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UTAH PESTS QUARTERLY NEWSLETTER

Utah Plant Pest Diagnostic Laboratory

USU Extension

IN THIS ISSUE

NEW MEDIA

EXTENSION
UtahStateUniversity

Utah Study of Hemp Pests

Hemp (*Cannabis sativa*) was grown as a federally-recognized Utah commodity starting in 2019, primarily for production of CBD oil. That fall, we surveyed hemp producers and learned that plant pests were a contributing cause of harvest losses in 2019 (average of 5% loss) and that producers were looking for pest identification and management information.

Utah Pests then formed a project team (see box) and received funding from Utah State University Extension to help fill these information gaps. One part of the project is to collaborate with hemp producers to identify the major pests of field-grown hemp through farm surveys in 2020 and 2021.

In summer 2020, the team identified 12 cooperator farms and scouted for insect and disease activity with up to six visits per farm. We searched plants for abnormal symptoms and where appropriate, collected associated plant tissue and/or arthropods for diagnosis in the Utah Plant Pest Diagnostic Lab.

Although our survey identified several plant pests, we quickly learned that none of them have yet become major pests in Utah. Few diseases were seen, and the most common arthropods were beneficial insects such as big-eyed bugs, minute pirate bugs, damsel bugs, assassin bugs, and lady beetles. As Utah's hemp acreage expands in the future, we expect to see more pests become established. Common pests are listed on the next page, with images of pest damage, on page 3.

On the farms we visited, it was apparent that other factors superseded plant pests in reducing yield, such as plant deformities due to genetic variation (see images on next page), plant nutrition, watering, lack of root growth, and weeds. Abnormal growth from genetic variation was due to starting crops from seed rather than from clones. We tested dozens of these plants for viruses (curly top, tobacco mosaic, and others), and all were negative.

The three most common hemp varieties grown on the cooperator fields were Trump (also known as T1), Abacus, and Berry Blossom, with about 14 other varieties also grown. There were no differences in pest problems or genetic variation between varieties.

The Pests of Hemp project team consists of Marion Murray (project lead and field survey), Claudia Nischwitz (plant pathogen diagnosis and cultivar testing), Ricardo Ramirez and Lauren Gates (cultivar testing and field survey), Zach Schumm (arthropod diagnosis), and county Extension faculty (Jody Gale, Cody Zesiger, Ruger Carter, Ben Scow, Mike Pace, Candace Schaible).

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Most Common Pests Found in the 2020 Survey, and Their Abundance

ARTHROPODS	
Ant, pavement - *Tetramorium caespitum*	2% of farms; some plant losses
Aphid, cannabis - *Phorodon cannabis*	5% of farms; no significant damage
Beet webworm - *Loxostege sticticalis*	2% of farms; no significant damage
Corn earworm - *Helicoverpa zea*	2% of farms; minor flower damage
Flea beetle, elongate - *Systena elongata*	33% of farms; minor foliar damage
Grasshoppers (multiple species)	50% of farms; no significant damage
Leafhoppers (unidentified)	50% of farms; no significant damage
Leafminers (old damage; unidentified)	2% of farms; no significant damage
Lygus bugs – *Lygus* spp.	90% of farms; no significant damage
Stink bug, one-spotted - *Euschistus variolarius*	1% of farms; not widespread
Thrips, western flower - *Frankliniella occidentalis*	90% of farms; no significant damage
Two-spotted spider mite - *Tetranychus urticae*	2% of farms; no significant damage
Wireworms – *Limonius* spp.	1% of farms; not widespread
DISEASES	
Crown gall - *Agrobacterium tumefaciens*	1% of farms; not widespread
Fusarium wilt and crown rot – *Fusarium* spp.	5% of farms; some plant losses
Powdery mildew - *Erysiphe* sp.	1% of farms; not widespread
Pythium crown rot – *P. aphanidermatum*	33% of farms; some plant losses

Examples of Poor Vigor Due to Genetic Variation From Seed-Grown Hemp

Stunting associated with upward-curled and twisted foliage.

Some plants start from seedlings with thin, curled leaves, and remain that way.

Stunted but otherwise healthy-looking plants were commonly seen. These plants often developed chlorotic foliage as they matured, and produced low yields.

Plants with chlorotic foliage were tested for nutrient deficiencies, and many results showed adequate nutrient content.

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Examples of Pests and Symptoms Found on Field-Grown Hemp in Summer 2020

Flea beetles were found on just a few farms, along with symptoms of their feeding damage.

Thrips feed by piercing the plant surface with their mouthparts and sucking the contents of cells, cauuseing white spots.

Beet webworm (shown above) and corn earworm were the only caterpillar pests found in 2020.

Leafminer damage was sporadic, with no larvae found within the mines to allow species identification.

Pavement ants were a problem on a few farms, not only disturbing the soil, but feeding on the crown, causing dieback.

Crown gall is a bacteria-caused disease found on one farm. Affected plants were stunted and some died.

Fusarium was found on a few farms, causing a wilting in a portion or in the entire plant.

Pythium crown rot is a deadly disease tied to saturated soils.

Marion Murray, IPM Project Leader

Dahlia Mosaic Virus

Dahlias are popular in Utah's cut flower industry, but can be affected by viruses. The USU Extension Plant Pathology lab identified several viruses in dahlia plants collected from Utah farms as well as in tubers and seed purchased from suppliers. One of the most common viruses was Dahlia mosaic virus (DMV).

DMV is a DNA virus in the genus caulimovirus. It is transmitted by aphids and carried over in seed and tubers. There are three strains: DMV-D10, DMV-Holland, and DMV-Portland. To date, the most common strain found in Utah is DMV-D10, followed by DMV-Holland. DMV-Portland occurs only occasionally. In some plants, two or even all three strains have been identified (Table 1). The strain found so far in seed is DMV-D10 (Table 2).

DMV causes many different symptoms, and it is currently unknown what affects symptom development. Some plants may show no symptoms at all while others are stunted, have mosaic patterns, vein clearing on leaves, or develop necrotic lesions. In some varieties, leaves are distorted and color breaking may occur on infected flowers. Moreover, stunted plants frequently do not produce marketable flowers.

In some cases, the symptoms could be caused by several viruses, including Tomato spotted wilt virus or Tobacco streak virus. To determine the virus and prevent its spread, farmers must submit plant samples to a plant pathologist for molecular- or antibody-based testing.

DMV can spread during the growing season by aphids that acquire the virus while feeding on infected plants, called secondary spread. The aphids deposit the virus in healthy plants during feeding. Insecticides to control aphids are not very effective since the aphids do not stay on the same plant for a substantial amount of time.

Many unanswered questions about DMV exist, and Drs. Claudia Nischwitz and Melanie Stock will address some of them in summer 2021, including transmission of the virus during cut flower harvest, associating DMV strains with specific symptoms, and a greenhouse trial to determine susceptibility of popular dahlia varieties.

To prevent DMV, start with healthy, virus-free tubers or seed. However, because these are difficult to source, testing your own stock is an option. Farmers that plan to overwinter tubers for next year's cut flower production can get up to 20 plants tested at USU, paid for by a grant. If you are interested in having some of your plants tested, please contact Nischwitz (claudia.nischwitz@usu.edu) or Stock (melanie.stock@usu.edu).

Symptoms of Dahlia mosaic virus include stunting (top left), vein-clearing on leaves (top right), color breaking on petals (lower left), and mosaic patterns (lower right).

Table 1. Distribution of DMV Strains Among Sample Types

	Seed	Tuber	Leaf	All Types
H only	0%	25%	12%	14%
P only	0%	3%	0%	1%
D only	54%	11%	8%	20%
HP	0%	0%	2%	1%
HD	0%	14%	29%	17%
PD	0%	3%	0%	1%
HPD	0%	0%	10%	5%
Total	**54%**	**56%**	**61%**	**58%**

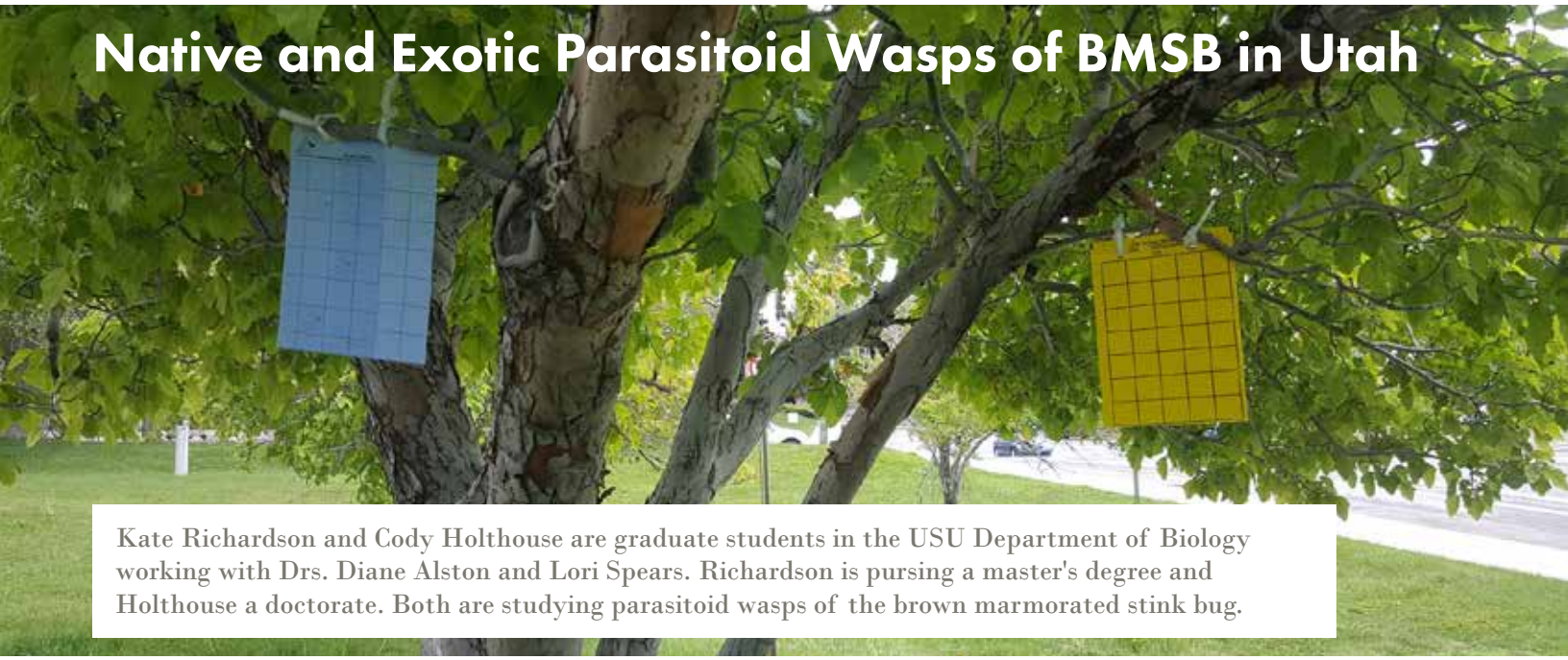
Note: H=Holland, P=Portland, D=D10

Table 2. Incidence of DMV Among Sample Types

	Seed	Tuber	Leaf	All Types
H Total	0%	39%	53%	36%
P Total	0%	6%	12%	7%
D Total	54%	28%	47%	42%

Tyson Compton, Technician, Claudia Nischwitz, Extension Plant Pathologist, and Melanie Stock, Urban & Small Farms Extension Specialist

Native and Exotic Parasitoid Wasps of BMSB in Utah



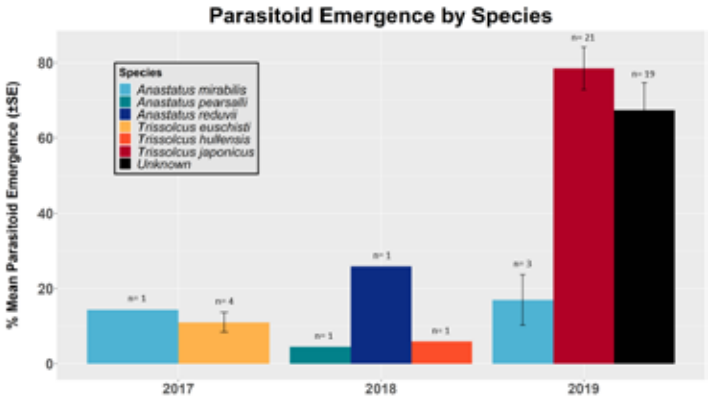
Kate Richardson and Cody Holthouse are graduate students in the USU Department of Biology working with Drs. Diane Alston and Lori Spears. Richardson is pursing a master's degree and Holthouse a doctorate. Both are studying parasitoid wasps of the brown marmorated stink bug.

The brown marmorated stink bug (BMSB, *Halyomorpha halys*) is a significant agricultural and urban nuisance pest in many regions of North America. In Utah, BMSB is established in six counties (Box Elder, Cache, Davis, Salt Lake, Utah, and Weber), and has been detected in Carbon and Kane counties. It feeds on a variety of ornamental and agriculturally significant plants, including specialty fruit crops like peach, tart cherry, and many vegetables. Managing BMSB with insecticides is challenging due in part to their strong dispersal capacity and their waxy, water-repellent cuticle that protects them from insecticide applications. Efforts have therefore emphasized biological control of BMSB eggs by small parasitoid wasps in the families Scelionidae and Eupelmidae (Order Hymenoptera). The most effective parasitoid of BMSB in both its native and invaded ranges is the samurai wasp, *Trissolcus japonicus*, a parasitoid native to southeast Asia that has also been found in some U.S. states.

In surveys for the samurai wasp and other native parasitoid species capable of parasitizing BMSB eggs in Utah, wild- and lab-reared BMSB egg masses were placed on outdoor hosts in 2017, 2018, and 2019. Five native parasitoid species were found: *Anastatus mirabilis, A. pearsalli, A. reduvii, Trissolcus euschisti,* and *T. hullensis*. On average, native adult wasps emerged from less than 26% of eggs within parasitized masses.

In 2019, the exotic samurai wasp was first detected in Utah, and our team found adults emerging from 21 egg masses that summer. On average, 78% of eggs within masses parasitized by the samurai wasp that year gave rise to adult wasps, shown in the figure above. These results suggest that the samurai wasp is a more effective egg parasitoid of BMSB than native wasps.

Sticky cards are a useful tool to detect local populations of parasitoid wasps. Yellow is the most popular color for this purpose; however, blue sticky cards appear to attract fewer non-target arthropods.



Percent parasitism of eggs in wild and lab-reared egg masses with adult wasp emergence in northern Utah, 2017–2019. Sample size (n) represents the number of egg masses parasitized. Bars without standard error lines represent single egg masses. The Unknown results represent parasitized egg masses where wasps were not present for identification. Given the large number of unknown wasps in 2019, many were likely *T. japonicus*.

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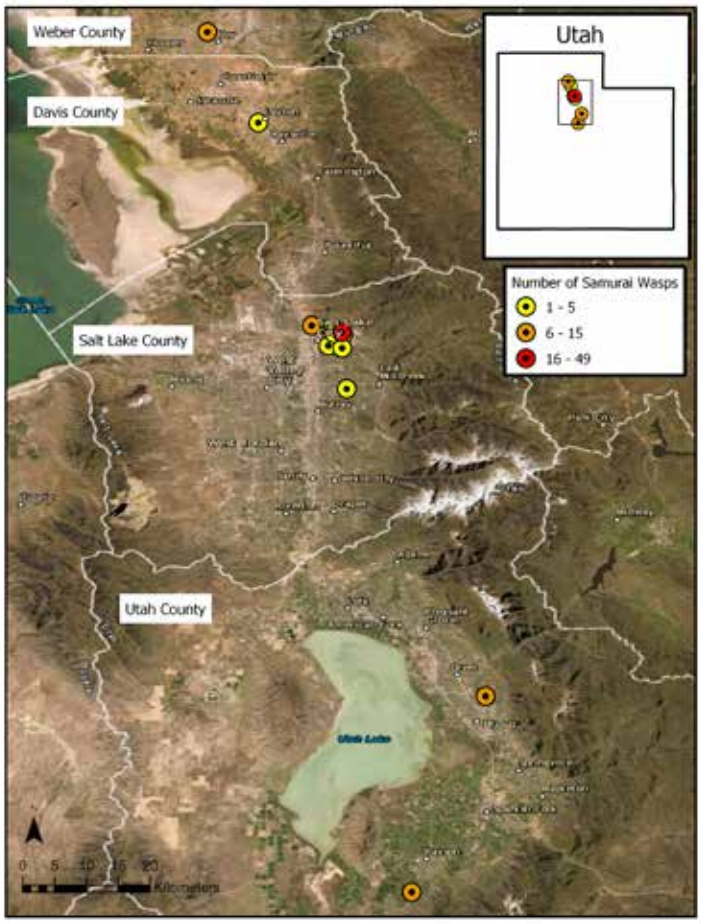
The samurai wasp, native to eastern Asia, is a promising biocontrol for BMSB (top). Stink bug eggs parasitized by a wasp turn black (bottom).



Map of samurai wasp detections in northern Utah on yellow and blue sticky card traps between late May and late September 2019–2020.

The search for parasitoid wasps in Utah also included sticky card traps in urban and agricultural landscapes along the Wasatch Front (shown at top of prior page). Easily installed sticky have been used across the U.S. to monitor parasitoid wasps of BMSB. Yellow is the most commonly used color due to its known attractiveness to many wasp species. However, yellow cards also attract numerous non-target species that reduces screening efficiency.

Our research team is comparing blue and yellow sticky cards as attractants of parasitoid wasps and non-target arthropods such as bees. Preliminary results show blue cards attract fewer target wasps and non-target arthropods than yellow cards, while representing a similar target wasp species complex. These results support the potential for increased screening efficiency with blue cards, and their use in parasitoid wasp surveys.

Yellow and blue sticky card traps deployed in 2019 and 2020 detected the samurai wasp in Davis, Salt Lake, Utah, and Weber counties (see map). Since 2019, we have observed reduced BMSB in certain areas, such as the University of Utah campus and neighborhoods in The Avenues of Salt Lake City. In fact, over just a three-week period, 11 Samurai wasps were caught in catalpa trees in The Avenues area in August 2020.

Adult parasitoid wasps are nutritionally dependent on nectar and pollen. To support establishment and enhancement of samurai wasp in Utah, upcoming research at USU will investigate the degree to which certain cover crops attract wasps. The studies will assess plants, such as buckwheat (*Fagopyrum esculentum*) and alyssum (*Lobularia maritima*), that attract and enhance the parasitism rates of the samurai wasp on BMSB egg masses, as well as those that extend the wasp's life span. These results will support the development of guidelines for specialty crop producers to encourage samurai wasp establishment and to better manage BMSB.

Kate Richardson, M.S. graduate student,
Cody Holthouse, PhD graduate student,
Diane Alston, Entomologist, and
Lori Spears, Invasive Species Coordinator

Spider Mites Active With Hot, Dry Conditions

The summer of 2020 was hot and dry in the West. A problematic group of pests of many agricultural, garden, and landscape plants that thrives in these conditions is spider mites. Acari is the group of arthropods that includes mites and ticks. Web-spinning spider mites (e.g., genus *Tetranychus*) produce fine webbing and can cause economic injury to plants. Many vegetable crops are prone to spider mite infestation, including beans, corn, eggplant, and cucurbits. Most tree and small fruits are also susceptible, especially raspberry, which frequently develops mite burn, a diagnostic leaf bronzing. Many landscape plantings are commonly infested; burning bush (*Euonymus*) and crocosmia commonly exhibit severe symptoms in a hot, dry summer. So what can be done to prevent mite burn, and loss of plant vigor and crop yield?

The first step is to understand the life cycle of spider mites, and when they are most vulnerable to suppression. Mature female adults (1/60-inch long) overwinter in reproductive diapause in protected locations, such as on low-growing plants, including weeds, and under the bark of trees. In spring, they become active, feeding on groundcover plants and leaves near the bottoms of plants. When temperatures rise above 80°F, the cycle from egg to adult may take as few as 10 days, and a single female can lay over 150 eggs in her lifespan. This makes for a lot of mites in a short amount of time. Mites will climb higher in plants and disperse via "ballooning" with spider silk on air currents as living conditions become crowded with other mites.

A key time to suppress mites is when first detecting low to modest numbers of mites, and before egg-laying moves into high gear. This typically occurs in early to mid summer, depending on weather conditions. Look for symptoms of mite feeding (fine white stippling and bronzing on leaves) and shake mites onto a light-colored surface to look for their movement. Use a 10-30x magnification hand lens to identify adult, nymph, and egg stages.

Early intervention will support the use of 'softer' products such as a stiff spray of water from a hose-end nozzle, insecticidal soap, horticultural oil (1%), and azadirachtin (neem oil). There are several registered mite growth inhibitors (Savey and Zeal) effective against eggs and nymphs. Other miticide products will also kill adult stages, such as Kanemite, Vendex, and Acramite.

Beyond chemical and physical controls, reduction in heat and dust can lower the risk of spider mite infestations. For low-growing crops, install shade covers to cool plants and reduce mite population growth. Plant a hardy grass or vegetation mix between crop rows to reduce dust and minimize broadleaf weeds which are good hosts (field bindweed, common mallow, knotweed). Dust provides a barrier to spider mite predators, and increases the temperature and aridity of leaf surfaces. For all plants, avoid stress from drought, poor nutrition, or herbicide injury; select cultivars with hairy leaves to deter mite feeding; and promote beneficial arthropods, such as predatory mites, true bugs, and the mite destroyer lady beetle.

Heavy feeding of two-spotted spider mite (inset) causes a scorched appearance of raspberry foliage.

Although the cooler temperatures of fall will arrive soon, remember these tips to prevent spider mite outbreaks in next year's crops, gardens, and landscapes. There are numerous effective approaches to suppressing spider mites beyond chemicals; be open-minded to these robust integrated practices to create a more sustainable plant production system.

Diane Alston, Entomologist

For more information

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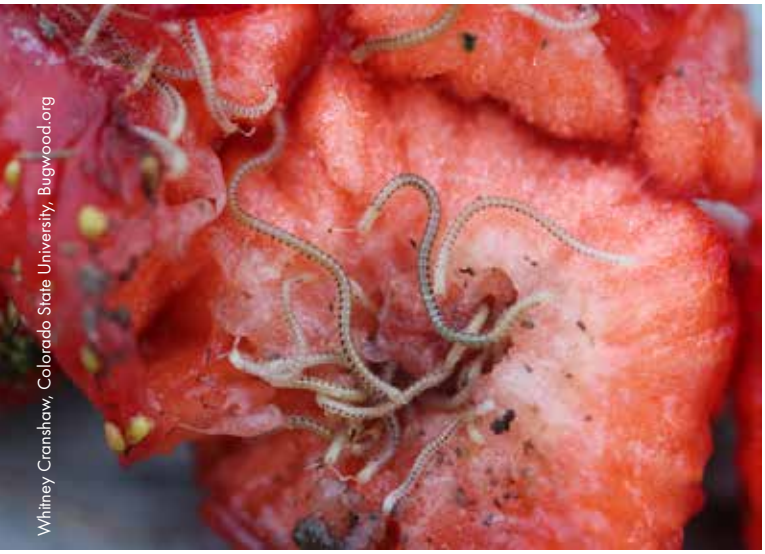
Got "Worms" in Your Berries?

There have been a few reports of "worms" in Utah berries over the past few years, including several inquiries in August 2020. The term "worm" technically describes mostly non-arthropod invertebrate organisms like earthworms, tapeworms, and roundworms. However, various arthropods are sometimes referred to as worms, including insect larvae (immature offspring) and even millipedes and centipedes. For example, mealworms are the larval form of the mealworm beetle. Yet, in Utah, "worms" in berries most likely describe millipedes.



Spotted snake millipedes are an introduced species that infests cultivated crops, such as strawberries, potatoes, beets, and squash, especially where they touch the ground.

Millipedes are elongated and round, and can feed on overripe fruit that is in contact with the soil, such as strawberries and low-hanging raspberries and blackberries. More generally, millipedes are scavengers that feed on decaying and moist organic matter, rarely feeding on roots and above-ground plant parts. Millipedes require high moisture and are therefore usually found in damp and dark locations, such as in soil, compost, and logs, or under leaves, boards, and rocks. They are multi-segmented and have two pairs of short legs on most body segments. Depending on the species, millipedes can vary from less than 1 inch to more than 10 inches in length, and in color from black to brown to creamy white.

Controls for millipedes are aimed at reducing moisture and favorable habitat. For example, remove decaying and dead vegetation, harvest fruit before they become ripe, prune low-hanging branches, and apply a dry mulch to act as a barrier between the fruit and the soil. Another control option is to place moistened newspapers in the infested garden area to divert and concentrate the millipedes. Since millipedes are considered beneficial overall due to their role in breaking down organic matter, controlling them using insecticides is not recommended unless infestations are severe and persistent. Review the references on millipedes at the end of this article for insecticide recommendations.

In Utah, it is unlikely that "worms in berries" are of the invasive spotted wing drosophila (SWD). SWD larvae are 1/16 to 1/6 inch long, tapered at both ends, legless, and cream-colored with black mouthparts. This Asian vinegar fly was first detected in the state in 2010, and our extensive annual trapping and fruit inspections have only detected adults, and have never found fruit damage due to SWD larvae. We trapped adults in cherry, peach, apple, plum, apricot, berry, and grape crops in both commercial orchards and home gardens. In addition, adults have been caught in traps in wild habitats, especially riparian areas, with river hawthorn, serviceberry, wild rose, dogwood, and other wild fruits. The 2020 survey updates are posted online at utahpests.usu.edu/caps/survey.

Spotted wing drosophila is an introduced species that infests ripening, ripe, and overripe fruit.

Adults are small, about 1/12 to 1/7 inch long. Identify adult males by the single black spot on the leading edge of each wing (near the tip) and distinguish females from

continued on next page

other drosophilids by a large, saw-like ovipositor (egg-laying device) located on the end of the abdomen. They generally become active in late summer (August) and trap captures peak from late September to early November. Late-season fruits are therefore at greatest risk for infestation.

Other arthropod pests that attack berry fruits include the European earwig, several fruit-eating wasps such as the yellow jacket and European paper wasp, various stink bugs like the green stink bug and the invasive brown marmorated stink bug, lygus bugs, thrips, grasshoppers, and spider mites. However, these pests are not likely to be mistaken as "worms" due to their appearance and feeding habitat. Other insects that infest raspberries in Utah include raspberry horntail, rose stem girdler, and raspberry crown borer. The larvae of these insects are the damaging life stage, and therefore, might be called "worms" by the public; however, the larvae feed on raspberry canes – not the actual berries.

Raspberry horntail attacks raspberry canes, and are among the primary pests of raspberries in Utah.

——— Lori Spears, USU CAPS Coordinator

For more information

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Cranshaw, W.S. (2013). *Millipedes, centipedes, and sowbugs*. [Fact Sheet No. 5.552]. Colorado State University Extension.

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GENERAL NEWS AND INFORMATION

Utah Pests Team Welcomes New Diagnostician

Insects and communicating science to people of all ages have been Zach Schumm's passions his entire life. As a result, he fits right in as the new arthropod diagnostician for the Utah Plant Pest Diagnostic Lab.

Zach earned his master's in biology from USU, with an emphasis in entomology, where he studied the ecology and management of brown marmorated stink bug. During his graduate studies, Zach received multiple awards and successfully published his thesis chapters. Zach received his Bachelor of Science from the University of Delaware in both entomology and wildlife ecology and conservation. Zach brings a new energy and expertise to the UPPDL and we are thrilled that he is now a part of the Utah Pests Team!

Tomatillo Trouble-Maker

The three-lined potato beetle adult is about ¼-inch long (left). Larvae have a slug-like appearance, and the orange, oval eggs are laid in clusters on the undersides of leaves (right).

Despite its name, the three-lined potato beetle (*Lema daturaphila*) is rarely observed on our potato crops. Rather, they are more prevalent in other Solanaceae crops and weeds, notably tomatillos (*Physalis* spp.). This beetle originates from North and Central America, but has since been reported causing economic damage to crops worldwide, such as the Cape gooseberry in South Africa and potatoes in Australia. Though uncommon, the three-lined potato beetle is established in Utah. In August 2020, it damaged tomatillos on a commercial vegetable farm in Box Elder County.

Adults are ¼-inch long and are orange-colored on the head, prothorax (with two black spots), and legs. Three distinctive black stripes run lengthwise along their yellow wing coverings. Larvae are greyish and slug-like, with legs and a black head. The slug-like appearance is because they cover themselves with their excrement as a probable defense to being eaten. Eggs are orange and ovular.

Three-lined potato beetles overwinter in the adult stage, and are active May through August. Females lay eggs in clusters on foliage that hatch in late June or July. Like adults, larvae feed on foliage in groups as opposed to individually, causing holes within leaves or complete defoliation. This may reduce plant vigor and photosynthesis. Like other leaf beetles, the three-lined potato beetle is able to avoid/tolerate the lethal tropane alkaloids found in some nightshade plants.

Larvae pupate in mid to late summer and then adults seek out protective sites for the winter. Depending on the location and temperatures, there can be two generations per year, but in northern Utah, more likely one generation with a partial second generation occurs.

Other insect pests that may be confused for the three-lined potato beetle and are more common, include the western corn rootworm, striped cucumber beetle, and Colorado potato beetle. The western corn rootworm is smaller (less than 0.25 inch long), yellow, has dark stripes along its back, and feeds primarily on corn and cucurbits. The striped cucumber beetle is slightly larger (0.33 inch long), yellow, and has the similar three black stripes. Lastly, the Colorado potato beetle has a similar name and hosts, but both the larva and adult differ in appearance from the three-lined potato beetle.

Tomatillos on the Box Elder County farm experienced considerable dieback, with one plant directly associated only with larval feeding. This pest was managed by hand-removing larvae and dumping them in soapy water. Other management methods include the use of an insecticide (permethrin or esfenvalerate), removing nearby weeds (especially those in the nightshade family), and exclusion by covering the crop with a light row cover.

— Nick Volesky, Vegetable IPM Associate

For more information

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Think You Found an Asian Giant Hornet? Here's What You May Be Seeing

The recent findings of Asian giant hornet (AGH) specimens in Washington and British Columbia, Canada has had homeowners and beekeepers on high alert this year. The Utah Plant Pest Diagnostic Lab (UPPDL) has received several photos of suspected AGH, and none were this non-native hornet. So, what are our fellow Utahns finding, and should we be concerned?

Asian giant hornet reaches about 2 inches in length. There are many large native wasps in Utah, most of which pose no threat to humans (or even plants for that matter). Three suspected AGH wasps the UPPDL regularly receives photos of include: horntail wasps, square-faced wasps, and ichneumon wasps.

Horntail wasps are the most common wasp submitted as potential AGH to the UPPDL for identification. Also called "wood wasps," these are large, semi-slender insects with a long, thick protrusion coming out of the abdomen's tip, often confused for a stinger. This protrusion is instead part of its ovipositor, the structure that insects use to lay their eggs. Horntail wasps use this ovipositor to deposit eggs under the bark and into the wood of trees. Often, these ovipositors will get stuck in trees as they lay eggs, and it is common to find dead horntail wasps stuck to their host tree.

Square-faced wasps are small to large ground-burrowing wasps. One of the larger species in Utah is the cicada killer wasp, a nearly 2-inch long wasp that looks menacing but is rather harmless to humans. These wasps are brown and black in color, with bright yellow markings on the abdomen. They received their name from their need to hunt cicadas to feed their young, which develop in underground nests. If you ever see a hole in the ground with a pile of soil surrounding the hole, there is a chance you are looking at the entrance to a square-faced wasp nest. The cicada killer is the only common square-faced wasp that rivals the size of AGH.

Finally, the ichneumon wasps are another large wasp commonly mistaken for AGH. Ichneumon wasp is a name that encompasses an entire group or "family" of wasps that can range from very small (< 1/2 inch) to very large (> 1.5 inches). Although these wasps are slender, the females may look worrisome due to the very long, stinger-

Hanna Royals, Museum Collections: Hymenoptera, USDA APHIS PPQ, Bugwood.org

A horntail wasp (left) and an Asian giant hornet (right). Note the thick protrusion extending out of the abdomen of the horntail, a key identification feature that Asian giant hornets do not possess.

Hanna Royals, Museum Collections: Hymenoptera, USDA APHIS PPQ, Bugwood.org

A cicada killer wasp (left) and an Asian giant hornet (right). While similar in size, the cicada killer abdomen is usually black in color, with bright yellow markings, whereas the Asian giant hornet has a striped appearance.

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like structures on their abdomens. Similar to the horntail wasps, this structure is an elongated ovipositor that they use to drill deep into trees and other plant structures to lay their eggs. Instead of laying eggs in the plant itself, they lay their eggs inside host insects that have already invaded the plant. Ichneumon wasps are actually one of the main parasitoids of horntail wasps.

Asian giant hornet is not expected to establish in Utah in the near future. Furthermore, the high elevation of the Intermountain West, combined with the arid climate, may make it challenging for AGH to establish. Nonetheless, the public remains a key player in detection efforts for invasive species. If you believe you have found AGH, contact the UPPDL for identification.

In a scenario where AGH does arrive in Utah and establishes, there still isn't much reason for alarm. They are typically unaggressive unless protecting their nest or food. In most cases, backing slowly away from a nest or hornet is all that is required to prevent a sting. Furthermore, the vast majority of stings do not come with associated health risks, unless you are allergic to the sting.

As with any stinging insect, call 911 if you suffer signs of an allergic reaction, or if experience unusual symptoms or health issues after a sting. Pain and localized swelling are normal, but trouble breathing, nausea, and hives are not. If you have known allergies to the stings of insects, administer a shot of epinephrine with an epipen.

An ichneumon wasp. Note the extremely long ovipositor, which cannot be used to sting.

Asian giant hornets, like most insects and arthropods that can sting or bite, are nothing more than a beautiful, misunderstood creature that are not as scary as they seem. Yes, we should be on the lookout for Asian giant hornet to prevent potential impacts to agriculture in the future, but they are not considered an immediate threat to Utahns or the state of Utah.

— Zach Schumm, Arthropod Diagnostician

Workshop on Mason Bees for Orchard Pollination

When: Wednesday, October 28th, 9:00am to 12:00pm PST
Where: Online using Zoom Conference
What: A series of short talks from industry professionals on the basics of orchard bee management and their deployment for crop pollination. These talks are designed to help growers better understand how to incorporate mason bees into their pollination programs.
How: The cost to attend is only $10. Visit our website to register: www.orchardbee.org/upcoming-events-1

Orchard Bee Association · Extension Utah State University · University of Idaho · Oregon State University Extension Service · CAFÉ · Watts · Foothill Bee Ranch

IPM In The News

Some Answers for Grape Pest

The pest, grape phylloxera, is native to the U.S., and after introduction to Europe, it almost decimated the French wine industry. In the U.S. where European grape varieties are grown, producers must graft these varieties to roots of native grapes to give them tolerance to this insect. Researchers at the French National Institute for Agriculture, Food, and Environment and the University of California-Riverside have concluded a decade-long effort to map the genome of grape phylloxera, identifying the genes involved in the attack on non-native grapes. In so doing, they are now able to engineer phylloxera-resistant grapevines.

Researchers Argue for Curbing Use of Neonicotinoid Insecticides

Researchers from North Carolina State and Penn State universities argued for curbing the use of neonicotinoid insecticides by discontinuing the preventive applications on crop seeds. They state in *Proceedings of the National Academy of Sciences* that although the practice is widespread, at least one study has cast doubt on its efficacy. Furthermore, evidence shows that these pesticides spread through the environment to pollinators, predators, and other insects they are not intended to kill.

Overall Insect Decline Not as Bad in U.S.

Scientists have been warning about severe insect declines for several years, particularly in Europe. University of Georgia scientist, Bill Snyder, and a team of researchers from UGA, Hendrix College, and USDA searched for evidence of decline specifically in the U.S. They used more than 5,300 data points for arthropods, collected over four to 36 years at monitoring sites representing 68 natural and managed areas. Some groups and sites showed increases or decreases in abundance and diversity, but many remained unchanged, yielding net abundance and biodiversity trends generally indistinguishable from zero. The authors, who published their findings in *Nature Ecology and Evolution*, note that pollinators and other beneficial insects do remain unambiguously in decline in North America.

Traditional Ag Practice Works for Corn Pest

Western corn rootworm is dubbed the "billion dollar pest" due to its potential for destruction. In 2003, a corn variety was introduced that contained the proteins from the bacterium *Bacillus thuringiensis* that kill rootworm larvae. Today, rootworms have evolved to resist the Bt protein, rendering this technology ineffective. Researchers from University of Arizona, North Carolina State University, University of California-Davis, McGill University, and Stockholm University reviewed the existing use of crop rotation to prevent rootworm problems. They examined six years of field data from 25 crop-reporting districts in Illinois, Iowa, and Minnesota where growers cycled different types of Bt-corn with other crops. They found that crop rotation was effective, even in areas where rootworm resistance to corn and soybean rotation had been previously reported.

Treatments Tested for Invasive Pest on Allium Crops

The newly-introduced allium leafminer (*Phytomyza gymnostoma*) is considered a major threat to onions, garlic, and leeks. A Cornell University-led team of researchers field-tested 14 insecticides, applied in a variety of methods, to understand the best treatment option for conventional and organic management. Foliar application was the most consistent and effective method, with up to 89% reduction in damage and up to 95% insect eradication, while application through drip irrigation was not effective. Most conventional insecticides were effective (dinotefuran, cyantraniliprole, abamectin, acetamiprid, cyromazine, imidacloprid, lambda-cyhalothrin, and methomyl). The organic option, spinosad, also reduced densities of allium leafminers as a foliar spray. It was also applied to bare roots and in plug trays for plant starts, where it reduced the insect's damage after transplanting by 90%. The researchers' findings are published in the *Journal of Economic Entomology*.

New Disease Identified on Apple in Northeast U.S.

Approximately 25% of a conventionally-grown apple crop and 100% of an organic crop in New York can be lost to a disease called bitter rot. Cornell plant pathologists sought to identify all the pathogens in the fungal genus *Colletotrichum* that causes the rot. *Colletotrichum* contains 189 species of fungi that cause rot diseases in a wide variety of fruit crops. The study, published in *Scientific Reports*, found a new species never described before and one that has been described before but never on apple. The dominant species was *C. fioriniae*, followed by *C. chrysophilum*, which is found in other fruits but not apples until now, and the newly discovered *C. noveboracense*, named after New York. The authors hypothesize that the range of these pathogens expanded due to climate change, but that more work is needed to demonstrate this.

Featured Picture of the Quarter

Shield-bearer moth larvae chew their way between the upper and lower epidermis of host plant leaves. Once inside, they "mine" their way through the tissues as they feed, creating a trail that is visible on the exterior surface of the leaf.

Once it is ready to pupate, the larva binds the surrounding upper and lower epidermis tissues with silk, and chews an ovular hole in the leaf. The chewed-out area of the leaf surrounds and protects the larva as it prepares for pupation, giving it the name "shield-bearer moth."

A Utah resident submitted this image to the UPPDL for diagnosis.

—— Zach Schumm,
Arthropod Diagnostician

New Publications, Websites, Apps

Pollination guides for vegetable crops, offered on eOrganic and developed by Cornell University, explain how to use controlled cross-pollination techniques for vegetables.

Results of the sixth National Cover Crop Survey have been released by the Conservation Technology Innovation Center, SARE, and the American Seed Trade Association. Of the farmers who seeded crops into the cover crop, 71% reported better weed control and 68% said soil moisture management improved. The 2019-2020 survey included perspectives from 1,172 farmers, representing every state.

Organic Farming Research Foundation and California universities are offering a Beginning Farmer Training Program. The free online training contains six modules comprised of written content, videos, and exercises. The program focuses on specialty crops, and the training can apply to anyone in the U.S.

The Organic Trade Association released Advancing Organic to Mitigate Climate Change, describing the role of organic farming and its ability to mitigate climate change. The report also identifies policy opportunities to support organic farmers, and encourages transition to organic farming.

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