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UTAH PESTS QUARTERLY

NEWSLETTER

Utah Plant Pest Diagnostic Laboratory

USU Extension

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Submitting a Plant Sample to the UPPDL (video)

Submitting a Pest Sample to the UPPDL (video)

The Complicated Relationship of Weeds, Arthropods, and Crops

Even when weeds are not in direct competition with crops, unmanaged field edges may be a source of pests, such as spider mite on corn.

Sustainable farming practices adopted by many farmers has resulted in weeds becoming an integral part of the farm landscape. However, the complex and unpredictable relationship between weeds and arthropods requires an understanding of pest and weed 'friendships' that can exacerbate crop pest issues versus other weeds that may be synergistic or beneficial.

Some weeds are 'friends' to pests, harboring a variety of insect and disease pests and acting as sources of crop pests. For example, wheat stem rust survives on its alternate host, barberry (*Barberry vulgaris*) and pest arthropods including leafhoppers, aphids, thrips, and mites find refuge in many weeds.

A Utah survey of spider mites on weeds associated with field edges of corn led by USU graduate student Mercy Odemba showed that weeds such as common mallow, barnyard grass, kochia, prickly lettuce, dandelion, barnyard grass, quack grass, green foxtail, and others harbor Banks grass mite and two-spotted spider mite early in the season. This finding demonstrates that some pest populations survive and increase on weeds and are capable of transferring to a neighbor crop. These interactions can be even more detrimental than herbivory alone when arthropods vector disease pathogens. For example, beet leafhopper transmits curly top virus from weeds to tomatoes and other hosts and aphids are well-known vectors of plant viruses that are transferred from weeds to crops.

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There are a number of arthropods that use weeds as a refuge for sustaining populations and overwintering, including spider mites on mallow (top) and aphids on feverwort (bottom).

Alternatively, some weeds may assist plant crops by increasing diversity. For instance, ground covers can aid in the conservation of soil, water, and organic matter and weeds such as purple deadnettle (*Lamium purpureum*), henbit (*Lamium amplexicaule*), and dandelion (*Taraxacum officinale*) provide food and shelter for pollinators and predators when crop plants are not yet established in the field. In one study, common knotweed provided alternate prey and shelter for predators such as big-eyed bugs, benefiting adjacent crops by reducing mite and aphid infestations.

When weeds are not competing for crop resources, leaving them unchecked may have major implications—good or bad–for crop health. Knowing whether to keep the right weeds and proper weed density may be the difference in pest prevention and crop yields.

Mercy Odemba, graduate student, Biology (PhD)
and Ricardo Ramirez, Entomologist

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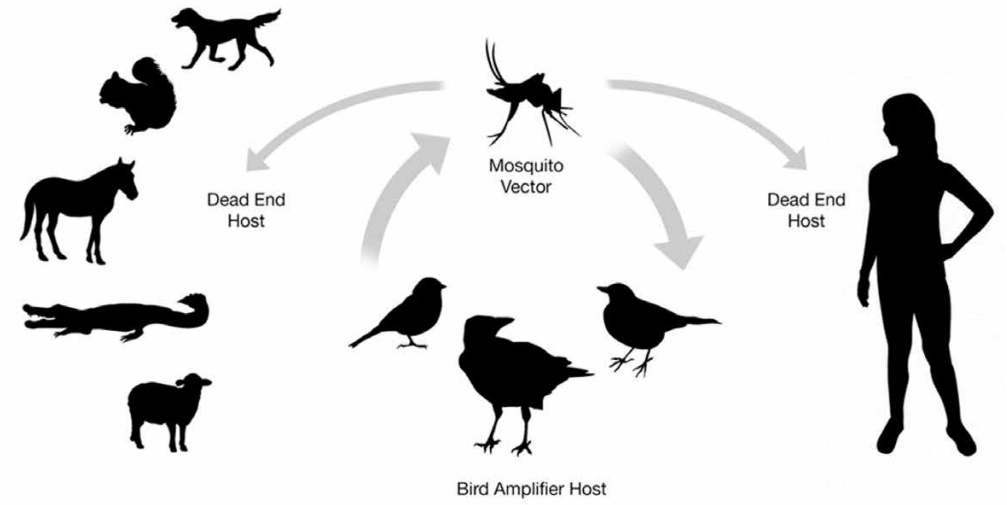
West Nile Virus in Horses

Dr. Karl Hoopes is an Equine Specialist and veterinarian at Utah State University Extension, specializing in equine medicine and equine behavior. He also leads a program call Ride Utah!, which provides a 2-hour trail ride, lunch, and professionally moderated group discussions for military personnel.
Learn more at the Extension Equine website.

In 2021, there were 12 cases of West Nile Virus (WNV) in horses in Utah, mostly in Weber and Box Elder counties. In 2022, the count (as of August 16) is four horses, occurring in Duchesne and Uintah counties. Three of these horses were unvaccinated; one is recovering, and three were euthanized. To track WNV, the Utah Health Department and mosquito abatement districts monitor mosquito populations. Along with these four cases, they have also found positive WNV mosquito pools in Salt Lake, Davis, and Weber Counties, although not nearly as many as they found in 2021.

In 1999, WNV was first discovered in the northeastern U.S. Clinical disease caused by the virus was first identified in birds, followed by humans and equines. By 2002, over 15,000 horses were diagnosed in over 41 states. Birds, primarily crows, blue jays, and magpies, are the primary reservoir for WNV in which the disease is usually fatal. The virus is transferred between birds by mosquitoes. When a bird is infected, it serves as an amplifying host of the virus. This means that the virus replicates quickly and results in large amounts of virus in the bloodstream resulting in a profound viremia. A viremic bird is then bitten by a mosquito which then transfers WNV to horses, humans, and other mammals. Infected mammals typically experience a low viremia. As a result, mammals are generally considered dead-end hosts and mosquitoes are unable to transmit WNV from an infected mammal to an uninfected mammal.



Life cycle of West Nile virus, which is vectored by mosquitoes. "Dead end" hosts mean that the mosquito cannot transmit the virus from an infected mammal to an uninfected mammal.

Image credit: Byas, Alex D., and Gregory D. Ebel. 2020. "Comparative Pathology of West Nile Virus in Humans and Non-Human Animals" Pathogens 9, no. 1: 48.

Horses can exhibit clinical signs when they become infected by WNV. As is common with many viral infections, many horses will not experience any clinical illness after becoming infected. However, WNV can cross over the blood-brain barrier and cause disease in the brain and spinal cord. This disease is referred to as WNV encephalomyelitis and can vary in range and severity. The most common symptoms of disease include ataxia in the hind limbs and twitching of the muzzle and neck muscles. Other symptoms include fever, wandering, impaired vision, and generalized weakness. Severe cases include depression,

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stumbling, paralysis, recumbency, and death. Geriatric horses or any horse that becomes recumbent (unable to get up) have a much higher risk of death from WNV infection.

Diagnosis in horses involves the presence of clinical symptoms and detection of antibodies in the bloodstream. Often the symptoms of WNV encephalomyelitis cannot be distinguished from other equine neurologic diseases. Therefore, a blood test is required to look for antibodies specific for WNV. Other equine neurologic diseases, such as Equine herpes virus (EHV), can also be fatal and can be spread from horse to horse. This makes it important to distinguish WNV infection from other neurologic diseases.

Treatment of WNV encephalomyelitis is mainly supportive as there is no cure. Controlling pain and inflammation with anti-inflammatories and fluid therapy is most often utilized. Initiation of supportive care at an early onset of the disease does lead to a more favorable outcome. The mortality rate for infected horses is estimated to be 35%. Approximately two-thirds of infected horses will recover. However, 40% of those that survive will continue to show clinical signs.

Since 2003, equine WNV vaccines have been available. Dosing frequency is important and it is vital that you visit with your veterinarian when determining a vaccination schedule. In heavily affected areas, the vaccine can be administered as often as every 4 months.

In addition to vaccinating your horse, focus on eliminating mosquitoes from horse areas. This includes removing standing water, thoroughly cleaning water troughs, using larvicides, keeping your horse inside during the peak mosquito times, using insect repellents, removing birds from the stall area and protecting yourself with proper clothing and mosquito repellent.

PLANT PATHOLOGY NEWS AND INFORMATION

Tomato Problems in 2022

In spring and summer 2022, I received many inquiries about tomato plants with various symptoms, including yellow leaves, green leaves with some purple veins, poor growth, or rolled leaves. Most clients were concerned about Beet curly top virus. However, none of the symptoms in the inquiries that came to me match curly top in tomato. Curly top symptoms, especially for early-season infections, consist of yellow leaves with purple veins, premature fruit ripening, and stunting.

Examples of tomato symptoms seen this summer include yellowing leaves, leaves with purple veins, and curled leaves.

Symptoms on aboveground plant parts are frequently caused by problems belowground or in the crown area above the soil line. The curling or rolling of leaves is due to the plant trying to reduce transpiration and conserve water. With the high temperatures, water restrictions and sometimes poor root development, this was frequently seen in Utah this summer.

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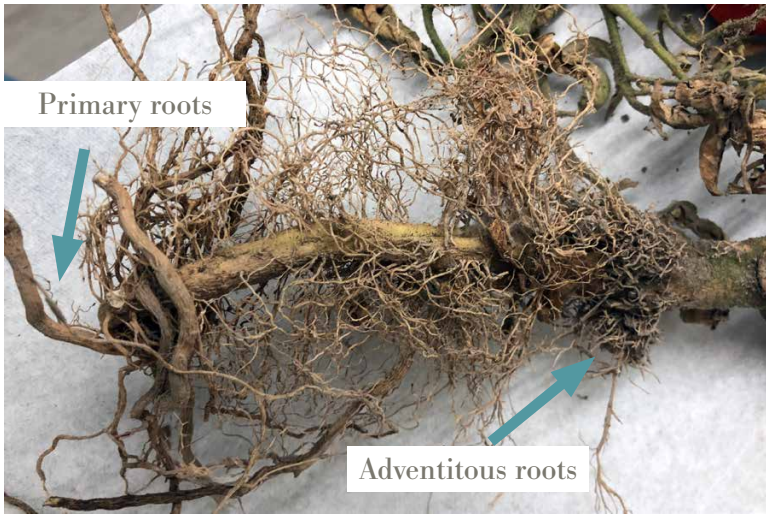
In some areas of Utah, tomato planting was delayed due to prolonged cold temperatures in May and early June, resulting in rootbound plants and poor root development. The sudden increase in temperature after planting led to a growth spurt above ground while roots were unable to keep up. Some tomato plants developed adventitious roots but the fine roots were unable to compensate for the poor development of primary roots.

Quite frequently poor root development was compounded by a root rot. We found three different pathogens causing root and/or crown rot on tomatoes this year.



Poor root development showing excessive adventitious roots.

Fusarium root and crown rot – *Fusarium oxysporum* f. sp. *radicis-lycopersici*

This pathogen is specific to tomatoes. Aboveground symptoms can superficially look similar to Fusarium wilt. Plants may wilt in the heat of the day and recover in the evening and some of the leaves, especially the lower leaves, turn yellow. Pulling up wilting plants reveals rotten roots and dark brown lesions on the main stem up to five inches above the soil line. There is no vascular discoloration but the lower stem and root cortex (interior part of the tap root) can be discolored. Occasionally, adventitious roots develop.

Management of Fusarium root and crown rot is limited. Resistant varieties are available and the plant label may state either "Resistant to Fusarium root and crown rot limited" or the designation "FORL". Note that if the tomato variety is described as resistant to "Fusarium," it is not resistant to Fusarium root and crown rot but to Fusarium wilt. Where the disease has been identified, crop rotation for several years can reduce incidence.

On tomato plants infected with Fusarium root and crown rot, the main stem can be discolored up to 5 inches above the crown.

Fusarium root rot – *Fusarium solani*

F. solani has a wider host range that includes other solanaceous vegetables such as pepper and potato. The symptoms look very similar to Fusarium root and crown rot. The only difference is that F. solani does not cause a root rot. To reduce disease incidence, rotate crops with non-solanaceous plants. There are no resistant varieties.

Pythium root rot – *Pythium* sp.

Pythium has a wide host range that includes tomato, cucurbits, and many other vegetables. Aboveground symptoms look like Fusarium root and crown rot. The difference is that Pythium causes a root rot but no crown rot. Pythium species cause infections in wet soil, where spores move in a film of water from root to root. There are no resistant tomato varieties available. Minimizing irrigation by using drip is the best management option for homeowners. For commercial growers, products containing mefenoxam applied at planting can minimize disease incidence.

Claudia Nischwitz, Extension Plant Pathologist

Plastic Mulch Effects on Tomato Spotted Wilt Virus

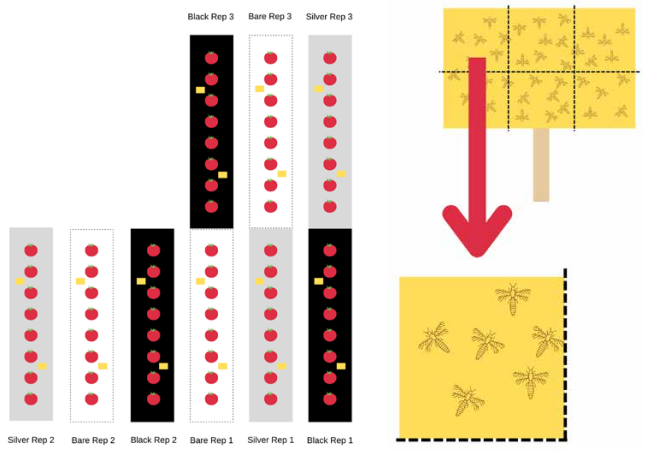
In 2022, the USU Extension Integrated Pest Management (IPM) program conducted a trial at the IPM Demonstration Farm in Logan, Utah to determine whether black mulch, silver mulch, or bare soil effects the presence of western flower thrips (WFT; *Frankliniella occidentalis*). WFT can vector Tomato spotted wilt virus (TSWV). This trial was inspired by, and replicated components from, Benjamin Scow's 2021 USU research thesis titled Management Strategies for Tomato Spotted Wilt Virus in Utah Tomatoes.

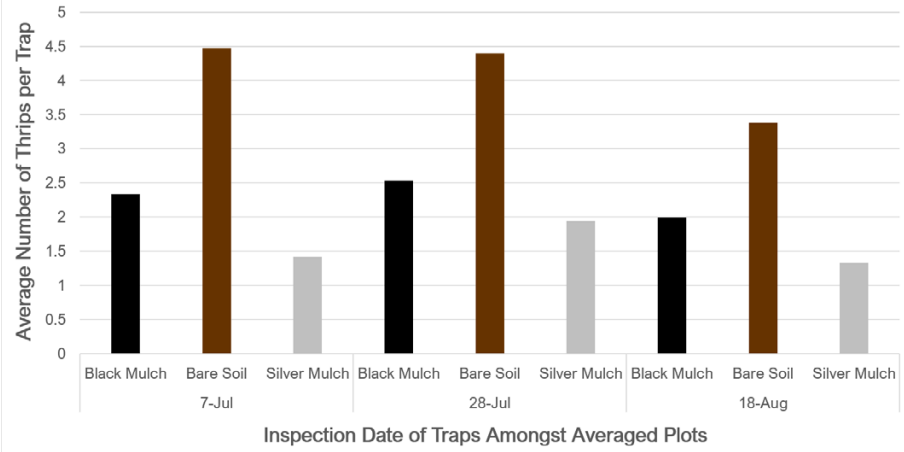
In this trial, we planted three, 20-foot rows of drip-irrigated tomato for each treatment (black mulch, silver mulch, and bare soil), spaced at 5 feet apart. We chose four tomato varieties (Early Girl, DX 52-12, Oregon Spring, and Arkansas Traveler) that were planted at two different dates in mid and late May. We hand-weeded the rows throughout the season, and maintained the plants as needed (but did not prune or stake them).

We installed yellow sticky traps to determine the presence of WFT. Two traps per treatment were used and inspected on July 7 and July 28 and 1 trap per treatment on August 18. To determine the WFT count, we inspected only the south-facing side of the trap. It was divided into six sections, each being assigned a rating (1-5) based on the number of thrips within that section. The ratings were then averaged for each trap.

The results showed that traps in the bare soil and black plastic had significantly more thrips present than traps in the silver mulch. This coincides with expected results that the shine of the mulch will deflect thrips. In the bare soil treatment, we found two tomato plants with visual symptoms of TSWV (target spots and a calico pattern on ripe fruit) that was confirmed using ImmunoStrip tests. One plant was found with symptoms in the silver mulch treatment, and this plant was on the edge of the row where thrips likely had migrated from other rows.

Our trial showed that silver plastic mulch successfully deterred thrips and potential spread of TSWV. When used correctly, plastic mulches can provide numerous other benefits for commercial tomato production. It can help reduce evaporation in the soil, evenly distribute and maintain soil temperatures, prevent erosion, control weeds, and evidently deter pests.





Top left: Diagram of treatment layout.
Top right: Thrips were counted on yellow traps by sections.
Bottom: Average rating of thrips counts by treatment and date.

Bridger Carey, Vegetable IPM Intern, and Nick Volesky, Vegetable IPM Associate

Additional Resources

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Emerald Ash Borer on the Move

Emerald ash borer and s-shaped larval galleries

The Emerald ash borer [(EAB) *Agrilus planipennis*] is an invasive beetle native to Asia. In 2002, EAB was first detected in the U.S. in Michigan and has since killed tens of millions of ash trees. Before this summer, the western-most occurrence of this insect was Colorado; however, in June of 2022, EAB was found in Forest Grove, Oregon and likely has been there for up to five years.

A biologist for the city of Portland noticed a suspected EAB emerging from an ash tree and alerted federal officials from the USDA who confirmed the identification. Even though EAB has not been found in Utah, the public should be aware, and looking for any signs of the beetle or its damage. Ash comprises up to 30% of the urban canopy in many Utah communities, so EAB's presence would make a noticeable impact.

Description and Damage

EAB adults are bright, metallic, emerald-colored insects and are only about half an inch long. Adults lay eggs on ash bark in spring and larvae bore into the tree, eating the bark and creating S-shaped galleries, where they will eventually pupate and overwinter. The next spring, the new adults will emerge from the tree, leaving behind distinctive D-shaped exit holes. The affected trees have a thin canopy, split bark, and eventually die.

What is Being Done

To help prevent the spread of EAB, federal officials from USDA-APHIS are releasing biocontrol agents that are parasitoid wasps. The wasps lay eggs inside EAB eggs or larvae, and the wasp larvae consume the egg or larval contents, effectively killing the host.

In addition, the Utah Department of Agriculture and Food (UDAF) implemented a state quarantine in 2021 that restricts movement of the beetle in any living stage, as well as ash trees, green waste of ash, ash firewood, and other articles that present a hazard of spreading the insect. Further, since EAB and several other forest pests can be transported to new areas on firewood, UDAF also implemented a state firewood quarantine which prohibits firewood imports from high-risk areas of the U.S. and Canada, unless the shipment is certified as heat-treated or meets other precautionary standards set forth by the state.

Buying local firewood is the simplest way to ensure that you are not moving invasive species to new areas. If you purchase firewood, be sure to check the label to see where the firewood originated. If it was harvested in Utah or heat-treated, then the product meets the quarantine. If you have already moved firewood into the state from a quarantined area, then it is important that you burn it immediately. Make sure to collect all pieces of wood and rake up any dropped leaves, bark, twigs, or other debris and burn them as well. It is imperative that the wood is not left behind or returned to where it was from.

Emily Parent, Research Technician, and Lori Spears, USU Invasive Species Specialist

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Sacrificial Sunflowers

One of the many trials this season at the IPM Program's Demonstration Farm in Logan, UT included a planting of a sunflower "wall" on the eastern edge as a trap crop for the adjacent vegetable production. Trap cropping involves growing plants alongside a crop that are more appealing to a target pest, thereby protecting the crop. Some sunflower varieties are grown as a crop and harvested for their seeds while others are found along roadsides, in pastures and rangelands, or as ornamentals in gardens. Wherever they occur, one can find up to 150 plant-feeding insect species on them.

We selected the Peredovik variety of sunflower as our trap crop. We interplanted the sunflowers with dwarf sorghum in a 200-foot row with drip irrigation and plastic mulch. This allowed for vigorous growth and minimal weed competition. The sunflowers were planted about 5 inches apart and grew 4 to 5 feet tall. Numerous literature citations indicate that sunflowers (and other Asteraceae plants) are an excellent intercrop, and we found this to be accurate on our farm. By late July and early August, much of our sunflower trap crop "wall" had succumbed to extensive pest pressure. Our trial mainly focused on identifying and monitoring these damaging insects being deterred from the vegetable crops; however, we also observed a significant amount of beneficials amongst the planting.

We regularly encountered the following pests on the sunflowers, and many of these are found on sunflowers across Utah.

Stink bugs (Family Pentatomidae) are shield-shaped true bugs. Both adults and nymphs have piercing-sucking mouthparts to feed. Though we found several species of stink bugs on the sunflowers, it was difficult to identify any specific damage being caused to the flower. Similar to other true bug species, they may be feeding on developing and developed seeds.

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Grasshoppers (Family Acrididae) are a major generalist plant feeder found throughout Utah rangelands and home landscapes. They're easily identified by their large hind legs and mobility. High numbers of grasshoppers were found on the sunflowers, likely due to their proximity to a section of unmanaged weeds. Grasshoppers have chewing mouthparts that tear away tissue. Damage was primarily observed on the stem, foliage, petals, and involucre.

European earwig (*Forficula auricularia*) is easily identified by its slender dark brown body, red-brown head, and a prominent pair of pinchers on the rear of the body. Earwig populations tend to be at their highest in mid to late summer. On our sunflower trap crop, earwigs were found on all parts of the plant, especially the head amongst the disc florets. Extensive feeding was found on the petals, involucre, stem, and leaves.

Lygus bugs (Family Miridae) are very common in Utah agriculture and cause general damage to flowers and seeds. These small true bugs are 0.2-inches at the adult stage. They vary in color from pale green to dark brown. They have a distinctive triangle or "V" on their back. On sunflowers, lygus bugs feed on developing seeds which can cause necrosis on the seeds and affect the flavor.

Sunflower stem weevil (*Cylindrocopturus adspersus*) adults are 1.75-inch long and gray with white markings. They have black eyes, snouts, and antennae. Eggs are laid within the sunflower stems. When the larvae hatch they feed in the lower portion of the stem. This tunneling cause the stem to become weakened and vulnerable to pathogen infection.

Sunflower moth (*Homoeosoma electellum*) is a gray-tan color and one-third inch long. Mature larvae are ¾-inch and have alternate dark and light-colored stripes running the length of their brown bodies. Moths lay their eggs on top of the sunflower heads. Upon hatching, the larvae burrow through the corolla of the flower to feed on the pollen inside the disk florets. Larvae may also feed on the anthers and styles. This prevents the sunflower from being fertilized and producing seeds.

— Nick Volesky, Vegetable IPM Associate

End-of-Year Bee Hotel Maintenance


JayDee Gunnell, USU Extension


JayDee Gunnell, USU Extension

Bee hotels (also called "bee boxes" and "bee blocks") are popular in backyards and commercial agriculture alike, adding nesting habitat for native pollinators. Roughly 1,100 native bee species reside in Utah, and about 30% of these depend on above-ground nesting sites, such as hollow or pithy stems and burrows in wood, which bee hotels can provide. Common pollinator guests include mason bees, leafcutter bees, small carpenter bees, wool-carder bees, and resin bees, among others. Unmaintained hotels, however, can harbor high rates of harmful bee pests and diseases, so if you use these structures, be sure to establish an annual maintenance routine to promote bee health. Fall is a good time to begin.

When bee activity has ceased in late autumn or after the first frosts have occurred, gently remove the nesting tubes and blocks from your hotel for inspection and overwintering. Moving the hotel later in autumn (November or December) allows bees to more fully develop and has been associated with producing heavier (thus healthier) adults in the summer-nesting alfalfa leafcutter bee. Dislodged bees can starve when moved too early in their development, but storing the tubes with the capped ends facing upwards can prevent this by effectively positioning young bees atop their food source. Inspect the tubes for damage such as cracks and holes, which can indicate the presence of bee pests and diseases (e.g., chalkbrood) and necessitate opening for closer examination.


Crown Bees

Dead bee larva infected with chalkbrood, a highly destructive fungal pathogen of cavity-nesting bees.

Your hotel may overwinter in its outside location if it will remain dry and protected from the elements and predators, otherwise move the nesting materials to an unheated garage, shed, or similar area that is protected from moisture, wind, direct sun, and predators such as birds and rodents. Note that a refrigerator should not be used to overwinter leafcutter bee nests, which can be identified by their vegetative tube plugs.

Prepare for next year's nesting season by having a second set of tubes and hotels ready for spring placement. Provide a range of interior tube diameters from about 1/16" to

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3/8" to attract a wider variety of bee species, or only offer the diameter preferred by the species you wish to attract. Note that in general, the wider the entrance, the longer the tube should be, as shallow tubes predominantly produce male bees. (A more detailed USU fact sheet, "Making and Managing Wild Bee Hotels," will soon be available on the Utah Pests website.)

In early spring, place your overwintered hotel or nesting tubes in a dark container with a small exit hole (an "emergence box") before relocating them outside. Leave the nests in the emergence box for a full year unless you are managing for a single bee species; a second year may be warranted when nests are from parsivoltine bees (species taking up to two winters to emerge) such as *Osmia coloradensis* and *O. montana* in Utah, among others.

An emergence box encourages the new generation of bees to nest in fresh sites and allows the nesting materials to be cleaned or discarded without fear of tossing new nests. Discard paper straws, liners, all stems and reeds, and entire fixed-tube hotels once bees have emerged (look for exit holes in the end plugs). Discard drilled wooden nesting blocks at least every two years, even when using disposable liners. Nesting materials that can be disassembled for cleaning, such as grooved boards and trays can be reinstated after all surfaces have been thoroughly scrubbed and soaked in a solution of 1-part bleach to 2-parts water.

Observe your hotel's ongoings beginning in spring, and become familiar with its benefactors. Throughout spring and summer, check your hotel often for signs of moisture, bird and rodent activity, bee parasites, and infestations of pests such as ants, spiders, beetles, and earwigs. When next fall arrives, repeat your maintenance routine. Provide a 5-star guest experience and in return, reap outsized rewards from these small but mighty pollinators.

Leafcutter bees seal nest tubes with vegetation, whereas mason bees use mud to protect nesting chambers.

— Ann Mull, Research Technician, and Lori Spears, USU Invasive Species Specialist

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IPM In The News

Stressed Plants Produce Their own Aspirin

A new paper published in *Science Advances* examined how plants regulate their production of salicylic acid, an important chemical in the field of research surrounding plant resistance. University of California-Riverside scientists discovered that heat, intense sunshine, and drought trigger a specific molecule called MEcPP to be produced, which then accumulates and leads to the production of salicylic acid. The production of salicylic acid sets off protective actions within the plant cells that scientists liken to a "plant painkiller," or a chemical that allows plants to withstand stressors that are likely to become more common with the effects of climate change.

Onions Maintain Yield with Less Insecticide and Fertilizer

Onion thrips is one of the most pressing pests of onion, and it has developed resistance to many insecticides. To address this issue, researchers at Cornell AgriTech have been fine-tuning action thresholds for this pest and fertilizer-pest interactions for the last three years. Their research, published in Agronomy, showed that onion growers in New York who followed action thresholds for determining when to apply insecticides for thrips made 2.3 fewer applications per season with no negative effects on yield. In addition, the results also showed that farmers could use 50 to 100% less fertilizer without reducing yields. These findings are important in not only combating insecticide resistance in thrips, but also decreasing fertilizer applications, both of which help the environment and the growers' wallets.

Ants' Role in Pest Control

A new paper published in the ***Proceedings of the Royal Society B*** conducted a review of research looking at ants as a pest control option as compared to traditional pesticides. The researchers analyzed 26 species of tree ants, 17 crops, and 30 pest species in 52 studies across the U.S., Australia, the U.K., and Brazil. They found the greatest effects in shaded crops that would occur in agroforested lands (tree crops grown with ground crops). In these areas, they found that a higher diversity of ants resulted in more diverse pest control and that some species were more effective than pesticides at controlling crop damage. However, the scientists caution that the use of ants in agriculture is complex ecologically and there is concern that ants can still increase pests that produce honeydew due to this complexity.

Insect Counteracts Tobacco Plant Defenses

While studying plant defense mechanisms in wild tobacco, chemists at the Max Planck Institute for Chemical Ecology discovered that the larvae of the tobacco hawkmoth can use two different mechanisms to detoxify the plant's defenses after ingestion. The researchers implemented a new research strategy they coined "frassomics" in which they analyzed frass plus all metabolites and discovered the chemical conversions of the ingested plant metabolites. The study, published in *Proceedings of the National Academy of Sciences*, serves as an example of the evolution of plant defenses and the adaptations of an insect who specializes in feeding on that plant.

Tracking Plant Pathogens in Leafhoppers

Phytoplasmas, a type of bacteria that cause plant diseases, are often vectored by leafhoppers. A novel study, reported in the journal *Biology*, analyzed 407 leafhopper species collected from natural areas around the world to learn more about phytoplasmas. Using next-generation DNA sequencing techniques, method, researchers found phytoplasmas in regions of the world where such diseases had not been reported and identified several new strains of bacteria.

Soil Temperature and Pest Spread in Crops

Corn earworm (*Helicoverpa zea*) is an important pest that feeds on corn, cotton, soybeans, peppers, tomatoes and other vegetable crops. Researchers at North Carolina State University combined historical soil temperature data with corn earworm monitoring data to better understand how well larvae survive underground over the winter. The researchers first outlined three U.S. zones representing annual overwintering areas (southern zone), no overwintering survival (north), and a transition zone. They then created a model to predict pest spread through the end of the century. The model suggests the southern zone will double in size by the end of the century and shift well to the north, while the other two zones will shrink. States where corn earworm does not currently overwinter may experience heavier populations in the years to come.

Featured Picture of the Quarter

This Utah-grown corn has a disease called corn smut. Something with the name "smut" does not sound appealing to eat, but the fungal fruiting body growing out of the corn is a delicacy for some people and cultures. In Mexico it is readily sold as huitlacoche, and in southern Utah, ancestral Puebloans that regularly ate the fungus avoided nutritional deficiencies due to its abundance of several essential amino acids.

Corn smut is not common in Utah, but can occur under cool and wet conditions during corn silking. The fungus, *Ustilago maydis*, can survive as spores in soils and decaying plant matter for several years.

Image by Claudia Nischwitz, Extension Plant Pathologist

ATTENTION FARMERS:

How do you Manage Rodents?

Outbreaks of highly pathogenic avian influenza, swine fever, and other serious diseases are often attributed to rodents. A collaborative program between Fordham University, Cornell University, The University of Tokyo, and Japan Pest Control Association will address this issue.

They first need to determine the current situation of rodents on farms and their control. You can help by filling out this survey, which will take up to 10 min - bit.ly/survey_rodents

Clipart courtesy of FCIT

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NPDN National Plant Diagnostic Network

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