UTAH PESTS News

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

Battling Bed Bugs in Utah

"Sleep tight, don't let the bed bugs bite." All people know this phrase, and the harsh reality of its meaning is becoming known once again. Over the past decade, reports of bed bugs (Cimicidae: *Cimex lectularius*) throughout North America and abroad have been on the rise. Accordingly, bed bug submissions to the UPPDL have also been increasing. This article will briefly explain the recent resurgence of bed bugs, and considerations for selecting a pest control company to eradicate bed bug problems.

HISTORY OF BED BUGS

In the 1920s and 1930s, Americans were plagued by bed bugs. Some reports stated that one out of every three homes was infested. People could pick up unwanted bugs on buses, taxis, in the movie theater, and just about anywhere. But in the early 1950s, bed bugs disappeared from the developed world's radar, thanks to new insecticides like DDT, and improved living standards. DDT applications in homes, hotels, transportation vehicles, and health care facilities would kill bed bugs for several months to over a year.

Due to the elimination DDT and the increase in world travel, bed bugs started a resurgence in the 1990s, with increasing reports of infestations in the last few years. Today's insecticides are not up to the challenge of effectively controlling bed bugs, largely because pesticide manufacturers have not had to create chemicals to battle these pests, and because of resistance to the few products that are registered for use. Because of increased travel, people are unknowingly transporting bed bugs all over the world, and even into their own homes.

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Top: Bed bugs can be found in a variety of life stages (instars), often huddled together.

Middle: Adult bed bugs feed for about 15 minutes before they become engorged to three times their size.

Bottom: Blood-like excrement emitted from a feeding bed bug will stain sheets and mattresses, and can be used to detect the presence of an active bed bug infestation.

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NEW *UTAH PESTS* FACT SHEETS

The following can be found on our Web site:

Raspberry Horntail

Community Grasshopper Control

PESTICIDES IN SCHOOLS: A HOT TOPIC

Parents of school-age children should become aware of reducing or eliminating harmful chemicals in Utah's schools. Get involved by visiting the EPA's IPM in Schools, or the University of Florida's School IPM Web sites to learn about helping to keep your child's school healthy.

www.utahpests.usu.edu

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UtahState University COOPERATIVE EXTENSION

I HAVE BED BUGS. NOW WHAT?

The first thing you need to understand is that bed bugs are a very difficult indoor pest to eliminate. Their biology and habits are geared toward survival, and standard management practices that work on most indoor pests are not applicable to bed bugs. Eliminating bed bugs will take two to three visits from a pest control professional. Proper treatments are expensive, time consuming, and require your commitment.

If you find a suspected bed bug, have it identified. There are many look-alikes, as well as closely related species that should be treated in a different manner than bed bugs—most notably western bat bugs (*Cimex pilosellus*). Once identified, begin looking for a pest control company; do not try eliminating bed bugs on your own. You will not succeed.

You should obtain at least three bids to determine the pest control professional that works for you. Do not be swayed by the cheapest bid. Eliminating bed bugs is intensive, expensive, and takes trained, experienced professionals to get the job done properly.

Do your homework before selecting a pest control company and ask questions. The company you select should provide a well thought-out management plan, but should not claim to eliminate bed bugs 100% (unless they use whole-structure fumigation). Other characteristics of a successful pest control company include:

- proven track record for bed bug removal
- educates clients on bed bugs and the treatment process
- informs client of responsibilities upfront, which should include washing and bagging clothes and linens, and emptying drawers and closets
- treats and inspects a minimum of two times, and possibly more than three
- uses multiple formulations of insecticides (liquids, dusts, and aerosols)
- performs a detailed inspection before every application and after the final application
- takes detailed notes during spray treatments and inspections
- vacuums and steam cleans carpets, mattresses, box springs, and furniture
- runs a staff of well-trained technicians
- affiliated with a professional pest management association
- licensed and insured

To help facilitate successful elimination of bed bugs and to prevent reintroduction, you should plan to supplement the professional treatment with the following tactics:

- vacuum frequently and remove bag or empty canister regularly as vacuums can distribute bed bugs
- purchase bed-bug proof mattress and box spring covers
- use hot water to launder clothes and linens
- minimize clutter

As a homeowner, business owner, landlord, facilities manager, etc., it is important to have realistic expectations concerning bed bug management. Unless you employ whole-structure fumigation, treatment for bed bugs will be rigorous, involving multiple, thorough inspections and insecticidal treatments, cooperation and understanding, the use of supplemental integrated pest management tactics, and tolerance for the bugs while the program is implemented.

For an in-depth discussion of bed bug history, biology, control tactics and more, please see the updated Bed Bug fact sheet, or contact Ryan Davis at the Utah Plant Pest Diagnostic Lab (ryan.davis@usu.edu).

-Ryan Davis, Arthropod Diagnostician

Turfgrass Insect Pests of Utah

There are a number of insects that can cause aesthetic and economic loss to turfgrass in Utah's home lawns and recreational and athletic fields. White grubs and subterranean sod webworm (aka the cranberry girdler) are the most destructive, while billbugs and sod webworms are the most common.

WHITE GRUBS

White grub larvae (top) have three obvious pairs of legs and are almost always found curled in a C-shape. May/June beetles (bottom) have just one generation every three years.

White grubs are the immature stage of scarab beetles, and primarily feed on turfgrass roots. The May/June beetle, masked chafer, and black turfgrass Ataenius are established in Utah. The Japanese beetle was introduced into the Orem area in 2006, but an eradication program has currently minimized its population.

When mature, white grub species range in length from 3/8 to 2 inches and form a C-shape when at rest. Grubs bear three obvious pairs of legs near their head end. Their life cycle length varies from several generations per year (black turfgrass Ataenius) to one per year (masked chafer) to one every three years (May/June beetle).

Cultural Practices to Prevent Turf Insect Problems:

- apply fertilizer in the proper amounts and at the right time
- irrigate deeply and infrequently
- mow grass at a height of 1.5 inches or higher
- select a well-adapted turf variety
- amend soil with organic matter
- aerate and de-thatch as needed

Brown patches in grass from grub feeding injury often aren't apparent until late summer in an otherwise healthy turf. Heavily damaged turfgrass can feel spongy, pull up easily, and tear away from the chewed roots.

Economic thresholds for white grubs vary due to body size and feeding intensity: 3-5 per ft^2 for May/June beetle, 8-10 per ft^2 for masked chafer, and 30-50 ft^2 for black turfgrass Ataenius. To determine density, cut a 6 x 6 inch square, peel the sod back, and count grubs in the soil and roots.

Biological control using beneficial nematodes and fungi can help maintain grub populations below economic thresholds; however, when damage is detected, insecticides may be necessary. Apply systemic insecticides (Acelepryn, Arena, and Merit) in early summer before eggs hatch to allow adequate time for plant uptake. Contact insecticides should be applied in mid summer through early fall before the grubs move deeper in the soil zone to spend the winter. Contact insecticides include broad-spectrum products such as Dylox and Sevin, and more selective or reduced-risk products such as Mach 2 and Concern.

Before applying insecticides, it is critical to reduce the thatch layer to no more than ½ inch deep or aerate the soil to enhance chemical penetration, and to apply ½ to ¾ inches of water after application to move materials into the root zone. Repeat irrigation every 4-5 days to continue chemical movement into the soil. Long-lasting clean-up of white grubs often requires several years of treatment. For more information, see the USU white grubs fact sheet.

BILLBUGS

Three to four species of billbugs occur in Utah. In the northern region, the Denver and bluegrass billbugs are common, and infest cool-season grasses. The Phoenix

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Billbug damage in turf is usually apparent in early and mid summer.

and hunting billbugs infest warm-season grasses, such as bermudagrass and zoysiagrass. The Phoenix billbug has been identified in the Moab area and the hunting billbug may occur in lower elevation areas of southwestern Utah.

Billbugs are weevils. Larvae look similar to white grubs, but are smaller (up to only ½ in long) and legless. They have white bodies and a brown head and resemble grains of puffed rice. Billbug larvae feed in the crown and upper root zone and damage is typically apparent in early and mid summer. Early detection is important to good control because young larvae are easier to kill than older larvae.

Infested turfgrass looks stressed with small brown patches. Grass blades can be easily pulled away from the crown in small tufts. Sawdust-like frass (insect poop) is often evident in the thatch. The treatment threshold is 1 larva per ft^2. If necessary, insecticides should be applied in early to mid summer when damage is noted and the threshold is reached. The same insecticide products discussed for white grubs are effective for billbugs. For more information, see the USU billbug fact sheet.

SUBTERRANEAN SOD WEBWORM

The subterranean sod webworm (SSW) feeds in turfgrass crowns and roots. SSW injury looks similar to that of white grubs. Damage begins as small brown patches that can increase rapidly in the late summer to early fall. This insect has become a persistent turfgrass pest along the Wasatch Front, and has been more difficult to control than billbugs and the common sod webworm.

SSW larvae are dirty-white to grey in color with an orange-brown head. Adults are buff-colored moths with brown and cream stripes (shown lower left). Moths fly just above the turfgrass at dusk/night, and are active in mid to late summer.

The treatment threshold is only 1-2 larvae per ft^2. Turf/soil samples are required to identify larvae feeding in the crown and root zone. The same insecticides discussed for white grubs are also effective against the SSW. In addition, the bio-insecticide, *Bacillus thuringiensis* (Deliver), kills caterpillars when ingested, and pyrethroid insecticides (Scimitar, Talstar, Tempo) kill larvae and adults. For more information, see the USU cranberry girdler fact sheet.

SOD WEBWORMS

The common sod webworm is a complex of many species, seven of which occur in Utah. The different species look similar: adults are dull brown and grey moths and larvae are brown-grey to green with dark circular spots and hairs on their sides. Larvae spend the winter in cocoons in the thatch layer and begin to feed in the spring with warming temperatures.

Larvae feed on grass blades at night and retreat to the thatch during the day. Feeding damage begins as general turf thinning, but can intensify into small brown patches. Injury is evident during the summer and into the early fall. Sod webworm feeding is above ground and roots remain intact, unlike with the SSW. Small green-brown pellets of caterpillar frass can be seen in the thatch (shown above). To sample, larvae can be flushed from the thatch by pouring soapy water (1 Tbsp liquid dishwashing detergent in 1 gal of water) onto the turf. The treatment threshold and control options are the same as for SSW. For more information, see the USU sod webworm fact sheet.

-Diane Alston, Extension Entomologist

Encouraging Native Pollinators in your Yard and Garden

Figure 1. Many species of sweat bees, such as the one shown here foraging on apple blossoms, are native to Utah.

For many people, honey bees immediately come to mind when considering pollination. However, just about any animal that visits a flower in search of nectar is a potential pollinator. This includes butterflies, moths, bats, hummingbirds, and native bees. There are over 4,000 species of wild bees in the United States; 900 of these species are native to Utah (Figure 1). With the exception of bumble bees and some sweat bees, native Utah bees are solitary, not social, like honey bees. Female solitary bees each build their own nest, although often they nest in aggregations.

There are three things that you must consider if you would like native pollinators to thrive in your yard and garden:

- Pollinators need continuous, high quality forage.
- Pollinators have shelter and other habitat needs.
- Pesticides can be harmful to pollinators.

To attract a wide variety of pollinators, you need a variety of flowering plants. Try to plan for continuous bloom throughout the growing season. Although it can be advantageous to plant native plants, non-natives can also be a good choice, if thoughtfully selected. Water-wise plants make an excellent choice. Different pollinators are attracted to different flower colors and shapes. This can actually make planning the garden more fun, and the finished product more enjoyable. It is important, however, that you do not introduce invasive plant species. Keep in mind that some plants which are appropriate for gardens in some parts of the country can be invasive, bothersome weeds in other areas.

In addition to food, pollinators also have other requirements, such as shelter and nest materials. Trees, bushes, and other vegetation can provide butterflies, moths, and hummingbirds with protected areas for perching, nesting, and hibernation. Trees can also meet other habitat requirements; for example, hummingbirds often collect nest materials from willow trees. Pollinators need both sun and shade. Often they will bask in the sun early in the morning, and build their nests in shady spots. And finally, pollinators need sources of clean water.

The habitat needs of native bees are similar to the needs of other pollinators. They need sunny areas, shady areas, shelter, and nest materials. Native bees fall into two categories: those that nest in the ground and those that nest in cavities. For those that nest in the ground, it is important to provide areas of open, well-drained, loosely packed soil. They cannot nest in areas with weed barriers, thick mulch, thick turf, or small gravel.

Some of the easiest pollinators to actively encourage are bees that nest in pre-existing cavities. There are several options available, depending on the level of time and effort you would like to invest. If you have raspberries in your farm or yard, leave the canes pruned high rather than cutting them close to the ground. Solitary bees can build nests inside these canes, as well as other pithy stems that you leave long, such as Siberian iris flower stems. If you do not have plants in your yard with long, pithy stems, you can easily provide nest sites for bees by drilling holes in a log or stump (Figure 2). If you are interested in actively managing cavity-nesting bees, you can provide bundles of hollow reeds or cardboard

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Native Pollinators, continued from previous page

Figure 2 (top). A log with holes drilled into it provides nest sites for solitary bees. In this photo (top), the mud-covered holes are completed bee nests.

Figure 3 (bottom). Empty reeds have been bundled together and placed in a plastic container to protect them from the rain. Bees are actively nesting in many of the reeds.

tubes, or construct nest blocks, and place them in a sheltered area (Figure 3). Also, cavity-nesting bees often need other materials to complete their nests, such as mud, leaf pieces, or plant fibers. Don't be alarmed if you see bees collecting leaf pieces or plant fibers. It is highly unlikely that they will collect enough to seriously damage the plant.

Pesticides can be harmful to all pollinators. Even botanical insecticides can harm bees and other pollinators if not used carefully. Seek other methods of controlling weeds, diseases, and insect pests before resorting to pesticides. If you feel you have exhausted all other options, be considerate in your pesticide selection. Use "softer" pesticides whenever possible. Always read the label and follow directions carefully. Treat only the affected areas. Timing is important. Some insecticides are only effective during a certain period of an insect's life cycle. If you miss this period, you may affect your pollinators, but not effectively control your insect problem. Also, always apply pesticides in the evening when bees are not active, and cover the nests with a tarp before spraying.

Once you realize how easy it is to encourage native pollinators to visit and live in your yard and garden, you will find that not only do they provide great pollination services, but they are entertaining and interesting. More information on specific topics can be found by clicking on the following orange links:

- garden plants that appeal to native bees
- more detailed information on native bees
- NAPPC Pollinator Friendly Practices Guidelines
- pollinator conservation in agricultural settings
- butterfly habitat
- hummingbird habitat
- building stick nests for solitary bees
- building nest blocks for solitary bees

More detailed instructions for managing blue orchard bees can be found at:

- the USDA-ARS Logan Bee Lab
- "How to Manage the Blue Orchard Bee as an Orchard Pollinator"

The Utah Native Plant Society is a wonderful resource for more information on these and other pollinator-relevant topics.

-Cory Vorel, USU CAPS Coordinator

Utah Pests Welcomes New CAPS Coordinator

This fall, Cory Vorel started as the Utah State University Cooperative Agricultural Pests Survey Coordinator. Along with Clint Burfitt, the Utah Department of Agriculture and Food CAPS Coordinator, Cory administers the CAPS program, which monitors for invasive pests throughout the State. In addition, Cory is teaching a variety of workshops, writing fact sheets, and participating in other Extension activities. She recently attended a conference on thousand cankers disease of walnut trees, an emerging threat of black and English walnuts.

Cory is originally from Ogden, and she received her B.S. in Zoology from Weber State University. More recently, she completed her doctorate with the Department of Biology at Utah State University. Her dissertation research was completed at the USDA-ARS Bee Biology and Systematics Laboratory in Logan, where she studied learning, nest selection, and dispersal of solitary bees. Nowadays she can be found in VSB 317, or you can drop her an email at cory.vorel@usu.edu.

Are Native Plants Resistant to Pests?

By Dr. Heidi Kratsch and Dr. Larry Rupp, Extension Ornamental Horticulture Specialists in the Department of Plants, Soils, and Climate at USU

Figure 1. Terminal growth of nursery-grown canyon maple on July 22 (left) and typical wild maple on June 9 (right). Note difference in terminal bud set and the presence of leaf tatter on the nursery-grown plant.

Demand for ornamental plant species native to the Intermountain West is expanding rapidly. People desire plants native to their region for their ability to attract native pollinators and other wildlife to their yard, to conserve water, and for their unique charm and beauty. Purchasing native plants supports growers who produce these plants for their ornamental value or for use in reclamation and restoration of disturbed rangelands. Many native plant proponents claim that using native plants decreases plant pest problems. However, our observations do not bear this out. In reality, the result is neither an increase nor a decrease in the incidence of pest problems. Instead, growing native plant species often means a shift in the pest population, which may require an adjustment in approach to landscape and nursery pest management. We oversee an ornamental native plant production and evaluation program at Utah State University, and work with an ever-changing variety of native plant species. Here we share some of our experiences in dealing with pest problems during production of native plant species.

In pesticide trials with 4-month-old seedlings, we noticed that disease incidence tended to less be with native plant species, and some native plants appear to be resistant, even when inoculated directly with the disease-causing organism. This was demonstrated in replicated trials with silver buffaloberry (*Shepherdia argentea*) inoculated with *Phytophthora parasitica*, and with Mexican cliffrose (*Purshia mexicana*) and seaside alder (*Alnus maritima*) inoculated with *Phytophthora cinnamomi,* (*Phytophthora* spp. are the causal agents of root rot).

This disease-resistance also may hold true for mature plants under landscape conditions, but only if plants are placed in the right spot in the landscape and maintained in a way that simulates the conditions to which they are native. For example, penstemons are native to arid and semi-arid regions in North America. They are sensitive to heavy, wet soils and will develop root-rot diseases under these conditions. Growing penstemons in heavy clay soil, or over-watering plants in containers, can encourage development of disease because they are better adapted to faster draining soils lower in organic matter, which are likely to harbor a different variety of microbes.

Relatively small changes in the growing environment (such as the north side of a house versus the south side) may put a native plant in a distinctly non-native setting, where it may suffer from stress and become more susceptible to pests. We often assume that because of their adaptation to a certain environment and co-evolution with beneficial insects and soil microbes, native plants are free from disease and insect problems. But native plants have also co-evolved with the pests that are native to their region. On the other hand, it is possible for an exotic plant to be pest-free when introduced to a new environment if there are no organisms adapted to attacking it.

A nursery by nature is an artificial environment, unlike the environment to which plants are adapted. Plants are grown under conditions that restrict root growth, either in pots or in the ground situated close to other plants. A greenhouse is even more artificial because natural enemies that might protect species in their native habitat usually are not present in a greenhouse. For example, although globemallow (*Sphaeralcea*) species are rarely affected in the wild, in an enclosed setting

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Are Native Plants Resistant to Pests? continued from previous page

they are attractive to aphids, which attack the flower buds. We have used horticultural oils and pyrethroids to control aphids in our native plant propagation greenhouse, but our best long-term solution to this problem was to get globemallows out of the greenhouse into the open air as soon as the weather permitted.

Nursery environments encourage growth patterns that can be very different from those in a native environment; plants may be exposed to pests or physiological conditions they may otherwise avoid simply due to timing. In the wild, native canyon maple (*Acer grandidentatum*) typically sets a terminal bud in early June after 3-5 nodes have formed. Similar plants grown in the same vicinity, but in an irrigated nursery, will continue to have active terminal buds well into July, and produce much longer shoots with many more nodes as well as secondary shoots from lateral buds. As a result, the growing points and new leaves of nursery-grown maples may be exposed to conditions that simply do not exist at the time wild-grown plants are at the same physiological stage. This difference exposes growing points and new leaf tissue of nursery-grown plants to stress in July, while wild plants have long since ceased growth before such stress can occur. As a result, we commonly see leaf tatter on canyon maple in the nursery, but we rarely see it on maples growing in the wild. We have noticed that thrips are present at the time of the appearance of leaf tatter in the nursery, and they are likely the cause. Thrips are not present when wild maples are actively growing earlier in the spring (Figure 1). On the other hand, we have never noticed ovipositor (the insect part that facilitates egg-laying) damage from cicadas in the nursery, while it is a common occurrence in the wild (Figure 2).

Nursery best management practices require an effective weed control program. The weeds we find in our nurseries are typical of those found in most production agriculture settings in northern Utah. However, in situations where we have grown plants under low-volume or drip irrigation, it is possible to see a shift in the species of weeds present. For example, weeds such as redroot pigweed (*Amaranthus retroflexus*) may disappear, while others such as Russian thistle (*Salsola kali*) may begin to invade. One weed is not worse than the other, but it is important to realize that weed-control strategies may need to change with the shift in weed species.

Finally, native plant species have varying degrees of susceptibility to pesticides, and show phytotoxicity to chemicals that are not a problem for more common horticultural varieties. Unless cultivated varieties are available, most native plant species have not been tested for potential toxicity to pesticides. For this reason, we recommend cautious use of pesticides on native plant crops, with an emphasis on "soft" controls such as insecticidal soaps and horticultural oils, and use of weed barriers in planted areas. Cultural controls can also be effective. We recently redesigned our outdoor plant holding area with separate irrigation zones for optimal care of plants with different water needs, and we stock planting substrates with various levels of organic matter for optimizing the plant root-zone environment.

Figure 2. Ovipositor damage from cicada on canyon maple (left) with subsequent flagging (right). Flagging is the result of cicadas laying eggs inside small terminal branches; these branches eventually die and break off.

Including native plant species is a great way for smaller nurseries to develop a "niche" market, and for all nurseries to diversify their inventory to respond to the increasing demand for regional native plants. Extra attention to potential changes in pest populations can help growers to protect investments.

Tree Fruit and Landscape Pests to Watch For in Utah

APPLE CLEARWING

The apple clearwing (*Synanthedon myopaeformis*, related to the greater peachtree borer, *S. exitiosa*) was identified from a British Columbia orchard in 2005 as the first record in North America. It was thought to have been introduced on infected planting stock from Europe. In some orchards that were almost fully replanted, 95-100 percent of trees are infested. It has since been found in several other B.C. orchards and parts of northwestern Washington State.

The adult moths are metallic blue with an orange band. They are attracted to the lure used for greater peachtree borer, and the Utah IPM program is watching for this pest. Female moths lay eggs in spring on wounds, grafts, and pruning scars of apple trees, and the larvae spend two years in the cambium from the crown to the scaffold limbs. As the bark dies over the feeding areas, it becomes loose and flaky. Trees under drought stress are more susceptible to death.

SPOTTED WING DROSOPHILA

A vinegar fly pest was discovered feeding on Santa Cruz county, California strawberries and raspberries in fall 2008. It was later identified as *Drosophila suzukii,* spotted wing drosophila (SWD). The spring and summer of 2009 showed this pests' true intentions, where, by the end of the season, it was found on nine hosts (strawberries, raspberries, blackberries, blueberries, table and wine grapes, cherries, plums, and peaches) in four states (CA, OR, and WA, and FL via a separate introduction) and B.C. This Asian native was first described in Japan, and has been established in Hawaii since 1980. It is one of only two of the 3,000 species of *Drosophila* (vinegar flies) that is known to be a plant pest.

The female penetrates the skin of ripening fruit, laying 2-3 eggs each time. A single female can lay up to 350 eggs, and could potentially form 100,000,000 adults in just four weeks. The larvae develop inside the fruit, and exit to pupate. The feeding area becomes soft, brown and sunken. According to the original description, adults are most active at 68° F, and above 86° F, males become sterile.

Whether this pest could become established in Utah is unknown, but seasonal introductions are certainly a possibility. A predictive model of establishment in the West shows that the northern Utah fruit growing region has been identified as "marginal" due to lack of moisture and temperature extremes. The eggs, larvae, and adults cannot survive below freezing, and vinegar flies prefer humidity, dying within 24 hours in the absence of water. If SWD were to become established in Utah, predictions show that emergence would begin around mid-June, and depending on location, it would have 1-7 generations per season.

Research is underway in CA-OR-WA to look at treatment options, pest biology, determining when fruits become susceptible to egg-laying, and monitoring options. In Utah, we will monitor for this pest using yellow sticky traps and fruit inspections.

EUROPEAN GRAPEVINE MOTH

The first record of European grapevine moth in the U.S. was in the Napa Valley of California in October 2009. It was introduced into Chile in 2008 and has since become a serious pest there. It is not predicted to be a threat in Utah, but residents

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should be aware of it, as it feeds on several hosts besides grapes, including blackberry, currant, cherry, peach, plum, and cucumber. Larvae of spring and summer generations feed on flowers and leaves, while later generation larvae feed on and within the fruit, moving around in silken threads.

PINE WILT

Pine wilt is a disease caused by the pinewood nematode (*Bursaphelenchus xylophilus*). The nematode is native to the U.S., but the disease has not been recorded in Utah. It is a significant problem of pines in the Midwest where trees are killed within a few months. Scotch pine is highly susceptible, and Austrian and 5-needled pines are somewhat susceptible. The nematode is vectored from tree to tree by the pine sawyer beetle (*Monochamus* sp.). Larvae of this beetle grow and develop in dead or dying trees, and if nematodes are present in the tree, they will enter the pupal chamber formed by the pine sawyer larva. The emerging adult then transports tens of thousands of nematodes to healthy pine trees where it feeds on the outer bark tissue. The nematodes enter the xylem vessels and multiply by the millions. The only visible symptom is a rapid yellowing, then browning of the foliage.

PHYTOPHTHORA RAMORUM

Phytophthora ramorum, which causes the disease sudden oak death, was discovered killing oak trees along the California coast in the mid-1990s. It is a pathogen that thrives in cool, wet climates, but because several other *Phytophthora* species are able to cause plant disease in Utah, residents should be on the lookout. Currently, there are over 75 hosts (click here for a full list) and symptoms vary from leaf blights (shown above on maple) to bleeding trunk cankers.

The primary spread of this pathogen to other parts of the country has occurred via transportation of nursery stock, wood, green waste, soil, etc. from infected areas. To prevent spread, many counties of California and Oregon are quarantined while the remaining counties, and all of Washington, have transport restrictions. Even still, *P. ramorum* still pops up here and there, including a November 2009 identification in Maryland on a witch hazel shipped from Oregon. With diligent inspections and eradication, *P. ramorum* has not become established anywhere except the regulated states.

PHYTOPHTHORA BLEEDING CANKER

This disease occurs commonly in the east and in the Pacific Northwest, and rarely in Utah. We are watching for this disease because in the last 7 years, many silver maples have been killed by bleeding canker, caused by *Phytophthora citricola* and *P. cactorum,* in northern Nevada. Phytophthora bleeding canker is known to occur on a variety of hosts: maples, beech, birch, dogwood, elm, oaks, tulip-tree, willow, and some fruit trees. This summer, the UPPDL identified bleeding canker on horsechestnut.

Phytophthora is a fungus-relative that commonly causes crown and collar rot in Utah. Spread of the pathogen to stems may be caused by rain splash, contaminated irrigation water, pruning, or any other physical transport. The pathogen invades the bark and spreads in the cambium, killing tissue as it advances and staining it red-brown. Most trees will ooze a tar-like sap from the infected area, which can range from a few inches to several feet long (shown above). Usually cankers are found on the lower trunk, but can occur higher.

If you notice any of these pests, please do not hesitate to collect a sample for the UPPDL to diagnose. It is very important to identify potential agricultural or landscape threats before they cause economic harm. For information on collecting samples, go to: www.utahpests.usu.edu/uppdl, or call the Lab at 435-797-2435.

-Marion Murray, IPM Project Leader

In the National News

HOPE FOR AMERICAN CHESTNUT

Chestnut blight has virtually wiped out the American chesnut as a dominant tree in eastern forests. Breeders at University of Georgia have developed a method for inserting a known anti-fungal gene into the host tree's DNA. The thought is that the new gene will help the tree develop resistance to the pathogen. This breeding process has been a 20-year effort, where they first found a way to grow chestnut trees from a single cell, and then how to insert the anti-fungal gene. Several trees are now growing in greenhouses to be used for resistance studies.

CSREES IS NOW NIFA

The National Institute of Food and Agriculture was launched on October 1, 2009 as mandated by the recent Farm Bill. NIFA is formed from the Cooperative State Research, Education, and Extension Service, and is now USDA's extramural research enterprise. The elected leader of NIFA is plant scientist Roger Beachy of the Danforth Plant Science Center and winner of the Wolf Prize in Agriculture. NIFA will serve to keep American agriculture competitive, improve nutrition and food safety, and provide a secure energy future, all while protecting natural resources.

PREDATOR BEETLE RELEASED FOR HEMLOCK WOOLLY ADELGID

Hemlock woolly adelgid was first introduced to North America in the Pacific Northwest, and spread across to the U.S. where it is now a significant pest of hemlocks in the East, killing thousands of acres of trees. A team of entomologists from Cornell, UMass, and the USFS released a predatory beetle of the adelgid on infested land in NY. The beetle (*Laricobius nigrinus*), is native to the Pacific Northwest where it has helped to keep the adelgid in check, preventing it from becoming the problem it is in the East. Hemlock woolly adelgid is a tricky pest because it continues to develop over the winter months. *L. nigrinus* beetles have a synchronous life cycle, and can feed on the adelgids in winter as well as summer. In the East, the beetle feeds exclusively on the adelgids. The study site will be monitored for 10 years to determine the effect of the beetle.

SELECTIVE BEES TARGET HEMOLYMPH-FEEDING MITE

Honey bees are naturally hygienic, removing diseased brood from their nests. ARS scientists in Baton Rouge, LA have developed honey bees with a high expression of a genetic trait called varroa-sensitive hygiene (VSH) which heightens their hygienic activity against the varroa mite, a parasite that, at high levels, can kill the bee colony. VSH allows the bee to more easily remove mite-infested pupae from the capped brood. VHS bees are aggressive in their pursuit of the mites, ganging up and chewing through the cap of an infested brood. For bees without this trait, the mites are sometimes hard to located since they attack the bee brood while they are inside the capped cells.

DUPONT STARTS USING BIODEGRADABLE PACKAGING

DuPont says that the new environmental packaging it is launching for the turf industry will reduce wasted and exposure to pesticides. The packaging is certified compostable and biodegradable, and was designed in response to the needs of pest management professionals. DuPont found that pre-measured packaging allows for better inventory management and improves usability. The name of the packaging is called "Terrene" and the insecticide Arilon is the first to be sold in the packaging.

NEW USDA WEB SITE TARGETS SMALL FARMERS AND CONSUMERS

USDA has sponsored a new Web site (click here) to create new economic opportunities for small farmers by better connecting consumers with local producers. The idea of the site is to start a national conversation about the importance of understanding where food comes from and where it goes. The site is using resources from across the entire USDA to help create the link between local production and local consumption. The site provides resources for strengthening rural communities, supporting local farmers, promoting healthy eating, protecting natural resources, and grants, loans, and support for small farmers.

MOSQUITOES' ATTRACTION TO HUMANS DISCOVERED

UC-Davis entomologists have discovered the dominant odor naturally produced in humans that attracts the mosquito species that carries West Nile virus. After testing hundreds of naturally occurring compounds emitted by people and birds, they discovered that the primary chemical mosquitoes are sensing is called nonanol. Mosquitoes can detect it in very low concentrations, directing them to a blood meal. Carbon dioxide is also a known attractant, but the combination of nonanol and carbon dioxide increases attraction by more than 50 percent.

SUCCESSFUL BIOLOGICAL CONTROL OF SPIDER MITES

Penn State Fruit Research and Extension have studied the use of the ladybug, *Stethorus punctum,* and a predatory mite, *Typhlodromus pyri,* to control European red mite and two-spotted spider mite. They found that the predatory mite roams around, finding prey by accident, whereas the lady bug is attracted to specific visual and chemical cues. Spider mite feeding causes leaves to turn yellow and emit a volatile chemical, both of which are irresistible to the lady bug. But due to certain pesticides used in the PA test orchards, the lady beetles are killed. As a result, the predatory mites have been found to be the most successful predator.

Featured Picture of the Quarter

California prionus beetle is a large root boring beetle that attacks many deciduous trees and shrubs. Prionus has been a problem on cherry and peach trees growing in sandy soils in northern Utah. Entomologist Diane Alston is researching different monitoring techniques using lures and traps to get a better understanding of the beetle flight period and the potential for mass-trapping and mating disruption.

-Utah Pests archive image

Calendar of IPM-Related Events

January 19 - 21, Utah State Horticultural Association Annual Convention, Provo, UT, www.utahhort.org

January 25 - 27, Utah Green Conference, Salt Lake City, UT, www.utahgreen.org

February 25 - 27, Annual Pest Management Conference, Society of American Florists, Orlando, FL, www.safnow.org/

February 21 - 24, Annual Pesticide Stewardship Conference, Savannah, Georgia, tpsalliance.org/conference/introduction.htm

March 25, Pesticides in Urban Settings and Aggregate Human Exposures Symposium, San Francisco, CA, northeastipm.org

March 12, "Issues of Concern," Workshop on Competition and Regulatory Issues in the Agriculture Industry, co-sponsored by the US Department of Justice and USDA, www.justice.gov/atr/public/press_releases/2009/251937

January 13-15, Western Orchard Pest and Disease Management Conference, Portland, OR, entomology.tfrec.wsu.edu/wopdmc

January 31 - February 3, Association of Applied IPM Ecologists Annual Conference, Modesto, CA, www.aaie.net/conference

February 7 - 11, Joint Annual Meeting of the Society for Range Management and the Weed Science Society of America, Denver, CO, www.rangelands.org/denver2010

April 5 - 8, Annual Western Forest Insect Work Conference, Flagstaff, AZ, www.fsl.orst.edu/wfiwc

April 11 - 14, Pacific Branch Entomological Society Annual Meeting, Boise, ID, entsoc.org

UTAH PESTS people and programs are supported by:

UtahStateUniversity COOPERATIVE EXTENSION

NPDN National Plant Diagnostic Network

WPDN Western Plant Diagnostic Network

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