UTAH PESTS News

Utah Plant Pest Diagnostic Laboratory and USU Extension Vol. III, Spring 2009

Sabbatical Research Experience with the NW Michigan Cherry Industry

Diane Alston and family enjoyed Sleeping Bear Dunes National Lakeshore and feasting on cherry products–just a few activities spent during her sabbatical weekends in Michigan, the cherry capital of the world.

My family and I had a fun and productive sabbatical experience in northwestern Michigan during the spring and summer of 2008. Michigan produces 75% of U.S. tart cherries and is one of four major producers of sweet cherries. I collaborated with Michigan State University entomologists on research projects on plum curculio biological control and cherry fruit fly ecology and management. Drs. Nikki Rothwell, Mark Whalon, Larry Gut, and others were generous with their time and expertise and helped me jump right into research opportunities with the Michigan fruit industry.

First, I conducted a survey of 37 fruit orchards and vineyards for the presence of entomopathogens (nematodes, fungi, and bacteria that kill insects). A goal was to assess whether the sandy soils of NW Michigan are conducive to entomopathogens and microbial activity. By targeting soil-dwelling life stages of insects, such as the summer generation of plum curculio and cherry fruit fly larvae, growers can take advantage of additional timings to suppress pest populations.

Waxworm larvae were used to "bait" soils for native entomopathogens. Entomopathogen-induced insect mortality ranged from 5-95% per site, and was 50% or greater in 22 of the 37 sites. Soils of organically managed sites

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What's Inside

News Highlights

AFRICANIZED HONEY BEES FOUND IN SOUTHERN UTAH

Utah Dept. of Agriculture and Food (UDAF) recently detected Africanized honey bees in monitored traps and in honey bee hives in Washington and Kane counties. UDAF, USU, and agricultural stakeholders will work together to develop tools and educational materials for beekeepers and citizens. This bee has been present in southern and southwestern U.S. since the early 1990s. The new fact sheet, Africanized Honey Bees, provides more details.

www.utahpests.usu.edu

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Utah State University COOPERATIVE EXTENSION

Michigan Sabbatical, continued from previous page

had greater entomopathogen activity than transitional organic, sustainable, and conventional orchard soils. Entomopathogens were more common in grape and tart cherry sites than in sweet cherry, and apple sites were intermediate. These results support that the presence of mulches and ground covers, and lower toxicity or shorter-lived pest control products used in organic production may encourage biologically active soils that can suppress soil-dwelling insects. Additionally, results suggest that the sandy soils of NW Michigan are conducive to entomopathogens, and as long as adequate soil moisture is maintained, may be good sites for application of entomopathogen products, such as nematodes and fungi.

Second, I contributed to a statewide effort to develop a predictive model of plum curculio (PC) phenology in fruit. Such a model would allow growers to better time controls for the summer generation, such as insect growth regulators that reduce egg hatch, entomopathogens to kill larvae in the soil, or post-harvest foliar sprays for adults. Results showed that PC phenology was more advanced in tart and sweet cherry than in apple, and more advanced in fruit on the ground than fruit in the tree. At 450-500 DD_{50}, the majority of PC in fruit on trees were eggs and 1^{st} instars, while in fruit on the ground the majority were 1^{st} to 4^{th} instars. At 650-700 DD_{50}, most PC in cherry fruits on trees were 3^{rd} to 4^{th} instars while in fruit on the ground most were 4^{th} instars or had already exited (except not from apple). These data suggest that applications of entomopathogens to target 4^{th} instars burrowing into soil would need to be applied beginning at about 500 DD_{50} and continue past 700 DD_{50}. This study is on-going and more data will be collected in subsequent years.

Third, I participated in a study on cherry fruit fly (CFF) reproductive maturity and behavior in sweet and tart cherry orchards as compared to a native host, black cherry. The goal was to build upon

Diane used a new trick for hanging traps: attaching the trap to a bamboo pole and hooking it over a limb as high as 12 feet in the tree.

data collected by Dr. Luis Teixeira of MSU suggesting that peak egg-laying of CFF in cherry orchards occurs during and just after cherry harvest when fruits are at peak ripeness, but that CFF trapped in nearby black cherry trees don't have mature eggs until later in August when black cherry fruits become ripe. My results support these findings. Observations of CFF behavior in tart cherry trees found that flies didn't begin to spend time on fruits until they were fully red in color. Most of the flies collected from fruits were males, suggesting that males sit and wait to mate with females. Results from this study will be contributed to research and Extension publications.

In addition to the exciting research opportunities, my family and I found many diversions. We took advantage of the abundance of places to kayak, fish, swim, and hike. Sleeping Bear Dunes National Lakeshore is a real treasure and we hiked on many of the park's trails. We take with us fond memories of the region and people in the "Cherry Capital of the World."

-Diane Alston, Extension Entomologist

Imidacloprid for Insect Control

In the mid 1980s, Bayer CropScience patented a new chemical for insect control—imidacloprid (IC). Registered for use in the United States in 1994, this chemical was the first in a new group of insecticides known as the neonicotinoids, and is currently considered the most widely used insecticide in the world. Today, neonicotinoids (mode of action group 4a; click here for MOA descriptions) includes active ingredients such as acetamiprid, clothianidin, dinotefuran, nitenpyram, thiacloprid, and thiamethoxam. There are over 250 IC-containing products available in Utah.

Imidacloprid is registered on over 140 crops for a variety of pests. The following are controlled by Merit 75 WP:

adelgids	European crane fly	*mole crickets
annual bluegrass weevil	flatheaded borers	Oriental beetle
aphids	green june beetle	pine tip moth
asiatic garden beetles	Japanese beetle	psyllids
billbug	lace bugs	sawfly
black vine weevil	leaf beetles	*sod webworm
*chinch bug	leafhoppers	soft scales
*cutworms/armyworms	leafminers	*thrips
emerald ash borer	masked chafers	white grubs
European chafer	mealybugs	whiteflies

Application methods to control insects in this list vary by crop and situation. Please carefully read the label before applying. (*suppression only)

Imidacloprid is not a true systemic insecticide because it not translocated throughout all plant tissue, however it may diffuse partially into the phloem. When applied as a soil drench/injection, trunk injection, or seed treatment, it is transported throughout the water-carrying vessels (xylem), providing "systemic" protection. When IC is applied as a foliar spray, it may be absorbed into the leaves via "translaminar flow." Any susceptible insects feeding on foliage or phloem tissues will be killed as a result of contact or ingestion with IC. Imidacloprid kills insects by causing rapid firing of nerves, leading to paralysis and death.

When used as a soil drench/injection or trunk injection, imidacloprid can remain active from a few months to a year. It is a good choice for IPM programs because it targets foliar- and phloem-feeding pests while preserving predatory insects. Because this type of application can take days (turf) to months (large trees) for the chemical to translocate, it may take a while to see results. If pests are causing major damage and immediate control is needed, consider applying fast-acting insecticides like spinosad, horticultural oil, synthetic pyrethroids, etc. The insecticide you choose will depend on your target pest and location, and the timing will depend on the pest life cycle. Any unknown pest should be sent to the Utah Plant Pest Diagnostic Lab for identification. Many common Utah pests are described in Extension fact sheets.

As with any insecticide, IC is a chemical that enters the environment. While it has lower toxicity levels than many broad-spectrum insecticides, it is capable of killing or giving sub-lethal doses to many non-target insects, including bees, parasitic wasps, birds, and mammals. This chemical, when used as a seed treatment, has been implicated (but not proven) in contributing to widespread honey bee death in Europe. It is banned in France, Italy, Germany, and Slovenia as a seed treatment on such crops as sunflower, rapeseed, and sweet corn. It is highly toxic to fish and aquatic invertebrates. Because of its frequent use, insect resistance to IC is building in some systems like Colorado potato beetle in Michigan, and the greenhouse whitefly in Europe. Make sure to rotate insecticides that have different modes of action (see the spring 2008 Utah Pests newsletter for more information on preventing resistance). Additionally, IC has been shown to increase spider mite fecundity (number of eggs produced). For more details on the potential side effects of IC click here. An article containing counter-arguments may be found here.

Apply Imidacloprid Safely and Effectively..

- An IC product can be applied with, or after a curative insecticide for long-term pest control. (Check the product label for compatibility.)
- Do not mix IC with any products containing Boron.
- Imidacloprid can be applied with fertilizer to promote faster uptake and translocation.
- For insect control in woody plants, fall and early spring are good times to apply soil drenches/injections. These applications are best followed by irrigation, and should not be applied to waterlogged soil.
- Because IC is translocated quickly in turf, it is best to apply during the egg-laying period of the target pest.
- Imidacloprid is highly toxic to bees, so do not apply or allow drift on blooming plants.

The use of IC should be secondary to cultural and mechanical practices of maintaining a healthy landscape, which can reduce the amount of chemicals needed by over 90%. Use proper monitoring/scouting techniques to survey for pests before damage occurs, and only apply IC if there is current, or imminent damage. Once pests are under control, discontinue the use of any insecticide and resume non-chemical methods of pest management. As always, carefully read and follow the application instructions on the product label.

-Ryan Davis, Arthropod Diagnostician

Turf Problems to Watch for This Spring

As the weather warms this spring and turf begins actively growing, pathogens will also become active in infected tissue. The most common turf diseases in Utah are snow molds, necrotic ring spot, and take-all patch.

SNOW MOLDS

Snow molds, both gray snow mold (*Typhula* spp.) and pink snow mold (*Microdochium nivale*), first appear after snow melt. These fungi are different than most because they thrive in cooler temperatures. Infection begins under snow cover and disease symptoms in the turf are not visible until the snow begins to melt. These diseases can occur separately or together and almost all turf species are susceptible to both.

Pink snow mold first appears as circular patches of infected turf that can change color from orange-brown to dark reddish-brown to light gray or tan. There may also be a faint growth of white or light pink mycelium around the edges of the patch, but the pink color is only noticeable at certain times of the day. If the conditions are cool and wet for a prolonged period of time, the patches can combine, creating larger areas of infected turf. Numerous, small clusters of pink spores are produced on the surface of the leaves. The spores begin new infections as they move to other areas of the turf. The symptoms can be confused with gray snow mold.

The first symptoms of gray snow mold are areas of yellow, straw-colored turf. The leaves become matted and covered with a thick or thin layer of white to gray mycelium. The mycelium eventually dries, giving the leaves a gray or silver color. Infected leaves will be covered with small, black sclerotia, which the fungus uses as overwintering structures. Infected patches can coalesce into larger areas when conditions are favorable. Gray snow mold is different than the other diseases in that only the leaves are killed while the crown is not affected. So new leaves will be produced from the crown.

Mycelia of gray snow mold is visible under the melting snow.

Management practices are similar for both pink and gray snow mold. Avoid applying nitrogen fertilizers late in the season to prevent late season growth. Mow the lawn at the end of the season. Remove excess thatch and spread out large snow piles. Removing snow to promote better drainage and removing the mycelial crust on infected turf by raking will help in recovery. Apply a low rate fertilizer in the spring to promote new growth.

NECROTIC RING SPOT

Although necrotic ring spot (*Ophiosphaerella korrae*) develops during cool, wet weather, symptoms may not be noticeable until the turf is drought stressed in the summer. The first symptoms are small, light green areas of turf. As the leaves are infected, they will turn a reddish-brown to bronze color, weakening to a light straw color. The turf will frequently survive or re-colonize the center of the patch giving it a ring-like appearance known as a "frog-eye." In some cases, all the turf in the patch will die resulting in a sunken depression. There are no leaf lesions present on the foliage of infected turf. As the disease advances, roots, crowns, and lower stems will develop a black or brown color due to the presence of fungal hyphae. Infected roots may become severely rotted. This disease is typically more severe in turf established from sod and in areas with compacted soil. Symptoms will usually appear two to three years after the turf is established.

Management practices that reduce stress on the turf will also help suppress necrotic ring spot. Water lawns deeply and as infrequently as possible. However, if your turf is infected with necrotic ring spot, frequent watering will cool the grass and allow plants with depleted root systems to survive the late afternoon heat. In this case, light applications of water can be applied daily to infected turf to reduce heat stress and begin recovery. Core-aerate, with clean equipment, and maintain a balanced fertilization program, especially for nitrogen, phosphorus, and potassium. Slow-release fertilizers, rather than quick-release forms, will reduce disease severity.

TAKE-ALL

Symptoms of take-all (*Gaeumannomyces graminis*) appear in late spring or early summer and persist through the summer, becoming more noticeable when the turf becomes stressed in hot, dry weather. Infected turf can have symptoms similar to necrotic ring spot or pink snow mold. They begin as small

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NEWS FROM THE *UTAH PESTS* GROUP, CONTINUED

UTAH PESTS In-Service Training Featured Whitney Cranshaw

The Utah Pests In-Service Training highlighted turf and ornamental diagnostics and pest management February 3 and 4 in Provo. The event featured 12 presentations by USU faculty, Extension agents, and keynote speaker Dr. Whitney Cranshaw. Dr. Cranshaw, professor and Extension entomologist at Colorado State University, is a renowned insect photographer, and author of five books and numerous Extension publications. He captivated the audience of 45 with topics from butterfly gardening, to thousand cankers diseases, to insect "scatology" (identifying insects based on excrement). All presentations are available on the Utah Pests Web site.

The In-Service Training concluded with a "dueling diagnostics" segment that challenged everyone and was rated a favorite by the audience, which included agents, public garden horticulturists, golf course managers, and members of the green industry.

-Erin Hodgson, Extension Entomologist

Speakers included (left to right): Diane Alston, Ryan Davis, JayDee Gunnell, Alicia Moulton, Whitney Cranshaw, Marion Murray, and Chuck Gay. Not pictured are Erin Hodgson, Erin Frank, Extension agents Taun Beddes and Maggie Shao, and Dr. Fred Baker, Forest Pathologist at USU.

Participants interacted with speakers at the specimen display area, which included microscopes for personalized pest diagnostics, and demonstrations such as use of sweep nets, beating trays, and hand lenses.

PLANT PATHOLOGY NEWS , continued

Turf Diseases, continued from previous page

Symptoms of take-all look similar to pink snow mold and necrotic ring spot.

light brown or reddish-brown patches. The edges of these patches or the whole patch can be reddish-brown or bronze when the disease is actively developing. The roots will have dark brown streaks and as the disease progresses the stolons, rhizomes, roots, and shoot bases will turn dark brown or black. The plants will become brittle in hot dry weather and pieces can be easily pulled from the soil.

Recovery from take-all is slow. Planting a mixture of grasses can reduce disease severity. Maintaining a low soil pH around 5.5 to 6.0 will also reduce disease severity, although this may not be as feasible with Utah's alkaline soils. This would require ongoing management practices to lower the pH, which can get expensive. Maintain a balanced fertilization program, paying particular attention to manganese, potassium, and phosphorus. Deficiencies of these nutrients can increase disease severity. Factors restricting root growth can also increase disease severity. Avoid excessive irrigation and nitrogen applications, provide adequate drainage, and aerate turf when symptoms are absent to improve air and water movement and alleviate soil compaction.

-Erin Frank, Plant Disease Diagnostician

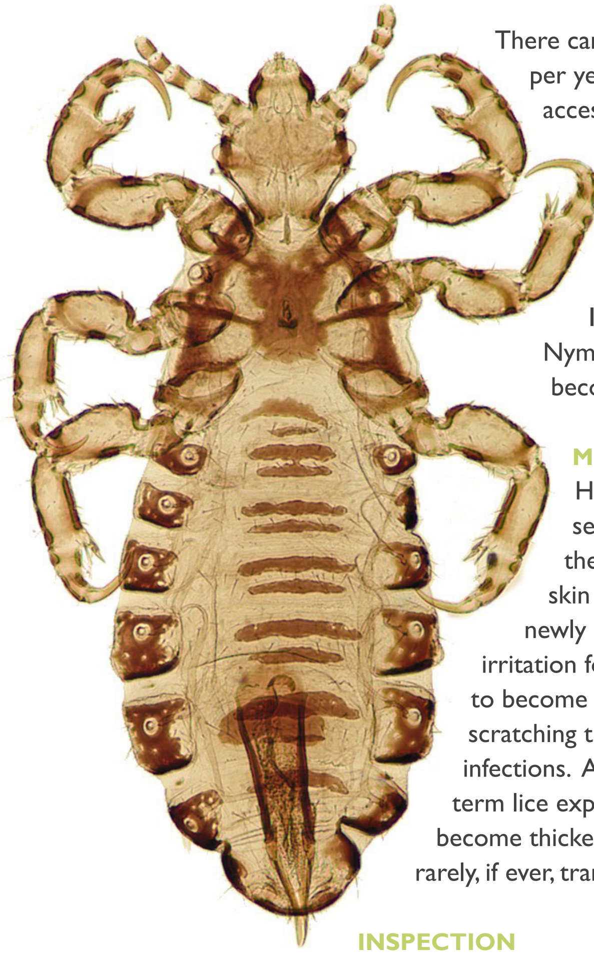
Getting Nit-Picky About Head Lice Control

Good to know...

- 6-12 million people in the U.S. are infested with lice every year.
- Children are most susceptible because of close contact and exchange of personal items (e.g., clothing, backpacks, ear phones, etc.).
- Lice infestations can be controlled with careful inspections and diligent sanitation.

Common myths about lice...

- Only dirty kids can get lice.
- People with long hair get lice more easily.
- The entire house must be treated to kill lice.
- Pets transmit lice to humans.



Lice have been closely associated with humans for a long time. Human lice infestations (pediculosis) are still common worldwide. Often these "lousy pests" are an embarrassment because of long-standing myths associated with poor sanitation. Anyone can get lice, especially when in close contact with other people.

BIOLOGY AND LIFE CYCLE

All lice are wingless insects that go through simple metamorphosis (egg, nymph, adult). Lice do not have jumping legs like fleas and cannot jump from host to host. They have specialized claws for clinging onto hair. Some lice feed by sucking (head lice) and some by chewing. Sucking lice are blood feeders and have a narrow head with piercing-sucking mouthparts, and must have a living host on which to feed and reproduce. These kinds of lice are host specific and rarely survive more than 48 hours away from their host. Head lice, *Pediculus humanus capitis* (order Phthiraptera) prefer to live and feed on the human head and are the most common human-infesting species in the U.S. Adults are 2-3.5 mm long.

There can be 10 to 12 overlapping generations per year, depending on the temperature and access to blood meals. A mated female can lay about 5 to 10 eggs (or nits) per day for 4 to 5 weeks. Individual eggs are glued onto hair shafts close to the scalp. Eggs hatch into nymphs after incubating for 10 to 14 days and begin feeding immediately. Nymphs go through 3 instars before becoming adults in 10 to 12 days.

MEDICAL IMPORTANCE

Head lice feed on blood from the scalp several times a day. While feeding, the lice inject saliva that can cause the skin to become itchy and irritated. A newly infested person may not develop an irritation for 4-6 weeks, because it takes time to become sensitive to the saliva. Constantly scratching the scalp can lead to secondary infections. A scabby crust may form from long term lice exposure, and in some cases the skin can become thickened and discolored. Head lice will rarely, if ever, transmit diseases to humans.

INSPECTION

Periodically checking for head lice can prevent advanced infestations. This is especially true if you or a family member is in close contact with others on a regular basis. Shampoo hair without a conditioner, and comb. Divide hair into sections and look for eggs and adults. Head lice are most commonly found within 0.5 inch of the scalp. If any lice are found, it is important to check all family members.

CONTROL

Launder clothes and bedding on the highest heat settings or have them dry-cleaned. Non-washable items should be sequestered in plastic zip top bags for 2 weeks or frozen for 2 days (a good option for earphones). Vacuum, sweep, and dust to remove shed hair with eggs attached.

Medicated shampoos are the most common treatment for head lice infestations. Products containing permethrin (Nix) or pyrethrins with piperonyl butoxide (A200, Rid, Pronto Plus) are usually effective. Prescription products, like Ovide, are also available. Multiple applications are often necessary to kill eggs and nymphs.

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Head Lice Control, continued from previous page

Non-medicated shampoos, like TLC Lice shampoo or Lice Killer shampoo, are also available, and safe on sensitive skin. They should be used where strains of head lice have become resistant to conventional medicated shampoos. They must be used every day for 2 weeks, along with blow drying and brushing to destroy all life stages. Alternatively, wash hair every 3 days for 3 weeks with a gentle cleanser, like Cetaphil, and blow dry with hot air for 20 minutes. Because no lice shampoo is 100% effective, the use of "nit combs" is highly recommended. Fine-toothed combs, such as LiceMeister should be used every other day for 2 weeks. Continuously dip the comb in hot, soapy water as it is worked through each section of hair.

Head lice can be an embarrassing problem for you and your family. Unfortunately, pediculosis is often stereotyped with dirty people. The truth about lice is that they are a nuisance, but can be controlled with thorough inspection and sanitation. For more information, see the Human Lice Fact Sheet.

-Erin Hodgson, Extension Entomologist

Surge of Black Pineleaf Scale in Northern Utah

Arborists and USU Extension agents have noticed an upsurge in the incidence of black pineleaf scale in the last 3 to 5 years on Scotch, Austrian, and ponderosa pines in northern Utah. "I think this is huge problem for the Salt Lake City metro area," said Hal Jensen, certified arborist and member of the Utah Community Forest Council. "Some trees are so infested that they are approaching death, from city parks in Draper, Sandy, West Valley City," to lighter infestations elsewhere.

The black pineleaf scale (*Nuculaspis californica*) is an armored scale, concealing its body under a removable, waxy covering. It feeds only on needles, and most pine species are susceptible, as well as Douglas-fir. Considered to be a native insect occurring throughout North America, black pineleaf scale is primarily a pest of economic importance in western U.S.

This scale is kept in check by two wasp parasitoids (*Prospatella* sp. and *Physcus varicornis*) that have three or more generations during the scale's single one. Pineleaf scale is sensitive to sudden cold temperatures, and early fall frosts can also prevent outbreaks. Jensen has observed that trees in the lower part of valley are more heavily infested than those higher up on the benches, where temperatures are cooler.

The current outbreak in Utah was probably triggered by a combination of factors including mild fall weather, dust (which encourages scale and discourages predators), and urban stressors such as prolonged moisture deficit, soil compaction, and root injury. Use of pesticides that inadvertently killed the parasitoid wasps could also have played a role.

JayDee Gunnell USU Extension

Many trees in the Salt Lake Valley are severely infested, as shown on this Austrian pine above.

According to the Oregon Dept. of Forestry, scale infestations are measured by the average number of scales per inch of needle. Low/endemic populations occur at 0.5 scale/inch of needle, growth loss occurs at 4 scales/inch, and mortality occurs at 20+ scales/inch.

DAMAGE

Leaf-inhabiting armored scales feed by inserting their straw-like mouthparts into the needle tissue and removing nutrients and contents of mesophyll cells. Where scales feed, the foliage becomes yellowed with localized necrosis. Under heavy and prolonged infestations, needles that are normally retained for 5 years will drop in 1 to 2 years. New needles are sparse, stunted, and chlorotic. Branches die back and the tree may eventually be killed. Often, infestations will predispose trees to attack by bark beetles.

Mike Marett, Sandy City Urban Forester, has seen infested trees in his city increase to the hundreds in the last 5 years. "I had to remove 12 to 14 specimen trees last year, and only one had secondary bark beetle attack." He has struggled with control and has tried a variety of options such as dormant oil, foliar sprays to the crawlers, and Mauget injections of systemics.

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Black Pineleaf Scale, continued from previous page

BIOLOGY

We know from observation in neighboring states that there is probably only a single generation per year in northern Utah. Scales overwinter as immatures, and in early June, winged adult males emerge and in their short life spans, seek out females. Mated female lay up to 40 eggs under their coverings in late spring. Egg hatch occurs over several weeks starting in late June and early July, after new needles have completed growth. Yellow crawlers are soon visible with a 10-20x hand lens, and are active through mid to late July. They migrate to current season needles, or become airborne, where they are delivered to nearby hosts. By early August, crawlers will have settled to immobility for the remainder of their lives.

Hal Jensen

Hal Jensen

Infested trees may die within 5 years (top). Pruning is not an option in scale control. Infested twigs retain only the current years' growth (bottom).

CONTROL

Managers should take an IPM approach in controlling black pineleaf scale, which includes a combination of maintaining tree health, promoting the wasp parasitoids, and foliar or systemic insecticides for severe infestations. Foliar insecticides must be timed to the crawler stage because the waxy covering on adults is impervious to liquids.

Horticultural oil, insecticidal soap, and some insect growth regulators (IGRs) are foliar insecticides that are softer on the beneficials. Note that oil should not be applied to drought or heat-stressed plants, and that fatty acids in soaps can be inactivated by Utah's hard water, so add a buffer or conditioning agent. IGRs such as Distance (pyrifoxyfen) or Talus (buprofezin) disrupt molting and work best on earliest instars. These products also have sublethal effects in that surviving females lay fewer eggs the following year.

Know Crawler Emergence...

- wrap double-sided sticky tape tightly around an infested needle cluster;
- shake a limb over white cloth;
- examine needles regularly in June/July with a hand lens

In general, crawlers begin hatching at approximately 1068 degree days, or when greenspire linden or northern catalpa blooms.

A systemic may also be applied as an injection or soil drench. Safari (dinotefuran) is a newer neonicotinoid that has shown good results on armored scales (however, it is expensive). It is highly water soluble and moves quickly through the plant tissue. It should be applied in early spring. Imidacloprid (Merit) is not effective against armored scales because the amount taken up through the xylem and into plant mesophyll and parenchyma cells is not a lethal dose.

Jerry Goodspeed, USU Extension horticulture agent in Weber County, noted that with years of remedial care, trees can recover. "The worst infestation I saw was about 100 pines on a golf course in SLC in the summer of 2005. Most of the trees eventually recovered after oil treatments, supplemental insecticides, and improved irrigation." USU Extension will continue to work with city managers and arborists to bring the epidemic to a manageable level. A balance must be found among the wasp predators and the scale, which may take several years of treatment. In the meantime, an early fall frost can result in significant mortality, speeding up the process.

-Marion Murray, IPM Project Leader

Transitioning to Organic Agriculture

By Jennifer Reeve, Assistant Professor of Organic and Sustainable Agriculture in the Plant, Soils, and Climate Department at USU. Jennifer's focus is soil management, and soil sustainability.

Organic agriculture is a frequent topic of conversation today among both consumers and producers. With rising costs of inputs and a steady demand for organically grown products, growers are increasingly wondering if "going organic" might be worth it. The process can no doubt seem daunting and there can be a steep learning curve. In the past there has been a paucity of reliable information on the farming practices involved in organic agriculture, but that is changing.

The first thing to consider is the size of your current operation and potential market you wish to access. We recommend to initially transition a small portion of the farm to organic. During the three-year transition period, no inputs of conventional fertilizer or pesticides are allowed and no price premiums are available until the field or operation is fully certified. Problems such as reduced yields and increased pest pressures are often enhanced during the transition period, as the farm adapts to the new management practices.

Organic production relies to a much greater degree than conventional agriculture on the inherent fertility of the soil. This fertility is based on the organic matter content of the soil, which provides a warehouse of slow-release nutrients. As such, choose your best land to transition to organic agriculture to minimize the expected yield losses that may occur before organic matter in the soil is replenished. While fast-release sources of fertilizer, such as fish meal, are available for organic production, they are expensive, so it is unwise to rely too heavily on these products and instead focus on long-term building of soil fertility. The same is true for weed control. Organic management relies on minimizing the weed seed bank, so starting out with minimum weeds can help enormously in the long run.

One of the best ways to build long-term soil fertility is through addition of perennial crops in the rotation. Perennials have much deeper root systems than annuals, and deposit organic matter deep within the soil profile. Choosing a field that has been in long-term alfalfa production or grass clover hay would be an ideal place to start.

Otherwise, if you have the land available, focus on including as many soil-building cover crops in the rotation as possible. The exact approach to take depends on the crop and cropping system you have in mind.

Jennifer Reeve, USU

Jennifer Reeve, USU

Reeve and other specialists recently established an organic vegetable farm at USU's Greenville Research Farm. Students of all majors volunteer to manage the farm and harvest the vegetables. Produce is sold on the USU campus.

The Web site of the National Sustainable Agriculture Information Service (ATTRA) is probably the best source of detailed information on organic practices for a large selection of crops and organic production systems. University Extension Web sites, as well as the centralized eXtension Web site are also increasingly providing information on organic management strategies. These may or may not be transferable to Utah's growing conditions, although much can be learned from studying the general approaches taken.

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Transitioning to Organic Agriculture continued from previous page

Utah State University also has an emerging research program in organic production practices tailored specifically to local conditions. Experiments with season-extension for organic vegetable production have proven to be very successful. New research plots are currently being established to study organic transition strategies for organic field crops and vegetables, selecting cover crops for weed control, and input reduction and orchard floor management strategies for organic stone fruit production. All these systems need to be optimized to the challenges of Utah's climate where alkaline soils are low in organic matter, and the short growing season and limited water supply can make the use of cover crops challenging. Conversely, the climate provides important benefits to the organic grower in that the dry sunny growing season usually limits disease pressure.

In the past, many independent certifiers provided varying standards and requirements for organic certification under their own labels. In 2001, the USDA introduced standardized certification requirements under the National Organic Program (NOP). While the NOP does not certify farms directly, individual certifying agencies are accredited by the USDA NOP to issue certifications conforming to the minimum requirements of the NOP rule. These requirements can be found at the NOP Web site and a simplified introduction to the rules can also be found by clicking here, or here. People are free to shop around for a certification agency that best meets their needs, and are not restricted to state agencies.

Initially, the organic certification process can be time consuming and arduous as it requires meticulous recording of all management decisions made on the farm. Once management plans have been developed and an efficient record-keeping system established, the time needed is usually relatively minor. For market gardeners grossing less than $5000 per year in sales, certification is not needed in order to market your produce as organic. In instances where a direct customer relationship exists between the grower and consumer, many growers have found it unnecessary to undertake the certification process, and instead market their produce as "local" and/or "naturally grown."

Larger growers wishing to enter the mass market chain or grow for export must obtain organic certification as it forms the contract between distant consumers and the grower that certain minimum requirements have been met. Detailed records of farm practices for the three years leading up to certification need to be provided as well as detailed management plans for how organic status will be maintained in the future. In addition, a yearly certification fee is required and the process involves an on-farm visit from a certifying agent.

While no one would claim that organic production is an easy approach, it certainly can be very rewarding. In order to be an effective organic farmer, an understanding of the seasonal cycles involved in pest dynamics, crop rotations, and nutrient management is necessary. The learning and understanding involved in developing such a relationship with the land can be a source of increasing satisfaction. In addition, many growers have found that the organic label has enabled them to expand into niche markets and increase the profitability of their farms. Ultimately, a successful organic grower requires a combination of biological-based farming knowledge, and marketing and business expertise.

Jennifer Reeve, USU

Jennifer Reeve, USU

Starting out with proper soil fertility is helpful when transitioning to organic. Most organic growers rely on composts, green manure, etc., to improve soil fertility rather than expensive organic fertilizers.

NEWS, WEB SITES, PUBLICATIONS, CALENDAR AND MORE

In the National News

FORESTS BECOMING SOURCE OF CARBON DIOXIDE

Canada's 1.2 million square miles of forests account for more than 7 percent of Earth's total forest lands. Once considered the "lungs of the planet" due to the amount of carbon they sequestered, they have recently shifted to becoming a carbon source. Studies by the Canadian Forest Service show that due to wildfire damage and vast mountain pine beetle infestations, the forests may remain a source of carbon until at least 2022.

EFFORTS TO BOLSTER NATIONAL ADOPTION OF SCHOOL IPM

More than 50 USDA studies have documented unsafe and illegal use of pesticides and unnecessary pesticide exposure in U.S. schools. Research shows that schools with IPM programs have up to 90% fewer pest problems and pest-related allergens compared to schools using pesticides.

A group of more than 30 professionals representing universities and federal agencies, and led by University of Arizona and the IPM Institute, have prepared "Pest Management Strategic Plan for IPM in Schools," aiming for full (voluntary) adoption of IPM in schools by 2015. It includes current conditions, pest management strategies, research and education needs, and a timeline to achieve the adoption goals.

USU and Utah Dept. of Ag. and Food are members of the Western Region IPM in Schools Working Group.

NEW ZEALAND BANS ENDOSULFAN

In January 2009, New Zealand banned the use of endosulfan (Thionex), joining several other countries including all those in the European Union. Currently, the Stockholm Convention on Persistent Organic Pollutants is undertaking an assessment to list endosulfan for global restrictions. In the U.S., endosulfan is used on cotton, vegetables, and other crops. It is one of the most frequently reported causes of farmworker poisoning. The U.S. EPA is currently reviewing petitions submitted in February 2008 to cancel uses of endosulfan.

GRASS BUFFERS FILTER HERBICIDE RESIDUES

Agricultural Research Service studies show that using grass buffers around agricultural fields adjacent to riparian areas can reduce the amount of herbicide runoff from soil surface application by up to 90%. Of the species tested, eastern gammagrass was most effective, with orchardgrass and switchgrass almost as effective. The grass strip serves as a "filter," degrading the herbicide (Atrazine) before it runs off onto adjacent sites or into shallow ground water.

Bt CROPS AFFECT NON-TARGET INSECTS LESS THAN INSECTICIDES

ARS, University, and EPA scientists recently studied the effects of Bt crops on non-target insects by comparing their abundance in Bt crops and non-Bt crops without insecticides with those two types of crops with insecticides. The results showed that the most influential factor was the insecticide applied and that broad-spectrum insecticides had a larger negative impact on non-target insects than the Bt crop fields.

Useful Publications and Web Sites

PUBLICATIONS

- "Organic Potato Pest Management Plan" for western production is available from the Western IPM Center. It summarizes the research, education, and regulatory needs of each pest. Access it here.
- "Field Borders for Agronomic, Economic, and Wildlife Benefits" is a new online publication prepared by the University of Missouri to help growers establish habitats in field borders. Access it here.
- "Water, Agriculture, and You" summarizes research by The Rodale Institute showing the relationship between agricultural practices and ground and surface water quality. Also included are management recommendations, resources, and a bibliography. Access it here.
- "Organic Certification of Vegetable Operations" explains the organic certification process in detail. Produced by the University of Minnesota. Access it here.

WEB SITES

- www.extension.org/organic%20production is a new organic agriculture resource on the eXtension Web site, authored by a community of university faculty and members of the agriculture industry.
- urbanext.illinois.edu/containergardening/ helps in all aspects of container gardening, especially useful when growing vegetables in urban or small spaces.
- www.cias.wisc.edu is the Center for Integrated Agricultural Systems (University of WI), and includes information on maximizing the dollar for a variety of cropping systems, as well as successful models of food distribution.

Featured Picture of the Quarter

Grape phylloxera (*Daktulosphaira vitifoliae*) is an aphid-like pest of grapes, native to eastern U.S. Two forms exist, one that feeds on root galls and one that feeds on leaf galls. Native grapes tolerate feeding, while European rootstocks are highly susceptible. This pest almost destroyed the wine industry in France in the late 1800s.

The foliar-feeding form produces galls on the leaves, inside which nymphs feed. Adults emerge and lay eggs (shown at left) via asexual reproduction (parthenogenesis). Up to seven generations can occur.

-Photo by Diane Alston

Calendar of IPM-Related Events

March 23 - 26, 60th Annual Western Forest Insect Work Conference, Spokane, WA www.fsl.orst.edu/wfiwc/meetings/next

March 24 - 26, 6th International IPM Symposium, Portland, OR, www.ipmcenters.org/ipmsymposium09/

March 29 - April 1, 93rd Annual Meeting of the Pacific Branch Entomological Society of America, San Diego, CA, groups.ucanr.org/_2009_PBESA

April 3 - 4, 27th National Pesticide Forum, Carrboro, NC, www.beyondpesticides.org/forum/brochures

April 14, ISA-Sponsored Workshop: "Up By Roots," Oregon City, OR, www.isa-arbor.com/conference/resources/UpByRoots_workshop_gen.pdf

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 for International Trade and Food Security, Wooster, OH, plantpath.osu.edu/extension/international

August 16 - 20, Society for Invertebrate Pathology, 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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