UTAH PESTS News

Utah Plant Pest Diagnostic Laboratory and USU Extension Vol.V, Fall 2011

What's Inside

News Highlights

NEW *UTAH PESTS* **FACT SHEETS**

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Beneficial True Bugs: Damsel Bugs

The Economic Injury Level Concept

European Earwig

General Concepts of Biological Control

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Walnut Thousand Cankers

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Trick, or Treat? Spooky Fall Spider Activity

Fall is the season for spider encounters in Utah. Many spiders are nearing the end of their life, searching for mates and laying eggs, habits which usually increase the chance of human-spider interactions. Below is a description of the spiders commonly encountered in Utah during the fall months.

Adult female hobo spiders are laying egg sacs now (top), and they will hatch next spring from mid-May to mid-June. Adult female wolf spiders carry spiderlings on their backs (bottom).

HOBO SPIDER

By far, the spider most commonly seen in fall is the hobo. Populations are large in northern Utah, and when male spiders leave their webs in search of mates they often find their way indoors. Much has been written on the subject of hobo spiders, and the UPPDL recently created a comprehensive website that addresses most hobo questions.

WOLF SPIDER

Wolf spiders are ground hunting spiders, pursuing prey in lawns and gardens. They do not spend much time in webs. This time of year females can be seen with their egg sacs attached to the rear of their body (spinnerets). When the eggs hatch, the small spiderlings climb up on the mother's abdomen and stay there for about a week before dispersing. Large spiders in the genus *Hogna* cause particular concern this time of year, but like all wolf spiders, they are not poisonous to humans.

BANDED ORB-WEAVING SPIDER AND CAT-FACE SPIDER

The two most marvelous spiders Utahns might encounter are the banded orb-weaver and the cat-face spider (shown on page 4). The adult female banded orb-weaver has a large, oval-shaped abdomen adorned with black, yellow, and white stripes, and black bands on the legs. The cat-face female has a large, oddly shaped abdomen that resembles the face of a cat when viewed from the proper angle.

continued on next page

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COOPERATIVE EXTENSION

Spiders, continued from previous page

Cat-face spiders are attracted to porch lights where their perfectly shaped orb webs pluck flying insects from the air. This time of year the females can sometimes wander inside homes or other enclosures in search of an egg laying site. After the eggs are laid, females will likely die. The eggs will hatch next spring, and spiderlings will climb up structures and plants, release long strands of silk and "balloon" away in the wind to new sites.

GOLDEN HUNTSMAN (GIANT CRAB SPIDER)

Golden huntsman is the most common huntsman spider identified by the UPPDL. These large spiders are a beautiful gold color with black mouthparts and dense black hairs on the end of their legs, giving the appearance of dark socks. These "socks" allow this spider to climb up almost any surface. They are commonly found under the bark of trees or in narrow, secluded places.

TARANTULA

Utah is on the northern border of the tarantula's native range, but at times, these spiders can be found as far north as Cache County. In the fall, male tarantulas leave their underground burrows and migrate in search of female mates, sometimes into home landscapes. The genus of tarantula found in Utah (*Aphonopelma*) is not harmful to humans.

MANAGING SPIDERS INDOORS

None of the above spiders should be feared. The influx of spiders usually ends in late October, and tolerance of these beneficial creatures is the ideal strategy. However, if one of the above spiders enters a home, put an open container on top of the spider and slide a piece of paper under the opening. Then, flip the container and paper together, trapping the spider inside. The spider can then be safely released outdoors.

If additional control measures are desired, one or a combination of the techniques that follow are recommended.

Exclusion

- *Seal all cracks and crevices* (foundation, etc.) leading into the home with silicon caulk.
- *Install weather stripping* around doors and windows, especially all doors leading to the outside, including the garage door.

Cleaning and Habitat Modification

- *Vacuum regularly*. Spiders, webs, and egg sacs can be vacuumed up, directly eliminating spiders (except hobo egg sacs, which are found outdoors).
- *Minimize clutter*. Spiders love secluded places to hide and lay egg sacs. Simplify the environment inside by cleaning regularly and storing clutter in sealable storage bins. Outside, move rock and wood piles or anything that creates spider habitat away from the home.
- *Change exterior lighting*. Insects are attracted to exterior lights at night, which in turn will attract spiders looking for food. Replace regular light bulbs with sodium vapor lights which are less attractive to insects.

Monitoring

- *Sticky traps*. Standard sticky traps, which are available at garden centers, can be placed around baseboards to help determine which type of ground dwelling spiders are present and where they are coming from. They can also provide some level of control. For hobos, pheromone traps are more effective, but they may attract more spiders to the area, including from outdoors. Avoid using hobo pheromone-baited traps from August to October in Utah.

Chemical

If an infestation of spiders is present, use the following techniques.

- In secluded areas (crawl spaces, cracks and crevices, or any area where people won't come in contact with chemicals), use a dust formulation of an insecticide like TriDie. Do not use this product as a

continued on page 4

Organizing a Grasshopper Control Program

By Troy Cooper, Extension Associate Professor, County Director, and Agriculture Agent for Duchesne County, and Boyd Kitchen, Extension Associate Professor, County Director, and Agriculture Agent for Uintah and Daggett Counties.

For farmers and ranchers who depend on their land's productivity to stay in business, grasshoppers can be economically devastating. Control options are highly dependent on the balance between cost and effectiveness versus the economic loss of the crop or land use. For grasshoppers, the per-acre cost of control decreases and the effectiveness increases when large blocks of land are treated. Therefore, organizing groups of landowners to implement management improves the economics of grasshopper control.

Not only are grasshoppers voracious, but they also clip and drop green forage material, making it unavailable as range food. In a 10-acre field, for example, a density of eight grasshoppers per square yard can clip and consume enough forage in one season to feed a cow for one year (Hewitt 1977). The USDA-recommended action threshold for stockable rangeland is nine adults and/or late instar nymphs per square yard. Because grasshoppers are more susceptible to chemical control in the early nymphal stages, the Utah Department of Agriculture and Food considers chemical control justified when populations reach eight or more nymphs per square yard.

In fall 2008, the Extension offices in Duchesne and Uintah Counties were receiving calls about heavy grasshopper infestations. These calls led to fall scouting of infested areas to estimate the number of adults laying eggs.

Our scouting efforts discovered a high number of egg-laying adults, which meant that there could be a heavy grasshopper infestation in 2009. County Commissions, FSA Committees and Conservation District Boards were informed of the fall situation. We organized community meetings in early spring 2009 to spread the word of the possible devastation a large grasshopper infestation could have on forage and gardens. Another purpose of the meetings was to teach participants how to scout for grasshoppers, estimate densities, and chemical control options.

Producers in selected areas of possible heavy infestations were solicited to help in early scouting. When producers found high densities of grasshopper nymphs, they organized meetings to determine acreage infested and who might be interested in participating in a control program. After those meetings, we met with the representative producers and

Early spring is the time to start scouting for grasshopper nymphs. They were easy to find in 2008 and 2009.

Mated female grasshoppers lay eggs in the fall in undisturbed soil.

County Commissioners to inform them of the problem and to see if the county would be willing to help in the control program. The counties agreed to conduct GIS mapping and to serve as liaison between producers, the pesticide applicators, and the State of Utah. County attorneys prepared contracts for individual producers in which they agreed to pay their portion of the spray bill.

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Grasshopper Program, continued from previous page

Grasshopper densities are reported as numbers of grasshoppers (all species combined) per square yard. The technique most commonly used for these estimates requires the surveyor to count the number of grasshoppers fleeing an estimated one-square-foot area approximately 10-15 feet ahead (USDA, undated). The surveyor repeats this procedure 18 times per sample location, adds the 18 observations, and divides by two to determine the numbers of grasshoppers per square yard.

County GIS personnel created maps of producer fields that needed to be sprayed, which were used by the pilots applying the grasshopper insecticide. The growth regulator, Dimilin (diflubenzuron), was applied using the "reduced agent and area treatment method", or RAATs.

Over 59,000 acres were sprayed representing 304 individual producers. Duchesne County paid the grasshopper spray bill of $136,766.50 while Uintah County paid $29,433.00. UDAF reimbursed 90%, and producers reimbursed 10% of the total bill. There was a 78% estimated average kill based on post-spray survey of the originally-scouted acres. Overall success of the program was attributed to a combination of factors including organization of large numbers of landowners, the participation of the counties, and the technical aspects of the mapping and spraying.

GIS maps outlined fields to be treated with insecticide.

In 2010 and 2011, we conducted grasshopper scouting and landowners implemented their own control measures and submitted paperwork to the state for reimbursement. The success of the large effort in 2009 was evident in the reduced grasshopper numbers in both 2010 and 2011.

References:

Hewitt, G.B. 1977. Review of forage losses caused by rangeland grasshoppers. USDA Miscellaneous Publication 1348, 24 pp.

U.S. Department of Agriculture. Undated. Grasshopper survey, a species field guide. USDA, APHIS, PPQ.

Spiders, continued from page 2

broadcast treatment in areas where it may contact people.
- Liquid or dust insecticides may be applied directly to webs (this works especially well for black widow spiders).
- Non-residual aerosol sprays can be used to spray directly onto spiders.
- If an outside treatment for hobos is warranted, insecticide sprays are best timed for when egg sacs are hatching, which is typically from mid May to mid June in northern Utah.

Adult female banded orb-weaving spider (top left), adult female cat-face spider (top right), golden huntsman spider (bottom left), and tarantula (bottom right).

Bite Prevention Tips

- From August through October, remove skirts on beds and pull the bed about 8 inches from the walls to prevent wandering spiders from climbing the bed.
- Take caution when picking clothes up off the floor or in laundry baskets. Spiders hiding in these clothes can be mistakenly grabbed, resulting in a bite.
- Keep children's toys off of the floor where spiders can hide under them.

For more information on common Utah spiders, visit our Top 20 Arachnids web page.

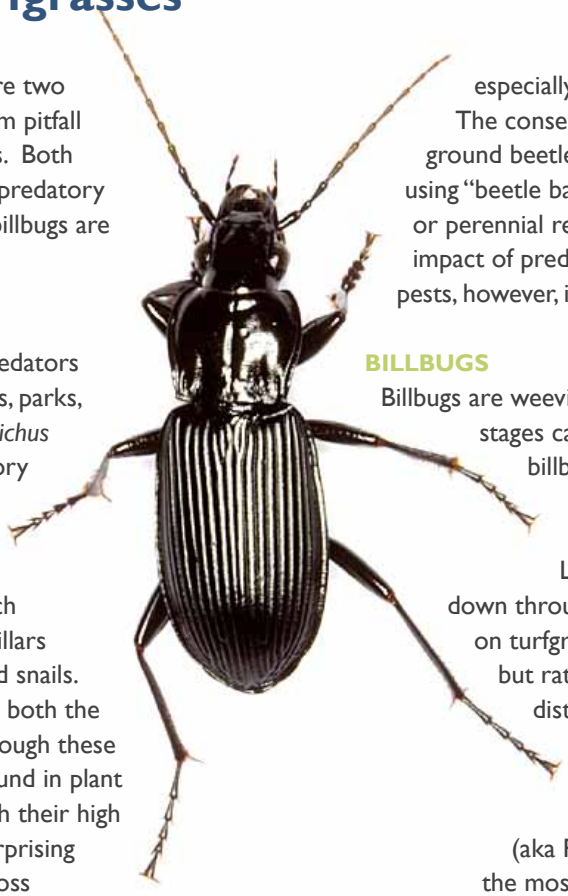
-Ryan Davis, Arthropod Diagnostician

Active Beetles in Turfgrasses

Predatory ground beetles and billbugs were two groups of beetles commonly collected from pitfall traps in 2011 in northern Utah turfgrasses. Both are active beetles that rarely fly; however, predatory ground beetles are beneficial insects and billbugs are pests of turfgrasses.

PREDATORY GROUND BEETLES

Predatory ground beetles are common predators in the family Carabidae that frequent lawns, parks, and golf courses. In Cache County, *Pterostichus melanarius* was the most abundant predatory ground beetle. This beetle was introduced to the U.S. from Europe and is widely distributed. These beetles are generalist predators that actively search for a wide variety of prey including caterpillars and other insect larvae, aphids, beetles, and snails. *Pterostichus* is highly mobile, nocturnal, and both the larval and adult stages are predatory. Although these beetles do not fly, they are occasionally found in plant and tree canopies searching for food. With their high abundance and ground activity it is not surprising that these beetles are found scurrying across floors in homes from time to time. In 2011 in northern Utah, activity of adult beetles started in May, peaked in August, AND declined drastically in October. *Pterostichus* overwinters in the larval stage in the soil. The benefits of this predator have been especially recognized in agricultural systems. The conservation and enhancement of predatory ground beetle populations has been achieved by using "beetle banks" which are strips of grasses or perennial refuge within agricultural crops. The impact of predatory ground beetles against turfgrass pests, however, is less understood.



The predatory ground beetle *Pterostichus* is black with grooves running the length of the wings. (Image courtesy of Josef Dvorak at biolib.cz)

BILLBUGS

Billbugs are weevils (or snout beetles) whose larval stages can be damaging to turfgrasses. Often billbug larvae are overlooked as major turf pests because damage resembles drought stress and larvae are small. Larvae feed in grass stems and move down through the thatch layer and then feed on turfgrass roots. Adult billbugs are not fast, but rather meander and "play dead" when disturbed. Monitoring of adult billbugs in 2011 revealed a complex of three billbug species in northern Utah: the hunting, bluegrass, and Denver (aka Rocky Mountain) billbugs. This year the most common billbug collected was the hunting billbug. Typically adult activity for hunting and bluegrass billbugs is low during June and July. The cool and wet spring of 2011 pushed adult emergence back about a month in northern Utah, starting around late May, so the peak was in July. Adult billbugs will move to sheltered sites (e.g., in weedy areas, debris, or perennial shrubs) to overwinter. Hunting and bluegrass billbug larvae that have not become adults before freezing temperatures occur may not survive through the winter. It is thought that only Denver billbugs can overwinter as adults or larvae. Chemical control for billbugs is ineffective in the fall season and only a few insecticides have curative properties against turf insects. Those insecticides, however, have had mixed results.

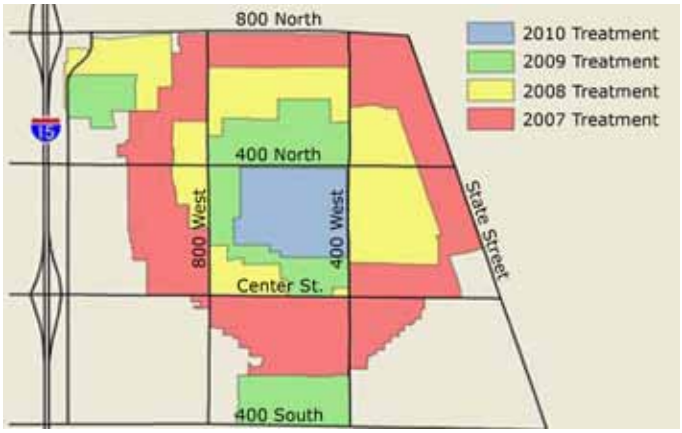
The adult hunting billbug is one of four turf billbugs found in Utah. It is recognized by a "(Y)" pattern on the thorax.

Beetles make up a large component of the turf insect community in Utah. In addition to predatory ground beetles and billbugs, other beetle pests such as white grubs, and other predators including some rove beetle species can be present. Monitoring these predatory and pest beetles is important to maintain beneficial services (i.e., biological control) from the good guys and to make an informed decision about early treatment of damaging larval stages of turf pests.

-Ricardo Ramirez, Entomologist

CAPS Update: Japanese Beetle

The Japanese beetle, *Popillia japonica*, is an introduced pest that has caused a lot of destruction in the eastern U.S. The larvae can damage lawns and nursery stock, while the adults feed on foliage and fruits of over 300 plant species. Japanese beetles can be difficult to control and are a threat to Utah's agriculture and nursery industries.



The area of Orem, Utah that has been treated for Japanese beetle over the last 4 years. (Map adapted from ***Protecting Utah's Agriculture: 2010 Insect Report***, Utah Department of Agriculture and Food.)

In 2006, a Japanese beetle infestation was discovered in Orem, Utah. Pheromone traps were used to determine the extent of the infested area. The Utah Department of Agriculture and Food partnered with private and government entities on both the local and national levels to develop and carry out an eradication program, which has been highly successful. Monitoring of the Orem area will continue in 2012. The continuation of insecticide treatments in the area will depend on the results of this year's trapping efforts; thus far, no beetles have been caught.

In addition to the Orem infestation, a single Japanese beetle was detected in both Cache and Salt Lake Counties in 2009 and a single beetle was detected in Salt Lake County in 2010. In each of these instances, a delimiting grid of traps showed no further beetle detections.

-Cory Stanley, USU CAPS Coordinator

CAPS (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).

Japanese beetle traps have been placed statewide for several years, both to detect beetles and to determine the extent of infestations once a beetle is detected. Unless otherwise indicated, the table indicates the number of Japanese beetles detected in the area of Orem, Utah. (Table adapted from ***Protecting Utah's Agriculture: 2010 Insect Report***, Utah Department of Agriculture and Food.)

Timeline	Number of traps	Number of beetles detected
1993-2006	481	1 (Salt Lake Intl. Airport)
2006	581	671
2007	3000	2157
June- Aug 2007: treated 480 acres of turf & 500 acres of foliage in Orem		
2008	3471	100
June-Aug 2008: treated 326 acres of turf & 808 acres of foliage in Orem		
2009	3280	7 (includes 1 in Cache County & 1 in Salt Lake County)
June-Aug 2009: treated 154 acres of turf & 92 acres of foliage in Orem		
2010	3241	2 (includes 1 in Salt Lake County)
June-Aug 2010: treated 46 acres of turf & 0 acres of foliage in Orem		
2011	2898	0 (year to date)
April-present: treated 40 acres of turf & 0 acres of foliage in Orem		

Honey Bees as Structural Pests

I have been receiving a lot of calls about bees and wasps recently. In our last newsletter, I explained why honey bees swarm and what you should do about a swarm on your property (click here for article). But what if it is more than a swarm? What if honey bees have actually established a nest on your property? The pollination services that honey bees provide are vital to our food supply, but their defensive stinging behavior can be a real problem if they've built a hive in your yard or even worse, within your walls or attic. If at all possible, you want to avoid killing the bees. Often a beekeeper will come and remove a hive that has established in your yard, shed, or other outdoor area. Members of the Utah Beekeepers Association (www. utahbeekeepers.com) may remove these bees for you. On their website click on the link for "Report a Swarm of Honey Bees!"

The honey bees that established this hive in an apartment ceiling were killed previously, but the owner neglected to remove the hive. The brown area in the center of the hive is where it is being consumed by an infestation of wax moths. Additionally, honey had begun dripping from the combs, soaking through and damaging the ceiling.

Unfortunately, it is a bigger challenge if the bees have established between the walls of your home or elsewhere within the structure. If this occurs, first you should try to contact a beekeeper to remove them. Some beekeepers will, but sometimes they are unwilling to, because removing the bees may require cutting away a portion of the wall, which can mean more work and liability than they are willing to accept. If you are unable to find a beekeeper to remove the bees, you may be forced to kill them. Many exterminators are able to do this for you, or you may attempt it yourself. Completely killing all of the bees can be challenging for many reasons in addition to the obvious safety concern. You don't know how large the hive is within the wall. You can kill the adults, but because the pupae will survive, you may need to treat two or three times. You want to kill the queen so that she doesn't continue to produce brood, but she could be anywhere within the hive. And lastly, not all of the bees will be in the hive when you treat it, which is another reason you may need to treat multiple times.

If you do decide to destroy the hive yourself, most importantly you need to protect yourself from both the pesticide and the bees. The pesticide label will provide guidelines, but at minimum, you should wear long sleeves, long pants, gloves, and protective eye wear. Treat at night or very early in the morning when most of the bees are present (rather than out foraging). Although any insecticide that is labeled for wasps will also be sufficient for bees, certain insecticides work better for treating wall voids. Deltamethrin is a good choice, either in its dry formulation (Deltadust) or its foam formulation (CB DFoam). You will need to make sure that the insecticide is well distributed within the hive-filled wall. If you can find the entry hole and it is above the hive, you can use this hole to administer the insecticide. However, if the entry is below the hive or if the hive is very large, you may need to inject the insecticide into the wall in one or more spots above or within the hive. Be cautious in doing this, and be very cautious about drilling into the wall in order to apply insecticide. As soon as the drill starts vibrating the wall, bees will become agitated.

Unfortunately, a bee hive in your wall presents more trouble than just the potential for stings. Once you have successfully killed the bees, you still need to remove the hive from the wall. If you do not, the wax could melt, and the wax and honey will do damage to the wall. Even if the wax doesn't melt, do you want a lot of wax, honey, and dead bees rotting inside your wall, creating odors and attracting other insects and rodents? I have actually had people tell me that they've dealt with a hive within their wall by simply plugging the entrance hole. Assuming that the bees did not find another way out, this probably worked to eventually kill them, but it also left behind a lot of wax, honey, and bee corpses to decay within the wall. I would not recommend this as a solution.

-Cory Stanley, USU CAPS Coordinator

Biopesticides are the Next Generation of Pest Control Products

The answer to growing food sustainably to feed a world population of 9 billion by 2050 may be biopesticides. Demand for these safer, alternative pesticides has been on the rise in the last 5 years, even through the economic crises, and is projected to significantly increase in the coming years. Growth in biopesticide sales, which currently accounts for just 11% of the total pesticide market, increased by 13% in 2010 compared to a 2% increase in synthetic pesticides. The biopesticide market is expected to reach $3 billion by 2015.

Biopesticides include natural enemies, antagonistic microorganisms, and materials derived from living organisms or from natural products. Bt (*Bacillus thuringiensis*) and its subspecies is one of the most well-known products, but other examples include tea tree oil, corn earworm virus, and kaolin clay. Also called biorationals and biologicals, these products are not just for organic use. In conventional agriculture, research is focused on developing integrated plans, combining biopesticides with reduced risk products, ultimately leading to reduced pesticide use.

The factors driving biopesticide demand range from political to environmental to the hidden costs of human health. Federal regulations have cancelled the use of many traditional products like azinphosmethyl, methyl bromide, and endosulfan. Municipalities are taking it a step further and creating a select list of allowable products in public spaces. These factors, along with others such as pest resistance, increased demand from organic farmers for more options, worker safety, and water quality, lead to the need for alternative, safe products that are effective and inexpensive.

Pesticide residue laws are also driving demand, and large food chains in the European Union are setting the trend in this regard. Some stores have implemented their own maximum residue levels (MRL) and food safety standards programs with names like "Nature's Choice," "Field to Fork" and "No Residue." One food store program will only accept products that have 70% or less of the legal maximum residue limit while other stores are banning certain legal pesticide products on their produce. U.S. retailers such as Walmart are beginning to have an impact in this area, and it will only increase into the future.

Plant Health Progress, Biological Control of Plant Pathogens: Research, Commercialization, and Application in the USA, Gardener, Fravel.

Because of these and other national programs, Europe has become the largest user of biopesticides. France, for example, has launched "Ecophyto 2018," where they hope to have a 50% reduction in pesticide use by 2018. The program will encourage growers to use biocontrol practices, promote innovation for safe and effective growing techniques, support marketing biopesticides, and educational outreach. Denmark has initiated "Green Growth" that provides financial support to developers of alternative plant protection products.

One of the factors that limits biopesticide production is that many companies that are producing biopesticides are smaller, and a large investment is required not only in registration but in demonstrating a new product to growers. To help with this, the IR-4 program in the U.S. has been instrumental in facilitating registration of sustainable pest management products for minor crops. Because of this program, the EPA approved more biopesticides than conventional products in 2010. In addition, larger companies such as Monsanto are now seeing the profits in biopesticides and investing in smaller companies to evaluate new products.

Lately, there has been plenty of research to back up efficacy claims that couldn't be said 5 years ago. Successful products now have increased shelf life, increased residual activity, and treat a wider range of crops and pests. As a result, sales have tripled to quadrupled in the last decade. Growers, advisors, dealers, and buyers must be prepared to adjust to the changes coming down the pike, driven by world demand for larger quantities of safe, quality, residue-free food.

-Marion Murray, IPM Project Leader

Raspberry Cane Damage Abundant in 2011

During the summer of 2011, wilting tips of raspberry canes caused by the raspberry horntail were a common sight. In autumn, cane death from two other insect culprits, the rose stem girdler and raspberry crown borer, becomes apparent. As fall-bearing raspberries reach peak production, it is frustrating to lose fruiting canes to these insect pests. This article will describe the two insects and best management practices.

The rose stem girdler adult is a bronze and green flat-headed beetle (top). The raspberry crown borer is a moth, with coloration that mimics a wasp (bottom).

The larva of the rose stem girdler has a pair of projections on its tail end and is flattened just behind the head (left). Larvae girdle canes, causing a swollen node (right).

ROSE STEM GIRDLER

The rose stem girdler, introduced from Europe, is a small (ca. 1/5 in), bronze- and green-colored flat-headed beetle (Family Buprestidae). It infests wild and cultivated roses, red raspberry, black and red currants, and gooseberry. The Utah Plant Pest Diagnostic Laboratory database has records from Sanpete County, Utah, and north, with the majority of records from the Wasatch Front, Cache, and Rich Counties.

The rose stem girdler has a single generation per year and spends the winter as a mature larva within a cane. Adults emerge during May and June. Females "cement" eggs singly onto canes, and the white, flattened larva bores into the cane through the bottom of the egg. Larvae grow up to ½ in long and have a pair of brown projections on the tail end. Larvae feed in the cambium just under the bark in a spiraling pattern causing the cane to swell. Researchers in Utah (Davis and Raghuvir 1964) found that most larvae tunnel upward in canes and that primocanes (1st year) are more susceptible than floricanes to attack. Feeding injury often girdles the cane causing it to break off later in the summer. The larva can survive the winter in the broken cane, so removal and destruction of infested canes is critical to reduction of the overwintering population. In addition to pruning, insecticides applied as a full cane drench in May through early June when adults are active can reduce infestations. Several applications are usually needed to cover the entire activity period. Insecticide groups with efficacy against rose stem girdler and registered on raspberry include botanical (pyrethrin[H]), carbamate (carbaryl[H]), insect growth regulator (azadirachtin[H]), neonicotinoid (acetamiprid[H], imidacloprid, and thiamethoxam), organophosphate (diazinon, malathion[H]), and synthetic pyrethroid (bifenthrin[H], esfenvalerate, fenpropathrin, permethrin[H], and zeta-cypermethrin). Removal of rose and other hosts near raspberry fields and gardens may also help reduce populations of rose stem girdler in the local area.

[H]available for homeowner use

RASPBERRY CROWN BORER

Raspberry crown borer primarily feeds in the crown and roots and causes the entire cane to dieback, tip over, and be easily pulled from the plant crown. Cane death is evident in late summer to early fall. Earlier in the summer, infested cane tips may wilt and curl into a shepherd's crook. The raspberry crown borer is a clearwing moth in the Family Sesiidae. The adult is a thick-bodied, day-flying moth (1 to 1 ¼ in wing span) that mimics a wasp (yellow stripes on a black body). The larvae are white with a brown head and grow up to 1 ¼ in long. In northern Utah, the insect spends 2 years feeding and developing within the plant to complete its life cycle, and injury is most evident in the second year. Adults are active in August through September. Females emit a pheromone to attract males. Researchers in British Columbia (BC), Canada have identified the pheromone, but it was unstable and volatilized quickly in BC and Utah field tests resulting in poor trap capture. Efforts are continuing to produce a stable pheromone lure. Female moths lay eggs on the lower leaves of canes and young larvae crawl down the canes and tunnel into

continued on next page

Raspberry Cane Injury, continued from previous page

the crown. The optimal timing for insecticide control is in the early fall (late September to early October) before young larvae tunnel into the crowns to spend the winter (McKern et al. 2007). A crown and root drench with a product containing bifenthrin[H], diazinon, or imidacloprid will kill the young larvae ([H]homeowner products available). Treatments should be applied for at least two consecutive years to successfully reduce the infestation.

-Diane Alston, Entomologist

References:

Davis, D.W., and N. N. Raghuvir. 1964. The biology of the rose stem girdler, *Agrilus rubicola* communis, on raspberries in Utah (Coleoptera: Buprestidae). Annals of the Entomological Society of America 57: 154-159.

Mckern, J. A., D. T. Johnson, and B. A. Lewis. 2007. Biology and control of the raspberry crown borer (Lepidoptera: Sesiidae). Journal of Economic Entomology 100: 398-404.

The base of canes hollowed out by crown borer feeding can be easily detached from the crown (right). Canes of raspberry plants attacked by crown borer die slowly through the season (left).

PLANT PATHOLOGY NEWS AND INFORMATION

Fungicide Resistance in Home Gardens

Chemicals have been successfully used for decades to control fungal pathogens. Currently there are fungicides on the market belonging to over 40 different chemical groups. The chemical groups are classified based on what part of the fungal physiology they target. Some chemical groups target a fungus at multiple points in its physiology, others only at one point. Chemical groups that only target one aspect of the fungal physiology are at high risk for resistance development. Numerous fungi have developed resistance to chemicals belonging to the demethylation inhibitors (DMI), QoI fungicides, and others, making these products less effective.

Fungicide resistance develops when fungicides from one chemical group are used continuously without alternating with a fungicide from another chemical group. A mutation in the gene that codes for the fungicide target can alter the fungal metabolism, allowing the fungus to continue its life cycle without interruption after the fungicide was applied. By using chemicals repeatedly from the same group, fungal individuals with a mutation that makes them immune to the chemical are selected, whereas the individuals without the mutation are killed. This may not be obvious initially, but over a couple of years the population of a specific fungus in a yard or orchard will consist of nearly 100% resistant individuals.

I recently received two inquiries from applicators stating that the fungicides they used for necrotic ring spot in home lawns did not work anymore. It turned out that they had used chemicals from the same chemical group for several years. In one case the applicator doubled the dose of the chemical in hopes that it would work again, but it didn't. The chemical class of fungicides is usually provided on the label. The label will also state the number of times it can be used consecutively in one growing season as well as the maximum amount that can be applied per area per year. This information is provided to prevent the development of resistance.

The benefit of following the label and alternating with fungicides from different chemical groups is not only for the benefit of one homeowner or grower. Fungal spores travel for miles and spores from resistant individuals can travel to orchards and yards further away. The owner of that orchard may use a recommended fungicide not knowing that the isolates in his orchard were already resistant when they arrived. To prevent fungicide resistance it is essential to follow the instructions on the label and alternate between products from different chemical groups. If we lose the effectiveness of good fungicides due to resistance without alternative control strategies, millions of dollars in crop losses could be the result.

-Claudia Nischwitz, Plant Pathologist

In the National News

PARASITOID REGULATORY MOLECULES MAY IMPROVE PEST CONTROL

Australian researchers have published the first-ever comprehensive analysis of the impact of a parasitoid wasp on its host. Larvae of the parasitic wasp, *Diadegma semiclausum,* that develop inside diamondback moth larvae inject secretions that contain symbiotic viruses that suppress the moth larvae's immune system and slow metabolism and development. The genes identified in the diamondback moth following parasitization, as well as the parasitoid regulatory molecules, could be used as targets or synthesized chemicals that allow for the control of this pest.

BIOLOGICAL FUNGICIDE FOR SOIL APPLICATIONS

Becker Underwood has recently released Subtilex NG, a biological fungicide based on the MBI 600 strain of *Bacillus subtilis*. The product, registered for soil borne pathogens of vegetable crops, does not require special storage or refrigeration because the bacteria produce an endospore that allows it to survive extreme environmental conditions like heat and desiccation. Subtilex NG works by protecting plants from pathogens through root colonization, and by producing a metabolite that destroys fungal pathogens' cell walls.

NEW PROTEIN DISCOVERED IN ARTHROPODS

Kansas State University biochemists made a discovery about the cuticle of insects that debunks a more than 50-year-old belief about insect exoskeletons. Their research showed that the enzyme chitinase, which breaks down the old skin during molting and long thought to avoid touching the new skin by a physical barrier, is actually prevented from breaking down the new skin by a protein called Knickkopf. This protein is most likely found in all arthropods. This finding could lead the way to new pest control products that target the Knickkopf protein, thus preventing insects from forming new exoskeletons during molting.

USE OF SOUND TO DETECT PEST PRESENCE

Research out of the University of Florida used high tech listening devices to pinpoint the location of the grape root borer on grapevine plants. By following the sound, vineyard growers could target pest control efforts. Researchers elsewhere have used similar technology to detect underground beetles, sugarcane pests, and grain insects in silos. The Florida researchers believe that this study will prove useful to their 22 wineries in dealing with this destructive pest, and could be used for other root boring beetles or caterpillars.

SCHOOL DISTRICTS, CHILDREN BENEFIT FROM IPM

Using IPM to manage pests in schools has returned great results. The Salt Lake City school district has saved $22,000 in pest control per year since implementing IPM. Their pesticide bill in 2010 was $5 for a can of wasp spray. Pest control managers in schools across the country have switched from broad spectrum pesticides to safer options including Vaseline, hoses, mops, flashlights, caulk, and sticky traps. A decade of research has shown that schools that use IPM show a decline in pesticide use as well as pest activity. Funding for school IPM programs has come from a variety of sources, and recently, the EPA has thrown in a $1.5 grant program. Children are more sensitive than adults to pesticides, and the biggest benefit of IPM is their safety.

USING GROUND COVERS IN ORGANIC PRODUCTION

USDA Agricultural Research Service scientists examined how fabric ground covers affect water penetration and nutrient levels in soils where compost or manure has been applied. They found no differences in microbial activity in soil with fabric or polypropylene covers and soil without fabric covers, suggesting that covers on the soil can prevent weeds without hampering soil biological activities.

Useful Publications and Websites

- Penn State has released a stink bug monitoring website that provides information about stink bug populations and spread.

- New **smart phone apps** have been developed to help growers save time and money in the field. Precision Laboratories Mix Tank is an app to determine sprays amounts and gives recommendations for products and mixing. An application called SoilWeb shows the NRCS soil information at your location. AGRIplot is a top rated app to calculate the plot area and distance of a field. Instead of using paper, use the Field Notes app to manage pesticide records.

Entomology Dictionary provides definitions of over 4,500 insect terms.

- AgriFoodGateway.com is an agriculture database where growers can access educational information, browse company directories, check market prices, and more.

Featured Picture

Late blight, caused by *Phytophthora infestans*, is a devastating disease of tomato and potato that occurs worldwide. It can wipe out an entire field in days because each small lesion can produce 100,000-300,000 spore-carrying structures to create new infections. We rarely see late blight in Utah because this pathogen needs moisture to spread; in fact, it was only first recorded in the UPPDL database in 2005. This year, however, the diagnostic clinic has seen several cases, which is not surprising given the increase in moisture Utah has received in the last 3 years.

-Image by the UPPDL

Calendar of Events

October 16-19, International Symposium on High Tunnel Horticultural Crop Production, State College, PA, horticulture.psu.edu/cms/ishs2011/

October 16-20, America Society of Agronomy, Crop Science Society of America, and Soil Science Society of America International Annual Meeting, San Antonio, TX, www.acsmeetings.org

October 18-19, Restoring the West Conference, Logan, UT, www.restoringthewest.org

October 19-22, Pestworld 2011, New Orleans, LA, www.npmapestworld.org/pestworld2011

November 6-9, National Plant Diagnostic Network 2011 National Meeting, San Francisco, CA, www.npdn.org/node/119

November 13-16, Entomological Society of America's 59th Annual Meeting, Reno, NV, www.entsoc.org/am/fm/index

November 14-15, Sustainable Agriculture Expo, Paso Robles, CA, www.sustainableagexpo.org

November 17-18, Utah Farm Bureau Federation Convention, Layton, UT, utfb.fb.org/Website/Calendar.html

UTAH PESTS people and programs are supported by:

Utah State University COOPERATIVE EXTENSION

NPDN National Plant Diagnostic Network · WPDN Western Plant Diagnostic Network · APHIS · NIFA · UDAF Utah Department of Agriculture and Food