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Bagworms

The emergence of bagworms appears to be a mixed bag this year. There are very high populations that have hatched and settled down to feed in southern Illinois. I saw the highest density of bagworms that I have ever seen in Collinsville on June 22 feeding on arborvitae. Their cases were about one-quarter to one-half inch long, but had not yet caused any obvious damage.

I received information from a landscaper about bagworms feeding in Paxton in east central Illinois on June 18. At that time, they were only about one-eighth inch long and were probably still ballooning to other trees. By now, they will have settled down to feed, making it an appropriate time to treat. As I reported earlier in this newsletter, I checked several female bagworm cases and associated arborvitae in Champaign a couple of weeks ago and found no viable eggs or hatched larvae.

Martha Smith, Extension Horticulture Center Educator, found one-quarter to one-half inch long bagworms in northwestern Illinois. A landscape professional reported viable eggs in bagworm cases north of Chicago within the past week.

What does this all mean? Obviously the cold weather that we had last winter was not severe enough to eliminate most of the bagworms in central and northern Illinois. Traditionally, bagworms were not found north of Interstate 80, but have been found in that area for the last few years. The traditional lack of bagworms north of I-80 may be due to a number of factors. Although minimum temperatures have an effect on insect survival, there are other factors that enter into the situation. Dr. Fredric Miller (Joliet Junior College and Morton Arboretum) and others have investigated super-cooling of insects, and its effect on winter insect survival. When the cold temperatures occur during the winter, temperatures before the cold weather, moisture levels, and various other factors enter into winter survivability.

This points out the need for scouting before insecticide applications are applied. You may encounter areas where the bagworm eggs did not overwinter, but nearby areas could have treatable numbers of young caterpillars. There is no indication that the winter had any effect on bagworm survival in southern Illinois, and populations may be locally very heavy.

Our recommendations for control are to spray with an appropriate insecticide about two weeks after egg hatch, when ballooning to other trees by the larvae has ceased. Hatching should be occurring now in northern Illinois. When ballooning is occurring, you can

see larvae hanging by one to three foot long silk strands from the upper branches of previously infested trees. They will have small, brown cases. When they have finished ballooning and are actively feeding, the larvae will be on foliage lower on the tree. Their cases will have bits of green foliage at the open ends. The larvae will not be hanging from silk threads unless they are jarred loose from the plant.

Bacillus thuringiensis kurstaki (Dipel, Thuricide), spinosad (Conserve), and various pyrethroids will be effective as sprays. In areas where spray drift is a problem, the soil-injected Lepitect containing acephate should be effective. It may take a couple of weeks for the Lepitect to start killing caterpillars.--*Phil Nixon*

Japanese Beetles

Japanese beetle adults have emerged throughout southern and central Illinois. They were reported "balling" on turf in Urbana on June 22. Adult males emerge a couple of days before females. They are able to sense emerging females while they are still underground and tunneling to the surface. By the time that she emerges, she has attracted a crowd of males. As soon as she emerges, each male tries to mate with her, and of course only one succeeds. However, the others crawl onto her and each other, creating a ball of beetles that may be as large as a ping pong ball. Most of the females emerge over a couple of days and fly to trees to feed, causing the males to follow them. For that reason, "balling" on turf only occurs for about two to three days until most of the females emerge.

It is still too early to determine emergence levels in central Illinois, and we have not received any reports of emergence yet in northern Illinois. Emergence appears to be occurring as in an average year. The first Japanese beetle adults typically appear in central Illinois between June 18 and 24, so they are right on schedule. We do not expect adult emergence in northern Illinois until just after the July 4 weekend.

As reported earlier in this newsletter, we are cautiously optimistic that the long period of deeply frozen soil this last winter may have caused high mortality on the overwintering grubs. We do not expect any reduction in beetle numbers in southern Illinois.

Because Japanese beetle adults fly to new food hosts about every three days and are attracted to plants where Japanese beetle adults have previously fed, early control is important. Handpicking or spraying adults when they first appear on foliage will reduce early feeding damage, resulting in less damage through the season. Although they feed on a wide variety of hosts, smartweed, linden, crabapple, birch, willow, and rose are their favorites.

Effective insecticides include carbaryl (Sevin) and various pyrethroids including cyfluthrin (Tempo, Bayer Advanced Multi-insect Killer) and permethrin (Astro, Eight Insect Spray). Each application should provide ten to fourteen days of control. Because the adult beetles are heavily feeding for about six weeks, three applications two weeks apart should be sufficient. --*Phil Nixon*

Wet Weather Turf Pests

The heavy rainfall this spring has resulted in higher numbers of some insects and insect relatives than normal. We reported on crayfish being more numerous in an earlier issue of this newsletter. These conditions are also conducive to high numbers of millipedes, fungus gnats, slugs, and earwigs.

Millipedes are many-legged, hard-shelled, brownish, slow-moving insect relatives that feed on decaying plant material in moist situations. They have two pairs of legs per segment, totaling over one hundred legs per animal. When very numerous, they crawl out onto pavement forming masses or rows of them on the march. On damp mornings, they crawl up the sides of buildings. As they die, they coil up.

Fungus gnats feed on decaying organic matter as clear, elongate, legless, worm-like larvae with dark heads. Mature larvae of some species are about one-quarter inch long. Although normally not seen above ground, in wet situations they may appear as writhing masses or marching ropes of individuals at the edge of paved areas and on mulched areas.

Fungus gnat adults are tiny, blackish flies that hover as large swarms of males. These swarms are a couple of feet across and tend to hover over upright objects such as fence posts, shrubs, and peoples' heads. These swarms are used by the males to attract females for mating.

Slugs are shell-less snails that feed on dead organic matter. They are soft-bodied with a pair of tentacles, each bearing an eye at the tip. The gray garden slug is very common, dark gray, and about one inch long. The other common species is the spotted garden slug, which is up to three inches long but can extend to about six inches. It is brownish with obvious dark spots.

High moisture levels will allow slugs to leave turf and mulched areas to climb on lawn furniture and up the sides of houses, particularly at night and damp mornings. They leave slime trails wherever they go that glisten like silver ribbons in the morning sunlight. Slugs eat holes in the leaves of thin-leaved, shade-loving plants such as hosta, violets, and impatiens.

Earwigs are about five-eighths inch long and reddish-brown with large pincers called forceps protruding from the posterior end. These insects are turning from nymphs into adults at this time. As adults, they are much more active, becoming obvious in their activities. They are nocturnal insects, hiding in cracks and crevices during the day. They work their way into buildings as well. People commonly find them under damp clothes and along baseboards indoors as well as in crevices of outdoor furniture and playground equipment. Landscapers notice them under loose pieces of bark.

Earwigs feed primarily on decaying organic matter and prefer moist locations. They will also feed on the leaves and flower petals of rose, daylily, dahlia, zinnia, and other flowers. They are commonly found hiding in the heads of lettuce and cabbage. They are also predators, feeding on adult fleas and other insects.

All of these insects are more numerous in areas with high amounts of dead organic matter and moisture. They will be more numerous in thatchy turf areas that are kept moist. Lawn care clients that over-water and insist on high fertilization will have more of these creatures than others. Core-aerification of turf along with appropriate fertilization and irrigation can reduce their numbers. Clients who mulch too deeply will also have more of these animals. Two to three inches or less of mulch is recommended.

Millipedes are not effectively controlled with pesticide applications. Fungus gnat larvae are also difficult to control with insecticides. Slugs can be controlled with slug baits containing iron phosphate (Sluggo, Escar-Go) or metaldehyde (Deadline). Earwigs can be controlled on foliage with carbaryl (Sevin) or pyrethroids. Do not spray blossoms. They can be kept out of houses with permethrin foundation sprays.--*Phil Nixon*

Cercospora Blight of Juniper

Cercospora blight of juniper is not usually a big problem in Illinois. It is more common in areas where Rocky Mountain juniper (*Juniperus scopulorum*) is grown. This year, however, we have seen this disease. Eastern red cedar (Juniperus virginiana) can also become infected, although the literature says that most landscape cultivars of eastern red cedar have resistance. Maybe this is just another example of increased disease following our wet, wet spring.

Cercospora blight actually begins in late summer and fall, so problems seen now began last year. Illinois arborists should be familiar with Phomopsis tip blight of juniper (see issue 7 of this newsletter). That fungal disease infects the newest growth. Cercospora blight, on the other hand, starts on the oldest foliage on the lower branches and spreads upward. Look for brown lower and inner growth with green branch tips at the top of the plant. Another big difference is the fungal fruiting body and spores. Fruiting bodies of *Cercospora* are fuzzy looking cushions with long spores.

The first image shows Cercospora blight on Eastern red cedars (junipers) in a windbreak. The image is credited to the USDA Forest Service Archive, USDA Forest Service, Bugwood.org. Compare this to the image of Phomopsis tip blight on the right credited to Oregon State University.

The Cercospora blight fungus, *Cercospora sequoiae* var. *juniperi*, lives from year to year on dead needles, whether on the plant or on the ground. Most infection occurs in early summer (now) but as long as wet weather continues, more disease will occur. Fungicides can be used to stop this disease in susceptible junipers. Sprays are made in late June and early July. Registered products include Armicarb, Camelot, Dithane, Fore, Formec, Junction, Kocide, Manhandle, and Protect. Repeat 1-3 times according to label directions from June through July if wet weather continues. Be sure to coat the tree well, especially the bottom of the tree. Home growers can use products containing copper, copper sulfate, mancozeb, or potassium bicarbonate.

Resistant junipers are available in the nursery industry. A table of resistance ratings is available in Diseases of Woody Ornamentals and Trees in Nurseries, edited by Jones and Benson.

There are other noninfectious problems that can also cause decline of junipers. Site stress, weather stress, planting problems, girdling roots, and many other factors could cause trees to die from the bottom upward. Such problems could also predispose plants to infection by *Cercospora*. Make sure you are getting the true and entire picture of the problem before you spray fungicides.--*Nancy Pataky*

Wetwood and Slime Flux

Until now, I had never thought about what weather conditions would promote wetwood and slime flux. Possibly wet weather is involved, but more likely increased incidents of slime flux now has to do with increased sap flow of trees in the spring and early summer. Admittedly I am going out on a limb here (pun intended).

Wetwood and slime flux is a chronic disease of trees that can contribute to general decline in tree vitality. It is not known to cause tree death. It is probably most common on elm in Illinois, but we see it on many other trees including oak, poplar, cottonwood, maple, redbud, sycamore, and other species. There are at least four bacteria associated with wetwood, the most common being *Enterobacter nimipressuralis*. The bacterium gains entry into the tree, usually through wounds and especially in the roots, where it ferments and causes internal pressure. Moisture containing the bacterium will flow from cracks, wounds, or weak areas in the tree. The usual place is in crotches of the tree as seen in the honeylocust image. Other times oozing comes from branch stubs as seen in the elm image. The smell that sometimes develops is usually due to secondary rotting organisms. Although this problem cannot be cured, it is comforting to know that the wet regions are not decayed. Decay fungi do not thrive in this water-soaked wood.

The wound that allowed entry of the bacteria may not be visible. What we see on the tree is a wet area of "bleeding" liquid that drips, flows, or oozes out of the tree. Bacteria in the inner sapwood and heartwood of the tree ferment, causing internal gas pressure. This pressure commonly reopens old wounds and the sour liquid flows down the bark. As it dries, a light gray/white encrustation remains. This encrustation is called slime flux. The liquid commonly causes localized death of the cambium. Although fluxing occurs from April to December, it is most conspicuous in the summer.

Wetwood does not kill trees, but it is associated with older trees, often in decline. There is no cure for this condition, but the following may be helpful. Fertilize stressed trees in the spring or fall to stimulate vigorous growth. Removing dead or weak branches, plus promptly pruning and shaping bark wounds is helpful. Proper pruning techniques will encourage rapid callousing of wounds. The sap flow that results from pruned branches is normal and is not the same as wetwood flow. The liquid we see with wetwood may flow year-round and is often followed by the foul smelling slime flux described.

We do not condone the use of pipes to "drain" this flow. Pipes are often used to get the liquid off the trunk, but the process of inserting the pipe may cause further injury within the trunk. Consult RPD No. 656, *Bacterial Wetwood and Slime Flux of Landscape Trees* for more on this condition. The report is available on line free of charge at http://www.aces.uiuc.edu/~vista/abstracts/a656.html.--*Nancy Pataky*

Black Knot

The fungal disease, Black Knot (*Apiosporina morbosa*), affects about 25 *Prunus* species. The more susceptible species include edible and ornamental plums and cherries. Initial infections cause brown swellings or galls that are usually elongated on branches. A young gall is shown in the first image. Frequently the galls/knots are on one side of the twig allowing the gall to elongate and causing the twig to bend sideways. These galls are difficult to see when the trees are in leaf.

With time, the bark covering the gall surface splits revealing an olive green fungal stroma. The stroma hardens and blackens during the winter. Once the blackened knot has released ascospores, it dies. If the black knot has completely girdled the twig, the twig beyond the gall will die. As long as the twig is alive, the fungal growth continues to expand downward along the twig. If side branches are encountered, the fungus usually encompasses, girdles, and kills those branches as well as shown in the second image. It is common to see a white fungal parasite (*Trichothecium roseum)* growing on the knot by the end of the second growing season.

Black knot, *Apiosporina morbosa,* overwinters in live knots as stroma. Spring rains stimulate the release of the ascospores which are then carried by the wind. The ascospores can enter through wounds, such as pruning cuts, but they can also enter directly into green twig tissue during periods of free moisture (rains, heavy dews, irrigation, etc). Once the spores germinate, the fungus penetrates the protective cuticle. The fungus grows through the twig for several months before stimulating the swelling that is the gall/black knot. Numerous black knots occur in susceptible trees. Severely infected trees decline in vigor and yield. Death of the plant may also occur.

Researchers suspect that there are subspecies of the fungus that are host specific. This would explain why different susceptible *Prunus* plants growing close to each other react differently to the disease.

Disease management may involve pruning and using fungicides. Prune out the black knots during the winter when plants are dormant. Use lime-sulfur as a dormant application after pruning or use thiophanate-methyl four times through the year. Apply while the tree is in dormancy, when the flowers are at pink bud, at petal fall, and 3 weeks after petal fall. If the infection is severe, spraying for two consecutive years can help.

Black knot is discussed in *Report on Plant Disease 809*, *Black Knot of Plums and Cherries*. This University of Illinois publication is available free of charge at http://www.aces.uiuc.edu/~vista/abstracts/a809.html. --*Jim Schuster*

Canada Thistle Management in Lawns and Landscapes

Canada thistle (*Cirsium arvense*) is a noxious (and obnoxious) weed that I occasionally get questions about. This plant is listed in 43 states' noxious weed laws meaning that its control is required by law. Illinois is no exception. If Canada thistle is growing on land that you own or manage, you are required to control it. Failure to do so may result in your being slapped with an unwanted fine. However, because this law is poorly enforced in many counties, we see more Canada thistle growing happily and spreading wildly than we should. It is commonly found along roadsides and in pastures, lawns, gardens, crops, and meadows.

Many thistles are biennials meaning that they require two years to complete their life cycle and produce seeds. Unlike many other thistles, Canada thistle is a rhizomatous perennial. That means that shoots can arise from their extensive underground system. These shoots are erect and donot form a rosette as seedlings do. Roots and rhizomes commonly extend 3 to 6 feet down in the soil profile which makes physically and completely uprooting the plant quite difficult to do. This plant is well known for its rapid spread by rhizomes and also by seed. One plant is capable of producing 1,500-5,000 long-lived (20 years or more), airborne seed. Seeds are capable of germinating within 8 to 10 days after the flowers open. If that weren't enough, one plant can also produce 6 meters of rhizomes per year. Most of the rhizomes stay within 1 foot of the soil surface. It is ranked as being an invasive plant of "major concern" by Elizabeth J. Czarapata, author of "*Invasive Plants of the Upper Midwest.*"

It's a cool season perennial and actively grows in the spring and fall. It produces flowers very early in summer, usually in early to mid June. Growth slows during hot weather. By early July, seeds are fully developed. This can vary depending on the year's growing conditions of course. Above ground portions can be killed by frost. Brown, erect stems may persist into the winter.

Plants can grow 2 to 5 feet tall. The stems are hairy and seedling leaves are covered with short bristly hairs. The leaves of mature plants are simple, alternate, and lobed with spiny margins. The upper leaf surface is dark green and hairless, while the lower surface is light green and may or may not have hairs. Flowers are numerous, small (less than 1"), spineless (unlike most other thistles), and bear pink-to-purple, sometimes white, flowers. Plants are dioecious and grow in patches of all male or all female plants. Cross pollination is necessary. Only the females produce seed.

The key to controlling Canada thistle is to control it early before it has a chance to produce seeds and a serious network of rhizomes. Mowing or repeated cutting may be used to help prevent the spread by preventing the production of seeds and starving the plant. Mowing too late, however, can spread the seed. Postemergent applications of a systemic herbicide may be used. Fall is typically the best time for these treatments. Other good times are during the early bolting stage when plants are 6-10" tall and during the bud to flowering stage. In lawns, some herbicide options are

2,4-D, MCPP, MCPA, dicamba, triclopyr, carfentrazone, and quinclorac. Clopyralid is quite effective on thistle. Non-selective herbicides such as glyphosate may also be used. Lawns should be properly maintained to promote a healthy, dense turf that will compete well with weeds.

Perhaps your site is not a lawn but instead a landscape bed. Many of these products are not labeled for this use due to the variety of species present. Be sure that the product you use is labeled for the intended area. Often times, careful spot treatments of non-selective herbicides are your only chemical option. Nearby sensitive plants may be covered with plastic prior to application. The plastic may be removed as soon as sprays dry. Applications may also be painted on using a brush or sponge. Be sure to read and follow all label directions carefully. Realize that multiple applications may be needed to eradicate this weed. --*Michelle Wiesbrook*