COOPERATIVE EXTENSION SERVICE
HOME, YARD & GARDEN PEST NEWSLETTER
College of Agricultural, Consumer and Environmental Sciences, University of Illinois at Urbana - Champaign
Illinois Natural History Survey, Champaign

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First Issue of the Year

Welcome to the Home, Yard, and Garden Pest Newsletter for 2013. This newsletter is published during the growing season to help ornamental horticulturists manage pest problems as they occur. Arborists, landscapers, lawn care personnel, golf course employees, garden center operators, and other professionals are the target audience of this newsletter. Although homeowners will find useful information, they should realize that control options and pesticide recommendations will be those appropriate and available for the professional.

Issues are published on-line only starting in mid-April. The next issue will be in two weeks in early May. We will have weekly issues during May and June, followed by issues every two weeks during July, August, and September. We will finish the year with a single issue in mid-October which will contain an index to the previous year's articles. This will total 17 issues.

We will provide timely articles in each issue on diseases and insect pests of trees, shrubs, turf, flowers, and other ornamental plants. Reporting on what we are seeing, being reported to us, and what we are predicting to occur within the next week or two. We will have occasional articles on weeds as well.

Illinois is 400 miles long from north to south, resulting in pests typically occurring one month in Cairo in extreme southern Illinois before they occur in Rockford in extreme northern Illinois. This phenomenon is very prevalent in the spring; take note of where diseases or pests are reported and make allowances for their time of appearance in your area.

We are always interested in your input either in reporting diseases or pests that you are seeing or in comments about the content and quality of this newsletter. We are looking forward to helping you have a productive year. (*Phil Nixon*)

Why Did the Worm Cross the Street?

Large numbers of earthworms have become obvious on sidewalks and streets with the heavy rains this week. Although it is well known that earthworms leave their burrows during heavy rains, we are unsure why they do it.

Colloquially, it is assumed that earthworms come to the surface because they are drowning. This is what I was told as a child, but even then I figured out that was not the case. When I was about ten years old, I noticed that the same earthworms were still moving around after being in a mud puddle for several hours on a cloudy day. I deduced that they should have drowned well before that much time elapsed. As I remember, my parents' response to my research find-

ings was “Oh, they must have come up for some other reason.” My interest in science at even a young age was surely a repeated burden for my parents. They felt better about it when I grew up and used my interest in science to become gainfully employed.

Earthworms breathe through their skin; they do not have lungs like spiders and us or spiracles like insects. As long as there is a reasonably high level of oxygen in the air or water and their skin stays moist, they do not want for oxygen. However, they are sensitive to increased levels of carbon dioxide and will move away from it. One possible reason for why earthworms leave their burrows during heavy rains is that the carbon dioxide that they expel does not dissipate very well in their flooded burrows.

Related to their avoidance of carbon dioxide, they are also repelled by low pH water. Increased levels of carbon dioxide in water causes it to be more acidic, having a lower pH. Rainwater by its nature is acidic; it becomes acidic during its formation. We have all heard of acid rain, which in reality is repetitive. The term acid rain refers to it becoming even more acidic due to increased carbon dioxide, sulfur oxides, and other low pH pollutants produced by industrial facilities. The rain that falls on my rural property south of Urbana ranges from a pH of 5.0 to 5.5. My well water has a pH range of 7.0-7.2, which is neutral to very slightly alkaline. It is likely that the water in the soil has a similar pH. It is thought that an influx of lower pH rainwater into their burrows causes the earthworms to leave.

Still another theory on why earthworms leave their burrows during rains is to migrate and reproduce. The assumption is that standing water and saturated soil is like an interstate expressway for earthworms, allowing them to move more freely and faster than through the soil or over its drier surface. Those that find themselves in mud puddles on streets and sidewalks are marooned and doomed to death by ultraviolet light. A few hours of exposure to ultraviolet light will kill earthworms as will their skin drying out.

Although all of the above except for drowning are probably factors in earthworms coming to the surface during rains, I put more credence in the migration and reproduction hypothesis. If the other factors were the driving influences, large numbers of juvenile worms should also be present, but the vast majority appears to be adult red worms with occasional adult nightcrawlers. When worms are brought to the surface with electricity, worm-grunting, or chemicals, many more worms are present. It is obvious that only a small percentage of the adult red worms are emerging during heavy rains. Perhaps this represents the small percentage of the population with the colonial spirit. It appears somewhat similar to the small percentage of the world’s people with a colonial spirit that immigrated to this continent and became our ancestors.

In addition to worms crawling across flooded sidewalks, we have also had reports of holes in the ground the size that would be caused by jabbing a pen into the ground. These one-quarter inch diameter holes are likely those of nightcrawlers. The adults of these large earthworms emerge at night to mate. Although the surface holes made by earthworms commonly have a pile of

castings, worm feces, next to them, frequently castings are not present.

Earthworms become active at soil temperatures around 39 degrees F. Insects generally become active within a couple of degrees of 50 degrees F, depending on the insect species. Only in southern Illinois have soil temperatures risen to 50 degrees F, although they are close to that in central Illinois. Although crayfish become active at temperatures below 50 degrees F, they make much larger holes. About the only creatures active at this time to make these holes are earthworms.

Nightcrawlers are hermaphrodites, having both male and female sex organs. They do not mate with themselves but emerge onto the soil surface at night during or after a rain to mate. Typically, members of a pair will stretch out from their respective burrows to meet on the soil surface between them. Complimentary sexual organs contact each other and mating occurs within a protective coating of slime. Each worm keeps its widened posterior end in the burrow as an anchor so that it can quickly retract into the burrow if disturbed. I have spent many spring evenings after dark as a child to teenager collecting nightcrawlers after rains in the spring using a red cellophane covered flashlight to locate the worms. They are very sensitive to white light and vibrations so one has to walk carefully when nightcrawling for fishing bait.

After mating, a cocoon is produced by the clitellum, the smooth area about one-third of the body back from the head end of the worm. As it passes down the worm, eggs are deposited into the cocoon followed by sperm exuded from the spermatheca or sac that received the sperm during mating. Once passing over the head end of the worm, it closes into a lemon-shaped cocoon. The cocoon is deposited in the soil where the fertilized eggs hatch into juvenile worms that leave to make a living on their own. It takes 60 to 90 days for an earthworm to mature sexually and about one year to reach full size. Most earthworm species live for four to eight years although most individuals probably don't survive more than one to two years. (*Phil Nixon*)

Spruce Spider Mite

Spruce spider mite and other mites that occur in the spring on needled evergreens such as pine mite, arborvitae mite, and juniper mite are susceptible to control with miticides at this time. They will remain susceptible to control through at least the end of the month in southern Illinois, mid-May in central Illinois, and late May in northern Illinois.

The foliage of infested trees will be bronze in appearance due to tiny spots, stipples, of brown, damaged groups of cells surrounded by green, unattacked cells. Spider mites are sucking pests (related to spiders) that remove the contents of cells, causing them to initially be white; but these cells then die and turn brown. Heavily attacked trees frequently lose branches, and even entire trees can be killed. These mites spend the summer in the egg stage, which is relatively difficult to control. They hatch in the fall to feed for a relatively short time until winter. They spend the winter as eggs, hatching again in the early spring to feed.

Before miticide application is made, it is important to determine that active mite

stages are present and that the population is sufficiently large enough to warrant control. It is common with spruce spider mite for an infestation to suddenly disappear, probably due to predation, weather changes, or other factors. Sometimes, the mite infestation does not return for decades.

Scout the mites by holding a piece of white paper under a branch and striking it sharply. This will cause many of the mites on the foliage to be knocked off onto the paper, where they can more easily be seen. They will appear as greenish to grayish specks that will be revealed with magnification to have six (larvae) or eight (nymphs, adults) legs. They will tend to move slowly and will streak green if smashed. It is common to also have faster-moving red mites that will streak red when crushed. These are predatory mites that are likely to provide biological control of the pest mites, if numerous.

Control spruce spider mites and other coniferous-feeding mites at this time with sprays of acequinocyl (Shuttle), bifenthrin (Onyx, Talstar), cyfluthrin (Tempo), insecticidal soap, or summer spray oil. With insecticidal soap and summer spray oil, repeat the application 1 week later. The other miticides should provide control with only one application. A continued cool spring is likely to extend the season of activity, allowing more damage to occur if not controlled. (*Phil Nixon*)

Phenology and Insect Management

Have you ever heard sayings such as "plant corn when oak leaves are the size of squirrels ear" or "apply crabgrass preventer when forsythia are blooming"? Sounds like old folk-lore but actually there is a science behind these statements. Phenology is the study of periodic plant and animal life cycle events and how they relate to seasonal/environmental changes. Rather than planning annual gardening tasks solely by the calendar, scientists have found correlations between temperatures and certain events by observing such things as bird migration, plant budding, flowering and fruiting and insect activities. American Indians observed nature and determined that soil was warm enough to prevent corn seeds from rotting at the same time oak leaves were emerging in the spring. Unknowingly they were using a phenological indicator. Oak leaves were a visual cue that told them it's time to plant corn.

Horticulture uses plant development to predict insect-pest activity. This is very useful as part of an integrated pest management (IPM) program because it helps to properly time pesticide controls to target the most susceptible life stage of a pest. Insects are cold blooded and their growth and development is directly aligned with weather conditions, particularly temperature. Plants and insects are likely to be similarly affected by cloud cover, rainfall, and the number of hours at various temperatures. The observation of visual cues such as plant bud break and bloom time, lets us know when certain pests are likely to be present and in a vulnerable stage to control. Pest populations vary from year to year so scout the pest-prone plant to make sure the insect is present. Once identified, correct pesticide applications should result in a high percentage of control with the least amount of chemical compared to the calendar method

that does not take into account seasonal temperatures.

We know that insects emerge earlier in warm years than in cool years – but how to predict? Scientists monitor growing degree-days. This is a measure of the amount of heat that accumulates over a specified base temperature during a 24-hour period. A base line temperature of 50°F has been commonly agreed upon for landscape/turf calculating the development of insect pests in landscape/turf. One degree-day accumulates for each degree the average temperature remains above 50° over those 24 hours. In a 24-hour period several degree-days can accumulate. If the temperature does not rise above 50 in that 24 hour period, no degree-days are reported.

There are several ways to calculate the number of degree-days but the easiest is the Average Method. Simply add the daily maximum and minimum temperatures and divide the sum by two to get the average temperature for the day. Subtract the base temperature (50) to get the number of degree-days for that 24-hour period. If the result is 5 degree-days, add them to the running total for that season. If the result is a negative number don't add to the accumulated number.

The Illinois Water Survey (http://www.isws.illinois.edu/) keeps track of growing degree-day reports from across the state. You can select a base temperature of either 40 or 50 degrees F. Although most insects do not develop at temperatures below 50 degrees F, many plants start developing at 40 degrees F. Generally, the number of days when high temperatures hover in the 40's degrees F is similar from spring to spring, so plant phenology works to predict insect development. Occasionally, there are extended periods of high temperatures in the 40's degrees F, resulting in plant phenology being less precise in predicting insect development. This is one reason for scouting before treating when using any of these methods.

The green-industry has phenological indicators for some of our insect pests. For example newly hatched Eastern tent caterpillars appear at the same number of degree-days when Saucer Magnolia (*Magnolia* x *soulangiana*) is in pink bud to early bloom. Bridal Wreath spiraea or Vanhoutttei spirea (*Spiraea* x *vanhoutteii*) is an indicator for various pest life stages from blooming through finished bloom.

Euonymous scale is a real problem to control since this pest protects itself with a hard outer shell. It has piercing/sucking mouthparts so it removes plant liquids while completely protected from chemical contact sprays. But there is a time in its lifecycle when it is not protected. This is when the eggs hatch and the crawler stage is present. The crawlers are spreading out to find a spot where they can anchor in and form their armored coat. They are very small and often go unnoticed. The visual cue is when Northern catalpa (*Catalpa speciosa*) is in early bloom. Never assume they are there, verify that the crawlers are present before applying a chemical control. The most vulnerable stage of bagworm is present when Northern catalpa is in full bloom.

Crabgrass seeds germinate when the soil temperatures are above 55˚F for 7 - 10

days. Frequently, the soil has warmed to this temperature when we have had the correct number of degree-days for forsythia to bloom. Don't apply every year on April 15 – when forsythia blooms, check soil temperature data to verify that the timing is right. (*Martha Smith, Horticulture Educator, Henry/Mercer/Rock Island/Stark counties, Phil Nixon*)

Drought

The Midwest suffered greatly during the summer drought of 2012, as the drought caused many problems ranging from vastly reduced yields of staple crops, to the decline, and sometimes death of ornamentals. For Illinois, the drought has ended as no portions of the state are currently listed under the U.S. Drought Monitor. The lasting effects of the 2012 drought will likely be seen for years to come.

Drought causes serious stresses to plants, including overall reduced plant vitality. Young plants often face a much larger struggle when trying to recover from drought because they do not have an established root system. Whatever the maturity of the affected plant, there are a handful of standard factors that will affect plant survivability after drought. The most important factor to note is the severity and timing of the drought. However, keep in mind that many plants have adapted survival techniques to deal with water stress.

Drought can have primary as well as secondary effects on trees. Primary effects occur as various plant tissues (roots, leaves, twigs, etc.) dry and become desiccated. This type of damage is commonly first observed as yellowing and browning along the margins of leaves and progresses towards the center of the leaves.

Secondary effects of drought stress occur as normal plant physiological functions are inhibited. In trees, drought stress can cause photosynthesis to cease, thereby hindering plant growth. Drought stress may also prevent the production of defensive chemicals, and could make the tree more susceptible to climate extremes (sunscald, frost crack from winter injury, and high winds). Trees may also be more sensitive to pesticide injury, phytotoxicity, salts from deicing, construction damage, insects, animals, and nutrient competition.

This leaves (no pun intended) plants vulnerable to opportunistic and secondary pathogen infection as well as pest infestation. These invaders often arrive in tandem and work together to bring their host plant to decline. A great example of this would be the sawyer beetle finding and feeding on a stressed pine tree. This beetle is the vector of the Pine Wilt Nematode, which causes pine wilt diseases. The beetle may also deposit eggs in the tree, which will hatch into wood boring larvae. The larvae and the beetles will feed under bark and form galleries. In addition to these two secondary invaders, they are often joined by a third invader called blue stain fungi. The blue stain fungi will make use of the injury caused by the nematodes and larvae as points of infection, which can clog up the vascular system of the tree. Together, all of these invaders can kill a stressed pine tree in very little time.

Unfortunately, the above example serves as one of many; there are many other

examples of secondary invader pathogens to trees after drought with differing effects. *Armillaria* causes a root rot and mushrooms to form at the base of many stressed woody plants. Stressed pine trees will be more susceptible to *Diplodia* infection, which can cause tip blight and cankers to form on wood. Expect to see drought compromised deciduous and coniferous hosts infected with "oozing" *Cytospora* cankers. We are already seeing the effects of the Hypoxylon canker on oaks and expect to see many more fungal canker fungi (*Botryosphaeria* and *Nectria*) infecting woody ornamentals, thanks to drought stress. Not all pathogens causing severe damage after drought are secondary invaders.

The best way to deal with these problematic secondary pathogens is to carefully scout plants and to follow proper cultural care techniques. To start, make sure plants are in well drained soil with good organic matter content, with mulch to conserve moisture, insulate roots, and fend off competitive weeds and mechanical damage. When planting, also avoid planting highly drought susceptible plants or those with shallow roots in drought prone sites. When drought signs and symptoms begin to appear on a plant, you will need to act immediately. Prune off dead branches as they appear or if a tree has died, remove it quickly to avoid luring in more secondary pests to nearby plants. When winter comes, after a season of drought, make sure to irrigate plants before they go dormant. Adequate soil moisture is necessary all year long and a stressed winter plant could have more trouble in the following spring. Follow Integrated Pest Management principles throughout the growing season to ensure proper care and alertness when it comes to plant pathogens and pests.

(*Sean Mullahy, U of I Plant Clinic student; and Stephanie Porter*)

Plant Clinic Sample Submission: The Importance of a Sample Quality and Detailed Information

The first step towards correcting any plant problem is the accurate identification of the cause. A plant problem could potentially be caused by a variety of unfavorable growing conditions, cultural practices, insect pests, and plant pathogens. Some of these problems may be easily diagnosed or identified on site. Others may require the assistance of an expert or specialized equipment and methods only available in a Plant Diagnostic Laboratory.

The University of Illinois Plant Clinic is a diagnostic laboratory located on the University's Urbana-Champaign campus. The clinic's lab is set-up to handle a wide variety of plant problems and is available to help with plant and insect identification, diagnosis of disease, insect, weed and chemical injury (chemical injury on field crops only), nematode assays, and help with nutrient related problems, as well as recommendations involving these diagnoses. The majority of the samples are diagnosed by clinic staff; however, professors and other specialists from campus are often consulted for assistance.

Even with all the tools and expertise available within the plant clinic, the most limiting factors to an accurate diagnosis is sample quality and lack of information. Diagnoses and recommended

controls by the University of Illinois Plant Clinic are based solely on the material and information submitted. The less representative the sample, and the less complete the information provided, the greater the chance for misdiagnosis. If you plan to submit a sample to the plant clinic, start by reviewing the "How to Submit a Sample" section of the Plant Clinic's web page (http://web.extension.illinois.edu/plantclinic/submitasample.cfm). The page has the current recommendations on how to collect, preserve, package and send a representative sample. In general, the plant clinic will need a generous amount of fresh material. For instance, when testing for oak wilt and other suspected vascular pathogens; the clinic requests several 8-10" long branches with ¾ - 1" diameters. The sample should also be collected from a live branch displaying early symptoms of disease. Samples that don't fit this description often have inconclusive results and will require resampling.

A completed *Plant Clinic Specimen Data* Form should be included with every sample. Take time to fill out the form and provided as much information as possible. Even the most seemingly insignificant detail may be vital for an accurate diagnosis. The specimen data form can be downloaded from the Plant Clinic's web page (http://web.extension.illinois.edu/plantclinic/sampledataform.cfm). Pictures can also be quite helpful, provided they are of high quality. Pictures are used evaluate symptom patterns and site surroundings. In some instances, we may even ask for a picture of the base of a tree to check for improper planting or pictures of various affected plant parts. Avoid sending photos that are blurry and out-of-focus or those that appear as silhouettes. The former may only result in the diagnosticians feeling dizzy.

When in doubt, contact the plant clinic regarding sample submissions (217-333-0519). They will be glad to help ensure a quality sample is received. (*Travis Cleveland*)

Star-of-Bethlehem Control Options: When You've Had Enough of the Spring Flowers

I'm a big fan of spring bulbs and their resulting flowers, but I recognize that not everyone is. Sometimes, a seemingly decent plant can find itself in a location where it is not wanted. It can be labeled as a "weed". *Gasp!* This is a sad story for everyone (and every plant) involved.

I was recently asked how to control Star-of-Bethlehem (summer snowflake), *Ornithogalum umbellatum,* in a landscape bed. This can be a difficult "weed" to control. In fact, many don't consider it to be a weed at all. This native of Europe has escaped cultivation and can be found statewide in Illinois. The flowers are typically bright, waxy and white yet occasionally bluish. They are present April through June on branched, open clusters that reach to about 30 cm high. They consist of 6 petals with a characteristic green stripe on the underside. The flower-stalks are leafless. The leaves are succulent and pale to dark green with a whitish grooved midrib on this cool-season perennial herb. Seed pods are produced in mid to late spring. Following this, plants die back to the ground. Reproduction is primarily by bulblets that develop surrounding the parent bulb.

To its detriment, Star-of-Bethlehem grows as tufts or clumps in lawns and landscapes which can be undesirable by some. Its early growing season has aided in its ability to escape cultivation. It's there and then it's gone. All parts of the plant are poisonous if ingested. Unfortunately, it is commonly confused with *Allium* species such as wild garlic and wild onion, both of which produce an oniony smell when crushed which is not present with Star-of-Bethlehem. Control tactics are similar for these species. For lawns, herbicide applications should be made in early spring when temps are at least 50 degrees. In the fall, make another application. In fact, complete control will likely require spring and fall applications for at least 2 consecutive years. If the population is small and you'd rather not use herbicides, you could try to cut plants back early to deplete the energy reserves. Digging up the bulbs may prove to be effective.

A few turfgrass herbicide options you could try include 2,4-D either alone or in a 3-way product. Ester formulations will likely be more effective. Follow label directions carefully to prevent vapor drift onto off-target sensitive plants nearby. Their new spring growth will be quite susceptible to herbicide injury. Professional applicators may also try sulfentrazone or carfentrazone. Again, sequential applications may be necessary for complete control. Mowing should be delayed following application to give the herbicide time to work. The label should specify the number of days. Read and follow all label directions.

These herbicides are not labeled for use in landscape beds. Spot treatments of the non-selective herbicide, glyphosate, could be tried but only marginal control may result. Physical removal of the bulbs may be the best option in these locations.

Even more recently, I was asked about controlling scilla, another spring blooming bulb that was growing in a lawn. Again, I was saddened; but I must remember that one man's flower is another man's weed. This ornamental will not likely be found on any herbicide label under the heading of pests controlled. However, the above recommendations for controlling Star-of-Bethlehem may hold true for this species.

If all else fails, embrace the flowers! They are short lived really. Perhaps you can offer the bulbs or plants free to a friend. Make a pot of coffee and chat with them while they dig! (*Michelle Wiesbrook*)