultural and ornamental products. Can't live without this reference.

Bugwood Images

Anyone who needs to prepare PowerPoints or use images for print or online, this website is a must. It provides an easily accessible archive of high quality images covering invasives, forestry, agriculture, IPM, plants, insects, diseases, fungi, wildlife, fire and other natural resource issues. Most images are of good quality as they are reviewed for content and quality.

Pest Tracker

A website to report exotic pests. It gives citizens, professionals and institutions information and maps on pest spread and progress about eradication, survey, and detection.



Science Daily

This site compiles snapshots of the latest research, and is updated daily. There are many topics, but I find the invasive species news most helpful.

These sites are useful for identifying disease problems:

- [Cornell Fruit Berry Diagnostic Tool](#)
- [Cornell Tomato Disease Identification Key](#)
- [University of Minnesota Diagnostic Tool](#)
- [Texas A&M Tomato Problem Solver](#)
- [The University of Cornell Guide to Healthy Lawns](#)

BOOKS

APS Compendium Series

Several dozen technical handbooks that include exhaustive information on identification, biology, and management of various crop groups. Particularly useful for diagnostics.

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Our Favorite Things, continued from previous page

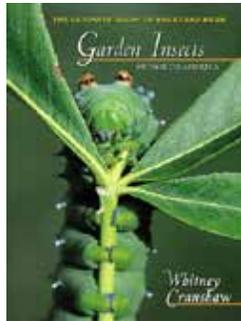
Pests of the Garden and Small Farm: A Grower's Guide to Using Less Pesticide, by Mary Louise Flint. 1999. University of California Press

Featuring more than 250 color photographs of pests and crops, and more than 100 drawings, this book helps to identify pests quickly—and to prevent, correct, or live with most common pest problems.

USU Extension's Intermountain Commercial Tree Fruit Production Guide and Utah Vegetable Production and Pest Management Guide

Garden Insects of North America: The Ultimate Guide to Backyard Bugs, by Whitney Cranshaw. 2004. Princeton Univ. Press

We consider this book to be the most comprehensive and user-friendly guide to the common insects and mites on crops and landscape plants. The full-color photographs are excellent and the text is concise, describing 1,420 insect pests!

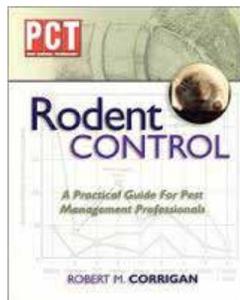


Insects that Feed on Trees and Shrubs, by Warren Johnson and Howard H. Lyon. 1991. Comstock Publishing.

This comprehensive handbook offers all you would ever need about landscape insect pests. It gives the essential facts about more than 900 species of insects and mites with full-color images.

Rodent Control: A Practical Guide for Pest Management Professionals, by R. Corrigan and D. Moreland. 2001. Pest Control Technology.

Rodent Control provides a comprehensive look at commensal rodent biology and behavior and multiple approaches for their control. A must have book.



Sunset's Western Garden Problem Solver. 2003.

A handy reference guide that covers insects, plant diseases, and weeds that occur in the West. Includes color photos and charts.

Natural Enemies Handbook: The Illustrated Guide to Biological Pest Control, by Mary Louise Flint. and S.H. Dreistadt. 1998. University of California Press

A non-technical guide to the identification and biology of beneficial organisms that control pests. This book is essential for everyone from Extension employees like us, but anyone who works with agricultural or landscape plants.

The Pesticide Book, by G.Ware. 2004. Meister Publishing Co.

Full of all the essential information you need to know about pesticides including how to understand labels, active ingredients, and how they work. This book is technical, but highly useful.

IPM for Schools: A How-to Manual. Bio-Integral Resource Center, Berkley, CA

This pdf publication sets the tone and content for the developing school IPM movement in the U.S. The material has been used as a source for school IPM websites, and has been borrowed extensively for everything from fact sheets to legislation.

APPS

weatherbug

Simple to use, clean interface, but chock full of data.

Provides 10-day forecasts, radar maps, and more for any location you set.

Demographica

Meant for Extension employees, or anyone who needs to report on contacts. Enter talk title, date, and attendees grouped by ethnicity. Export data for reporting purposes.

treebrowser

This app (website, too) is essential for anyone planting trees. You can search on any number of criteria to get a recommendation for trees suitable for that site.



Collaborative Organic Orchard Research with the National Park Service



Scenic and unique locations beckon field researchers. So it was no surprise when an opportunity to work in the historical fruit orchards of Capitol Reef National Park (CRNP) in south-central Utah was seized by a team of USU organic researchers. A USDA Organic Research and Extension Initiative grant garnered by the team included on-farm trials to test, implement, and demonstrate innovative organic practices.

CRNP is one of the few national parks to maintain orchards as part of its cultural heritage. Early settlers planted orchards as a cash crop and for subsistence. Today, the historical orchards contain over 3,100 fruit and nut trees. A few years ago, the orchards were converted to organic production practices. The tree-ripened fruit is sold through u-pick to park visitors, and is a main attraction in the summer months.

Wayne Hanks, CRNP orchard manager, has had success with pheromone-based mating disruption and microbial insecticides in managing key insect pests, but his major challenge is to provide adequate tree nutrition without the use of synthetic fertilizers. After several years without fertilization, orchard trees were noticeably stunted. The cost of hauling compost into the remote area was too expensive, and frankly, unsustainable. So Hanks thought, why not grow nutrients on-site?

The research team considered novel nitrogen-fixing legumes; however, because alfalfa already grew in old production fields and was approved for planting in the park, CRNP opted to focus on alfalfa. The collaborators designed the following objectives to test in the Carrell peach orchard (park orchards

are named for the settler families who originally planted them):

1. Determine whether peach tree nutrition can be enhanced by growing alfalfa on the orchard floor,
2. Assess competition of alfalfa and grass ground covers with weeds and peach trees, and
3. Assess effects of ground covers on insect and mite populations with a goal of minimizing pests and enhancing biological control.

In May 2012, following tillage of the established perennial grass cover, alfalfa seed was drilled into the soil of four 23 ft × 25 ft plots. Unfortunately, a nearby colony of yellow-bellied



The Carrell peach orchard trial was tilled and then planted with alfalfa seedlings in 2012. The seedlings were then promptly eaten by voracious marmots, requiring a treatment revision.

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Collaborative Organic Orchard Research, continued from previous page

marmots foraged heavily on the exposed alfalfa seedlings, greatly diminishing the stand and biomass. A new treatment was added in late summer 2013: drill alfalfa into undisturbed grass cover to "hide" the seedlings from the marmots. Ground cover density and biomass, soil and peach leaf nutrition, peach tree growth, and arthropod abundance and diversity were sampled in spring and late summer of 2013 and 2014 to address the study's objectives.



Sampling ground cover biomass.

In 2014, the alfalfa-grass mix had the greatest biomass and was resistant to invasion of weeds, as good as the undisturbed plots. The tillage/alfalfa plots were heavily invaded by weeds, especially dandelion, field bindweed, prostrate vervain, and showy milkweed. Soil nitrate and ammonium were very low, reflecting nitrogen deficiencies seen in the peach trees.



Collecting soil samples for nutrient analysis.

Tillage/alfalfa increased soil nitrate levels; however, this was likely due to release of nitrogen following tillage of the grass and not to nitrogen fixation, as the marmots kept alfalfa biomass low. In the soil, readily mineralizable carbon, microbial biomass, and phosphatase (enzyme produced by plants and microbes used in phosphorus mineralization) responded positively to planting alfalfa. Peach trees were deficient in nitrogen (N), magnesium (Mg), calcium (Ca), iron (Fe), and manganese (Mn). The tilled alfalfa treatment temporarily relieved N deficiency.

Arthropod abundance and diversity was low in all ground covers, less than 2.5 arthropods per gram dry weight. Thrips, flat mites, and springtails were the most abundant arthropods

in the ground cover; the first two groups being primarily herbivores, and the latter group, detritivores. Western flower thrips was the most abundant insect on peach leaves, and densities were greatest in plots with alfalfa. Few other insects and mites were found on peach leaves. Tree trunk circumference was greatest in tillage/alfalfa plots demonstrating that grass is competitive with trees for nutrients and water.

Our preliminary results show that tillage before planting alfalfa stimulated nitrogen release from the grass cover; however, this effect is likely to be short-lived without the addition of cover crops or compost. We are hopeful that the no-till alfalfa stand will thrive and provide a long-term source of nitrogen. The heavy herbivory of marmots on alfalfa in the tilled plots was unanticipated, but despite challenges in establishing and growing alfalfa in the Carrell peach orchard, the addition of a nitrogen-

fixing legume shows promise for improving soil and peach leaf tissue nitrogen levels. We recognize additional research collaborators, Drs. Brent Black and Corey Ransom.

-Diane Alston, Entomologist; Jennifer Reeve,
Organic and Sustainable Agriculture Researcher,
and Esther Thomsen, graduate student

New and Increasing Pests in Turf and Alfalfa



Adam Van Dyke of Professional Turfgrass Solutions, LLC

TURF

In 2014, the common crane fly, *Tipula oleracea*, an introduced fly from Europe, was detected for the first time in Utah turf, in Salt Lake and Tooele Counties by Adam Van Dyke of Professional Turfgrass Solutions, LLC. This crane fly has been an occasional pest in turf in the cool, moist habitats of the Pacific Northwest and the Northeast since the late 1990's. This new find is surprising given that arid habitats are not favorable for this insect. There are many other species of crane fly that are associated with streams and other bodies of water that do not harm turf.

In general, adult common crane fly resembles a very large mosquito that bumbles around in flight. These flies do not bite humans, and although one of their common names is "mosquito hawk," they do not feed on mosquitoes. The adults do not feed on turf; it is their larvae that cause the damage. Also known as "leather jackets," the larvae feed on turf roots, and when the microclimate is humid, they will also feed on blades of grass.

The turf damage seen in Utah has been minimal and isolated to a few spots. It is unclear how extensive the effect of this insect will be in coming years, given its occasional pest status in other areas of the U.S. where it is well established. Soapy water flushes or taking soil cores to investigate larval numbers in the soil are two ways to monitor larvae. In the Pacific Northwest, 25 larvae per square foot can be tolerated in healthy turf. Management consists of healthy plant maintenance and good drainage, beneficial nematodes, and pesticides are also available.

ALFALFA

The blue alfalfa aphid is not a new pest to alfalfa in Utah; however, in some areas of the state, particularly in southern



Adam Van Dyke of Professional Turfgrass Solutions, LLC

Crane fly larvae (*above*) and pupae are found below ground and leave noticeable adult emergence holes. Heavy damage is seen as brown spotting (*top*).

Utah, it has become difficult to manage. Other areas, including southern and central California and Arizona, have also had issues in dealing with this pest. It turns out that blue alfalfa aphid populations are increasing earlier in the season than previously thought, but it is not clear why this is happening. Some of the possible factors may include:

- Changes in predator and parasitoid abundance
- Changes in weather patterns (during the winter and growing season); cooler temperatures during the season favor blue alfalfa aphid but not beneficial insects
- Changes in pesticide efficacy against aphids
- More pesticide use for weevil that may reduce beneficial insects

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Turf and Alfalfa Pests, continued from previous page

Research surrounding this issue is currently being organized and conducted in areas with high aphid pressure.

Blue alfalfa aphids are phloem-feeding insects that feed on young alfalfa leaves and new stems. Moderate to high infestations may result in yellow leaves, leaf curl and wilt, defoliation, and slow green-up after cutting. Generally, low to moderate aphid populations can be tolerated, but identification is important. Pea aphid and blue alfalfa aphid can be differentiated by their antennae. Pea aphid has 3 to 4 bands along the antennae while blue alfalfa aphid antennae are not banded and uniformly brown.



Blue alfalfa aphids reproduce rapidly and honeydew or aphid excrement can lead to mold issues.

The primary strategies to reduce aphid infestations are to:

- Maintain the beneficial insects that provide natural pest control and keep aphids

in check. Pest Control Advisers (PCA) in California have observed very low parasitism of aphids by parasitoids and low abundance of lady beetles in problem areas.

- Use alfalfa varieties with resistance to blue alfalfa aphid.
- PCA's have observed that green chop with quick alfalfa removal aids in aphid suppression because they do not build up well in windrows.
- Use insecticides judiciously. In California, where blue alfalfa aphid has become a problem, PCA's found that Lannate, dimethoate, and Lorsban can be effective, with more options being considered.

-Ricardo Ramirez, Entomologist

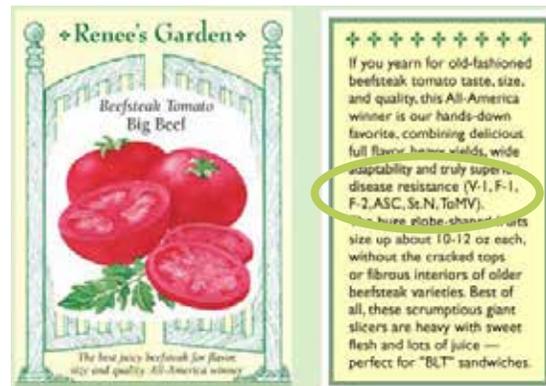
Selecting Seeds with Pest Management in Mind

Now is the time to plan your garden for next year. Selecting and buying seeds in the winter will ensure you'll have what you want when it's time to begin planting. Integrating pest management tactics into your selection of seeds can save you a lot of trouble and money later in the growing season.

First, select varieties that grow well in your area. Healthy plants can withstand damage from insects and diseases better. If possible select seeds from companies that test their seeds in similar environmental conditions as where you'll grow your plants. For more information on vegetable varieties that do well in Utah see [Home Vegetable Garden: Variety Recommendations for Utah](#), a USU Extension publication.

Next, choose varieties that show resistance to the common insects and diseases in your area. Varieties that are resistant to multiple insects and/or diseases are especially ideal. This information can be found in seed catalogs, on seed packets, or on-line in the details of the product. Choose certified seeds from reputable companies to help ensure that the seeds you purchase are disease-free. Lastly, don't be afraid to experiment with different varieties if the ones you choose this year don't work as well as you wanted.

-Bonnie Bunn, Vegetable IPM Associate



Disease info can be found on the backs of seed packets.



Disease resistance info can also be found online, as seen in this variety of bean that is resistant to bean mosaic virus and powdery mildew.

Volunteers are Critical to Invasive Species Work

The New Year is a great time to reflect on our blessings and reach out to others. One way to have a lasting impact on the world is to volunteer your time and services to an agency or cause of your choosing. Volunteers are invaluable and can make a huge difference in many aspects of community development, and volunteering is a strong component of the fabric of our nation. [The Corporation for National and Community Service website](#) estimates that in 2012, 64.5 million Americans gave 7.9 billion hours of volunteer service worth \$175 billion. Plus, volunteering can be a great way to develop skills, learn more about career options, acquire new professional contacts, make friends, get exercise, and spend time in the great outdoors.

Volunteers that assist scientists with their research are referred to as Citizen Scientists. Citizen scientists help collect data of scientific importance, and raise awareness and identify solutions to matters of ecological and environmental concern, including invasive species. First detectors are citizen scientists that help promote the early detection of destructive invasive species, whether they be plant pathogens, arthropods, nematodes, or weeds. First detectors are the front line of defense against pest infestations, and are critical for responding to the growing threats of invasive species.

Thanks to surveillance work by various federal and state agencies and engaged volunteers, many new exotic pests have been detected and targeted for eradication and management campaigns. For example, a citizen survey effort led to one of the earliest detections of the emerald ash borer in Connecticut (Rutledge et al. 2013). More locally, concerned community members and USU Master Gardeners were among the first to detect the brown marmorated stink bug and the Japanese beetle in Utah. In addition, Utah volunteers have sprung into action to help beat back invasive species that have taken over our landscape. For example, in 2013, volunteers from many organizations helped remove teasel (*Dipsacus fullonum*) from the Nibley wildlife reserve (Macavinta 2013). In 2012, Eric Babb of Utah County was recognized for his five years of service work to rid the Highland Glen Park of the invasive weed Dalmation toadflax (Page 2012).

[National Invasive Species Awareness Week](#) is scheduled for February 23-28, 2015, and below you will find a list of some local groups that have invasive species programs, and that may have volunteer opportunities available in February (or anytime, really). Note that this list is not exhaustive.

- [Stokes Nature Center](#)
- [Bear River Land Conservancy](#)
- [Ogden Nature Center](#)
- [The Nature Conservancy of Utah](#)
- [TreeUTAH](#)
- [Grand Canyon Trust](#)
- [Plateau Restoration Commission](#)
- [Jordan River Commission](#)
- [volunteer.gov](#) – a federal site that allows you to find opportunities by state

You can also download the [Invasive Insect Field Guide for Utah](#) and then set foot looking for some of these insects (keep in mind, however, that some of the insects described in this guide have not been found in the U.S.). [Bound copies](#) are available for purchase (\$5) from USU Extension (in the "Agriculture" category).



Finally, if you are interested in learning more about invasive species in Utah, consider enrolling in one of the [free invasive species workshops](#) taught by a member of the Utah Pests team this spring. Please note that we are currently in the process of scheduling these workshops, and so this website will be updated as workshops are scheduled.

-Lori Spears, USU CAPS Co-Coordinator

Lori has volunteered for a local animal rescue group since 2009, and has assisted several other non-profit organizations along the way. She is hoping to develop a First Detector Program for Utah. Stay tuned!

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In the National News

NEONICOTINOID EFFECTS ON SLUGS

Slugs are among the most challenging pests faced by Mid-Atlantic no-till soybean growers. Scientists report in the *Journal of Applied Ecology* that the use of neonicotinoids can exacerbate slug problems, thus reducing crop yield. Researchers planted quarter-acre plots with soybean seeds that were either treated with a neonicotinoid or untreated. The team tracked slug and predatory insect populations, and found that the slugs themselves were unaffected by the neonicotinoids, likely because they are mollusks, not insects. However, the slugs did indirectly transmit the insecticide to predatory ground beetles, impairing or killing more than 60 percent of the beetles in the test field. In addition, the neonicotinoids directly decreased activity of other slug predators. The result was a decrease in crop yield by 5% over the untreated field.

UNDERSTANDING DRAGONFLY FLIGHT

In an attempt to understand the dragonfly's ability to maneuver so easily, Cornell University entomologists studied their movement using high speed cameras. A magnet was attached to the underside of dragonflies, allowing them to be suspended upside down from a rod. When the rod was removed, the dragonflies instinctively rolled their body to make a 180-degree turn. By studying this footage, researchers were able to determine that the flight of dragonflies is directly related to the fact that they

can rotate their wings, changing the aerodynamic forces acting on each of their four wings. These findings will help to better understand evolution of insects and the wiring of their neural circuitry.

INNOVATIVE TREATMENT FOR FIRE ANTS

The red imported fire ant (*Solenopsis invicta*) damages crops, devastates small animal populations, and inflicts painful stings to livestock and to humans. USDA and collaborative scientists tested many naturally occurring compounds found on the skin of several species of poisonous frogs to determine their effect on fire ants. Past research has already identified about 900 alkaloids found on the skin of poisonous frogs. These frogs actually do not produce the alkaloids; rather, they sequester them by eating other organisms that produce the compounds. The USDA scientists identified one alkaloid found on the skin of Central America's poisonous frog, *Oophaga pumilio* (derived from mites) that was able to incapacitate and kill fire ants.

A SURPRISING EVOLUTIONARY FIND

Purdue and Colorado State University plant pathologists have discovered that the fungus responsible for walnut thousand canker disease has a rich genetic diversity. They analyzed 209 samples of *Geosmithia morbida* and found 57 genetic races of the disease. The study showed that thousand cankers disease likely originated in Southern California, rather than Arizona or New Mexico as researchers

previously thought. It also showed that it is native to the U.S., as is the walnut twig beetle. They surmise that the fungus and beetle might have caused only minor damage to trees in the West for thousands of years. New mutations led the fungus to suddenly emerge as an important pathogen.

PROPERTIES OF INK FROM A LONGHORNED BEETLE

Governments constantly add new features to paper money to stay ahead of counterfeiters. To simplify the process, researchers turned to *Tmesisternus isabellae*, a longhorn beetle that can shift from red to gold and back, depending on humidity. The researchers designed an ink, based off the beetle, which changes colors when exposed to ethanol and then returns to its original color. This ink is expected to be long-lasting and difficult to mimic. It has potential to be used in paper currency, color-changing billboards, and art displays.

NEW BIOLOGICAL CONTROL FOR LETTUCE APHID

Danish researchers reported in *Environmental Entomology* on a potential biocontrol agent for lettuce aphid. They evaluated three commercially available parasitoid wasps and found that *Aphelinus abdominalis* was effective as a biological control agent. The total mortality inflicted by *A. abdominalis* within a 24-hour exposure period was 51%. This means that growers may have a new, more effective treatment method than chemical control.

Useful Publications and Websites

- **Urban Insect Pests: Sustainable Management Strategies** is a new book that discusses control strategies of urban insect pests beyond pesticide products.
- **Pesticide and Field Records Plus** is an app that helps producers and agriculture businesses record and maintain pesticide application information.
- **In Praise of Bees: A Cabinet of Curiosities** is a new book that covers all aspects of the relationships between human society and bees.



Featured Picture of the Quarter

Females of the European wool carder bee (*Anthidium manicatum*) scrape or "card" fuzz from plants like lambs' ears (or even from wool socks or sweaters) for their nests, which are built in rotting wood or pre-existing tunnels. Male carder bees are very territorial and will aggressively defend patches of flowering plants from other insects or pollinators, almost to the death. This solitary bee has newly colonized Utah in the last 10 years, and in fact, now occurs throughout North America, North Africa, South America, Asia, the Canary Islands, and New Zealand.

-Image by Marion Murray, IPM Project Leader

IPM Symposium to be held in Salt Lake City

Salt Lake City is hosting the 8th International Integrated Pest Management (IPM) Symposium from **March 23-26, 2015** at the Salt Palace Convention Center.



There will be concurrent sessions, professional development sessions, plenary speakers, poster sessions, and networking opportunities. The groups of people attending the conference include independent consultants, academics, government employees, industry, producers, students, and business professionals from the U.S. and abroad.

There will be six symposium tracks:

- Agronomic and row crops
- Fruit, nut and specialty crops
- General agriculture
- Rangeland/natural and urban landscapes
- Urban, structural, and school
- Vegetable crops

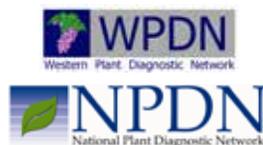
Attendees may submit an abstract for a poster presentation. Online submissions will be allowed until late January or when capacity has been reached, whichever comes first. For instructions on submitting an abstract, [click here](#).

For the full schedule and registration information, please see the website:

<http://www.ipmcenters.org/ipmsymposium15>

To receive email updates more about attending, exhibiting, or contributing to the Symposium, contact Elaine Wolff at wolffl@illinois.edu.

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