



IN THIS ISSUE

Cytospora Canker in Peach Trees

Fusarium Diseases in Tomato

Welcome New IPM Associate to the Team

Keeping the Home Compost Clean

Testing Novel Traps to Monitor Peach Twig Borer

Western Grapeleaf Skeletonizer

Wheat Stem Maggot in Cereal Crops

Transition to Organic Program Fact Sheets

IPM in the News

NEW MEDIA

[American Plum Borer](#)

[Cotton Root Rot](#)

[Organic Cherry Pest Management](#)

[Organic Pesticides - A General Overview](#)

Cytospora Canker in Utah Peach Trees

Reduced tree vigor and yield in a Utah peach orchard due to Cytospora canker.

Imagine investing thousands of dollars in a peach orchard that should remain productive for 20 years, only to find that disease pressure forces replanting trees much sooner. The cause? A fungal disease called Cytospora canker that kills branches and sometimes entire trees. It is one of the most common and destructive diseases of peach and other stone fruit trees in Utah. Growers report that, during the past five years, tree decline, reduced yields, pruning costs, and tree replacement due to Cytospora have increased significantly.

For decades, the literature stated that the fungal species affecting peach trees in Utah were *Cytospora cincta* and *C. leucostoma*. However, of the 57 canker samples our research team collected from seven orchards in summer 2026, we identified 49 as *Cytospora plurivora* and eight as *C. sorbicola*. These results indicate that both species are important canker-associated pathogens in Utah peach orchards, rather than the previously identified species. *C. plurivora* was described from olives in California in 2018 and has a wide host range.

Our team also conducted preliminary assays to determine which pathogen is more aggressive. In artificial nutrient media, *C. plurivora* grew almost twice as fast as *C. sorbicola*. However, when twig sections were inoculated with the two species, *C. sorbicola* was significantly more aggressive than *C. plurivora*. Our future studies will further evaluate the distribution of these species, their sensitivity to commercial fungicides, and locally adapted biocontrol agents for sustainable management.

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Cytospora Canker in Utah Peach Trees, continued



Fungal growth on nutrient media showing *Cytospora plurivora* (left) growing almost twice as fast as *C. sorbicola* (right).



Based on the images above, it appears that *C. plurivora* is the more aggressive pathogen. However, when grown on peach twigs, the result is the opposite. The twigs on the far left are control (no *Cytospora*), the twigs in the middle are *C. plurivora*, and the twigs on the right are *C. sorbicola*, whose cankers grew the longest.

How to Identify Cytospora Canker

Cankers are elongated, sunken, discolored areas of bark. Older cankers are often surrounded by swollen callus wood. On peach trees, dark-colored globs of gum form around the margins of the canker, often in an oval shape. On affected branches, if the canker girdles the branch, leaves above the infection site will droop and turn brown and remain attached.

Keep in mind that gumming on stone fruits can occur for many reasons. To determine whether *Cytospora* is the cause, scrape away the outer bark near the edge of the gumming. Cinnamon-colored, dead tissue in the inner bark indicates the presence of a canker.

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Left: Dead branch with brown leaves remaining attached. **Middle:** A canker associated with a pruning cut showing gummosis. The bark has been scraped away, revealing the semi-circle of necrotic (brown) tissue. **Right:** Mix of latex paint and Topsin applied to a canker to prevent sporulation.

Managing Cytospora Canker

Anyone growing peach trees should keep Cytospora prevention in mind. Once the disease becomes established in an orchard, it is difficult to manage because there are no fungicide options that can cure an established canker. Therefore, prevention is key.

- **Pruning:** Only prune peaches from late March through late July. Pruning in winter may increase the chance of cold injury, while pruning in late summer may reduce cold tolerance. Prune only during dry conditions.
- **Tree health:** Maintain balanced nutrient levels to decrease tree stress, particularly iron.
- **Avoid other tree injury:** To prevent bark sunscald, apply diluted white paint or use white tree wrap from December through March. Prevent mechanical injury from lawn mowers, trimmers, ladders, and harvest equipment.

- **Watering:** Use drip or soaker irrigation, as emitters and overhead and under-tree sprinklers can promote and disperse spores.
- **Variety:** Plant cold-hardy, tolerant species or varieties that are well suited to the site. Highly susceptible varieties include Berenda Sun, Elegant Lady, June Pride, Sierra Rich, and Zee Lady. Older peach varieties such as Glohaven, Redhaven, and Suncrest have shown greater resistance.
- **Fungicides:** For commercial production, research conducted in Colorado showed that applying a fungicide (Captan, Topsin, or lime sulfur) after pruning protects pruning cuts from infection. In addition, painting existing cankers with 50% latex paint plus captan, Topsin, or lime sulfur may reduce sporulation. These recommendations have not yet been tested in Utah.

— Marion Murray, IPM Specialist and Wei Wei, Molecular Biologist

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Fusarium Diseases in Tomato



Left: Tomato plants killed by Fusarium wilt.



Right: Inner stems, showing browning of the inner tissue (vascular discoloration) caused by Fusarium wilt.

Left image courtesy David B. Langston, Univ. of Georgia, bugwood.org. Right image courtesy of Cynthia Ocamb, Oregon State Univ.

In Utah, three diseases caused by *Fusarium* species are found on tomato—Fusarium wilt (*Fusarium oxysporum* f sp. *lycopersici*), Fusarium root and crown rot (*Fusarium oxysporum* f sp. *radicis-lycopersici*), and Fusarium foot rot (*Fusarium solani*). All three pathogens are soilborne but their symptoms and management differ.

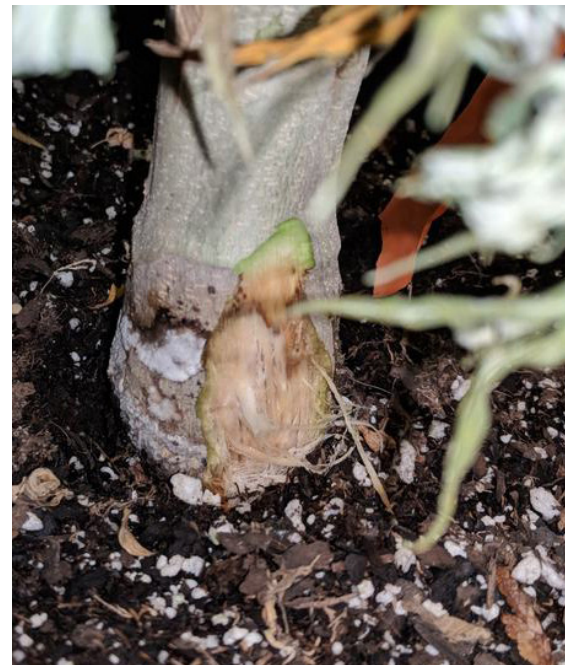
Symptoms of Fusarium Wilt

The first symptoms usually appear after flowering. Plants start to wilt during the heat of the day and initially may recover once temperatures cool down. As the disease advances, leaves turn yellow and permanent wilting sets in. Eventually, the plants die. Vascular discoloration can be observed within cut stems. There is no root or crown rot associated with Fusarium wilt.

Symptoms of Fusarium Crown and Root Rot

Aboveground symptoms can superficially look similar to Fusarium wilt. Plants may wilt in the heat of the day

and recover once it cools down and lower leaves in particular turn yellow. In addition, when wilting plants are pulled up, rotten roots are visible and dark brown lesions develop on the main stem on the first four to five inches above the soil line. There is no vascular discoloration in the stem but the lower stem and root cortex (interior part of



Exposed tissue at base of plant showing dark brown lesions just above the soil line caused by Fusarium crown and root rot.

Image courtesy of Lindsey Thiessen, NC State University.

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the tap root) can be discolored. Occasionally, adventitious roots develop on the stem.

Symptoms of Fusarium Foot Rot

Foliar symptoms consist of chlorosis and necrotic (brown) spots that can resemble symptoms caused by Tomato spotted wilt virus or Alfalfa mosaic virus. Flower buds can die. The roots have lesions that eventually girdle the roots. *F. solani* has additional hosts including potato and pepper.

Symptoms of Fusarium diseases of tomato

Disease	Vascular Discoloration	Root Rot	Crown Rot
Fusarium wilt	✓	⊗	⊗
Fusarium root and crown rot	⊗	✓	✓
Fusarium foot rot	⊗	✓	⊗

Management

Management options are limited for all three diseases. Prevent introduction by planting certified disease-free transplants and avoid wounding plants as wounds provide entrance points for Fusarium species. If Fusarium is identified in a field, rotate crops for several years with non-host crops to reduce inoculum in the soil.

For Fusarium wilt and Fusarium crown and root rot, the best option is the use of resistant varieties (there are no resistant varieties for Fusarium foot rot). There are many tomato varieties resistant to Fusarium wilt but only a few resistant to Fusarium root and crown rot. A tomato variety listed as resistant to Fusarium wilt does not mean it is resistant to Fusarium root and crown rot or vice versa. They are two distinct diseases. Cornell University lists [tomato varieties and their resistance levels](#) to various diseases.

— Claudia Nischwitz, Extension Plant Pathologist

The Plant Health Team Welcomes New Extension Crops IPM Associate

We are thrilled to welcome Evan Christensen to the USU Plant Health Extension team. While earning his associate degree at Idaho State University, Evan developed an interest in plant science and ecology. This interest led him to Utah State University, where he earned a B.S. in plant science and worked as a research assistant on flower, fruit, and vegetable production trials. For his master's degree at USU, Evan studied the use of biostimulants in watermelon production, exploring their potential to improve seedling growth in the greenhouse and optimize irrigation and nutrient management in the field.

Throughout these roles, integrated pest management has been an important component of his work, and he is excited to serve gardeners, farmers, and community members as part of the USU Extension Plant Health team. Evan focuses on vegetable crop pests and is responsible for sending out the Vegetable Pest Advisory, though he is also interested in working with agronomic crops like alfalfa and wheat.

Evan can be reached at evan.christensen@usu.edu or 435-797-0319.



Keeping the Home Compost Clean

Only disease-free garden waste should be added to a small-scale compost pile.
Image courtesy of Adobe Stock 2176361268

Composting is a great way to recycle crop residues and food scraps and improve soil health in the home vegetable garden. But understanding which materials to add to the pile and which should go into the trash is important, as an improperly managed compost pile can harbor not only insect pests and weed seeds, but also pathogens (fungi, bacteria, viruses) that cause plant disease.

What is composting?

Composting is the breakdown of organic materials by beneficial microbes in the presence of oxygen. A traditional home compost pile proceeds through three phases of decomposition (mesophilic, thermophilic, and maturation) to yield a quality product. In the moderate temperatures of the mesophilic phase, specialized microbes break down easily degradable compounds and generate heat. As the pile heats to above 104 °F, thermophilic (heat-loving) microbes take over and the breakdown of more complex compounds occurs. As the supply of these high-energy compounds is exhausted, the pile cools and enters the maturation phase. In this phase, mesophilic microbes go back to work and continue to break down organic matter until they deplete all available nutrients and the

organic matter stabilizes. A pile that has not matured may be 'hot' and can be toxic to plants.

Does composting kill plant pathogens?

The reduction of plant disease organisms in compost is largely achieved when all parts of a pile reach a sufficient temperature for a set amount of time. For example, at 131 °F, many plant pathogens are killed. Conversely, higher temperatures (above 149 °F) kill microbes that are beneficial to the pile. Commercial composting facilities in Utah are required to keep the temperature of a pile between 104 and 149 °F for at least five days, with a temperature of at least 131 °F maintained for a minimum of four consecutive hours during the five days. Compost applied in USDA-certified organic systems must start with a carbon to nitrogen ratio between 25:1 and 40:1 and must be kept between 131 and 170 °F for fifteen days.

Should I put diseased plant material in my home compost pile?

Home composting piles do not meet the same standards as large-scale facilities, and parts of the pile often do not reach temperatures high enough for long

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enough to kill plant pathogens. For this reason, do not add diseased plant residue (or weeds that have gone to seed) to home compost piles. Do not compost plant material treated with herbicides, either. Some herbicides break down very slowly and may remain in finished compost when you add these materials to a pile. Do not add these or the materials listed below to a home compost pile; instead, throw them away.

Weeds that have gone to seed	Compostable bags/food service ware ²
Diseased plants	Treated or painted wood
Herbicide-treated plants	Pet waste and cat litter
Meat, fish, and bones ^{1, 2}	Dryer lint
Dairy products ^{1, 2}	Glossy paper
Fats, oils, and grease ^{1, 2}	Produce stickers

¹ These foods can attract animals

² These materials can be composted at some commercial facilities, but backyard compost piles typically are not hot enough to decompose them.



An example of plant material that should not be added to a home compost pile—severe powdery mildew on pumpkin leaves.

What can I do with finished compost?

Fall is a great time to incorporate organic matter into the soil, whether that is from a properly maintained backyard compost pile or purchased from a reputable source. Add 1 to 2 inches per year of low-salt compost to build soil and improve tilth. Soil should not be worked or tilled when wet. Compost additions increase soil fertility, microbial diversity, water holding capacity, and can strengthen plant defenses and suppress soilborne pathogenic fungi and bacteria. Compost can be a sustainable addition to a vegetable garden, but home composters should take care to ensure that the finished compost is free of plant pathogens.

— Evan Christensen, Crops IPM Associate

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Testing Novel Traps to Monitor Peach Twig Borer

Peach twig borer (PTB; *Anarsia lineatella* Zeller) is the most damaging insect pest in stone fruits (peach, nectarine, plum, and apricot) in the Intermountain West. In the past seven years, PTB has been challenging to manage in Utah, resulting in significant economic loss. Currently, the two main strategies to manage PTB are 1) Mating Disruption (MD) to prevent or delay moths from reproducing, and 2) timed insecticide sprays based on a degree-day model to target larvae, the most susceptible stage (conventional or non-MD). Whether using MD or not, growers typically monitor for the presence of adult moths using a pheromone trap. The current pheromone used in traps only attracts male moths. This makes it difficult to interpret insect catches in relation to real field populations since only half of the population—males—are monitored.



Male peach twig borer on a sticky liner.

Our Goals

The Demard lab is conducting a three-year study evaluating the performance of PTB pheromone traps with or without baits, in combination with or without UV-A LED light, to improve PTB monitoring in both MD and non-MD (conventional) orchards. The goal of the project is to determine whether a novel trapping system can successfully attract PTB females and to evaluate the efficacy of MD by assessing whether females are mated or not. We are also assessing the impact of these traps on non-target insects. We hypothesized that the combination traps with the lure, bait, and light will catch more male and female moths compared to the standard commercial sex pheromone alone. We also hypothesize that the combination traps will not increase non-target insects.



A standard delta trap was modified with the addition of a UV-A light source, and tested with various attractants for peach twig borer.

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Trap Types Tested

In summer 2026, we compared moth catch in five trap types within each of six peach orchards in Box Elder and Utah counties. Three of the orchards used mating disruption (MD), and three did not (non-MD). The trap types included the standard PTB lure, plus a combination of two attractants (acetic acid and terpinyl acetate) with and without UV-A lights. Each trap type was repeated three times in each orchard.

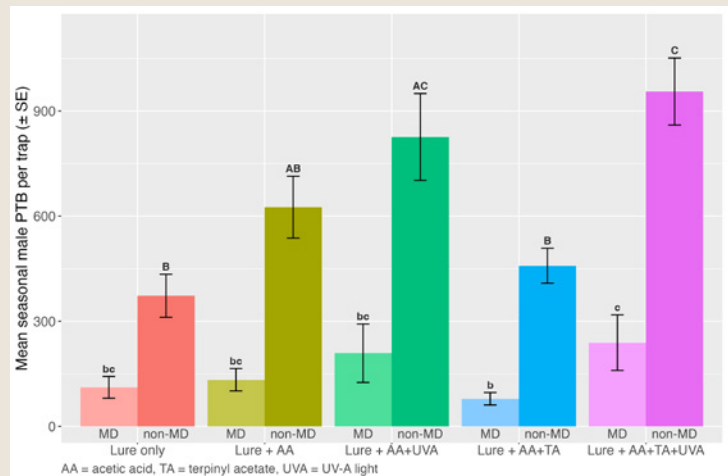
- **Acetic Acid (AA)** is a microbial fermentation product of sugar. It acts as a synergist with other compounds to form more powerful attractants,

enhancing trap performance for fruit flies, codling moth, or oriental fruit moth.

- **Terpinyl Acetate (TA)** is a secondary plant metabolite that has been shown to be highly effective for both male and female oriental fruit moths as well as fruit flies.
- **UV lights** can attract nocturnal moths; a previous study showed that UV-A light significantly increases catches of tortricid pests in orchards (Knight et al. 2023).

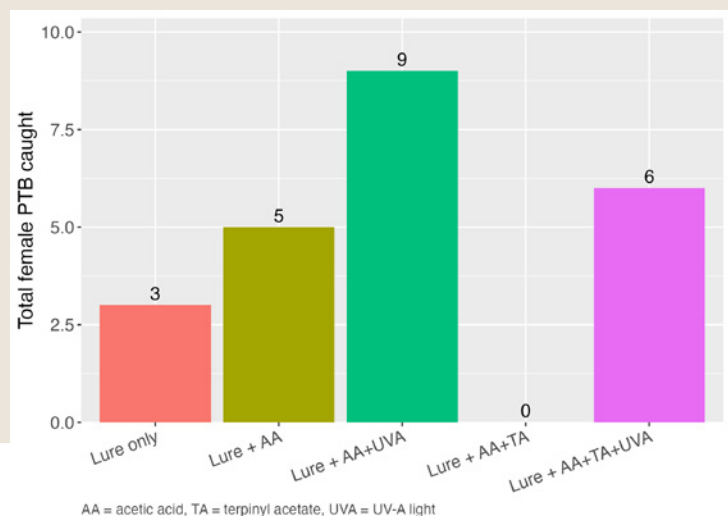
Preliminary Findings

Overall trap catches: MD orchards showed significantly lower PTB counts across all treatment types, indicating lower populations of PTB in those orchards compared to conventionally managed orchards. UV-A treatments produced the highest catches across management strategies, but those were significantly different from the commercial standard lure only for non-MD orchards. Catches using two attractants without UV-A light did not differ from the commercial lure, suggesting that for the treatment with two attractants and the light, the increase in catches is due to the UV-A light.



Weekly mean male PTB moths per trap across three orchards with mating disruption (MD) and three with non-mating disruption (non-MD) from May to August 2026.

Female moths: This season, female numbers were too low to conclude any real treatment effects with only 23 moths identified. Preliminarily, UV-A traps had higher counts. Most of the females (19) were caught in non-MD management, probably due to higher pest pressure in those orchards. Females were detected late in the season (second generation only), with the median of most abundance being around the week of August 13.

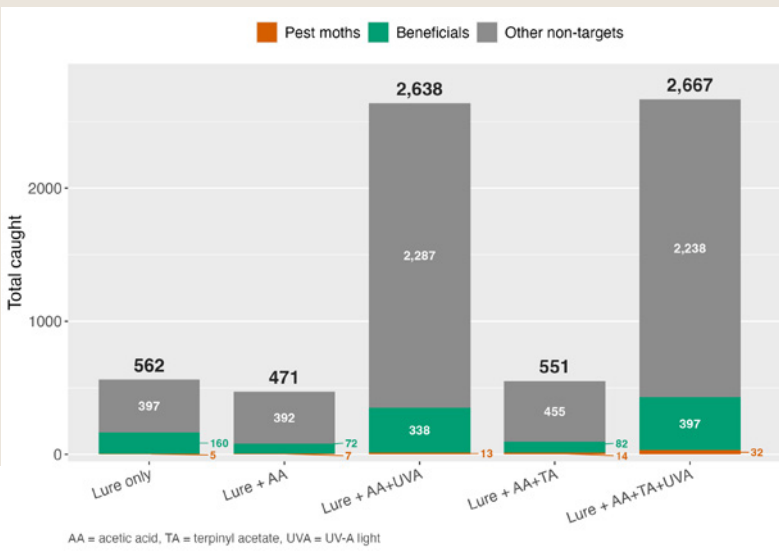


Sum of female PTB moths caught from May to August 2026, pooled across both management types.

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Non-target catches: Besides parasitoid wasps that had higher occurrence on lure-only traps, non-target catches were primarily observed in traps with the UV-A light. The largest group of non-targets detected were other lepidoptera and trichoptera (caddisflies), followed by lacewings and leafhoppers. Two other orchard pest moths were detected: codling moth and obliquebanded leafroller.

Sum of non-targets caught from May to August 2026, pooled across both management types.



Summary of non-target catches across all traps (90 total) from May to August 2026

Group	Taxon	Total Caught	Weekly Max	Most Caught In
Pest moths	Codling moth	63	3	Lure+AA+TA+UVA
	Obliquebanded leafroller	8	1	Lure+AA+TA+UVA
Beneficials	Green lacewing	815	19	Lure+AA+TA+UVA
	Parasitoid wasps	168	34	Lure only
	Lady beetles	66	2	Lure+AA+UVA
Other non-targets	Other Lepidoptera and Trichoptera*	5,023	74	Lure+AA+TA+UVA
	Leafhoppers	746	69	Lure+AA+UVA

* Trichoptera (caddisflies) were recorded together with "other Lepidoptera" for half of the season. The two taxa are therefore reported combined.

Future Direction

This first-year result showed that UV-A light increased PTB male catches and could also increase female catches, although only 23 females were caught compared to approximately 36,088 males. However, UV-A light also enhanced attraction of some non-target beneficial organisms, including other lepidopterans, trichopterans, lacewings, and lady beetles. Results of this season must be taken with caution due to the absence of fruit caused by a late

freeze in spring 2026. This winter, the team aims to determine the mating status of those females (mated vs. non-mated) via dissection. Looking forward, future extended monitoring of PTB in a typical fruiting year will provide further insight into females’ phenology. Efforts to catch and monitor female PTB will continue in 2027 and 2028, with additional treatment types explored to address the current low female monitoring success.

— Gavin Munson, PhD student and Emilie Demard, Extension Entomologist

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Getting to Know the Western Grapeleaf Skeletonizer

The western grapeleaf skeletonizer is a voracious leaf-feeder, living up to its name.

Image courtesy J. Shipp, iNaturalist.com

Grape growers in southern Utah are encountering an insect that rapidly consumes leaves—the western grapeleaf skeletonizer (*Harrisina metallica*). In Utah, it currently only occurs in far southern Utah only. However, knowing how to recognize the insect, its characteristic feeding damage, and when it is active can help prevent damage, regardless of location.

The western grapeleaf skeletonizer adult is a small moth with a metallic blue-black body and a wingspan of approximately 1.3 inches. Mature larvae (caterpillars) are just longer than 0.5-inch and are particularly distinctive. Their bodies are yellow with purple and black bands and covered with short hairs (spines). These spines can cause skin irritation or welts, so avoid handling the caterpillars with bare hands.

The caterpillars primarily feed on grapevines, although Virginia creeper and Boston ivy are also hosts. After larvae hatch, they feed together on the undersides of grape leaves. This type of early feeding removes the lower leaf epidermis, leaving the upper leaf surface intact. The result is pale or translucent patches on the leaves. As the caterpillars mature, they migrate to new tissue and consume more of the leaf while avoiding the larger veins—a condition known as skeletonizing.



The adult western grapevine skeletonizer is a day-flying moth with a metallic bluish-black body.

Image courtesy Bart Jones, iNaturalist.com



Female moths lay egg clusters on the undersides of leaves and together, the young larvae consume only the leaf surface, leaving behind a white "patch" on the upper leaf.

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Heavy infestations can result in significant defoliation, which is more than a cosmetic problem. Grapevine leaves are essential for producing the carbohydrates needed for fruit development and storage. When substantial leaf area is lost, exposed fruit can also become more vulnerable to sun damage. In addition, the reduced canopy protection can contribute to other fruit quality problems, including bunch rot under favorable conditions.

The western grapeleaf skeletonizer overwinters as a pupa inside a silken cocoon, often beneath bark or plant debris. Adults emerge in spring around the time grape leaves are expanding. Females lay clusters of translucent yellow eggs on the undersides of leaves. Depending on conditions, the insect can complete two to three generations per year. Therefore, populations increase as the growing season progresses.

Active monitoring is important, particularly in areas where the pest has occurred previously. Begin examining grape foliage after leaf expansion, paying particular attention to the undersides of leaves. Look for egg masses, groups of small larvae, pale scraped areas on leaves, and eventually the characteristic skeletonized foliage. Early detection is preferable because young larvae are easier to manage.

The presence of a few western grapeleaf skeletonizers does not necessarily mean that an insecticide application is needed. First, assess the extent of feeding and the number of larvae present. If treatment is warranted, target small larvae with an insecticide labeled for use on grapes and the pest. Always follow the product label regarding crop use, application rate, preharvest interval, and other restrictions and use appropriate personal protection equipment.

The key takeaway is awareness rather than alarm. The western grapeleaf skeletonizer is not currently a statewide grape pest. Regular scouting can help distinguish the distinctive symptoms from other causes



A vineyard in southern Utah experienced heavy feeding in summer 2026.



Mature larvae have distinctive bands of color and spines that can cause skin irritation or welts.

Image courtesy Entomo-logic, iNaturalist.com

of leaf damage and determine whether management is necessary. When in doubt, photograph the insect or damage and contact the Utah Plant Pest Diagnostic Lab for assistance with identification and management recommendations.

— Ernane Vieira-Neto, Arthropod Diagnostician and
Claudia Nischwitz, Extension Plant Pathologist

Wheat Stem Maggot in Cereal Crops

The wheat stem maggot (*Meromyza americana*) is an occasional pest of wheat, barley, rye, oats, and cultivated and wild grasses. Infestations can produce conspicuous white or bleached heads that are often mistaken for a disease, drought stress, or other stem-boring insect. Wheat stem maggot is not a major pest and there are no reports of it in Utah. However, we occasionally see white-head symptoms resembling stem maggot injury in small-grain fields throughout the Intermountain West. We recently received a concern from a stakeholder in Cache County, and we detected wheat stem maggot larvae in their wheat stems. Our team will survey fields to determine its prevalence, distribution, and economic importance in Utah.

Life Cycle

Wheat stem maggot overwinters primarily as a larva (maggot) within wheat stubble and grassy hosts. In spring, the pale green to cream-colored larvae pupate within stems and the small, yellow-green adult flies emerge during May and June. Female flies lay eggs on grass leaves or stems and newly hatched larvae tunnel into stems and feed. After two to three weeks, larvae pupate within the stems. The number of annual generations in Utah is unknown, but typically it is two to three, depending on location and environmental conditions.

Symptoms

While this pest primarily attacks wheat, reports indicate that it can also attack corn, rye, and other



Wheat stem maggot damage is white, bleached wheat heads, easily visible among the surrounding green wheat. Image courtesy Tyler Wist, Agriculture and Agri-Food Canada



The adult wheat stem maggot is a tiny yellow fly. Image courtesy Tom Murray, pbase.com

grass crops, especially those following infested fields. The most recognizable symptom is the development of "white heads" or "bleached heads", which generally lack kernels. The damaged head and upper stem turn white while the rest of the plant (including flag leaf) remains green before grain maturity. The damaged

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and weakened stem can be easily pulled from the plant. Upon inspection, a brown feeding tunnel may be visible inside the stem. Because these white heads symptoms resemble those caused by Fusarium head blight, drought stress, stem injury, or other stem pests, careful diagnosis is important before management decisions are made.

Management Strategies

Although we have not yet assessed the distribution and damage of wheat stem maggot in Utah, growers should be familiar with its characteristic injury and be prepared for tactics to prevent it from causing economic damage. Cultural controls are the primary methods for management. Insecticides are not recommended because this pest uses multiple grassy weed hosts and the larvae are protected inside stems.

Monitoring: Scout fields from late May through July (before cereal crops mature) for isolated white heads of wheat.

- Pull suspected stems and split them open to look for tunneling and larvae.
- Check field margins and nearby grassy areas for volunteer cereals and alternate grassy hosts.
- Record the percentage of affected stems to determine whether injury is increasing from year to year or field to field.



Excised larva of wheat stem maggot.

Image courtesy J.P. Michaud Kansas State University

Cultural controls: The most effective management strategy is reducing the "green bridge" such as volunteer wheat and grassy weeds that allow wheat stem maggot populations to persist between crops. Eliminating or managing these green bridges and rotating cereals with non-host crops, when possible, help manage the pest. Managing grass along field borders may also reduce local populations.

Biological controls: Several naturally occurring parasitoid wasps attack wheat stem maggot larvae and may help suppress populations. Conserving beneficial insects through integrated pest management practices can enhance natural control.

— Subodh Adhikari, Extension Entomologist

Utah Transition to Organic Program Outreach

The Transition to Organic Program at USU, funded by USDA, draws to a close in late fall 2026. Over the last four years, the program has connected dozens of farmers with certified organic mentors, helping them to overcome the financial and technical issues with transitioning, and teaching them about maintaining an organic farm. The mentoring and farm outreach program, led by Michele Schahczenski, has included 21 mentorships, 15 field days, 5 winter workshops, 3 trade shows, 6 articles, 3 radio shows, a website, and much more. The team also is finalizing 20 fact sheets

and 4 enterprise budgets. Four of these fact sheets focus on organic pest management:

- [Organic Pesticides](#)
- [Organic Cherry Pest Management](#)
- [Organic Management of Pillbugs and Sowbugs in Strawberries and Other Fruits](#)
- Organic Peach Pest Management (in progress)



IPM In The News

Pesticide Risks to Bumble Bees

Georgia Tech researchers wanted to know why sulfoxaflor, a pesticide introduced in 2013 to control aphids and other sap-feeding insects, is toxic to bumble bees. To do so, they exposed worker bumble bees to low doses of the pesticide and tracked changes in gene activity. The biggest effects showed up in ovarian tissue, suggesting the pesticide may interfere with reproduction even at sublethal levels. Published in *Ecotoxicology and Environmental Safety*, the findings highlight the tension between controlling crop pests and protecting pollinators.

USDA Corn Deregulation

The USDA's Animal and Plant Health Inspection Service has deregulated Monsanto's MON 87429 corn, which was engineered for resistance to dicamba, glufosinate, quizalofop, and 2,4-D, along with tissue-specific glyphosate resistance to support hybrid seed production. After reviewing Monsanto's petition, current science, and public comments dating back to 2020, the agency concluded the corn poses no greater plant pest risk than conventional varieties.

Glyphosate Effects on Bees

Glyphosate has long been considered safe for bees because bees lack the enzyme that the herbicide targets in plants. However, a study by Virginia Tech researchers, published in the *Journal of Experimental Biology*, found that glyphosate still causes trouble at the behavioral level. Bees exposed to it foraged 13 percent less within just three days and showed changes in brain chemicals tied to behavior. Across a whole colony that declines, this could mean less honey, weaker pollination, and greater risk to long-term survival.

Oak Trees vs. Caterpillars

A recent study, published in *Nature Ecology & Evolution*, found that after a bad caterpillar infestation year, oak trees delay leaf emergence by about three days the following spring, leaving newly hatched caterpillars with nothing to eat. Using five years of Sentinel-1 satellite radar data covering 2,400 square kilometers of Bavarian forest, including a major 2019 spongy moth outbreak, researchers from the University of Würzburg found this small delay cuts caterpillar survival and reduces leaf damage by about 55%.

Queen Bees' Pesticide Defense

University of California, Davis researchers discovered that honey bee queens have a defense mechanism no one had documented before. The queen can shift accumulated pesticide contamination into their eggs. Using small experimental colonies dosed with a radioactively tagged pesticide, the team found that worker bees' ability to filter out contaminants dropped from 95% on day one to 86% by day ten, showing that protection has real limits. Published in *Current Biology*, the study suggests this survival strategy may come at a steep cost to developing offspring and contribute to slow, delayed colony collapse.

Bacteria for Crops in Saline Soils

A team of researchers from the University of East Anglia found that soil-dwelling *Pseudomonas* bacteria help plants survive in salty soils by triggering the production of lignin in cell walls. In greenhouse and field trials, bacteria-treated soybean plants developed stronger roots and produced higher yields than normal plants under salt stress. The results, published in *Science Advances*, point toward possible

continued on next page

Featured Picture of the Quarter



This summer, we saw high numbers of whiteflies on cole crops, likely cabbage whitefly. This species (*Aleyrodes proletella*) has been in the eastern U.S. since the 1990s, and in the West since the early 2000s. The adults lay a circular ring of eggs that hatch into immobile, scale-like nymphs that consume sap. The nymphs pupate into adults and the cycle repeats many times over the summer. They overwinter as adults and most are killed by cold temperatures.

— Image by Evan Christensen,
Crops IPM Associate

IPM in the News, continued

treatments for land that has become too salty to farm.

Soil Fungal Networks

A landmark study published in *Science* produced the first global map of arbuscular mycorrhizal fungi, which are specialized fungi

that form symbiotic relationships with roots of about 70% of plant species. Drawing on more than 16,000 soil samples and machine learning, the Society for the Protection of Underground Networks researchers estimated these fungal networks stretch about 110 quadrillion kilometers

worldwide and move about 4 billion tons of CO₂ into soil each year, equal to about 11% of human emissions. Agricultural land had about half the fungal density of wild ecosystems, and natural grasslands hold about 40% of the world's fungal biomass.

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