



Pavement Ants Forming Colonies Now

The pavement ant (*Tetramorium caespitum*: Formicidae) is one of Utah's most frequently encountered home-invading ants. This species, which derives its name from its habit of nesting below patios, driveways, and sidewalks, forms colonies of up to 4000 members. They have a voracious and varied appetite of proteinaceous foods like grease, fat, insects, and sugary foods such as honeydew, fruit, and sweets.

Like termites and some members of the bee, wasp, and ant family (Hymenoptera), pavement ants are highly social insects. Sociality in ants includes a queen, multiple generations of worker ants, male reproductive ants, and sharing of responsibilities in the colony by all castes. Most importantly, the ant social system is dependant upon food sharing (trophallaxis), and the transfer of nutrients through bodily secretions from workers to reproductives (queens and males) and larvae, and from larvae to workers and reproductives. Pavement ant workers are 3/16-inch long and may have one to multiple queens.

Ants have a complete life cycle consisting of an egg, larva, pupa, and adult. In spring (or whenever conditions are right), homeowners can see pavement ants swarming, when winged males and queens leave the nest and congregate to mate. Newly mated queens will search for new nesting locations, which may occur inside or outside the home. Winged, swarming ants are often mistaken for termites.



Ryan Davis



April Nobile, California Academy of Sciences

Top: Pavement ants enter into battles that can leave hundreds dead. *Bottom:* Lateral view of adult pavement ant. Note the spine-like projections and the double node.

Pavement ants generally colonize areas under concrete, logs, or rocks, or may even nest in the open on exposed soil. Outside, these ants are harmless, but can become problematic when they enter buildings in search of food. Occasionally, they will nest in wall voids and behind baseboards. Pavement ants form

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EXTENSION ENTOMOLOGIST STARTS FRESH AT IOWA STATE

Erin Hodgson accepted a once-in-a-lifetime position as Extension Entomologist in soybeans at Iowa State University. In her short time at USU, she touched many lives and was extremely productive, bolstering the *UTAH PESTS* program with fact sheets, research, educational tools, and energy. Her laughter and good spirits will be greatly missed.

www.utahpests.usu.edu

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Pavement Ants, continued from previous page

long, distinct trails of worker ants, which can be seen up to 30 feet away from the nest.

Multiple tactics should be used to eliminate ant colonies and exclude ants from your home:

1. Locate nests and entry ways into the house. Observe ant activity and follow ant trails back to their source. Ant trails may be along baseboards, under carpets, or along plumbing or electrical pathways.
2. Use some or all of the tactics listed below to suppress pavement ants. The more tactics you use, the more likely you will see results.
 - Caulk all cracks and crevices where ants may nest or enter.
 - Vacuum regularly and clean up all crumbs and spills.
 - Keep human and pet food properly stored in air-tight containers.
 - Remove large rocks, boards, lawn ornaments, etc., under which ants may colonize.
 - Prune plants from contacting the house.
 - Keep ants from entering trees by using a sticky band around the trunk.
 - Create a dry, plant-free gravel border around the foundation. Wood mulch provides habitat for ants to construct nests.
 - Control honeydew-producing insects like aphids and soft scales.
 - Sponge invading ants and ant trails with soapy water.
 - Drench each individual ant mound with an insecticide.
 - If ant nests are inside the house, wall void and baseboard treatments may be needed. Use in conjunction with other tactics to prevent re-infestation.
 - Deploy bait stations (boric acid, fipronil, hydramethylnon, etc.).



April Noble, California Academy of Sciences

Worker ants are distinguished from others in the colony by the rough grooves found on their head and body, which may be seen with a 30x hand lens.

Spraying worker ants outside the nests will not suppress pavement ants. The queen must be killed to successfully eliminate an ant nest. Ant baits are designed to target the queen. Worker ants take the chemical back to the nest and share it with other nest mates and the queen(s).

Because of their diverse diet, multiple types of baits should be placed along ant trails to test which one the ants most prefer. Select their favorite baits and place them outside the home near the point of entry. Check baits frequently and replace dried or spent units. Always place baits where children and pets cannot access them. Ant baits may only be partially effective at controlling pavement ants given their diverse eating habits, and should be used in conjunction with other methods for increased control.

Goals for controlling pavement ants should be long-, not short-term. Because ants are small, diverse, and vary greatly in their biology, it is recommended that all ants should be identified before considering a control program. Samples may be sent to the Utah Plant Pest Diagnostic Lab for proper identification and a timely response with control recommendations.

-Ryan Davis, Arthropod Diagnostician

USU Joins School IPM Work Group

In agriculture, the way we have historically managed pests is changing from a no-tolerance, eradication paradigm to a multi-tactic, biology-based management plan based on pest thresholds. Today, the same shift in pest control strategies has come to the forefront of secondary schools due to the hard work by leaders of the IPM Institute, the USDA IPM Regional Centers, Cooperative Extension, universities, and individuals. A strategic plan was recently developed to transition all schools in the U.S. to IPM pest management by 2015 (Green & Gouge 2008; [click here](#) for pdf). The plan includes implementing IPM for all pest problems in schools with the goal of reducing the use of pesticides (71% average reduction is possible) and to create a safer, more productive learning environment.

Why does IPM in schools matter? If for no other reason, to protect the health of children. Research has shown that pesticide exposure for school employees and students can cause coughing, shortness of breath, nausea, vomiting, headaches, and eye irritation ([NIOSH Fact Sheet](#)). NIOSH reports that long-term exposure in adults has been associated with chronic health effects such as cancer, neurological, and reproductive problems.

In the Salt Lake City school district, school IPM is well under way. Along with the hard work from facilities, maintenance staff, and teachers, SLC district administrators Greg Smith, Ricardo Zubiate, Robin Anderson, Mervin Brewer, and Mark Ruff, have been on the forefront of a highly successful school IPM program. Among many other awards, SLC school district was the first in the Rocky Mountain region to be awarded

IPM STAR certification, a voluntary program sponsored by the IPM Institute and the EPA. ([Click here](#) for full story.) The district joins just 27 other STAR certified districts in the nation.



In 2009, USU Insect Diagnostician Ryan Davis, joined the Western Region School IPM Implementation and Assessment Work Group, funded by the Western Region IPM Center. He will help the SLC school district develop online resources for managing pests, act as a resource for insect-related pest control issues, and aid in the adoption of IPM in Utah's schools. Despite successes at the SLC school district, adoption by other Utah school districts has been slow. Because improper pest management affects all Utah children, parents can help to drive IPM adoption in schools by working with school administrators. For information on how to get started, visit the EPA's IPM in Schools Web site ([click here](#)). You can also contact Ryan directly by sending an e-mail to ryan.davis@biology.usu.edu.

-Ryan Davis, Arthropod Diagnostician

References:

1. Green, T.A., and D.H. Gouge, eds. 2008. School IPM 2015: A Strategic Plan for Integrated Pest Management in Schools in the United States. 286 pp.
2. National Institute for Occupational Health and Safety. Reducing Pesticide Exposure at Schools. Fact Sheet. September, 2007.

All Utah Counties Now "Scoped"

Recently, Diane Alston and Ryan Davis travelled to three regional Extension meetings in Utah to provide training for the Leica EZ4D dissecting microscope with integrated camera. Each of Utah's Extension county offices now has a new microscope.

The microscope program, funded through the Western Plant Disease Diagnostic Network, and state funding for the Utah Plant Pest Diagnostic Lab, will facilitate distance pest diagnostics between counties and the UPPDL on campus.

With integrated camera/microscope, staff in county Extension offices can take detailed close-ups and quickly send images to the UPPDL for diagnosis.



Curly Top Virus Beginning to Show Up in Southern Utah

In the Washington County Extension office, we have already received reports of Curly Top Virus (CTV) from home gardeners. Many call it “the blight” for lack of another term, which often causes confusion in diagnosis. CTV is vectored by the beet leafhopper (*Circulifer tenellus*). During their migration in early spring, leafhoppers feed on infected weeds such as lambsquarter, halogeton, Russian thistle, and four wing saltbrush. They then transfer the disease with their piercing-sucking mouthparts to healthy garden plants such as tomato.

Past experience in southern Utah has shown that disease incidence increases as temperatures warm into late May and early June. Several factors likely account for the increase. As temperatures rise, the weed hosts begin to dry, making them less suitable for feeding. This probably encourages leafhoppers to move onto more desirable species. In addition, high winds in spring may blow leafhoppers long distances into commercial fields and residential home gardens.

Plants infected with CTV appear yellow and stunted. Tomato leaves become thicker, and roll upward. Veins on infected leaves may turn a purple color. These symptoms are quite different from other common “blight” diseases of tomato such as early blight and late blight where dark spots with a yellow halo appear. Early blight-infected plants commonly show lower leaf dieback, as the symptoms progress slowly toward the top of the plant. Late blight-infected plants generally decline quickly and symptoms appear widespread on the plant. In the case of these blights, overhead watering will increase the spread of disease. With CTV, water is not as issue, and although overhead watering is not recommended on vegetables, it does not play a role in spreading this disease.

Things growers can do to decrease the chances of curly top virus infection:

- As much as practical, locate vegetable plantings as far from weed hosts as possible.
- Place row cover materials such as remay or similar light-weight cloth over plants to exclude beet leafhoppers.
- Leafhoppers prefer sunny areas, so planting in shade may decrease the chance transmission from feeding.
- “Double plant,” or increase plant density to lower the



Rick Heflebower, USU Extension

Even a “resistant” tomato variety such as Rowpac, can become infected with curly top virus.

probability that every plant will be infected, allowing some plants to survive without decimating the entire field.

- Use one or more resistant tomato varieties, including Rowpac, Roza, Salad Master, or Colombian. In our USU trials some of these varieties did get CTV. Since there are several known strains, and viruses historically mutate quite easily, the use of resistant tomato varieties may lower incidence but will not likely be a silver bullet for this disease.

Since curly top virus is so sporadic it is a very difficult disease to study and predict. Dr. John Damicone with Oklahoma State University has written several bulletins on CTV. He reported a couple of years ago that he had set up some research to evaluate several of the control methods mentioned above, only to have a season with almost no CTV in the region. It is the same sporadic nature of the disease that makes it difficult to time insecticide sprays against leafhopper that can give effective control. This is why insecticides are not recommended as a control option.

-Rick Heflebower, Washington County Extension
Horticulture Agent, extension.usu.edu/washington

Disease Spotlight: Armillaria Root Rot



This spring, the weather has been moist enough in northern Utah for a host of fungal fruiting bodies to emerge, including the mushrooms of the “honey fungus,” armillaria. The mushrooms

are only a small part of the organism—like apples on a tree. The main body (thallus) lives underground, helping to decompose wood, or causing a “shoestring root rot” disease in a variety of woody plants. *Armillaria* species are most commonly found in native forests, but Utah landscape hosts include almost all conifers, ash, birch, black locust, dogwood, elm, hackberry, maple, oak, planetree, poplar, sycamore, willow, and most fruit trees.

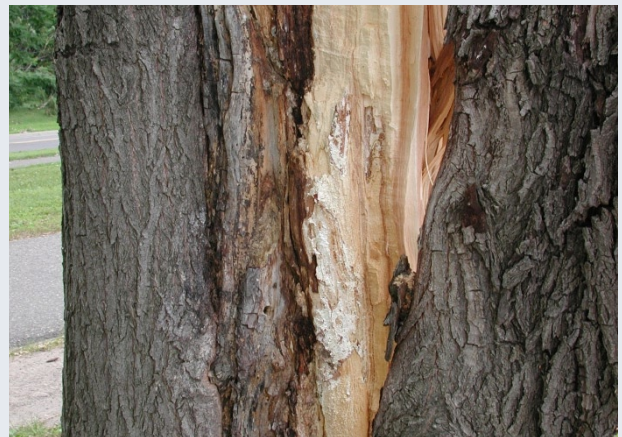
SYMPTOMS

Armillaria invades the roots, causing symptoms of the crown that resemble a host of other problems. Trees that are infected by a less aggressive strain will decline over a period of several years. The canopy will be thin, with stunted growth, off-color foliage, branch dieback, and on conifers, an excessive crop of cones before death. Aggressive forms of armillaria will kill trees within one season.

At the initial stages, decayed wood looks healthy in color, but water soaked. Advanced decay is whitish in color, and spongy in hardwoods and stringy in conifers. This type of decay is called “white rot.”

SPREAD

Armillaria has a tricky adaptation that allows it to become named the “humongous fungus.” (In 1992, an underground mat representing 37 acres of a continuous fungal clone in Michigan was found to be the heaviest in the world—weighing as much as a blue whale.) Armillaria can live as a parasite, causing disease as described above, or it may live for decades as a saprophyte, happily feeding on coarse woody debris. When the opportunity arises, it can easily transform its metabolic processes from absorbing dead tissue to absorbing living plant tissue. Spread of the disease occurs when vigorous rhizomorphs grow through the soil and happen to contact healthy tree roots. Root-to-root contact or root grafting can also spread armillaria from an infected to an uninfected host.



Joseph O'Brien, USDA Forest Service

DIAGNOSIS

Armillaria may be more widespread in Utah than we know. Organisms of the phylum Basidiomycota will form short-lived fruiting bodies only when enough moisture is present, which isn't always the case in the arid West. Without the obvious mushrooms, armillaria cannot be identified without invasive investigation. Removing infected bark will expose a thick mat of white mycelium (shown in upper and lower image), and sometimes the black string-like rhizomorphs (shown lower), both of which are characteristic of this disease. Rhizomorphs are tightly bound hyphal structures that “explore” for food in distances of up to 10 feet. They penetrate healthy roots by a combination of mechanical pressure and enzyme action—wounds are not necessary.



Tim Tigner, Virginia Department of Forestry

Still not sure if it is armillaria? Look at the mycelial mats at night and they will glow—they are bioluminescent.

MANAGEMENT

Like all wood-invading fungi, once it has become established, there is no chemical that can eradicate it. Since armillaria is a root rot, pruning the canopy or removing a portion of the tree will have no effect. Trees that are suspected of light infections can sometimes survive several years with optimal watering and fertilization. Dead trees should be removed. Grinding the stump will prevent armillaria from remaining in the site longer than one to three years.

-Marion Murray, IPM Project Leader

The Right Trap for the Right Wasp

A common question I hear this time of year is, “My yard is overrun with wasps, and they are eating my raspberries and grapes. I put out a trap, but why hasn’t it helped?” The most likely reason is that the trap you are using is not attractive to the target wasp species. Since the invasion of the European paper wasp to Utah less than 10 years ago, this species has become a prominent nuisance and fruit-eating pest for growers and home gardeners. The primary type of wasp trap sold in garden and home centers contains heptyl butyrate, a chemical that is attractive to the yellow jacket wasp, but not to the European paper wasp.

Dr. Peter Landolt, USDA ARS Entomologist in Wapato, WA, studies the chemical ecology of insects, and has developed do-it-yourself traps to attract food-eating social wasps. The key is first determining the problem wasp species, and then selecting an appropriate trap.

The yellow jacket, shown at right, has a broad “waist” and more yellow than black color on its lower body (abdomen). It commonly builds its paper nests in the ground or under dense vegetation. Yellow jackets are primarily attracted to meat baits. A simple trap can be made by cutting the top from a plastic soda bottle and inverting it (without the lid) into the bottom “cup.” Punch a hole on each side of the cup and hang the trap using wire or twine. Hang a piece of meat, such as hamburger or fish, just below the funnel-shaped top and fill the cup with water plus 1 tsp. detergent. Position the meat so that the wasp will fall into the soapy water when it attempts to fly away after cutting off a piece.



Do-it-yourself wasp traps must be designed for the right type of wasp. Yellow jackets are attracted to meat, and European paper wasps are attracted to fermenting fruit.



Gary Alpert, Harvard University

The European paper wasp has a narrow waist and more black than yellow on its abdomen (see image on next page). This wasp builds upside-down umbrella-shaped paper nests and attaches them to overhangs, decks, and other structures. The European paper wasp is highly attracted to decaying fruit. Landolt recommends loading the soda bottle trap previously described with a mixture of 1 part fruit juice to 10 parts water + 1 tsp. liquid detergent. The juice must begin to ferment in order to be attractive, and so it may take a day or two for rapid fermentation to begin. You can accelerate the fermentation by adding a piece of overripe fruit.

The wasps will try to fly up towards the light after getting a bite of food, but will hit the bottom of the funnel and fall into the soapy water which will make it difficult for them to fly. They should eventually get caught in the liquid in the bottom of the trap. Landolt cautioned against adding insecticides because the

sweet traps could attract and harm honeybees. Since ripe and overripe fruits will compete with traps for the wasps’ attention, he advised to trap wasps preemptively to reduce populations before they become a problem during fruit harvest. He advised positioning traps every 30 ft around the perimeter of a vineyard or orchard as well as within the field. The higher the wasp population, the more traps will be required to reduce wasp numbers. The traps should be checked regularly to remove dead wasps and refill the bait.

If you need assistance with identifying a wasp, collect and submit a sample to the Utah Plant Pest Diagnostic Lab.

-Diane Alston, Extension Entomologist

Reference:

Mitham, P. 2008. Do-it-yourself wasp control: savvy traps have the right chemistry. *Good Fruit Grower*, December, Vol. 59, No. 17.

Natural Control of Invasive Wasp



A viral or protozoan pathogen that causes wing deformation and sick larvae may help to bring the burgeoning European paper wasp population under control.

The European paper wasp, *Polistes dominulus*, was introduced into eastern North America almost 30 years ago and has been making its way westward, arriving in northern Utah less than 10 years ago. Since its arrival, it has overwhelmed and displaced a number of native species of paper wasps. This is a

Black Grass Bug Explosion in Utah Rangelands

The UPPDL has received numerous reports of black grass bug outbreaks this spring. Thousands of acres have been affected in Sevier, Juab, San Juan, Cache, and Box Elder counties. Farmers and ranchers in areas of higher elevation with cooler temperatures should be on the lookout for grass bugs.

Black grass bugs, which are actually a complex of related insects, are not new to Utah. Favorable conditions in recent years have helped increase their populations to damaging levels in rangeland, forage, and field crops. In particular, blue bunch wheatgrass, crested wheatgrass, and intermediate wheatgrass are grass bug favorites, but wheat, barley, oats, and rye may also be affected. Once black grass bug nymphs are detected in the spring, control is limited to insecticidal sprays containing acephate, carbaryl,



Whitney Cranshaw, Colorado State University

lambda-cyhalothrin, malathion, and methyl parathion.

Black grass bugs overwinter as eggs, and have one generation per year. Egg hatch begins in the spring and adults will remain active for 5 to 6 weeks, sucking the chlorophyll out of host plants. They then lay eggs within grass stems.

The large populations of grass bugs this year will likely yield a large population for next year, so farmers and ranchers should think about next year's control now. The key to suppression is to burn or graze the field in summer to diminish overwintering eggs, and reduce the need for insecticides next year.

-Ryan Davis, Arthropod Diagnostician

[Click here](#) for USU black grass bug fact sheet.

common phenomenon with newly invasive insects. They arrive with few or no natural enemies (predators, parasites, and pathogens) to keep their populations in balance, and quickly elevate to pest status.

There is some good news on *P. dominulus* populations in northern Utah – wasp individuals infected with an entomopathogen, most likely a virus or protozoan, have been spotted. In 2006, I first observed European paper wasp adults with deformed wings on the ground below several nests hanging from a porch ceiling. Adults typically fly to and from their nests to find food. But these adults were spending significant time on the ground below their nests which indicated they may not be orientating or navigating properly. Then I noticed flaccid wasp larvae on the ground underneath their nests. Adults will clean their nests of sick or dead larvae, but the number of sick larvae was unusually high. These symptoms fit with those of an insect infected by a pathogen. These first observations were made in eastern Logan. Since then I have observed similarly “diseased” wasps in Richmond and other locations in Cache Valley.

If you have observed “diseased” European paper wasps in any areas outside of Cache County, please send me an e-mail message informing me of the location and approximate date of observation (diane.alston@usu.edu). It will be interesting to follow the spread of this pathogen that may help reduce *P. dominulus* to being just another paper wasp, rather than the dominant nuisance and stinging wasp in northern Utah.

-Diane Alston, Extension Entomologist

In the National News

PESTICIDE REDUCTION IN PARKS

Pesticide reduction and/or elimination policies have been implemented in hundreds of parks across the nation. Some examples include: New York State Parks; Chicago City Parks; 29 communities and townships in New Jersey; 17 cities in the Northwest covering more than 50 parks; and numerous communities throughout Massachusetts, Maine, and Connecticut. Some parks have gone completely pesticide-free, including Camden and Rockport, ME.

ORIGINS OF PHYTOPHTHORA RAMORUM INVESTIGATED

The pathogen that causes sudden oak death may be as old as 5 million years. This discovery by ARS and NC State University may help shed light on where it came from, and how it was spread. Three distinct lineages, (EUI, NAI and NA2) were introduced to Europe and western North America in the last 10 years. Several years of DNA sequencing analysis has shown that each lineage originated in a distinct (as yet unknown) geographic location, and has mutated independently of the other.

NEMATODE-RESISTANT POTATO

A new russet potato germplasm resistant to feeding by the Columbia root-knot

nematode has been developed through painstaking breeding work by ARS. This pest is normally controlled by chemical fumigants. Two more years of field trials are in the works before release to the agricultural market.

NEW CLASS OF FUNGICIDE DISCOVERED

New anti-fungal agents called phytoalexin detoxification inhibitors (paldoxins) have been developed by University of Saskatchewan mycologists. Paldoxins work to block the ability of pathogenic fungi from destroying plants' natural defense chemicals, called phytoalexins. The most powerful phytoalexins discovered were found in camelina, and many fungi were unable to degrade the chemical. The paldoxins are unique in that they work by disrupting a key chemical signaling pathway that fungi use to break down a plant's normal defenses, slowing pathogenic fungi without harming other organisms. The paldoxins have been tested on several crucifers, including rapeseed and mustard greens.

NEW INSECT REPELLENT AVAILABLE SOON

DuPont recently registered a biological insect repellent ingredient, Refined Oil of *Nepeta cataria*, made from catmint

(catnip), the first biological for mosquitos to be registered in eight years. Research shows its repellency is similar to DEET, and can be safely reapplied as often as necessary. It is not oily and has a pleasant fragrance.

A SECOND USE FOR CATMINT

Not only does catmint oil repel biting insects (see previous), but USDA ARS entomologists have also found certain catmint compounds to repel the Asian lady beetle. Nepetalactone was one compound that repelled 95 percent of adult beetles in a laboratory study. This technology may prove useful in preventing lady beetles from entering buildings, where the repellent is combined with a trap collects insects for release elsewhere.

FIRST EVER ORGANIC AG SURVEY

USDA's National Agricultural Statistics Service will survey U.S. organic farms and farms in transition this June 2009, the first survey of its kind. The survey will help identify production and marketing practices, income, and expenses. Results will be used to guide future farm policies, funding, availability of goods and services, and community development.

Useful Publications and Web Sites

PUBLICATIONS

- "Using Organic Nutrient Sources" was prepared by Penn State University to help growers interpret soil test recommendations for incorporating organic nutrient sources. Access it [here](#).
- "A Targeted Conservation Approach for Improving Environmental Quality," prepared by Iowa State University,

encourages the strategic use of trees, prairies, and other perennials in a way that will result in multiple environmental benefits while causing only a small change in overall agricultural production. Access it [here](#).

WEB SITES

- www.omafra.gov.on.ca/IPM/english is a new interactive IPM training tool, called Ontario cropIPM. The tool

targets Ontario growers, but some information is applicable to Utah, including photo galleries, scouting calendars, glossaries, and additional resources.

- www.rodaleinstitute.org/new_farm is the online version of New Farm, which has been around for 29 years as an information source for farmers.



Featured Picture of the Quarter

Each female lady beetle may lay from 20 to 1,000 eggs in her lifetime, often in small clusters in protected sites. If predator food is not readily available, lady beetles will eat eggs within and between beetle species.

Lady beetles are highly effective predators, especially against aphids. They are most effective when aphid populations are high. The convergent lady beetle adult can consume up to 50 aphids per day, and the seven-spotted lady beetle adults can consume several hundred aphids per day.

-Photo by Marion Murray

Calendar of IPM-Related Events

July 24 - 29, International Society of Arboriculture Annual Meeting, Providence, RI, www.isa-arbor.com/conference

July 25 - 30, Mycological Society of America and Botanical Society of America Annual Conference, Snowbird, UT, 2009.botanyconference.org

July 30 - August 6, APS Annual Meeting in conjunction with APS Pacific Division Meeting, Portland, OR, meeting.apsnet.org

August 10 - 21, Pest and Disease Diagnostics Workshop for International Trade and Food Security, Wooster, OH, plantpath.osu.edu/extension/international

August 16 - 20, Society for Invertebrate Pathology Annual Conference, Park City, UT, www.sipweb.org/meeting

September 15 - 19, 5th National Small Farms Conference, Springfield, IL, www.conferences.uiuc.edu/conferences/conferenceviewer2/view.cfm?conf=20033

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