UTAH PESTS News

Utah Plant Pest Diagnostic Laboratory and USU Extension Vol.VI, Summer 2012

Grasshopper Alert

Watch out for young grasshoppers jumping around your landscape, garden, and crop fields. Large numbers of immature grasshoppers have been spotted in some locations in Utah this spring. The best time to control grasshoppers is when they are young, before they have wings and can fly away from insecticide treatments. For best results, organize your neighborhood or local farming/ranching community to work together to treat larger tracts of land. Treating as wide an area as possible is a key to success.

Top: Differential grasshopper nymph.

Bottom: Grasshopper feeding injury.

In the late summer and fall, adult female grasshoppers lay their eggs in pods in undisturbed soil. Open fields, roadsides, weedy areas, rangelands, and boundaries between open space and residential lots are common grasshopper egg-laying sites. The eggs hatch the following spring and the immature grasshoppers, called nymphs, crawl and hop to find green plants to eat. As temperatures warm, soil moisture declines, and unmanaged plants dry down; grasshopper nymphs move into home yards and gardens, and agricultural fields to seek green forage. The best time to treat is in the early summer as nymphs move from open to cultivated land, and before the nymphs develop into winged adults (click here to see diagrams on distinguishing grasshopper nymphal stages).

There are three main insecticide formulations, or types, to treat grasshoppers: baits, dusts, and sprays. Baits are a mixture of an attractive food source, such as wheat bran, plus an insecticide. Common baits contain carbaryl, a carbamate insecticide, or spores of *Nosema locustae*, a natural grasshopper pathogen. Spread the bait evenly throughout the habitat. They must be reapplied approximately weekly, and immediately after wetting events, such as rain or irrigation. Baits are selective in that they only kill grasshoppers and other foraging insects (*N. locustae* will only kill grasshoppers). The primary dust product available contains carbaryl. Dusts have short residuals, and must be reapplied approximately weekly and after wetting events. Both baits and dusts are easy to apply, but moderately expensive. There are numerous insecticide sprays with efficacy

continued on next page

What's Inside

News Highlights

NEW *UTAH PESTS* **FACT SHEETS**

The following can be found on our website:

Beneficials: Predatory Mites

Pink Root of Onion

Spiders

www.utahpests.usu.edu

UTAH PESTS Staff

Diane Alston
Entomologist
diane.alston@usu.edu
435-797-2516

Ryan Davis
Arthropod Diagnostician
ryan.davis@usu.edu
435-797-2435

Marion Murray
IPM Project Leader
Editor, Utah Pests News
marion.murray@usu.edu
435-797-0776

Claudia Nischwitz
Plant Pathologist
claudia.nischwitz@usu.edu
435-797-7569

Ricardo Ramirez
Entomologist
ricardo.ramirez@usu.edu
435-797-8088

Cory Stanley
USU CAPS Coordinator
cory.stanley@usu.edu
801-388-5433

Utah Plant Pest Diagnostic Lab
BNR Room 203
Utah State University
5305 Old Main Hill
Logan, UT 84322

UTAH PESTS News
is published quarterly.

To subscribe, click here.

utahpests.usu.edu

UtahState University COOPERATIVE EXTENSION

Tomato Diseases, continued from previous page

against grasshoppers, including malathion, carbaryl, permethrin, and bifenthrin. An insect growth regulator, diflubenzuron (Dimilin), is available for commercial-scale applications. Sprays are less expensive than baits and dusts, but require a sprayer suitable to the situation and scale of the application. Sprays will kill on contact, or when grasshoppers eat the treated foliage. Check all product labels for allowed application sites. For example, some insecticides can be applied to ornamentals, but not to edible plants.

For urban sites, apply insecticides along the borders of residential properties, and for a distance into the open and irrigated lands on either side of the border. There isn't a threshold established for urban lands, but USDA recommends that treatments begin when nine or more grasshoppers are found per square yard on rangelands. A threshold for cultivated lands, including urban and agricultural would likely be lower. If possible, apply a border treatment to all contiguous properties along their interface with open lands. Join together with neighbors to increase the size of the area that is treated for best results. Another option for sensitive edible plants, such as vegetables and herbs, is to cover them with floating row cover to exclude grasshopper feeding. Covers on vegetables that require insect pollination, such as squash, must be opened during the morning hours when pollinators are most active to ensure good fruit set.

For grasshopper-infested agricultural lands and private rangelands, the Utah Department of Agriculture and Food (UDAF) and USDA Animal and Plant Health Inspection Service have sponsored a cost-share program in past years. Clint Burfitt, UDAF Entomologist, is the contact for information on grasshopper and Mormon cricket surveys and control program.

For more information on community-wide grasshopper control, check out the USU Extension fact sheet.

-Diane Alston, Entomologist

Don't Spittle on Me

Spittlebugs, also called froghoppers, have been numerous the last several years. Probably everyone has seen one, but may not have known it. Spittlebugs form masses of sticky, frothy bubbles on leaf nodes (points where leaves join the stem). The blob of foam may have tricked you into thinking that someone spit onto the plant (maybe you blamed your kids for spitting into the flower beds or shrubbery?). The immature insect lives inside its spittle mass. Wipe away the foam to see the small (1/4 inch) frog-looking insect inside. The spittle provides protection from predators, desiccation, and temperature extremes. When they molt into an adult, they depart their protective spittle blob.

Juniper, arborvitae, pine, clover, strawberry, weeds, and many herbaceous plants are common hosts for spittlebugs.

Economic harm to the plants is uncommon. The best treatment is to apply a stiff spray of water from your hose to wash away the spittle and leave the bug to dry out or become prey for a hungry predator.

For additional information on spittlebugs and their control, read fact sheets by the University of Wisconsin and North Carolina State University.

-Diane Alston, Entomologist

Getting Chemicals Into Trees Without Spraying
Part 2: Soil Injection/Drenching and Trunk Basal Spray

By Dr. Michael Kuhns, Extension Forestry Specialist, Wildland Resources Department, Utah State University Cooperative Extension, Logan. Kuhns maintains a very informative website at forestry.usu.edu.

Chemicals are applied to trees to repel or kill damaging insects, to treat or prevent fungal diseases, to give nutrients, and to kill sprouts, stumps, or even entire trees with herbicides. Spraying is the most typical way to apply these chemicals, but it sometimes isn't appropriate. Chemicals can sometimes be placed inside trees or gotten inside easily, which is what we'll cover here. In the last article we covered trunk implantation and trunk injection. In this article we will cover soil injection/drenching and trunk basal sprays. We also will present a recap of all of the methods and give some guidelines for which option to choose.

SOIL INJECTION/DRENCH

Soil injection or drench methods involve placing chemicals in liquid form in the soil near the roots. As with the other methods, the chemicals must be water soluble. Chemicals should be applied to moist but not saturated soil. Chemical application timing varies depending on the chemical and the pest. This is used for application of imidacloprid, dinotefuran (Safari), and some growth regulators. The high pressure equipment needed for soil injection is expensive.

Soil injection methods typically involve injecting chemicals 2 to 4 inches deep with a high pressure injector either within 18 inches of the trunk or on a grid. The amount to be applied depends on trunk diameter, with additional trunk diameters added if multiple trees are being treated in an area. Soil injection of dinotefuran has been used in Utah recently for control of black pineleaf scale, and it has been quite effective.

With the soil drench method, you simply pour chemical mixed in water on the soil near the tree's root crown. Mulch or other surface organic matter is pulled back and the chemical is poured directly on mineral soil. The mulch is then replaced. The amount of chemical used is based on inches of trunk diameter and will be stated on the label. Chemicals used would be similar to the soil injection method.

With soil injection and drench methods the trees are not wounded but presumably somewhat higher amounts of chemicals must be used than with trunk injection (though maybe less than with spraying). Also, there is a higher possibility for affecting non-target insects. The soil drench method uses almost no tools. Uptake may be slower than with trunk injection, and it is critical that the chemical be water soluble.

TRUNK BASAL SPRAY

Trunk basal sprays involve spraying, but the chemical is applied to the trunk base and is absorbed through the bark and then taken up in the vascular system. The chemical is sprayed on the lower five feet of a dry trunk, saturating the bark.

Soil injection system involves injecting chemicals 2 to 4 inches deep.

Trunk basal sprays saturate the lower 5 feet of the trunk.

continued on page 5

Grower Profile: Merv Weeks, Weeks Berries of Paradise

Mervin Weeks, a Vernal, Utah native who has been farming in Paradise, Utah for 40 years, is known for his innovative farming practices, a result of his upbringing and school experiences. He earned a B.S. in Horticulture from BYU, where he helped evaluate the Hertitage raspberry, and an M.S. in Plant Science from USU. He then worked under Lamar Anderson, USU Professor Emeritus, until 1987, when he found he needed to spend full time on his expanding family farm.

Paradise is located in northern Utah, tucked away in the southern edge of Cache Valley. "It lives up to its name with the ideal climate, soil, and elevation (5,000 ft) for growing the best tasting berries," says Weeks. The 110 acres he farms there were acquired piecemeal, from land purchases made starting in 1978. His largest acquisition of land was a parcel purchased from his friend, the late USU horticulture professor, Alvin Hamson, who developed the Hamson tomato.

Weeks takes a spirited approach to everything he does, and is a pioneer in farming and marketing. When he started farming back in the late 1970s, he sold produce from portable fruit stand trucks that traveled all over Utah, and even into Montana and Wyoming. "It was how we survived in the lean years." Today, Weeks Berries sells fruit in permanent fruit stands, farmer's markets, grocery stores, and specialty sales. A winery in Layton, who buys currants from the farm, received an international award for their black currant wine. A portion of the farm's produce is processed on site into value-added goods. Merv says, "the most popular product is our freezer jam which is in over 100 stores." Other items include currant and raspberry juices and gourmet jams and syrups.

When Weeks set out to develop his farm, he chose to plant a diversity of fruits, and dozens of varieties of each. The farm is most known for their raspberries, comprised of 20 varieties. "Canby is a variety that some specialists scoff at, but it's a customer favorite for its sweetness. We also like Heritage for berries that travel easily, and Royalty for the jam. Cascade Delight is an interesting variety out of Washington and Oregon that we are looking at." Weeks Berries also operates one of the largest currant farms in the nation (red, black, and white currants), and grows gooseberries, blackberries, grapes, elderberries, strawberries, and blueberries.

Merv Weeks of Weeks Berries of Paradise has planted 26 acres of new raspberries (***top***) and propagates new plants on-site (***bottom***).

Blueberries in Utah? Everyone knows that they are nearly impossible to grow in alkaline soils, but that didn't stop the inventive Weeks, who in 2005, grew the first commercial crop in the state. The blueberries get special pampering of about a dozen practices to keep them thriving, including trellises and raised beds, wood chips and bark mulch, sulfur applications, netting to keep the birds out, and winter protection. In spite of that, Weeks wants to increase the crop. "In a good year, we harvest 500-700 cases of blueberries, with Duke being especially productive and tasty. My sons ask me why we bother with them, but managing them is a learning curve, and I tell them that some year we'll reach 2,000 cases and it will all be worth it."

continued on next page

Getting Chemicals Into Trees, continued from page 3

Chemical uptake occurs through bark. The method is fast, equipment is simple and fairly cheap, there is little chance for spray drift, and no holes are required. Dinotefuran (Safari) can be applied with this method for control of black pineleaf scale and other pests. Imidacloprid also has been applied experimentally with this method, but it currently is not labeled for such use. Check the label for allowable uses for your state before you purchase or apply a chemical. Labels frequently change, so check each time you use a chemical.

WHICH IS BEST?

Deciding which of these chemical application methods is best depends on your circumstances, the tree's circumstances, and the target pest or nutrient used. Methods that do not harm the tree, especially if they are done repeatedly, should be chosen first. Simplicity and low cost also are important. Trunk basal spray and soil drench meet these criteria, as does soil injection if the equipment is readily available.

Injection without a drilled hole (i.e. ArborSystems Wedgle Direct-Inject system) seems attractive at first glance, but equipment is expensive and, more importantly, the bubbles formed during the injection can cause significant wounding. Therefore, these systems should be used with caution. If non-injected methods are available, they should get priority. Repeated injection treatments (e.g. yearly) should be avoided.

Injection and implantation are most useful where soil access is limited or extensive root damage may have occurred. Even then, a trunk basal spray would likely work, assuming the product is labeled for the pest and for that type of application.

CAUTION

Use of trade names and specific product examples is not meant to imply endorsement of certain products. Always read pesticide labels and follow directions.

For a complete fact sheet on this topic go to forestry.usu.edu/htm/publications/utah-forest-facts and click on fact sheet #20.

Weeks Berries of Paradise, continued from previous page

Recently Weeks has begun looking at tree fruit varieties that are optimal for his high elevation area. He planted 20 varieties of pears, 45 varieties of plums, 20 varieties of apricots, and 50 varieties of peaches and nectarines. "Gloria is a very hardy peach out of New Jersey that we are looking at, and we also grow PF24 and several Stella series varieties." Not satisfied with just fruits, Weeks recently installed a vented hoop house with 52 anchors in which to produce vegetables. This year he has 350 tomato (including Hamson) and 200 pepper plants thriving.

The isolation of the farm and ideal growing conditions mean that the farm's berries can be grown pesticide free. "Raspberry horntail is one of our most serious pests, and we manage it by hand pruning to remove the larvae in the canes." Birds, such as robins and starlings, are also a significant threat to yields. The farm uses cannons and other scaring devices, and netting on important crops like the blueberries. "The cadillac of bird control would be a falconer," Merv says, but as an alternative, he wants to explore ways to attract raptors to scare off the smaller birds. He has already had success with owl boxes for rodent control.

The forward-thinking Merv is always ready to try new ideas and often collaborates with others on research projects. In 2009, he discovered that some of his currants were being attacked by currant borer, a nasty pest that causes heavy dieback and loss of yield. He contacted USU, and agreed to use his farm to trial a potential new mating disruption product. Other collaborative projects on his farm have included plant breeding and variety trials.

As with many farms in Utah, Weeks Berries is a family affair. Although the farm can employ as many as 100 workers in the height of picking season, Merv's wife and kids help keep the farm running day to day. His son Jarrod manages the processing and marketing, Joe is his right hand man in the field, Jess runs the fruit stands, his daughter sells in the Logan farmer's market, and his son, Jake, owns Jake's Place, in Bear Lake, "making the best shakes around, from our berries, of course." His wife, Clara Jean, has been "the cornerstone of the business since day one. She was instrumental in getting the fruit out to markets, and now, is tireless in doing the driving on long marketing, delivery, or consulting trips."

Weeks Berries of Paradise is located at 8650 South 800 East and their produce is sold at farm stands in Wellsville, Hyde Park, Park City, Salt Lake City, and West Point. Their jams, syrups, and juices can be found in many grocery and specialty stores in the West. For more information, visit their website at www.weeksberries.com.

-Marion Murray, IPM Project Leader

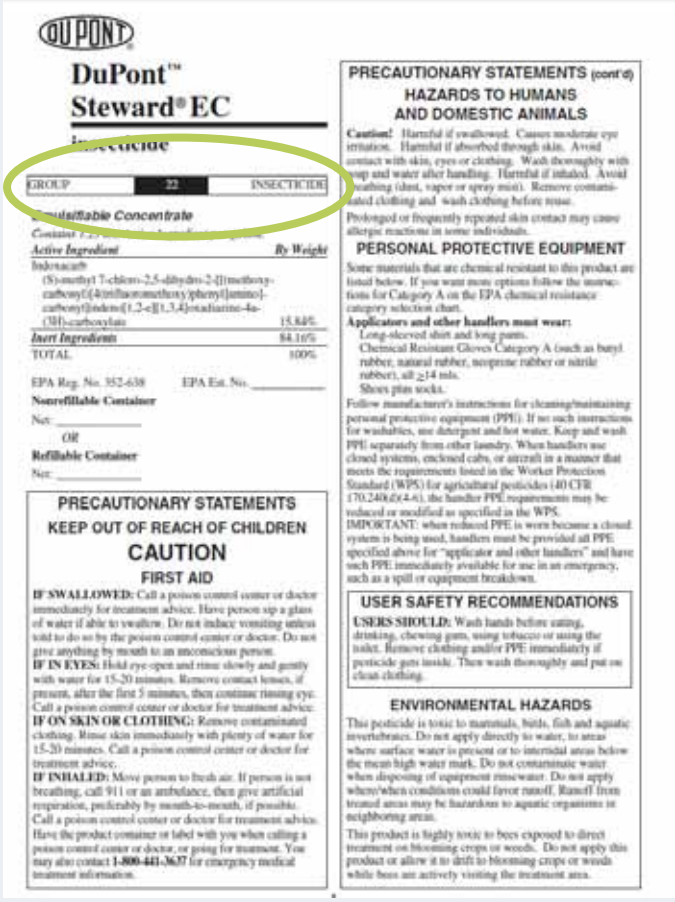
Indoxacarb Helps Growers Escape Alfalfa Weevil But...

The warm spring gave alfalfa plants a head start in growth this season allowing growers to consider multiple options for weevil management. By the time alfalfa weevil larvae reached their threshold, alfalfa plants were within the harvest window. Some growers opted to harvest without an insecticide treatment since plants were able to withstand weevil feeding. In some cases, larval abundance was high and green-up after harvest was slow so insecticides were applied.

Growers have been searching for a replacement for the once available Furadan. Chemical management of alfalfa weevil has been limited to a few modes of action, organophosphates (group 1B) and pyrethroids (group 3), for which multiple products are available. Unfortunately, weevil suppression has come with mixed results using these products. This season several growers tried their hand at using indoxacarb (Steward) with a different mode of action for weevil management. Indoxacarb is categorized as a group 22 insecticide that works by blocking the sodium channel in the nerve axon and inhibiting a nerve impulse. A number of growers reported this product was successful for weevil management this season and it appears to be a product that may provide relief for growers battling weevil larvae every season.

One concern with indoxacarb's success in Utah alfalfa is the impulse of many to rush to switch to one product and its eventual widespread use that could lead to problems with insect resistance over time. It is imperative that resistance management strategies be implemented early on to maintain and extend the life of such a successful tool. Monitoring weevil larvae and utilizing their thresholds to make a decision whether insecticide treatment is needed is the first step. This season, even though weevil threshold may have been reached just before anticipated harvest, an early cutting was used in some instances and is recommended as an alternative to chemicals. Rotating among different chemicals with different modes of action can aid in slowing down insect resistance to chemicals when insecticides are chosen as the primary strategy for weevil management.

Product names and active ingredients may be different but they may share a similar mode of action. The Insecticide Resistance Action Committee (IRAC) has developed the classification of chemicals with different modes of action into different group numbers (click here for the pdf). Chemical companies have made it easier to determine whether products have a similar mode of action by providing these group numbers on the label. Not all companies have followed suit in providing this information on the label so a search for the mode of action for the active ingredient will be required. When using a chemical rotation, switching group numbers with successive applications is key. Alfalfa growers in Utah are able to rotate among groups 1, 3, and 22 for weevil management. Be aware that combination products containing two active ingredients with different modes of action are available but can limit options for chemical rotation.



DUPONT

DuPont™
Steward® EC

GROUP 22 INSECTICIDE

Active Ingredient — By Weight
Indoxacarb ... 15.84%
Inert Ingredients ... 84.16%
TOTAL ... 100%

EPA Reg. No. 352-638 EPA Est. No. ____
Nonrefillable Container
Net: ____
OR
Refillable Container
Net: ____

PRECAUTIONARY STATEMENTS
KEEP OUT OF REACH OF CHILDREN
CAUTION
FIRST AID

IF SWALLOWED: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or doctor. Do not give anything by mouth to an unconscious person.
IF IN EYES: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.
IF ON SKIN OR CLOTHING: Remove contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.
IF INHALED: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. Call a poison control center or doctor for treatment advice. Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-441-3637 for emergency medical treatment information.

PRECAUTIONARY STATEMENTS (cont'd)
HAZARDS TO HUMANS AND DOMESTIC ANIMALS

Caution! Harmful if swallowed. Causes moderate eye irritation. Harmful if absorbed through skin. Avoid contact with skin, eyes or clothing. Wash thoroughly with soap and water after handling. Harmful if inhaled. Avoid breathing (dust, vapor or spray mist). Remove contaminated clothing and wash clothing before reuse.

Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.

PERSONAL PROTECTIVE EQUIPMENT

Some materials that are chemical resistant to this product are listed below. If you want more options follow the instructions for Category A on the EPA chemical resistance category selection chart.

Applicators and other handlers must wear:
Long-sleeved shirt and long pants.
Chemical Resistant Gloves Category A (such as butyl rubber, natural rubber, neoprene rubber or nitrile rubber), all ≥14 mils.
Shoes plus socks.

Follow manufacturer's instructions for cleaning/maintaining personal protective equipment (PPE). If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry. When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides (40 CFR 170.240(d)(4-6)), the handler PPE requirements may be reduced or modified as specified in the WPS.
IMPORTANT: when reduced PPE is worn because a closed system is being used, handlers must be provided all PPE specified above for "applicator and other handlers" and have such PPE immediately available for use in an emergency, such as a spill or equipment breakdown.

USER SAFETY RECOMMENDATIONS

USERS SHOULD: Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet. Remove clothing and/or PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

ENVIRONMENTAL HAZARDS

This pesticide is toxic to mammals, birds, fish and aquatic invertebrates. Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment rinsewater. Do not apply where/when conditions could favor runoff. Runoff from treated areas may be hazardous to aquatic organisms in neighboring areas.

This product is highly toxic to bees exposed to direct treatment or blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops or weeds while bees are actively visiting the treatment area.

This pesticide label for Steward (indoxacarb) shows the mode of action (MOA) group number, which can be found on labels of many newer products. Different active ingredients can share a similar MOA.

-Ricardo Ramirez, Extension Entomologist

Springtail into Summer

Every year, as spring moisture and cool temperatures fade into hot, dry days, springtails become a nuisance problem for many people. Around the world springtails are one of the most numerous organisms inhabiting soil where they help break down organic matter and fungi. Previous studies show that there can be between 40,000 and 200,000 springtails in one square meter of soil in temperate grasslands and woodlands. In the spring, cool, wet weather allows populations of springtails to surge in the soil. Once temperatures rise and the rain subsides, the soil dries out, forcing large numbers of springtails to find a cool, moist environment or suffer the consequences. Unfortunately, springtails sometimes enter homes and gather in large numbers in moist areas such as the kitchen or bathroom where faulty plumbing can provide moisture for them.

Springtails are very small, only a few millimeters in length or smaller. They usually go unnoticed until they invade homes; however, close examination of soil, leaf litter, and other organic material will demonstrate their abundance. Most springtails do not have the typical breathing system (branched tubes for oxygen diffusion) that insects have, but instead exchange oxygen directly through their cuticle, making them highly susceptible to desiccation. In addition to being wingless, diagnostic features include the "furca" and "collophore." The furca is the springing organ from which this organism's name is derived. It is housed near the end of the ventral ("stomach") side and is held in place by a catch located on the abdomen. When threatened, the furca is released and the springtail flings away, seemingly disappearing from sight. This can most commonly be seen with the springtails known as snow fleas, which can be observed frequently when hiking on snow fields in the spring. On the first abdominal segment springtails have a tube (collophore) extending down that extrudes a sticky substance that helps them stick to surfaces and can also aid in water uptake. Due to their small size, a hand lens, or more appropriately a microscope, is needed to see the features described above.

Springtails that invade homes usually decline in numbers within a few days to a week. They are resistant to many insecticides so spraying is not recommended. Inside the home, areas with excess moisture should be dried out and the source of moisture (leaky pipes, sinks, etc.) should be repaired. Because residual debris or organic material can harbor springtails, cracks and crevices along interior walls/baseboards near problem areas should be thoroughly cleaned. Large aggregations of springtails can be vacuumed and the bag discarded. Use caulk to seal cracks and crevices where springtails may enter.

Some people believe that some springtails are parasites, causing biting and scratching sensations of the skin, citing a 1994 study. Conclusions from the study's publication implicating microscopic springtails parasitizing human skin have since been proven false. Springtails are only a nuisance pest and can be dealt with using tolerance and the simple techniques listed above.

Springtails are tiny insect-like creatures, usually only a few millimeters in length or smaller (shown at 50x magnification).

Top: Two springtails showing dorsal and lateral surfaces. The furca, or springing device, can be readily seen protruding from the end of the bottom springtail's abdomen. When living, the furca is held under the body and not easily observed.

Bottom: Ventral side of a springtail showing the collophore located just behind the last pair of legs.

-Ryan Davis, Arthropod Diagnostician

New Honey Bee Resources

New local resources are available both to those who want to keep honey bees and to those that want to get rid of them. A new beekeeping supply store, Deseret Hive Supply, has opened at 1518 Washington Boulevard in Ogden. Calling ahead is recommended (801-866-3245), because their business hours are limited. Weber County also has a new beekeeping club, the Weber Beekeepers Association, which meet at the main Ogden Library. More information about this club can be found at weberbeekeepersassociation.com. USU Extension is planning several beekeeping classes and pollinator education workshops in the coming months. The schedule for these is regularly updated on bees.usu.edu. You can also find information on the Utah Bees Facebook page (www.facebook.com/pages/Utah-Bees/392063520806415). Lastly, there is a new website to help homeowners across the Wasatch Front that are the unwilling hosts to swarming honey bees: www.utahswarmremoval.com.

ALL ABOUT BEES

a workshop for anyone who wants to learn about our most important pollinators

Wednesday, August 22, 2012, 2-6 pm
Kaysville Education Center
80 East Sego Lily Drive

You will learn about:

- Bees, their biology, and their social systems - Not all of them live in hives and make honey!
- Pollinator conservation - Your landscape really matters!
- How to get started with honey beekeeping - It's easier than you think!

Pre-registration is required. Register at **allaboutbees.eventbrite.com**.
Admission fee is $10. Refreshments will be served.
For more information contact Cory Stanley at cory.stanley@usu.edu or 801-388-5433.

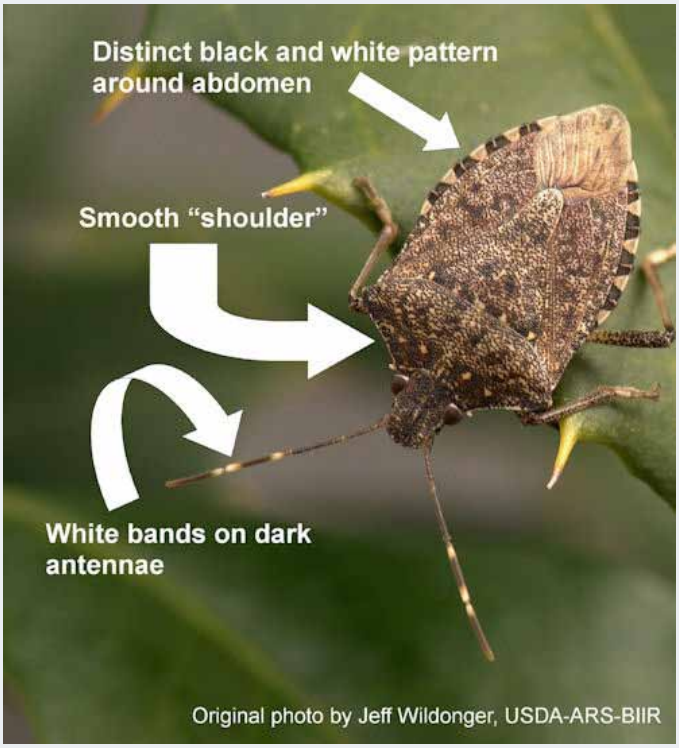
The Search for Brown Marmorated Stink Bug in Utah

The first U.S. detection of the brown marmorated stink bug (BMSB), *Halyomorpha halys,* which is native to Asia, occurred in the 1990's in Allentown, PA. Since its introduction, it has spread quickly, having been reported in 33 states thus far and recently causing severe damage in some states. Unlike many agricultural pests, BMSB is a year-round problem. During the late spring and summer, it feeds on a large variety of plants, including many that are grown in Utah, such as cherry, apple, pear, peach, apricot, grape, raspberry, and many ornamentals. It can cause severe damage as it feeds on fruits and leaves, resulting in necrotic tissue and cat-facing injury. In the fall, BMSB migrates indoors where it aggregates, becoming a nuisance pest and emitting a foul odor when disturbed or destroyed. More information can be found in the Utah Pests BMSB fact sheet and on the new Oregon State University BMSB website.

Until recently, BMSB was typically detected as a result of the damage it caused, and surveys were limited to visual methods. In 2011, a BMSB lure became available, making survey methods much more efficient. This lure and funding from a Specialty Crops Block Grant are enabling a survey of 30 orchard and community garden sites, in conjunction with CAPS and Farm Bill invasive pest surveys that are also being completed this summer. Given the rapidly expanding range of this pest, it will soon be in Utah, if it is not already here. Early detection is crucial for effective management with minimal impact to Utah's agricultural industries. Please contact your county Extension office or Cory Stanley (cory.stanley@usu.edu) if you see this pest.

By Cory Stanley, USU CAPS Coordinator

The Cooperative Agricultural Pest Survey is a federal program, administered jointly by USDA-APHIS-PPQ and each state, whose purpose is early detection of invasive species that could threaten U.S. agriculture. In Utah, the program is co-coordinated by Cory Stanley (USU) and Clint Burfitt (UDAF).



Top: Identifying features of adult brown marmorated stink bug.

Bottom: Three different stages of nymphs on an egg mass.

Root-Knot Nematodes on Vegetables and Ornamentals

Root-knot nematodes cause galls on tubers and roots, leading to stunted, wilted plants that are often off-color. Due to the wide host range, managing root-knot nematodes means taking the field temporarily out of production, and tilling it periodically until populations are reduced.

Root-knot nematodes (*Meloidogyne* sp.) are microscopic roundworms that live in the soil and infect plant roots. There are more than 70 species described that occur around the world. Some species infect hundreds of different crops and weeds which makes it very difficult to manage them. The northern root-knot nematode (*Meloidogyne hapla*) is most common in Utah, along with a few other species that feed on vegetables and ornamentals.

Root-knot nematodes pass through four juvenile life stages before they become adults. The female second stage juvenile penetrates the root at the tip and moves up the root until it finds a suitable feeding site. There it establishes itself permanently, goes through the other two juvenile stages, and then changes its shape from worm-like to lemon-like. When the nematodes become obese they frequently break through the root and deposit egg masses into the soil. One female root-knot nematode can produce several hundred eggs during her lifetime.

Male nematodes are not needed for reproduction in most root-knot, or *Meloidogyne,* species. The presence of male nematodes in the soil is a sign that the nematodes have been present in the field for a while. Not all *Meloidogyne* species have males, and their occurrence can depend on environmental conditions.

Above-ground symptoms of infection with root-knot nematodes often resemble symptoms of nutrient deficiency. Plants are yellow, small, stunted and wilt easily. Roots of affected plants often have galls. The galls, which contain the female nematodes, form due to hormones released by the females. The plants will transport more nutrients to the galls, providing more nutrition to the nematode. On root crops like carrots, the nematodes can cause forking and galls on the carrot.

If nematodes have been diagnosed in your field, management practices should be diligent due to the wide host range. Keeping the area fallow and weed-free and periodically roto-tilling it during the summer can help reduce the nematode populations over time to a level that allows vegetable or ornamental production. In a few years, however, nematode populations may build up again to a level where they cause significant damage. Samples with symptoms of root-knot nematodes can be sent to Claudia Nischwitz at the Utah Plant Pest Diagnostic Lab for confirmation.

-Claudia Nischwitz, Extension Plant Pathologist

In the National News

PLANT GROWTH AFFECTED BY PRIOR PLANTS IN SAME SOIL

Not long ago, it was discovered that root-feeding insects cause plants to release volatiles in the air, which leaf-feeding insects cue in on to avoid the plant. Recently, Netherlands Institute of Ecology scientists found that ragwort plants grown in soil previously containing insect-fed plants will also release those same volatiles. The changes in the new plant reflected whether the old plant was fed on by root- or leaf-feeding insects, thus repelling both those insect types. The soil fungal community was found to relegate these changes.

VARROA MITES ALTER BEE-INFECTING VIRUS

Research conducted in Hawaii by scientists from the University of Sheffield, the Marine Biological Association, the Food and Environment Research Agency and the University of Hawaii, and reported in *Science Magazine*, found that the newly introduced varroa mites to Hawaiian hives increased the prevalence of deformed wing virus (DWV) in Hawaii bee colonies from 10% to 100%. As a result, the number of viral particles increased by a million fold and the number of viral strains was reduced, leading to the predominance of a single virulent strain. Deformed wing virus is naturally transmitted in bees through feeding or sex but the mites change the disease so it becomes more deadly, shortening the bees' lifespan. The authors conclude that the worldwide spread of varroa mites has led to the selection of DWV strains that are widely distributed and highly contagious.

BED BUGS SURVIVE OTC FOGGERS

Scientific evidence by Oregon State University entomologists conclusively shows that over-the-counter foggers are ineffective against bed bugs. The researchers found that three different commonly found brands had no effects on 5 different bed bug populations. The insects survive the applications due to resistance, and their habit of residing in protected locations.

HISTORIC PRESENCE OF PLANT DISEASE CAN AFFECT ITS STRENGTH

The virulence of a plant pathogen is sometimes related to the host plant from which it was transmitted, according to NSF and NIH funded research out of University of California and USDA Agriculture Research Service, published in the journal *PLoS ONE*. The authors showed, for the first time, the genetic process by which pathogens' environmental history can change their behavior. One disease they studied was sudden oak death, caused by *Phytophthora ramorum*. They examined identical strains of the pathogen from different plant hosts and found that they were strikingly different in their virulence and their ability to proliferate. The results of this study may provide scientists with future approaches to control a disease, such as manipulating gene expression to artificially reduce the aggressiveness of plant pathogens.

ASSESSMENT OF CLIMATE CHANGE AND FOREST DISEASES

The USDA Forest Service's Pacific Southwest Research Station conducted a review of the impact of climate change on forest diseases in the Western U.S. and Canada. They considered eight pathogens and two climate change scenarios (warmer and drier and warmer and wetter), and assigned a high, moderate, or low risk value for each pathogen and each scenario. Diseases that could become more prevalent in hot, dry conditions are armillaria root rot, cytospora canker, yellow-cedar decline, and dwarf mistletoes. The warm and wet scenario favors *Phytophthora* diseases such as sudden oak death. The full report, "A Risk Assessment of Climate Change and the Impact of Forest Diseases on Forest Ecosystems in the Western United States and Canada," is available here.

"MEDICINAL PLANTS" USED BY SICK BEES

North Carolina State University entomologists found that when honey bees that are infected with a harmful fungus, worker bees will increase the amount of plant resins they bring to the hive. Honey bees typically collect propolis (a mixture of plant resin and wax) to line their hives for protection. But the presence of a pathogenic fungus resulted in a 45% increase in the amount of propolis collected. They also found that bees were able to discern pathogenic fungi from harmless fungi, since colonies did not bring in increased amounts of propolis when exposed to harmless fungal species. Oddly, the presence of pathogenic bacteria did not affect the bees' propolis collection. This new knowledge will help beekeepers to understand the reasoning for the collection of propolis. This paper was published in *PLoS ONE*.

HOW IMIDACLOPRID CAN AFFECT HONEY BEES

University of California at San Diego (UCSD) entomologists found various ways that imidacloprid affects honey bees (*Journal of Experimental Biology*). They exposed bees to the insecticide in an amount equivalent to that found in nectar from a treated plant, and then observed feeding preferences, and communication with other bees. They found that the exposed bees preferred to feed on sweeter nectar and refused less sweet nectars, as compared to the untreated bees. In addition, the treated bees recruited nest mates ("waggle dance") to good food less often than the untreated bees. These changes may lead to a reduction in resources brought back to the colony due to the preference for sweetness and lack of communication.

Featured Picture

A honey bee colony may collect up to 125 pounds of pollen in one year. When pollen is scarce, such as in early spring, bees have been known to collect other materials that look like pollen, like sawdust, rotted wood, coal dust, or fine soil. This bee was seen collecting fine coffee grounds from a compost pile in early March. The bee has packed the coffee into her corbiculae (pollen baskets) on her hind legs to carry back to the hive.

Pollen is the source of protein and lipids, minerals, and vitamins for bees. Some beekeepers provide artificial materials when pollen is in short supply.

-Image by Jim Cane, USDA Agriculture Research Service, "Logan Bee Lab"

Calendar of Events

July 23-29, National Moth Week

Jul 31-Aug 3, American Society for Horticultural Science 2012, Miami, Florida

Aug 4-8, American Phytopathological Society Annual Meeting, Providence, Rhode Island

Aug 5-8, 83rd Rocky Mountain Conference of Entomologists, Woodland Park, CO

Aug 5-10, 97th Ecological Society of America Annual Meeting, Portland, OR

Aug 22, All About Bees Workshop, Kaysville Education Center, Kaysville, Utah

Sept. 11-14, ForestSAT 2012: Invasive Pests and Biodiversity, Corvallis, OR

UTAH PESTS people and programs are supported by:

UtahStateUniversity COOPERATIVE EXTENSION

NPDN National Plant Diagnostic Network

WPDN Western Plant Diagnostic Network

APHIS

NIFA

UDAF Utah Department of Agriculture and Food