UTAH PESTS News

Utah Plant Pest Diagnostic Laboratory and USU Extension Vol.VI, Winter 2012

What's Inside

News Highlights

NEW *UTAH PESTS* **FACT SHEETS**

The following can be found on our website:

Spanish translations: Bed Bugs, Damsel Bugs, Termitas

www.utahpests.usu.edu

Pheromone Technologies to Manage Prionus Root Borer

The larvae of *Prionus californicus*, a long-horned or round-headed beetle (Cerambycidae), feed on the roots of trees and shrubs, including those of fruits, ornamentals, and natives. It is also a pest of hops in the Pacific Northwest. Feeding damage causes decreased nutrient uptake, water stress, reduced tree growth, and loss of fruiting wood and scaffold limbs. In fruit orchards with high populations of prionus, significant tree decline and mortality may result. There have been few effective controls for the pest. Soil fumigation and fallowing orchard soils for 5-6 years are expensive, reduce site productivity, and have shown variable efficacy.

Interestingly, this insect is native to western North America. Most insect "pest" species are invasive and non-native. Its life cycle requires 3 to 5 years, and most of it is spent below-ground as larvae chewing on roots. In Utah, the beetle has been found in sweet cherry, apricot, and peach orchards, especially along the mountain benches where soils are sandy. Porous soils are more conducive to the movement of larvae as the largest instars (mature larvae) can reach more than 4 inches in length and up to ¾ inch in width – one big grub! In studies conducted in fruit orchards in Box Elder County, it was found that younger, smaller larvae feed on smaller diameter roots toward the outer edges of the root zone, and tend to move inwards and upward as they develop and feed on larger roots. The majority of larvae in the tree crown are late instars. The insect pupates near the soil surface and adults emerge from approximately June through September in northern Utah. Adults are short-lived (several weeks) large, brown beetles, and are active primarily at twilight (crepuscular). Males can fly up to several hundred yards and have strongly serrated antennae to detect a sex pheromone released by females. Recently, entomologists identified the pheromone chemical and synthesized a mimic of the primary component, 3,5-dimethyldodecanoic acid (Rodstein et al. 2009).

Researchers, including ourselves (Barbour et al. 2011), have tested this pheromone in the field and found that it is highly effective as a trap lure. The best trap design that we tested is a sunken 5 gallon bucket topped

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UtahState University
COOPERATIVE EXTENSION

Prionus, continued from previous page

with a large funnel and pheromone lure hung above. We have tested a commercial lure (Contech Enterprises, Victoria, BC, Canada) and an experimental mating disruption dispenser (Pacific Biocontrol, Vancouver, WA) to assess if these technologies show promise for monitoring and management of the prionus root borer in orchards. The answer to both of these questions is a resounding "YES".

In 2011, we set up trials in two pairs of sweet cherry orchards (0.25 and 1.1 mile apart) with the upwind orchard serving as the untreated site and the other treated with 100 mating disruption (MD) dispensers per acre. Dispensers were stapled to the lower trunk because adult mating typically occurs on the ground. A second trial was established in two additional sweet cherry orchards to compare the attraction of a research vs. commercial pheromone lure (0.1 vs. 30 mg pheromone load), and to test the longevity of the commercial lure (2 vs. 4 week interval between replacement). Four bucket traps were placed in each orchard; half were baited with the research lure and half with the commercial lure. In the lure longevity test, half of the commercial lures were replaced every 2 weeks and the other half were replaced every 4 weeks. An astounding 338 *P. californicus* male beetles were caught in the six cherry orchards during 2011. Trap capture in the MD orchards was 90% less than in the paired untreated orchards. This indicates that the male beetles were much less effective in locating the traps when the MD pheromone was present throughout the orchard.

Trap shutdown (reduced trap capture) is used as a measure of potential disruption of mating and suppression of population growth. The 30 mg Contech (commercial) lures caught about three times more beetles than the 0.1 mg research lure in both the MD and untreated orchards. In the lure longevity comparison, there was no difference in attraction of beetles to Contech lures replaced every 2 or 4 weeks, confirming that this commercial lure should last at least one month in the field, and perhaps longer.

Contech pheromone lure suspended over a sunken bucket trap.

These results show great promise for use of pheromone technology for population monitoring, MD, and potentially mass-trapping of males. Because the beetle has a long life cycle, treatment with either MD dispensers or a relatively high number of baited traps will be required for multiple years to suppress populations as only a small proportion emerges as adults each year. However, pheromone technology holds the first bright spot for effective management of the prionus root borer, and is good news for Utah orchardists. The Contech lure will be available for sale in 2012, and hopefully the MD dispenser will be available soon.

We thank Contech Enterprises, Pacific Biocontrol, and the numerous research assistants who helped with this project over the last three years.

-Diane Alston, Entomologist, and
Mike Pace, Box Elder Co. Extension Agent

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Rodstein, J., et al. 2009. Identification and synthesis of a female-produced sex pheromone for the cerambycid beetle *Prionus californicus*. J. Chem. Ecol. 35: 590-600.

Barbour, J., et al. 2011. Synthetic 3,5-dimethyldodecanoic acid serves as a general attractant for multiple species of prionus (Coleoptera: Cerambycidae). Ann. Entomol. Soc. of Am. 104: 588-593.

Proper Tank Mixing Using the Jar Test

Tank mixing pesticides saves time and money, but if done incorrectly, can lead to plant injury, damaged spray equipment, or a useless mix. Typically, pesticide labels will provide information on pesticide mixtures that lead to phytotoxicity (plant injury). This type of mixture is chemically incompatible. Some mixtures, however, may result in physical incompatibility, which is usually not mentioned on product labels. A physical incompatible mixture may lead to a foamy, flaky, gelatinous or sludge-like product that is ineffective on the target pests. A jar test can quickly determine physical compatibility.

STEP 1: Add one pint of water to a glass jar with a lid. (Use the same water source that will go in the tank.)

STEP 2: Check spray water pH and adjust if necessary. Often, the pesticide label will give the optimal pH range for best results.

STEP 3: Add pesticides one at a time, and shake vigorously after each addition. The pesticides should be added in the following order:

water soluble pouches – 1 tbs
wettable powders – 1 tbs
dry flowables – 1 tbs
capsule suspensions – 1 tsp
emulsifiable concentrates – 1 tsp
soluble liquids – 1 tsp
soluble powders – 1 tsp
surfactants and other adjuvants – 1 tsp
fertilizers – use a scale to weigh out 1.1 grams

STEP 4: After all products have been added, shake again, let the solution stand for 15 minutes and then shake one last time and observe the results.

Compatible mixture

- Jar is cool to the touch, and mixture is smooth.

Incompatible mixture

- Layers form quickly after stirring
- Mixture is clumpy, grainy, or foamy, or becomes sludgy
- Jar is warm or hot to the touch

If the mixture is incompatible, do not use the mix of chemicals on your plants. You could re-do the jar test (with a clean jar) to see if changing some steps will improve the mix:

- change the order of mixing
- change the water supply
- change the pesticide brand and/or select a different formulation

If the mix is compatible, add pesticides to the spray tank in the same order as used in the jar test. Rinse all utensils and jars and pour the rinse water (rinsate) into the spray tank.

STEP 5: Triple rinse and discard the jar.

If you own an iPhone or Android phone, there are several free apps available that help with tank mixing: TankMix by DuPont, Mix Tank by Precision Laboratories, Mobile Ag Tank Mix by Marrone, and Syngenta TankCalk.

Scentless Seed Bugs in Homes this Winter

The scentless seed bugs (family Rhopalidae) are most known for the infamous boxelder bugs that commonly invade peoples' homes in the fall, winter, and spring. This year, a smaller, nameless relative of the boxelder bug in the genus *Arhyssus* is invading homes in northern Utah. Commonly found feeding on weeds and plants in dry habitats, this bug is a small (7-8 mm), dull brown to green insect with straw-like mouthparts. It migrates to structures during fall to spend the cold months in warm shelter. This insect is not of health concern and like boxelder bugs, is only searching for a warm winter retreat. No chemical controls are recommended. As for boxelder bugs, sealing entry points and vacuuming up bugs inside the home are the primary control methods.

-Ryan Davis, Arthropod Diagnostician

Honey Bee Navigation

A crocus looks very different to a bee. Flowers often have ultraviolet "nectar guides," which are invisible to humans but aid foraging bees.

Many of us have heard of the amazing ability of honey bees to communicate the location of food and other resources to each other by dancing. The honey bees' "waggle dance" conveys a wealth of information, including the direction, distance, and the amount of food.

This is even more amazing when we consider honey bee eyesight. A worker bee's eye is made up of about 4,500 facets, called ommatidia. Each facet sees a small portion of the big picture, so to speak. But honey bees only have about 1% of the eye-to-brain connections that humans have, which means that they see the world at a much lower resolution than we do. Also, unlike human eyes which have receptors for blue, green, and red light, honey bee eyes contain receptors that are sensitive to blue, green, ultraviolet light, and UV polarized light.

Honey bee eyes function in interesting ways. They see flowers differently than humans. They cannot see red, but they can see ultraviolet flower coloration that our eyes cannot detect. Their eyes also have a high flicker-fusion frequency, which means they can easily detect rapidly moving objects. If a honey bee were to view a movie, it would look like a slide show.

The structure and function of honey bee eyes also dramatically affects their navigation. One reason is that honey bees cannot actually see the sun in the sky; at least, not the way we do. Also, to a bee, anything more than about 2 meters away is just a blur. I highly recommend that you check out Andy Giger's B-EYE, a cool website that allows you to see the world through the eyes of a honey bee (http://andygiger.com/science/beye/beyehome.html).

Honey bees are known to forage many yards or even miles from their hives. Given the limitations of their eyesight, how do they learn all of the information that they communicate to nest mates? Even more concerning, how do they not become lost? Honey bees actually have many navigation tools that they can use: the sun, visual landmarks, and the earth's electromagnetic field.

If bees cannot "see" the sun, how do they locate it and use it for navigation? One important clue they use is ultraviolet light. Especially on clear days, the bees identify the location of the sun as the area of the sky with the least ultraviolet light. In fact, experiments have shown that a bee may identify any object in the sky as the sun, as long as it is less than 20 degrees across the horizon, and less than 15% of the light associated with it is ultraviolet; the amount of polarization is unimportant. In comparison, a human would identify a 0.4°, completely unpolarized, white circle as the sun, while a bee might identify a 9°, 75% polarized, blue square as the sun. It seems like this would be a problem, but not for a bee.

Relying on the sun for navigation also presents a problem because, not only does the sun move, but its rate of movement changes throughout the day. After foraging for two hours, a bee needs to find her home relative to the sun, but the sun has moved. How does she find her way home? Actually, she relies on experience. Each day the bee memorizes how the sun moves through the sky, and this memory becomes the solution not only to the problem of sun movement, but the problem of cloudy days.

Another clue from the sun that helps bees navigate on cloudy days is polarized light. The light coming from the sun is actually not polarized, but when it bounces off particles in

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Honeybee navigation, continued from previous page

The world as seen through a new imaging system that mimics honey bee vision.

the atmosphere, it becomes polarized. A bee actually sees concentric circles of polarized light throughout the sky. The bee knows that the strongest polarization lies in a circle that is 90˚ from the sun, and uses this information to estimate the sun's location. Patterns of polarized light are so useful that a bee only needs to see one patch of sky that is 10˚ wide to determine where the sun is.

Although bees have the ability to use UV and polarized light for navigation, they actually rely most heavily on physical landmarks. As long as the landmarks are prominent, nearby (within 2 meters), and unambiguous, a bee will use them as the main source of navigational information. However, they must remain consistent. If the landmarks are moved, the bees will become confused and unable to find the hive.

It is believed that bees have one more navigation tool that is rather remarkable. Even during long stretches of darkness, such as confinement within the hive during winter, the earth's magnetic field is a reliable means of navigation. The bees are able to detect electromagnetic fields because bees are actually magnetic. They contain a region of magnetite in the front of their abdomens. They also use their ability to detect magnetic fields to regulate their internal clocks and to guide them as they build combs within the hive. If a strong magnet is placed on a hive, with a magnetic field radiating in all directions, the bees will build strange and contorted honey combs.

To summarize, honey bees have four redundant navigation systems that are useful in different situations. Bee learning and memory, as well as the sun, are very important for navigation. The structure and function of their eyes causes limitations, but also provides advantages.

What does all of this mean to beekeepers? Knowing the capabilities and limitations of bee eyesight and navigation can help beekeepers make important management decisions. Where and when to move the hives is probably the most important decision that will be influenced by this knowledge.

If you move a hive anywhere from 2 yards to 2 miles, the bees cannot locate previous landmarks, even though for them, the sun's position and movement patterns have not changed. This causes great confusion for the bees; foragers continue to return to the old landmarks, and many become lost. If bees are moved farther than 2 miles, both the landmarks and the cues provided by the sun change. The bees realize this, and they learn their new surroundings as they forage, preventing confusion and lost bees.

If a beekeeper wants to move a hive more than 2 yards but less than 2 miles, this is best done a little at a time. Alternatively, it can be done during winter, when bees remain in the hive for long periods, because they will naturally reassess their surroundings upon emergence from the hive.

-Cory Stanley, CAPS Coordinator

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CAPS Update: Spotted Wing Drosophila Detected at More Sites During 2011 Orchard Survey

Eight different tree fruits and six different berries are grown by at least 370 operations on approximately 7,000 acres in the state of Utah (NASS, 2006). There is a substantial risk that invasive insects will be introduced that could have a severe impact on Utah's fruit industries, which yield over $14 million annually (NASS, 2006). The risk is amplified because many pests have multiple hosts that are present in Utah. If any of the pests were to become established, it would severely impact our fruit industries, which yield over $14 million annually (NASS, 2006).

In 2011, a survey for eight exotic species was conducted at 37 orchards and fruit stands. Spotted wing drosophila (*Drosophila suzukii*), a vinegar fly which was first detected in Kaysville in 2010, was targeted. Seven moth species were also targeted: European grapevine moth (*Lobesia botrana*), plum fruit moth (*Cydia funebrana*), light brown apple moth (*Epiphyas postvittana*), false codling moth (*Thaumatotibia leucotreta*), summer fruit tortrix moth (*Adoxophyes orana*), Egyptian cottonworm (*Spodoptera littoralis*), and old world bollworm (*Helicoverpa armigera*).

None of the target moth species were detected in any of the 2,043 samples. However, the traps yielded 51 spotted wing drosophila from three sites in Davis County. Unlike other vinegar flies, spotted wing drosophila is able to attack unripe fruit. Its repeated detection is of great concern and emphasizes the need for increased monitoring by those who grow fruit. More information on monitoring can be found on the USU fact sheet.

-Cory Stanley, USU CAPS Coordinator

CAPS (Cooperative Agricultural Pest Survey) is a federal program, administered jointly by USDA-APHIS-PPQ and each state, whose purpose is early detection of invasive species that could threaten U.S. agriculture. In Utah, the program is co-coordinated by Cory Stanley (USU) and Clint Burfitt (UDAF).

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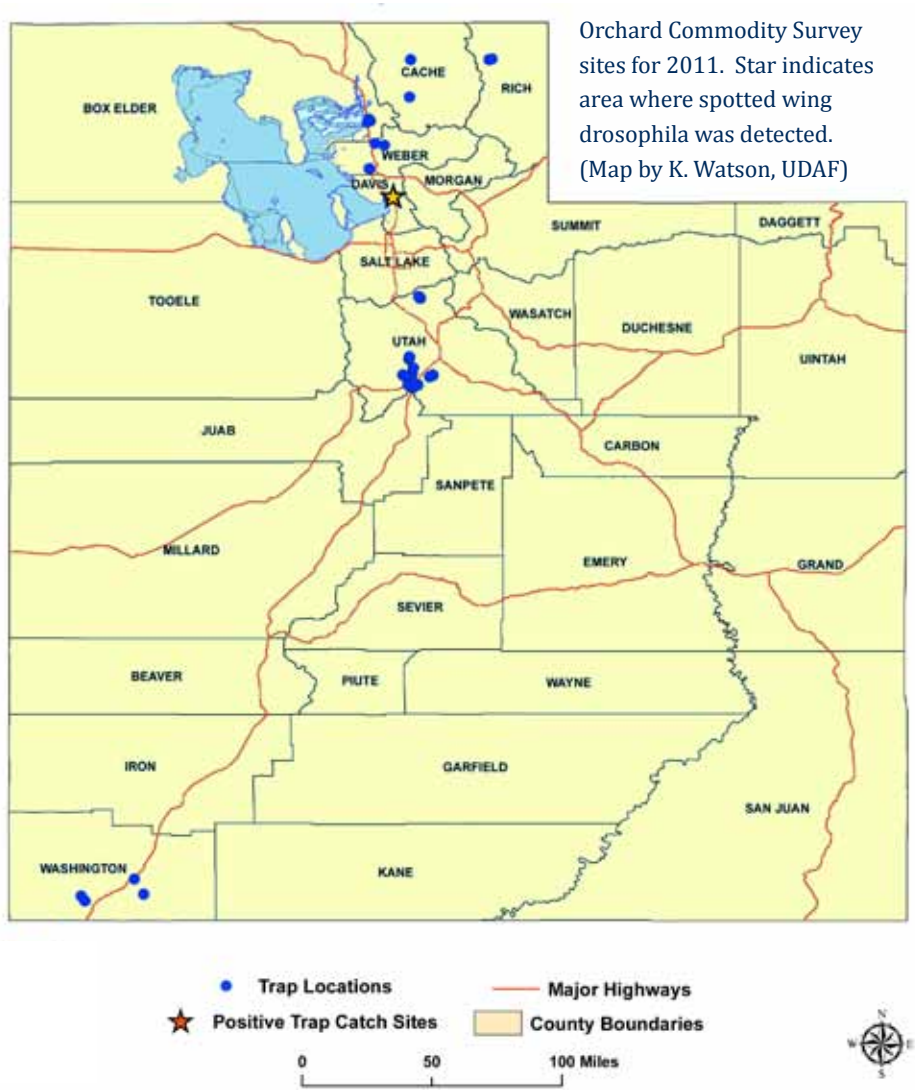
National Agricultural Statistics Service (NASS). 2006. Utah Fruit and Berry Survey. NASS, USDA, Salt Lake City, Utah. 35 pp.



Orchard Commodity Survey sites for 2011. Star indicates area where spotted wing drosophila was detected. (Map by K. Watson, UDAF)

Spotted wing drosophila is a newly detected pest that could severely impact Utah's fruit industries.

Monitoring Alfalfa Weevil Can Save Money

The alfalfa weevil is a frequent foe of Utah alfalfa growers. Traditionally, this early spring pest is controlled with broad-spectrum insecticides regardless of whether pest larvae reach economic thresholds. Utah State University research suggests that developing a weevil monitoring plan in preparation for spring weevil activity could be economically beneficial.

MONITOR AND SAVE ON WEEVIL SPRAYS

In 2008, USU Extension agents in Cache, Beaver, Box Elder, and Weber counties conducted a study to investigate whether yield differed in fields that were sprayed or not sprayed for alfalfa weevil (click here for the full report). All fields sampled that year had weevil larvae below the economic threshold level of 20 larvae per sweep. More importantly, yield measurements were similar for fields that were treated for alfalfa weevils and those that were left untreated. Recreational sprays–those that are not necessary–can be costly but avoidable with proper monitoring.

MONITOR AND SAVE ON APHID SPRAYS

Weevil monitoring and not using pesticides when densities are below the economic threshold level can also be profitable later in the season. A study conducted in Sevier County by USU Extension examined insects in alfalfa fields one month after broad-spectrum insecticides were used for weevil control (click here for the full report). Fields that were sprayed for alfalfa weevil had significantly more pea aphids and fewer beneficial insects later in the season than fields that were not sprayed for weevil. Large populations of aphids can decrease yield and may require additional insecticide applications and added cost. In unsprayed fields, the higher number of beneficial insects may contribute to maintaining lower aphid populations.

MONITOR AND SAVE WITH BENEFICIAL INSECTS

A 2011 USU study conducted in Cache Valley highlighted the importance of beneficial insect populations and their role in suppressing aphid populations. In a survey of alfalfa fields we found that alfalfa is home to a diverse community of beneficial insects. These beneficial insects included damsel bugs, big-eyed bugs, and lady beetles. Both adult and juvenile stages of these beneficial insects are predatory and were found simultaneously in these fields. We set up a complementary field cage experiment at USU's Greenville Research Farm in Logan to examine whether it was important to have all of these beneficial insect species and life stages (adults and juveniles) to suppress aphid populations in alfalfa. We found that conserving multiple predatory insect species can decrease aphid populations compared to having a single species. Furthermore, beneficial insect communities made up of both adult and juvenile stages were most efficient at suppressing pea aphids in alfalfa. This suggests yet another reason to monitor weevil populations and avoid unnecessary sprays.

A 15-inch diameter sweep net is often used for monitoring alfalfa weevil (top). An insect suction sampler (D-vac) was used in a 2011 beneficial insect survey in Cache County, UT alfalfa fields (bottom).

Alfalfa weevils can be destructive insects and unfortunately, numerous alfalfa growers have lost money to weevil damage. It is clear, however, that insecticide use when weevil populations are below thresholds can also be costly and can have unintended consequences adding to these costs. Monitoring and using thresholds can be effective tools to make informed decisions about when or whether insect management is necessary and can add profit to the bottom line.

-Ricardo Ramirez, Entomologist, and
Erica Stephens, MS student in Dept of Biology, USU

Cluster Flies in Indoor Settings

A common fly found indoors throughout the winter months is the cluster fly (*Pollenia rudis*). Like the boxelder bug, they overwinter as adults in attics and voids, becoming periodically active during warm winter spells and early spring. These warm periods trick the flies into thinking that spring has arrived and they attempt to leave the house, gathering at windows.

You will not find eggs or larvae of cluster flies indoors. They lay their eggs outside, in soil cracks. When the eggs hatch, larvae seek out earthworms to parasitize, and can take from 27-39 days to develop into adults. There can be up to 4 generations per summer. During summer, adult flies can be found on flowers and fruits. Cluster fly adults don't become a nuisance until temperatures cool down in the fall and the flies enter the home, congregating in the attic, voids, or any out-of-the-way place.

Fortunately, cluster flies are not considered a pest of health concern. They do not bite, and since they do not reproduce in feces or filth they do not transmit diseases.

Control of cluster flies in the home should begin in early fall when temperatures drop. Monitor south- and west-facing walls for flies, as they will begin to congregate there to find heat. Once they are detected, spray the exterior walls with a pyrethroid insecticide to reduce fly numbers entering the structure. In Utah, there are over 250 products labeled for control of cluster flies on "household or domestic dwellings: outdoor." Common active ingredients from Group 3 (pyrethroids) include permethrin, deltamethrin, pyrethrin, lambda-cyhalothrin and cyfluthrin. Reapply the insecticide as stated on the label to provide long-term control, until cold temperatures curtail fly activity. Choosing a product with a long residual (time period before reapplication) might limit the number of applications to only one well-timed spray.

A solely chemical approach should not be taken for cluster fly control. Cluster flies must enter the home through cracks and crevices in the foundation, siding, fascia, window/door frames, etc. Inspect the exterior of the house and seal all cracks, crevices, and openings. Unfortunately, cluster flies can fit into very small spaces and total elimination of all entry points is not always feasible. Do the best you can to reduce entry points and target sprays for the times when flies are most abundant. Using exclusion techniques for flies will also keep out unwanted boxelder bugs and other nuisance pests.

Once cluster flies are in the house, insecticide treatment is not recommended. Cluster flies are not of medical concern and occasional presence should be tolerated until the following spring when they leave the structure. If large numbers of flies are killed in wall voids or attics, carcasses can attract worse pests such as carpet beetles.

Adult cluster fly showing alternating pattern of shiny abdominal patches (top). Adult cluster fly showing diagnostic yellow hairs on thorax (bottom).

If you can find groups of cluster flies, use a vacuum to suck them up. Since the flies are usually sluggish in winter, they are easy to capture or kill. Light traps can be used in attics or voids to collect flies, and other traps such as "Cluster Buster" can be used inside, attached to windows.

Treating lawns, fields, soil, etc. is not recommended for control of this fly. Cluster flies can be found throughout the environment; treating your lawn or attempting to treat favorable habitat in the surrounding areas will not have a significant effect on their numbers. Focus on protecting your home instead of trying to eliminate these flies from the environment.

-Ryan Davis, Arthropod Diagnostician

Growing Healthy Plants

As many gardeners start planning for the spring and summer growing season, there are a few things to consider that can go a long way to ensure that you have healthy plants.

TO AVOID DAMPING OFF

Damping-off is a common seedling disease that can be easily avoided. There are several different organisms that cause the disease including *Pythium* and *Rhizoctonia*. Both of these survive on plant debris, in soil, and on wooden surfaces. When growing transplants from seed, it is essential to use clean trays and tools, to clean surfaces, and to use sterile soil. *Pythium* and *Rhizoctonia* can infect the roots of seedlings and the crown. The plants typically have dark brown to black roots and will fall over.

To minimize infection, clean growing surfaces, pots, trays, and planting tools with a 10% bleach solution and remove all dirt from the previous year. The use of a sterile planting mix is best. Place pots and trays in individual saucers to isolate infections and prevent spread of the pathogens. The seedlings should be kept moist, but never excessively watered or left in water. Damping-off is often worse where plants are kept very wet. The surface where pots and trays are placed also needs to be kept clean; preferably disinfected with a 10% bleach solution. If trays or pots are placed on the ground, put a sheet of plastic down to put the trays on. Both *Pythium* and *Rhizoctonia* are common soil pathogens and can come into contact with seedling roots as the roots grow into the ground, or water can carry the pathogens into the trays.

BUYING TRANSPLANTS

When purchasing vegetable or ornamental transplants, it is important to inspect the plants. Transplants should look healthy and vigorous. Stunted, yellow plants may lack nutrients, or have something more serious such as root rot or root infections with nematodes. By buying infected transplants and placing them in yards and fields, nematodes and root pathogens can be introduced that contribute to or cause problems in coming years.

For example, do not purchase transplants showing signs of powdery mildew or rust, or roses with black spot on leaves or stems. These plants have diseases that need to be treated with fungicides throughout the growing season. Some powdery mildews and rusts infect other plant species and these pathogens can be introduced into yards and fields. The fungus that causes black spot on rose (*Diplocarpon rosae*) can survive on stems and buds during the winter and infect new leaves as well as neighboring rose plants in the spring.

Damping-off, caused by many soil-borne pathogens, can cause severe losses in new seedlings and transplants.

ROTATION

Crop rotation is important to reduce disease incidence. When the same plant species is grown year after year in the same location, pathogens such as *Fusarium* can build up large populations in the soil. Instead of losing one plant as in previous years, all the plants can be lost.

Fusarium species are often very specific to one host plant. Species of other soil-borne pathogens like *Pythium, Rhizoctonia, Verticillium* or *Phytophthora* can often infect multiple plant species. If it is known that one of these pathogens caused a problem in the previous year, determine its host range before planting. A Google search for the specific species of a pathogen and host range can provide this information or you can contact me (claudia.nischwitz@usu.edu).

Whenever possible, select varieties resistant to specific pathogens to avoid problems. Many seed companies provide information on their seed packets indicating resistance to certain pathogens. A tomato variety, for example, would have some of the following letters (from bonnieplants.com) to indicate resistance to the specific pathogens:

- V - verticillium wilt
- F - fusarium wilt (two F's indicate resistance to both races 1 and 2)
- N - nematodes
- A - alternaria stem canker
- T - tobacco mosaic virus
- St - stemphylium (gray leaf spot)
- SWV - tomato spotted wilt virus
- LB - late blight

-Claudia Nischwitz, Plant Pathologist

In the National News

PARASITIC PHORID FLY IS A NEW THREAT TO HONEY BEES

Researchers in California recently determined that a parasitic phorid fly, *Apocephalus borealis*, previously known to attack bumble bees, also infects and kills honey bees. Flies lay eggs in honey bees, and as the larvae develop, parasitized bees exhibit abnormal behavior, leave their hives at night, and die soon after. The flies are also thought to be a vector or reservoir for the honey bee pathogens *Nosema ceranae* and deformed wing virus. This discovery, featured in an article published in PLoS ONE, could be important to scientists trying to discover the cause of colony collapse disorder (click here for article).

NEW HERBICIDE OIL TESTED

Most bioherbicides are essential oils that work by killing the aboveground plant parts, and not the roots. And few have any residual activity. Manuka oil seems to be an exception. It was tested by USDA Agriculture Research Service biologists on several broadleaf and grass weeds. Not only did they find good aboveground plant kill, but also pre-emergence activity against crabgrass. The oil has some systemic activity in the weeds, unlike most natural herbicides. Additionally, it will last for 7 days, whereas natural herbicides may last only a few hours.

AMINO ACID WITH ACTIVITY AGAINST PESTS

Methionine is an amino acid found in many biological organisms, including humans. Its pesticidal activity was discovered in the early 2000s, and it has since been listed as an "inert ingredient" by the EPA due to its lack of effect on humans, and is often used as a food additive. University of Florida researchers tested methionine against the lime swallowtail, a defoliating pest introduced into the Caribbean in 2006 which has the potential to severely impact the U.S. citrus industry. They found that when methionine is sprayed on leaves and the caterpillars ingest the leaves, it killed 100% of the larvae within 2 to 3 days. Methionine would be a new class of pesticide, and has an advantage in that it is a biodegradable nitrogen source. It has shown activity against mosquito larvae, tomato hornworm, and Colorado potato beetle. Phoenix Environmental Care LLC is developing a pest control product for turf and ornamental pests.

STIFFER PLANT-IMPORT SCREENING RECOMMENDED TO PREVENT NEW INVASIVE WEEDS

Approximately 60% of invasive plants in the U.S. were introduced deliberately through the plant trade. Increasing trade with emerging economies in Asia and Africa will lead to a possibility of many new plant introductions to the trade. Several ecologists have written a review in the recent edition of *Frontiers in Ecology and the Environment* urging USDA to adopt proactive pre-emptive screening of nursery stock before new plants are imported. Pre-import screening has been used in Australia for almost 10 years, and has successfully stopped many new introductions. Stopping invasions before they start is the most effective way of preventing impacts.

SATELLITES MAY HELP TO CERTIFY ORGANIC CROPS IN EUROPE

Ecocert, an organic certification organization based out of France, has been working with the Europe Space Agency in testing the use of satellite images as a tool to aid in certifying crops as organic. In Europe, organic farms must comply with set standards, undergo evaluation, and pass a yearly inspection. Specialized satellite imagery was used to highlight several indicators based on crop management practices, including crop spectral reflectance, yield forecasts, and spatial heterogeneity. Testing has shown accuracy rates of 80 to 100% in discriminating organic from conventional fields. They hope that this method will soon be a reliable and affordable operational service.

Useful Publications and Websites

- eXtension.org has developed eApples as an online resource housing apple research conducted by national university extension services.
- Texas A&M University has launched a mobile phone app called TickApp to help identify, prevent, and remove ticks.
- The IPM Institute of North America has developed a fun, interactive website to help children identify pests
- A free, community-supported app called "What's Invasive" allows people to identify and record what pests they find in their area to share with others in the region.
- "Wisconsin Farm to School" encourages healthy lifestyles in children and support for the local agricultural economy. They have developed "toolkits," targeted to school nutrition directors and producers, to help in farm-to-school programs.

Featured Picture

A single lady beetle can lay 200-1,000 eggs in her lifetime, depending on the species and availability of prey. Eggs are typically laid in groups of 30-50 on the undersides of leaves. It takes about 3-10 days for the eggs to hatch, and the larvae have up to 60 hours to find food before dying. If food is not readily available, newly hatched larvae will cannibalize siblings, or feed on unhatched eggs. Young larvae feed on prey with a piercing-sucking mechanism, while older larvae develop a chewing action, consuming the entire prey.

-Image by Erica Stephens, graduate student in the USU Biology Department

Calendar of Events

Feb 28-Mar 1, 2012, National Invasive Species Forum, Ottawa, Canada, www.invasiveplantcouncilbc.ca/special-events/national-invasive-species-forum

March 5-6 2012, Western Society of Weed Science Annual Meeting, Reno, NV, www.wsweedscience.org/Meeting/prereg

March 5-8 2012, Vertebrate Pest Conference, Monterey, CA, www.vpconference.org

March 6-8 2012, 20th High Altitude Revegetation Workshop, www.highaltitudereveg.org

March 20-22 2012, 58th Conference on Soil Borne Plant Pathogens and Nematology Workshop, San Marino, CA soilfungus.ars.usda.gov

March 25-29 2012, Annual Pacific Branch of Entomological Society of America Meeting, Portland, OR, www.entsoc.org/pacific

March 27-29 2012, 7th International IPM Symposium, Memphis, TN, www.ipmcenters.org/ipmsymposium12

March 30-31 2012, 30th National Pesticide Forum, New Haven, CT, www.shopbeyondpesticides.org/30napefoheco

April 11-14, 2012, 35th Annual Society for Ethnobiology, Denver, CO, ethnobiology.org/conference/upcoming

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NPDN National Plant Diagnostic Network · WPDN Western Plant Diagnostic Network · APHIS · NIFA · UDAF Utah Department of Agriculture and Food