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Insect and Mite Activity Noted in Ohio Nurseries and Landscapes: 2004

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Introduction

Insect and mite activities reported in 2004 in Ohio State University Extension's *Buckeye Yard and Garden Line (BYGL)* and *Pest Evaluation and Suppression Techniques (PEST)* newsletters as well as other sources are summarized and compared to previous seasons. Unusual insect and mite activity is also reported.

Summary

Caterpillars that produce general defoliation were conspicuous by their relative absence in Ohio landscapes during the 2004 season. These included gypsy moth *(Lymantria dispar);* yellownecked caterpillar *(Datana ministra);* and walnut caterpillar *(D. integerrima).* However, giant silkworm moths were commonly noticed, including hickory horned devil *(Citheronia regalis);* polyphemus moth *(Antheraea polyphemus);* cecropia moth *(Hyalophora cecropia);* promethia moth *(Callosamia promethea);* and imperial moth *(Eacles imperialis).* High populations of grasshoppers were observed in western Ohio, but heavy infections of the fungal insect pathogen, *Entomophaga grylli,* were also observed.

A number of sawfly defoliators made their presence known, including dusky birch sawfly *(Croesus latitarsus);* European pine sawfly *(Neodiprion sertifer);* redheaded pine sawfly *(Neodiprion lecontei);* introduced pine sawfly *(N. similis);* and white pine sawfly *(N. pinetum).*

The common bagworm *(Thyridopteryx ephemeraeformis)* appeared in high numbers in the southern and central parts of Ohio, with few damaging populations found in the northern part of the state. Mimosa webworm *(Homadaula anisocentra)* populations were heavy in central and northeastern Ohio. Localized high populations of forest tent caterpillars *(Malacosoma disstria)* occurred in southwestern Ohio, but eastern tent caterpillar *(Malacosoma americanum)* and fall webworm *(Hyphantria cunea)* were virtual "no-shows" in much of the state.

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Boxwood leafminer *(Monarthropalpus flavus)* was a common pest on their namesake in central and southwestern Ohio, and basswood leafminer *(Baliosus ruber)* was heavy in the northwestern and north central parts of the state.

The non-native emerald ash borer *(Agrilus planipennis)* once again garnered a significant amount of attention in northwestern Ohio. The native six-spotted green tiger beetle *(Cicindela sexguttata)* caused some identification confusion with the emerald ash borer in some areas of the state. White pine weevil *(Pissodes strobi)* made its annual appearance in northeastern Ohio, but damaging populations were also common in central Ohio, and this insect surprised landscapers by appearing in the western and southwestern parts of the state.

A number of sucking insects appeared in significant numbers in Ohio, but the emergence of Brood X of the 17-year periodical cicada *(Magicicada* spp.) was by far the most significant insect event in Ohio during the 2004 season. More than 20 counties in the western and southwestern part of the state were affected.

Other sucking insects noted in Ohio for producing significant localized populations during the 2004 season included several species of lace bugs — oak lace bug *(Corythuca arcuata)*, hawthorn lace bug *(C. cydoniae)*, azalea lace bug *(Stephanitis pyrioides)*, sycamore lace bug *(C. ciliata)*, walnut lace bug *(C. juglandis)*, rhododendron lace bug *(S. rhododendri)*, chrysanthemum lace bug *(C. marmorata)*, the basswood lace bug *(Gargaphia tiliae)*, and the beech blight aphid *(Grylloprociphilus imbricator)*.

Spruce spider mite *(Oligonychus ununguis)* populations continued almost unabated throughout much of the 2004 growing season in Ohio, and the pearleaf blister mite *(Phytoptus pyri)* was again a common occurrence on ornamental pears in the southwest and central parts of the state.

Japanese beetle *(Popillia japonica)* adult emergence was very inconsistent between geographical areas of the state, with significant leaf-feeding damage in some areas of Ohio. European chafer *(Rhizotrogus majalis)* adults were once again observed in northeastern Ohio. Bluegrass billbug *(Sphenophorus parvulus)* were common in a number of areas of the state.

New homes were again invaded by foreign grain beetles *(Ahasverus advena)*. Other homes, both new and old, were surrounded or invaded by an unusually heavy population outbreak of springtails. European paper wasp *(Polistes dominulus)* nests were commonly found in Ohio landscape plants, and this introduced insect seemed to make further headway in replacing native wasps. A report on the sumac flea beetle *(Blepharida rhois)* appeared for the first time in the *Buckeye Yard and GardenLine (BYGL)* during the 2004 season.

General Defoliators

Gypsy Moth

Currently, 43 counties in Ohio have established gypsy moth populations. These counties are in the northwestern, northeastern, and eastern parts of the state. However, gypsy moth populations in this area of general infestation have remained at relatively low levels over the past few years in Ohio, and the 2004 season was no exception.

The fungus *Entomophaga maimaiga*, which has become known as the gypsy moth fungus, has been generally credited with limiting gypsy moth population

outbreaks. The fungus infects caterpillars, and increased rates of infection are linked to wet spring weather.

National Weather Service records indicate that Akron/Canton received 6.62 inches of rain during May 2004, which is 3.07 inches above normal. Toledo (Lucas County) had 4.67 inches of rain, which is 1.53 inches above normal. In *BYGL* 2004-12 (6/24/04), we reported that gypsy moth caterpillars in Lucas County were heavily infected with the gypsy moth fungus.

Yellownecked and Walnut Caterpillars

Wet weather conditions may also have played a role in reducing populations of yellownecked and walnut caterpillars. Both are also subject to fungal infections. However, second generation yellownecked caterpillars, which occur during July and August, were also at low levels in the southwestern part of the state at a time when this area was relatively dry. It was speculated that the increased occurrence of the European paper wasp *(Polistes dominulus)* may play a role in reducing caterpillar populations (see the section on the European paper wasp later in this publication). This wasp is a major predator of caterpillars and sawflies.

Giant Silkworm Moth Caterpillars

A considerable number of caterpillars of several species of giant silkworm moths (Family Saturniidae) were observed during the 2004 season in Ohio including hickory horned devil *(Citheronia regalis);* polyphemus moth *(Antheraea polyphemus);* cecropia moth *(Hyalophora cecropia);* promethia moth *(Callosamia promethea);* and imperial moth *(Eacles imperialis).* Although these silkworm moths feed as defoliators, their solitary nature and generally low numbers mean that they seldom cause significant injury to their host plants, so control measures are not recommended.

Indeed, these caterpillars eventually develop into some of the most beautiful moths found in Ohio. Their numbers this past season seemed to represent a reversal of a general decline of these moths over the past several years, generally attributed to the depredations of parasitoids imported to control gypsy moth. *BYGL*ers speculated that the rise of the silkworm moths may be connected to low populations of gypsy moth, and a subsequent reduction in multi-host parasitoids associated with gypsy moths.

Grasshoppers

As with the 2003 season, grasshoppers were once again abundant during the 2004 season in the western part of Ohio. The two most common species observed were the redlegged grasshopper *(Melanoplus femur-rubrum)* and the differential grasshopper *(M. differentialis).* Nymphs of both species were found in great abundance along roadsides, edges of fields, and in other grassy areas, as well as in Ohio landscapes where they caused noticeable damage to a wide range of plants.

However, as with gypsy moth, grasshopper populations also appeared to be significantly affected by a fungal disease. In *BYGL* 2004-24 (6/16/04), Curtis Young reported observing a macabre scene in an old field in western Ohio. Thousands of dead grasshoppers were found clinging to weed and grass stems near the tops of the plants. The grasshoppers had succumbed to the pathogen *Entomophaga grylli. E. grylli* is actually a species complex that has at least two distinct pathogens in North America — *E. macleodii* and *E. calopteni.* These fungi are common in the western

United States and Canada where they are very important agents in managing grasshoppers in crops and rangelands.

E. grylli-infected grasshoppers crawl to the tops of plants and die with their heads pointing upward and their legs wrapped tightly around the stalks of the plants. The cadavers remain attached to the plants for several days until their bodies, having been digested and consumed by the pathogen, dry out. As the grasshopper disintegrates, millions of resting spores of the fungus release into the environment. These spores fall to the ground where they remain on or under the soil. When the spores germinate, they are ejected into the surrounding area.

The spores adhere to the bodies of foraging grasshoppers where they germinate, allowing the fungus to penetrate the grasshopper's body. The fungus consumes the internal organs of the grasshopper, then forms new resting spores. Just prior to its death, the grasshopper climbs to the top of the nearest plant where it dies. Because of the grasshopper's behavior of climbing to the top of the weeds, this disease is commonly called "summit disease."

Summit disease is capable of causing high mortality in grasshopper populations, but epizootics (outbreaks) are usually sporadic and localized, and generally occur late in the season after economic damage to crops and rangelands has occurred. Curtis Young noted that differential grasshoppers were most heavily infected.

Sawfly Defoliators

Dusky Birch Sawfly

As with the 2003 season, significant populations of dusky birch sawfly *(Croesus latitarsus)* were once again observed feeding on birch host in southwestern and central Ohio. The larvae feed on all species of birch, but seem particularly fond of gray birch *(Betula populifolia).* Early instars are grayish-green with indistinct black spots. Middle-instar larvae are greenish-gray with distinct black spots, and late instars are yellowish-green with black spots. All instars have shiny black head capsules and they feed in colonies, lined up head-to-tail along leaf margins.

When disturbed, larvae hang on with their prolegs and form their bodies into a distinct "S" shape, which is another great self-identifier for this insect — S for sawfly! Dusky birch sawflies have two generations in Ohio, so trees can be heavily defoliated during the season. However, they are easily controlled with any standard insecticide labeled for birch trees.

Conifer Sawflies

European pine sawfly *(Neodiprion sertifer)* is a perennial spring pest in Ohio of Scotch, mugo, red, jack, Table Mountain, and Swiss mountain pine, with white and Austrian pines serving as occasional hosts. During the 2004 season, only highly localized pockets of this sawfly were observed with infestations often confined to single trees in landscapes. Indeed, damage was often made more apparent by the stark contrast with unaffected conifers near the infested tree.

This sawfly has one generation per year. It spends the winter in the egg stage. Females use their saw-like ovipositors to deposit eggs in envelope-like slits cut into needles. Egg scars become light yellow, and rows of these scars are usually very evident on infested trees during the winter. Hatched overwintered eggs of the European sawfly were noted in Ohio this year by mid-April.

Heavy localized infestations of late season conifer sawflies were also observed during the 2004 season, particularly in the western and southwestern parts of the state. These included redheaded pine sawfly *(Neodiprion lecontei);* introduced pine sawfly *(N. similis);* and white pine sawfly *(N. pinetum).*

Redheaded pine sawfly larvae have red head capsules, and their bodies are yellowish-white with six rows of black spots. This sawfly overwinters in cocoons in the soil as late instar larvae, or as pre-pupae. Adults emerge, mate, and lay eggs on conifers in the spring. The larvae are gregarious feeders, and their colonies may be found on Scotch, white, red, mugo, and jack pines, as well as on larch, cedar, and Norway spruce. The larvae feed on new and old needles, and occasionally on the tender bark of young twigs. Thus, this sawfly is considered to be one of the most destructive of the pine sawflies. There are at least two generations per year in Ohio.

Introduced pine sawfly larvae favor eastern white pine but may also be found on Scotch, jack, red, and Swiss mountain pines. The larvae have shiny black head capsules. Their bodies have a double black stripe bordered by yellow along the dorsal midline, and their sides are dark with numerous yellow and white spots.

Winter is spent as cocooned larvae on the bark of their host tree. In the spring, adults emerge, mate, and lay eggs. The first generation larvae feed on the previous year's foliage. Early instars feed gregariously, but later instars feed singly. Second-generation larvae feed on both new and old needles. Like the redheaded pine sawfly, larvae of this sawfly will occasionally consume bark tissue when needles are exhausted; however, high populations sufficient to cause this feeding behavior are rare.

White pine sawfly has a distinct preference for its namesake host. However, the sawfly may occasionally be found on pitch, shortleaf, red, mugo, and Swiss mountain pines. Adult wasps emerge in spring, mate, and then females deposit eggs in the needles. Larvae are present between mid-June and late-July, and sometimes for a second generation between mid-August and late-September.

The black-headed larvae are yellow to white in color with four rows of square black spots running along the length of the body. Mature larvae migrate down, or drop out of the tree to the soil or duff under the tree, where they spin brown, oval cocoons. The larvae will either pupate immediately, or remain larvae and overwinter as pre-pupae. There is one, and sometimes a partial second, generation each year.

White pine sawfly feeding can result in branch or tree mortality following complete defoliation. Thus, management may be required when populations are large and the potential for extensive defoliation is high. White pine sawfly is easily managed with many common materials such as acephate, azadirachtin, carbaryl, and spinosad. Applications should be made when larvae are young or as soon as they are discovered. Remember, *Bacillus thuringiensis* var. *kurstaki (Btk)* does not work on sawfly larvae. *Btk* is only effective against the larvae of moths and butterflies.

Nest-Making Caterpillars

Bagworm

Historically, the common bagworm *(Thyridopteryx ephemeraeformis)* is found in higher numbers in the southern half of Ohio, roughly below a line bounded on the northern edge by Interstate 70.

However, during the 2003 season, high populations were observed throughout the state, with significant damage found in Toledo. During the 2004 season, the population distribution of this moth appeared to conform to historical boundaries. Few damaging populations were observed in northern Ohio while heavy infestations were common in the southern and west-central parts of the state.

Bagworms practice an unusual form of reproduction called paedogenesis (reproduction by larvae). Only the males pupate and emerge as flying moths. The female bagworm larvae do not pupate, nor do they exit their bags. They enter the last larval instar stage with mature sexual organs and produce a sex pheromone that attracts the male moths. Males fly to and mate with the females as they remain in their larval bags. After mating, the female's body rapidly fills with fertilized eggs, then she dies and becomes a dried, mummified "egg case" surrounding 300 to 1,000 eggs. Thus, the eggs overwinter inside the female's body, inside the bag.

Egg hatch occurs in the spring. This season, egg hatch began in the Cincinnati area in mid-May and was completed by the end of the month. Male moths began emerging in that part of the state in early September.

Mimosa Webworm

*BYGL*ers in northern and central Ohio observed heavy localized infestations of mimosa webworm *(Homadaula anisocentra)* on honeylocust during the 2004 season. Larvae of this moth feed gregariously within webs spun over the foliage. They feed primarily as skeletonizers on the lower leaf surface, and the damage causes leaves to turn orangish-brown and appear fire-scorched. Unlike with other web-makers, these clusters of "torched" leaves, rather than the actual webbing, usually draw attention to an infestation.

There are two to three generations per season in Ohio, and they typically overlap so that larvae may be present anytime from June into September. Also, female moths often deposit their eggs on nests from which they developed, so nests continue to expand and become more dense with silk and spent leaves from one generation to the next. Once nests become large and tightly woven, control applications may fail to penetrate the thick webbing.

The best time to control the caterpillars is early in the season, when nests are small and consist of loosely woven silk. Effective early season materials include *Bacillus thuringiensis (Bt),* as well as other insecticides listed in Ohio State University Extension Bulletin 504, *Insect and Mite Control on Woody Ornamentals and Herbaceous Perennials.*

Forest Tent Caterpillar

Significant numbers of forest tent caterpillars *(Malacosoma disstria)* were observed cavorting among the periodical cicadas in southwestern Ohio. Despite its common name, forest tent caterpillars construct only rudimentary mat-like silk nests on leaves, or on bark.

The caterpillars are only gregarious in their nesting behavior during early instar stages. Later instar caterpillars break from the colonies and feed singly among the host's branches. They are general defoliators and feed on a wide variety of deciduous trees, including sweetgum, oak, birch, aspen, maple, elm, and basswood. This moth caterpillar is capable of producing significant defoliation during population outbreaks.

Forest tent caterpillars have short grayish-white hairs and distinct white markings running down their backs. These markings have been variously described as looking like foot prints, or as being keyhole-shaped. The markings are flanked by cobalt blue lines running the length of the caterpillar's bodies.

The caterpillars are sometimes mistaken for other hairy caterpillars, such as eastern tent caterpillars or gypsy moth caterpillars. Eastern tent caterpillars have a distinct, unbroken white stripe down their backs. Gypsy moth caterpillars have five pairs of blue spots followed by six pairs of red spots running down their backs.

Eastern Tent Caterpillar

Overwintered eggs of eastern tent caterpillar *(Malacosoma americanum)* hatched in the Cincinnati area by the end of March, and small nests constructed in branch forks were evident the first week of April. However, as with the rest of the state, overall populations were relatively low, with only an occasional significant infestation.

Fall Webworm

Likewise, fall webworms *(Hyphantria cunea)* were also something of a no-show during the 2004 season. Despite numerous reports of significant numbers of first-generation nests, the second generation failed to make the curtain call. First-generation nests are usually very small and inconsequential, owing to small numbers of caterpillars.

Truly impressive nests enveloping large areas of leaves at the ends of tree branches are constructed by the greater caterpillar work force available in the second generation.

Leafminers

Boxwood Leafminer

As with the 2003 season, heavy localized boxwood leafminer *(Monarthropalpus flavus)* populations were observed in southern and central Ohio during the 2004 season. This tiny midge-fly spends the winter in the larval stage in blister-like leaf mines.

As spring approaches, the orangish-yellow larvae resume feeding for a short period, then pupate. Pupation was reported to occur in southern Ohio from mid-to-late April, and high numbers of adults were observed the first week of June. Adults superficially resemble miniature mosquitoes; however, they have bright orange abdomens.

Once larvae begin to pupate, the delaminated leaf tissue turns from light green to yellow, and finally to yellowish-orange. The color change is usually complete only after adults emerge. Damage produced by this leafminer is sometimes misdiagnosed as a nutrient deficiency or winter injury.

Larval control options include an application of imidacloprid *(e.g.,* Merit), made as a soil drench in late fall, which kills overwintering larvae. This strategy has proved to be very effective and also controls boxwood psyllids *(Psylla buxi).* Overwintered leafminer larvae may also be killed with a spring soil drench application of imidacloprid; however, this application may not control the psyllids.

A more traditional approach involves applying acephate *(e.g.,* Orthene) as a foliar systemic spray once egg laying is completed in the spring. Timing of the application is critical and requires close monitoring of leafminer activity.

Basswood Leafminer

The basswood leafminer *(Baliosus ruber)* once again caused noticeable defoliation of American basswood or linden *(Tilia americana)* in northwestern and north central Ohio. This beetle was first noted in the *BYGL* in 2000, with heavy populations and noticeable damage observed in the western part of the state.

The small, wedge-shaped reddish-yellow beetles have dark markings on their wings. They spend the winter in leaf litter under host trees and emerge in the spring to begin skeletonizing newly expanded foliage. Eggs are laid singly at the edges of skeletonized areas in early to mid-June. Larvae mine leaves until about mid-July and produce blotch mines. When large numbers of larvae are present, individual mines run together, producing extensive blister-like mines.

After pupation in late-July to early August, new adults begin to appear and continue to skeletonize the foliage. It is the late-season adult feeding that does the most damage to the leaves. When the adults are abundant and the feeding is intense, the entire canopy of a tree may be completely skeletonized, causing the foliage to turn brown, wither, and fall off. Trees that are heavily attacked for two to three years may show thin crowns and dead branches.

The basswood leafminer occurs throughout the eastern United States and Canada, wherever basswood grows. Although basswood is its preferred host, it has been reported feeding on oak, maple, willow, birch, hop hornbeam, apple, and cherry. In Ohio, it has been observed feeding on American basswood and oak only in woodlots.

However, during the 2004 season, adult beetles were observed feeding on ornamental lindens at Stranahan Arboretum near woodlots with heavily infested basswoods. Control of this beetle is not currently recommended, but if it continues to spread into landscapes, its control may be necessary in the future.

Borers

Emerald Ash Borer

In 2004, the non-native emerald ash borer *(Agrilus planipennis)* once again garnered the lion's share of attention among tree borers. More infestations were found in Ohio, but all were confined to the northwest part of the state. More information on this very significant borer may be found at this web site — **http://ashalert.osu.edu** — and later in this special circular.

White Pine Weevil

White pine weevil *(Pissodes strobi)* has been traditionally viewed as a Christmas tree and nursery production pest in Ohio, and in the past it was rarely found outside the northeastern part of the state. However, over the last few years *BYGL*ers have noted that the white pine weevil is now a common landscape pest that is frequently being found in the central part of Ohio.

During the 2004 season, a significant localized infestation of this borer was found in southwestern Ohio. This may indicate the weevil is now establishing itself in the southern part of the state. The change could present a diagnostic challenge to landscape and nursery managers unfamiliar with this insect.

This weevil has one generation per year. Overwintered females deposit eggs in the terminals of their conifer hosts, which include their namesake as well as Scotch, jack, red, and pitch pine plus Douglas-

fir, Colorado blue, and white spruce. The resulting white, legless, slightly curved, grub-like larvae tunnel downward just beneath the bark until pupation. Mature larvae construct pupation chambers, called chip cocoons, beneath the bark. The cocoons are created by the larvae positioning their bodies in tub-shape grooves excavated in the xylem, and then surrounding themselves with small, white wood chips.

Larval development is typically completed by mid-to-late summer. The tops of infested trees become wilted, turn brown, and die. Main leaders are often curved into a shepherd's crook. Larval tunneling usually does not progress past the top two lateral limb whorls; however, on small trees, larvae may tunnel to the base of the main stem, killing the entire tree.

Control measures focus upon preventative insecticide applications and sanitation. Wilted terminals should be removed and closely examined for evidence of weevil activity as soon as this symptom becomes evident. The cut ends of the removed stems should be inspected to make certain all the larvae have been removed. Infested material must be destroyed since the weevils will complete their development in cut tops left on the ground.

Insecticide applications made to terminals in early spring target overwintered female weevils as they feed on terminal tissue. Timing of these applications is critical, since the weevils only feed a short period of time before they lay eggs.

Another approach is to use imidacloprid *(e.g.,* Merit) sprays or soil drenches. The drenches appear to be more effective, especially if applied in October or November of the previous season. Soil drenching with imidacloprid is a viable control approach for managing white pine weevil in landscapes, where only a few trees must be protected. However, it may not be a cost-effective choice in nursery or Christmas-tree production.

Sucking Insects

Brood X Periodical Cicada

The emergence of Brood X of the 17-year periodical cicada *(Magicicada* spp.) was by far the most significant insect event in Ohio during the 2004 season. More than 20 counties in the western and southwestern part of the state were affected. Ohio was not alone. This cicada brood is the largest in the United States in terms of geographical distribution. Cicadas emerged in parts of Georgia and other states north to Michigan, and east into New Jersey. Observations made in Ohio are captured in excerpts from two *BYGL*s:

BYGL 2004-08 (5/20/04):

• Joe Boggs and Dave Dyke noted that periodical cicada activity has progressed rapidly, from a trickle to a roar, over about a 10-day period (May 15 – May 24) in Greater Cincinnati. The cicada males have been chorusing in unison since late last week; mating is in full swing; and oviposition is now occurring. Joe indicated that Kamikaze cicada strikes to his windshield as he drove the I-275 loop around western Hamilton County were bracing. Motorcyclists beware! Dave Shetlar reported that cicadas are now in full emergence in Greater Columbus, with males beginning to chorus and mating now occurring.

• On May 17, Joe Boggs checked a mix of 100 newly emerged (cream-colored) and fully colored cicadas in Oak Hill Cemetery in northern Hamilton County and found they were all were males, and they were all one species — *Magicicada cassini.* On May 19, he checked 50 fully colored

cicadas and found the male/female ratio to be 40/10. However, 50 newly emerged cicadas checked that day were found to be all females. It is common among many mass-emerging insects for males to emerge first.

Joe noted that *M. cassini* continues to be the only species he has found at the Oak Hill location. Dave Shetlar indicated that it is not unusual for localized segregation to occur among the three periodical cicada species common to Brood X *(M. cassini, M. septendecula,* and *M. septendecim).* He noted that *M. cassini* tended to be found in dry, upland locations. Dave reported that he is finding all three species in central Ohio.

• *BYGL*ers reported observing a soft "rain" falling from trees heavily populated by cicadas. Dave Dyke described it as looking like a fine mist as it was being reflected in shafts of sunlight filtering through tree canopies. The observation reminded *BYGL*ers that cicadas are indeed sucking insects (they resemble giant aphids), and they do feed. The observed "cicada-dew" is analogous to the "honey-dew" excreted by aphids. While *BYGL* readers have reported observing serious injury to herbaceous plants caused by the sucking activity of emerging cicadas, the most significant injury to plant materials is caused by the oviposition activity of the females. *BYGL*ers noted that oviposition damage is not yet evident.

BYGL 2004-10 (6/10/04):

• Jim Chatfield and Joe Boggs reported that periodical cicadas received a great deal of attention at this week's Ohio Plant Diagnostic Workshop held at Spring Grove Cemetery and Arboretum in Cincinnati. Workshop participants observed heavy oviposition on a wide range of trees and shrubs. The subsequent dieback of branch tips, or flagging, was just becoming evident, primarily on oaks. However, all agreed that the amount of flagging observed was just the tip of the iceberg. More is expected over the coming weeks. A surprising observation was the amount of egg laying that had occurred on ash leaf petioles, causing leaves to drop from the trees. The ground beneath several ash trees was littered with a considerable number of leaves, all with oviposition slits.

• While cicadas continue to sing in Cincinnati, they appear to be running out of steam — dead cicadas are now raining down from heavily infested trees in many locations. Pam Bennett noted that she has received phone calls from homeowners reporting foul odors from the accumulating dead cicadas in Clark County.

• Curtis Young noted that he has been amazed at the considerable discontinuity of cicada populations within the reported range of Brood X. The historical method of using clusters of counties as a basis to delineate brood emergence boundaries does not accurately depict the actual population distribution. For example, Curtis (ever the intrepid entomologist) reported that he had to leave his location in Allen County and drive all the way to Defiance County to enjoy the Brood X experience!

*BYGL*ers also noted they have observed extremely spotty, localized concentrations of cicadas. Areas with high populations and areas with negligible populations are often separated by only a few miles. However, several *BYGL*ers reported that they had observed large numbers of cicadas appearing in areas where there was little or no emergence from the ground. This movement did not appear to be over great distances since the newly infested areas were generally in close proximity to localized cicada "hot spots."

Lace Bugs

Lace bugs were very active in Ohio during the 2004 growing season with oak lace bugs *(Corythuca arcuata)* on bur and chestnut oaks, hawthorn lace bugs *(C. cydoniae)* on hawthorns, and azalea lace bugs *(Stephanitis pyrioides)* on azaleas leading the pack.

Other lace bugs commonly observed included sycamore lace bug *(C. ciliata);* walnut lace bug *(C. juglandis);* and rhododendron lace bug *(S. rhododendri).* The unusual chrysanthemum lace bug *(C. marmorata)* that lives on both the upper and lower leaf surfaces of its host caused damage to several herbaceous perennials, particularly asters.

Basswood lace bug *(Gargaphia tiliae)* was observed causing considerable damage to silver lindens *(Tilia tomentosa)* in northern Kentucky, just across the river from Cincinnati. Silver lindens have long been appreciated for their distinctive foliage. Their leaves feature an upper surface that is a lustrous, glistening dark green, while the lower surface is a soft silver. Breezes prompt glimmering displays as the silvery undersides of the leaves flicker in and out of view.

Unfortunately, when basswood lace bug populations are high, the captivating leaf features of the silver lindens are obscured. The normally dark green upper leaf surface appears light green to yellowish-green.

While such heavy damage on *Tilia* is rare for this insect, it is not unknown, and it is not confined to one species of lace bug. Walnut lace bug may also be found on the undersides of *Tilia* leaves, as well as butternut and black walnut leaves. Most insecticides labeled for use on *Tilia* control these insects.

Beech Blight Aphid

Over the past few years, the beech blight aphid *(Grylloprociphilus imbricator)* has waltzed from oddity to common occurrence in northeastern and central Ohio. During the 2004 season, the aphid kicked up its heels in the southwestern part of the state, with high populations commonly observed on American beech.

This woolly aphid enshrouds itself in a profuse mass of white, wool-like filaments. The aphids gather together in prominent colonies on twigs, branches, or on the underside of leaves of American beech trees. When a colony is disturbed, the aphids exhibit an unusual collective behavior by vibrating their posterior ends in unison. This behavior has been accurately described as causing the aphids to look like "dancing dust balls shaking their rear ends to the boogie woogie."

On large trees, aphid colonies are usually relegated to a few branches. However, on small trees, the entire canopy may become infested. The aphids are also prolific producers of honeydew, causing branches, sidewalks, parked cars, slow-moving gardeners, etc., beneath the colonies to become covered in sticky goo. The honeydew may become colonized by black sooty molds, converting the gummy accretions into blackish heaps.

Fortunately, the aphids are easily controlled with a focused stream of water, and the water pressure available to most homeowners is sufficient to convert the aphid's dance into a cascading water ballet.

Mites

Spruce Spider Mites

The spruce spider mite *(Oligonychus ununguis)* is often a serious pest of conifers

in Ohio. Damage symptoms include tiny yellow speckles, or stippling, on needles that may coalesce to produce intense yellowing or bronzing of the foliage. This is a cool-season mite, with damaging populations typically occurring in the spring and fall. The mites spend the summer months in the egg stage. Spring populations shift into the egg stage once the mites experience three consecutive days with temperatures above 86ºF.

However, during the 2004 season, the shift into the summer egg stage did not occur in much of Ohio until early September. Consequently, damage continued to accumulate throughout much of the season. Fortunately, landscape and nursery managers experienced a bit of a reprieve, since the normal egg hatch and development of high populations in the fall also failed to materialize with any significant regularity throughout the state. Reasons for the failure of fall adult populations to appear are unknown, but it was speculated that heavy rains may have washed mites from their hosts before significant numbers could accumulate.

Pearleaf Blister Mite

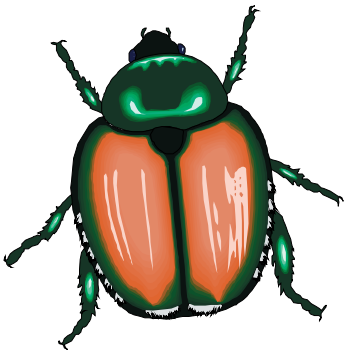
Pearleaf blister mite *(Phytoptus pyri)* was again a common occurrence on ornamental pears in southwestern and central Ohio during the 2004 season, with heavy localized populations observed. Symptoms may superficially resemble other problems, such as fungal leaf diseases, and in extreme cases, even bacterial fireblight.

The microscopic carrot-shaped eriophyid mites feed between the upper and the lower leaf surfaces, causing blisters to form on the upper leaf surface, and patches of brown-to-black necrotic tissue to form on the lower leaf surface. The blisters are at first light-green, but later they turn pinkish-red and finally black. When mite populations are high, the entire leaf may blacken and droop.

Turf Pests

Japanese Beetle

Japanese beetle *(Popillia japonica)* adult emergence in Ohio during the 2004 season appeared to be very inconsistent between different areas of the state. In some areas, beetles emerged over an extended period of time in a trickle of low numbers that seemed to go on forever. Feeding damage accumulated. This has been a common trend over the past few years in much of the state. However, other areas experienced a rapid emergence of high numbers of adults, but the emergence quickly came to a halt. Intense feeding damage seemed to occur "almost overnight."

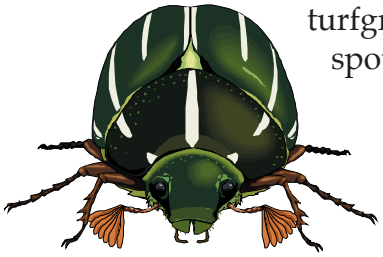


Speculation regarding reasons for the disparate emergences focused on weather patterns during previous seasons. Dry soil conditions occurring during the egg stage, a time when soil moisture is critical to egg development, may have caused some geographical populations to become more synchronous. Regardless, the observations reinforce the notion that insect behavior throughout Ohio cannot be painted with a broad brush.

European Chafer

There was once again a significant emergence of European chafer

adults *(Rhizotrogus majalis)* in northeastern Ohio. Mass mating flights of this beetle have become a common occurrence in late June in that part of the state in recent years. Although the beetles do little damage to trees and shrubs, these chafers participate in spectacular mating flights. Beginning at sunset, swarms of the brown adult beetles hang in large groups from the lower branches of trees. As mating progresses, the preoccupied beetles lose their grip and fall to the ground. The adults separate, and the female eventually seeks moist organic soils in which to lay her eggs.



Eggs hatch in mid- to late-July with second instar grubs developing in early August. Best controls for European chafer grubs are achieved by treating from the latter part of July into early August with products containing imadicloprid or halofenozide. So far, this non-native beetle has only been found in the northeastern part of the state.

Other Turf Insects

As with the 2002 and 2003 seasons, heavy localized infestations of bluegrass billbug *(Sphenophorus parvulus)* were again observed in central and southwestern Ohio. However, continued rains tended to mask damage produced by larvae feeding on stems and crowns.

Hairy chinch bugs *(Blissus leucopterus)* were very active in the Dayton, Columbus, and Akron-Canton areas. The first sign of chinch bug feeding damage is that some leaves turn a purple color. These damaged leaves soon turn yellowish-orange. Chinch bug damage may appear similar to symptoms associated with summer drought, and it is also sometimes mistaken for symptoms produced by certain turfgrass diseases such as dollar spot, leaf spot, or brown patch.

Household and Nuisance Pests

Foreign Grain Beetle

In 2004, construction of new homes in Ohio once again achieved a record high. Consequently, encounters with the foreign grain beetle *(Ahasverus advena)* were also a very common occurrence throughout the state. The consistent connection between this beetle and newly constructed homes has caused some entomologists to propose that it be re-named New House Beetle.

This elongated, and slightly flattened, beetle is reddish-brown and about 1/16" long. It belongs to the same family (Cucujidae) as the saw-toothed grain beetle *(Oryzaephilus surinamensis)*. Indeed, it is almost a dead-ringer for its toothy cousin but lacks the saw-toothed projections on the pronotum, which is the thoracic segment just behind the head. Another important distinction is that the foreign grain beetle is seldom found feeding on grain, except for moldy grain. This insect belongs to a group of beetles known as fungus beetles, because the larvae feed on fungi.

The adult beetles are attracted to fungi growing on the surface of damp grain or on damp plaster and drywall, as well as poorly seasoned wood. Damp sawdust within walls that is left behind during construction may also provide a good substrate for molds or mildews. The beetles lay their eggs on the fungal infested materials, and the larvae feed on the fungi. Typically, larval development continues as the new homes are being finished, and a new batch of homesteading beetles emerge, shortly after the new homeowners move in.

The beetles are only a nuisance since they do not bite or damage wood, fabric, or other materials. They most frequently are associated with homes constructed during the summer months. Populations found in homes tend to disappear after the initial adult emergence, unless air-tight construction techniques limit drying. Drying-out newly constructed homes can be enhanced by increasing ventilation using fans and dehumidifiers.

European Paper Wasp

The European paper wasp *(Polistes dominulus)* continues to expand its beach-head in Ohio; it is now one of the most common wasps found in the state. This exotic, invasive species is native to countries around the Mediterranean Sea.

It was first discovered in the United States in Cambridge, Massachusetts, during the late 1970s. Since then, it has spread to Maine, Vermont, Connecticut, New York, New Jersey, Maryland, Pennsylvania, Ohio, Michigan, California, and Washington. In many of these states, the European paper wasp also appears to be displacing the northern paper wasp *(Polistes fuscatus)*, a native species.

The wasp looks like a yellowjacket because of its yellow-and-black color patterns. The nest it constructs is the typical upside-down umbrella shape with open cells pointing downwards. It is typically a cavity nester, but when a cavity is not found, it will use other protected sites such as under deck railings and roof eaves, but more importantly, the European wasp has also been observed nesting in dense trees and shrubs.

During the 2004 season, nests of varying sizes were observed in several types of trees and shrubs including boxwoods, arborvitae, privet, spruce, and viburnum. Although much less aggressive than its American cousin, the wasp's nesting behavior increases the possibility and danger of landscapers, nurserymen, and homeowners encountering these wasps while working on or around ornamental trees and shrubs.

The Unusual

Springtails

Each year, *BYGL*ers encounter certain insects that are "enjoying" a truly remarkable population outbreak. This season, reports of springtails covering the mulch and flower beds near homes and "flooding" into homes continued from spring to early fall in Ohio, especially in the central and southwestern parts of the state. Although springtails are a common insect found in mulch and moist areas indoors, the *BYGL*ers were surprised to hear stories of "millions" teeming across the mulch, covering the surface of swimming pools, and dying by the thousands in first-floor rooms and basements.

Springtails (Order Collembola) are small (less than 1/8") wingless insects with a gradual form of metamorphosis. Unlike complete or incomplete metamorphosis, there are almost no outwardly detectable morphological changes to the insects as they mature to adults. Springtails derive their name from a structure called a "furcula." The furcula is a forked apparatus on the fourth-fifth abdominal segment which is kept folded underneath until the springtail needs to jump to escape danger. At this point, the furcula springs downward and back, catapulting the insect 15 times its length to safety.

The springtail family most often encountered in leaf litter, under bark, and around homes is Entomobryidae. These elongate, grayish to black insects eat

fungi, bacteria, dead insects, and decaying debris. They are considered beneficial in small numbers outdoors; however, when the environmental conditions cause moisture-loving bacteria and molds to escalate in growth, the springtails multiply to peak populations as well, and they may reach pest status.

Most entomologists agree that controlling these outbursts requires detecting the source(s) of moisture and the habitats that support the springtails, and modifying these areas. This management strategy is recommended over using a pesticide, because not only will solving the moisture problem reduce the springtail population to acceptable levels, but neglecting to repair a leakage may precipitate more serious problems.

Common sources of moisture outdoors include newly sodded lawns which are irrigated frequently, or lawns and flower beds which have an improperly set irrigation system. Lawn managers should closely monitor the amount of water distributed. Turfgrass specialists advise watering thoroughly (up to 1"), only once a week.

Thatch should be kept less than a half-inch in thickness as moist thatch contains a myriad of organic debris and does not dry as long as water is continuously supplied. Irrigation heads should be directed away from the foundation, and downspouts should extend several feet away from the house.

Gutters that are clear of leaves and debris are less likely to spill water onto the ground or against the house. Water lines and air conditioner pipes which are prone to condensation should be wrapped. Grading the soil so that rainwater flows away from the foundation will also help to keep the interior walls dry as well.

Mulch is an enormous source of springtails, as the wood provides moisture, food, and protection for numerous insects including springtails as well as spiders and other arthropods. A graduate student in entomology at Ohio State found that hardwood mulch supports a wide variety and number of insects, followed by wood bark and nuggets. Inorganic mulch had the fewest number and variety of insects.

For best results, maintain no more than 2" of mulch in the beds, and keep it at least 6 to 8" away from the outside parameter of the building.

Indoors, springtails are commonly found in bathrooms, basements, and crawl spaces. Molds which live on cool, moist walls and floors are consumed by springtails. Leaking or sweating pipes and appliances that use water often support small amounts of molds and bacteria as well. Newly built homes that are tightly insulated are often slow to dry and can be infested with springtails, fungus beetles, and foreign grain beetles for the first several years. Stacks of firewood, moldy paper, rolled rugs and boxes of fabric, magazines, or books are good habitats for springtails as well. Houseplants with constantly wet soil or drainage trays that never dry are also prone to springtail invasions.

Normally, once the source of the constant moisture is amended, either outside near the home or indoors, the springtails diminish. Cooler weather and a dryer environment also thwart springtail populations. These record numbers of springtails may or may not occur again for several years.

Sumac Flea Beetle

Curtis Young reported encountering a beetle he had not seen before while on

a diagnostic walk for Master Gardeners in Hancock County. The beetle was discovered devouring the foliage of over half of a 20′ long by 8′ wide stand of sumac in an ornamental planting. Multiple plants were completely defoliated with obvious branch die back. Numerous beetles were present on the remaining foliage and were easily collected. While looking at the beetles in the palm of his hand, they began to jump like flea beetles. The beetle was eventually identified as the sumac flea beetle *(Blepharida rhois).*

The beetle has a body shape that is very similar to the Colorado potato beetle; however, it is only about one-fourth to one-third the size of the potato beetle. The sumac flea beetle is one of the largest flea beetles in the United States.

The head and thorax is a shiny caramel-brown color, and some of the females have a caramel-olive green color. The rest of the body is a dark chestnut-brown color. The elytra (front wings) also are chestnut brown, overlaid by varying amounts of white, causing the elytra to look as though they were sprayed with artificial snow used to frost windows. The hind legs of the beetle have the enlarged femurs typical of flea beetles.

Little is known of the basic biology of the sumac flea beetle. However, Curtis was fortunate to observe beetles that were mating and laying eggs. The eggs were discovered on the main trunks, branches, and stems of the sumac plant. Initially, the egg masses were overlooked because they look like piles of fecal material.

Samples were collected and examined more closely, and it was found that females lay a random pile of eggs, and then they defecate on the pile. This egg laying behavior is also practiced by several other insects to disguise the eggs and conceal them from predators and parasites. The sumac flea beetle may overwinter in the egg stage.

Six-Spotted Green Tiger Beetle

Extreme concern over emerald ash borer is causing any green insect to be viewed with suspicion. During the spring, several *BYGL*ers received phone calls from Ohioans reporting emerald green beetles cruising wood-lots and forests in the southwestern part of the state. The callers feared the beetles were the dreaded emerald ash borer. The green beetle in question was the six-spotted green tiger beetle *(Cicindela sexguttata).* This is actually a native insect, and it is a predator with a very predatory-sounding name.

Tiger beetles belong to the family Cicindelidae. The common name for this family is descriptive since all tiger beetles are ferocious predators. Adults seize their prey, which includes small insects, with powerful sickle-shaped mandibles. Tiger beetles have long legs, and they are fast runners. They are also very good fliers.

As one would expect of a predator, they have excellent eyesight, and their protruding eyes make the beetles look like they are wearing goggles. Tiger beetles have elongated bodies, but the thorax is usually about half the width of the front wings and abdomen. Most tiger beetles have a shiny metallic color. This adds to the confusion with Agrilus beetles, which share similar colors and are commonly called metallic wood borers.

The tiger beetle's fine eyesight, quick speed, and flying agility makes it difficult for people to get a close look at the beetles, hampering positive identification. The six-spotted green tiger beetle has spots that are white and arranged along the trailing edge of the wing covers, three per side. However, reflective light bouncing off their shiny green color sometimes

obscures these spots. Their green color is a slightly lighter shade than the color of the emerald ash borer. Also, as with most Agrilus beetles, the thorax of the emerald ash borer is almost the same width as the abdomen. Green tiger beetles are common insects in the woods of Ohio, and they seem to prefer zipping around forest paths.

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