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Insect and Mite Activity Noted in Ohio Nurseries and Landscapes: 2003

Joseph F. Boggs, Curtis E. Young, David J. Shetlar, Barbara Bloetscher; Amy K. Stone, David J. Goerig, Timothy J. Malinich, David E. Dyke, Erik A. Draper, Pamela J. Bennett, Gary Y. Gao, and James A. Chatfield

Summary

Gypsy moth *(Lymantria dispar)* populations were low this past season across the state, as were populations of eastern tent caterpillar *(Malacosoma americanum)* and fall webworm *(Hyphantria cunea).* However, localized damaging infestations of yellow-necked caterpillar *(Datana ministra)* and bagworm *(Thyridopteryx ephemeraeformis)* were observed throughout the state. Mimosa webworm *(Homadaula anisocentra)* caused noticeable browning of honeylocusts in northeastern Ohio. Larch casebearer *(Coleophora laricella)* was common on its namesake in the southwestern and northeastern areas of the state.

A number of sawfly defoliators made their presence known including dusky birch sawfly *(Croesus latitarsus),* hollyhock sawfly *(Neoptilia malvacearum),* European pine sawfly *(Neodiprion sertifer),* and white pine sawfly *(N. pinetum).* Boxwood leafminer *(Monarthropalpus flavus)* and oak shothole leafminer *(Agromyza viridula)* were also common pests.

High grasshopper populations were reported throughout the state, which was unusual given the generally wet conditions present for much of the season. The two most common species observed were the redlegged grasshopper *(Melanoplus femur-rubrum)* and the differential grasshopper *(M. differentialis).*

The non-native emerald ash borer *(Agrilus planipennis)* was the most significant borer found in Ohio during the 2003 season. However, white pine weevil *(Pissodes strobi),* Asian ambrosia beetle *(Xylosandrus crassiusculus),* and the hornbeam version of twolined chestnut borer *(Agrilus bilineatus carpini)* were also observed.

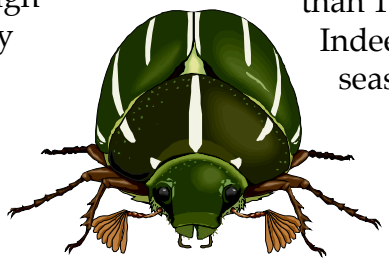
A number of sucking insects appeared in significant numbers in Ohio including potato leafhopper *(Empoasca fabae),* yucca plant bug *(Halticotoma valida),* spiny witchhazel aphid *(Hamamelistes spinosus),* and pine bark adelgid *(Pineus strobi).*

Joseph F. Boggs, Ohio State University Extension, Hamilton County/South District; Curtis E. Young, Ohio State University Extension, Allen County; David J. Shetlar, Ohio State University Extension/Ohio Agriculture Research and Development Center/Entomology; Barbara Bloetscher, Ohio State University Extension/C. Wayne Ellett Plant and Pest Diagnostic Clinic/Entomology; Amy K. Stone, Ohio State University Extension, Lucas County; David Goerig, Ohio State University Extension, Mahoning County; Timothy Malinich, Ohio State University Extension, Cuyahoga County; David Dyke, Ohio State University Extension, Hamilton County; Erik A. Draper, Ohio State University Extension, Geauga County; Pamela J. Bennett, Ohio State University Extension, Clark County; Gary Y. Gao, Ohio State University Extension, Clermont County; James A. Chatfield, Ohio State University Extension/North District/Horticulture and Crop Science.

Several species of lace bugs were also very evident, particularly oak lace bug *(Corythuca arcuata),* hawthorn lace bug *(C. cydoniae),* and azalea lace bug *(Stephanitis pyrioides).*

Spruce spider mite populations were low this past season owing to heavy spring rains. However, eriophyid rust mites, including spruce rust mite *(Nalepella halourga),* hemlock rust mite *(N. tsugifolia),* baldcypress rust mite *(Epitrimerus taxodii),* and the privet rust mite *(Aculus ligustri),* produced damaging localized infestations in many areas of the state.

Japanese beetle *(Popillia japonica)* populations were generally low throughout the state. However, a heavy emergence of European chafer *(Rhizotrogus majalis)* adults were observed in northeastern Ohio. Bluegrass billbug *(Sphenophorus parvulus)* and hairy chinch bugs *(Blissus leucopterus)* were common in a number of areas of the state.



The Oriental chestnut gall wasp *(Dryocosmus kuriphilus)* was found for the first time in Ohio this past season, and Oriental beetle *(Anomala (= Exomala) orientalis)* was found for the first time in central Ohio, far from its previously known sites in the extreme northeastern part of the state.

Introduction

Insect and mite activities reported in 2003 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.

General Defoliators

Gypsy Moth

Gypsy moth *(Lymantria dispar)* eggs began to hatch in northwestern Ohio the last week of April. Larval development was completed and pupation began to occur in that part of the state the first week of July. Populations of this general defoliator were low this past season across the state.

The Ohio Department of Agriculture (ODA) only treated nine blocks, in six counties, totaling 2,126 acres, as part of its suppression program. Last year's suppression-treatment blocks totaled more than 10,000 acres in 21 counties. Indeed, acreage sprayed this season was far less than that sprayed as recently as five years ago. However, just as wet weather contributed to a general decline in gypsy moth populations, several dry springs could lead to a rebound in the moth populations.

Yellownecked Caterpillar

Populations of yellownecked caterpillar *(Datana ministra)* were observed in central and southern Ohio, with some locally heavy infestations. These caterpillars feed in colonies, with each group focusing its collective gastric attention upon a single branch. They possess a cosmopolitan palate, feasting upon walnut, hickory, and oak as well as crabapple, cherry, maple, elm, beech, linden, birch, black locust, azalea, sumac, and boxwood.

Yellownecked caterpillars pass through three distinct color phases during their development, meaning that the larvae change color patterns. This trait may present an identification challenge. First-instar caterpillars are copper-colored with

no distinct lines. The next color phase begins with the second-instar caterpillars. They have distinct alternating longitudinal yellow and orangish-red lines. Last instar caterpillars show the third-color phase with caterpillars having alternating longitudinal black and yellow lines.

All instars share some common traits. They are all covered with white to yellowish-white hairs, although the hairs are most evident during the third color phase. All instars have black head capsules and a characteristic bright orangish-yellow segment behind the head, from which this insect gets its common name.

Finally, regardless of instar stage, when the caterpillars are disturbed, they lift their heads and tails, causing their bodies to become U-shaped.

Yellownecks have two, and possibly three, generations per year. Since they feed in colonies, the caterpillars generally defoliate their hosts one branch at a time, unless populations are high and numerous colonies occur on a single host. With multiple generations, this caterpillar can potentially completely defoliate its host in one season.

Giant Silkworm Moth Caterpillars

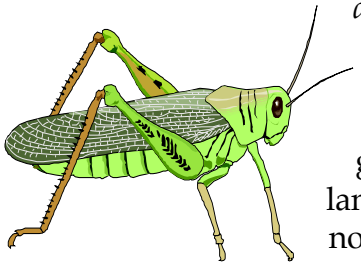
A considerable number of caterpillars of several species of giant silkworm moths (Family Saturniidae) were observed during the 2003 season in Ohio, including hickory horned devil *(Citheronia regalis),* polyphemus moth *(Antheraea polyphemus),* cecropia moth *(Hyalophora cecropia),* promethia moth *(Callosamia 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 that has been 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

Grasshoppers were abundant during the 2003 season throughout Ohio. This was surprising since high numbers of grasshoppers tend to be associated with dry soils, a rare occurrence this season in most areas of the state.

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. Extension agents in the southern portion of the state even observed nymphs and adults chewing holes in nylon window screening. This is not an uncommon behavior when populations are high.



Female grasshoppers lay eggs in the soil in egg-shaped, pod-like egg masses. Each egg mass consists of 20 to 120 eggs that are cemented together. The females

are capable of producing eight to 25 egg masses, depending upon the species. Thus, populations can expand rapidly. However, numerous predators, parasites, and pathogens tend to keep populations low during normal years. Indeed, fungal infections of egg masses are a common occurrence during wet seasons. *BYGL*ers were at a loss to explain the high populations.

Grasshopper infestations around homes can be controlled with an application of an insecticide labeled for use as a perimeter spray. Such applications are made around the outside of homes from the foundation to a few feet away from the foundation. Care should be taken not to spray plants, unless the insecticide is labeled for use on the plants. Of course, as with all pesticide applications, read and follow label directions.

Spraying window and door screens is not recommended since air passing through the screens could carry the insecticide into the home. To prevent damage to screens, nylon screens can be replaced with aluminum screens.

Sawfly Defoliators

Sawflies vs. Caterpillars

A number of *BYGL* reports this season centered on failed attempts by home gardeners and landscapers to control "caterpillars" using the naturally occurring insecticidal bacterium *Bacillus thuringiensis* or *Bt.* Of course, the caterpillars were actually caterpillar-like sawfly larvae.

While certain strains of *Bt* are very effective against caterpillars, which are the immature stage of moths and butterflies (Order Lepidoptera), sawflies belong to the Order Hymenoptera *(e.g.*, bees, wasps, etc.) which are not affected by *Bt.* It is essential to determine the identity of the larvae before using *Bt.*

There is a handy way to tell the difference between caterpillars and sawfly larvae. Starting at the front, the larvae of both types of insects have three pairs of hardened (sclerotized) legs beneath the first three segments immediately behind the head capsule. These are called *thoracic legs,* and they will remain on the insect into the adult stage.

Next, the larvae have pairs of fleshy legs beneath the abdominal segments. These are called *prolegs* and will be lost when the larvae pupate and the insects emerge as adults. Butterfly and moth caterpillars have two to five pairs of prolegs. Sawfly larvae have six to nine pairs.

Use your hand to help remember this "rule:" If the larvae have the same number of prolegs, or less, as the number of fingers on your hand, they are caterpillars. If they have more prolegs than the number of fingers on your hand, they are sawfly larvae.

Dusky Birch Sawfly

Significant populations of dusky birch sawfly *(Croesus latitarsus)* were observed feeding on the birches in southwestern 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.

Hollyhock Sawfly

As with past seasons, the mid- to late summer larval feeding activity of the hollyhock sawfly *(Neoptilia malvacearum)* generated a considerable number of telephone calls to Extension offices throughout Ohio. The larvae are pale green with black-colored heads, and they have tiny black-colored spines on each body segment. They are leaf skeletonizers that feed on the lower leaf surface of the foliage, leaving behind the upper surface and the main leaf veins. Hollyhock sawfly larvae frequently feed in groups.

The adults are small (3/16 inch), black-colored, fly-like insects with a reddish-brown thorax. The adult sawflies are interesting because their antennae split almost to the base, so they appear to have four antennae instead of two. This sawfly can have as many as three generations per year; however, control is not difficult. Carbaryl *(e.g.,* Sevin) is very effective, but it should be applied as soon as the larvae are discovered.

European Pine Sawfly

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 2003 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.

The 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. Overwintered eggs of the European sawfly were observed hatching in southwestern Ohio on April 7, 2003. Egg hatch was observed in the central part of the state on April 12, 2003.

The larvae are caterpillar-like in appearance and have bulbous, shiny-black head capsules. Early instars are mostly grayish-green, causing them to blend with surrounding needles. Later instars develop faint grayish-white longitudinal strips. The first instar larvae can only eat the needle surface, causing needles to turn brown and wilt, appearing straw-like.

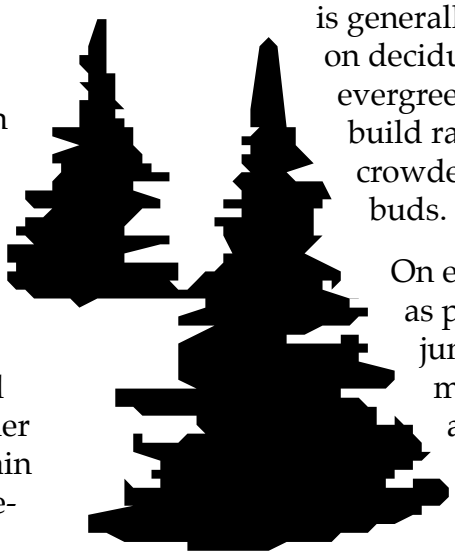
As the larvae grow, they eventually consume entire needles. All instars feed in groups and can rapidly defoliate branches. However, since feeding is confined to last year's needles and ceases before the new growth emerges, the impact on overall plant health is considered minimal.

White Pine Sawfly

White pine sawfly *(N. pinetum)* is a more serious pest than European pine sawfly, because it feeds late in the season on both old and new needles, and it may have more than one generation per year. High populations and considerable damage to white pine were observed in western Ohio, with localized populations observed

in the southwestern part of the state. The sawfly prefers eastern white pine but may occasionally be found on mugo and red pines.

Adult wasps emerge in spring, mate, and the 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.

White pine sawfly feeding damage 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.

Nest-Making Caterpillars

Bagworm

While bagworm *(Thyridopteryx ephemeraeformis)* populations throughout the state were not consistently high in 2003, heavy localized infestations were a common occurrence, particularly in the western half of the state. Indeed, damaging populations were observed in the Toledo area, a part of the state where this moth has seldom been found in the past.

Bagworm is well-known for the injury it can cause to several species of evergreens, especially arborvitae, juniper, spruce, and pine. It is somewhat less well-known for its activities on deciduous trees and shrubs.

According to the literature, bagworm caterpillars can feed and develop on more than 120 plant species, although injury is generally not nearly as severe on deciduous plants compared to evergreens. Heavy populations can build rapidly on all hosts, and, if crowded, the bagworms may eat buds.

On evergreen hosts such as pines, arborvitae, and junipers, this feeding activity may cause branch dieback and open, dead areas. If defoliation is excessive, plants may die the following season.

Landscapes should be monitored closely for this pest, especially on plants infested last season. If there are just a few bagworms on a plant, they can be handpicked and destroyed. *Bacillus thuringiensis* or *Bt (e.g.,* Dipel, Thuricide, or Caterpillar Attack) is effective against bagworm when bags are less than 3/8″ in length. Other properly labeled insecticides will have to be used if the caterpillars are allowed to get larger.

Mimosa Webworm

There were reports of heavy localized infestations of mimosa webworm *(Homadaula anisocentra)* in northern and central Ohio on honeylocust during the 2003 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*.

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 2003 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.

Larch Casebearer

The larch casebearer *(Coleophora laricella)* has generally been relegated to the list of landscape oddities in past seasons. However, significant populations were observed in southwestern and northeastern Ohio during the 2003 season.

The overwintered larvae of this small moth (wing span is only 1/3") get their name from the cigar-shaped cases they construct. They line mined-out needles with silk, insert their abdomen, and carry the dead needles around for protection.

The resulting unusual image is that of walking dead needles. When disturbed, larvae may attach a strand of silk to the tree and drop on silky threads towards the ground.

Damage includes burned or bleached needles that may give the trees a white/silvery appearance. Heavy infestations may result in complete defoliation of the tree. There are two generations per year, with the second generation generally appearing in mid- to late July.

Although control measures have generally not been recommended in past seasons, trees that were heavily infested during the 2003 season should be closely monitored next year.

Leafminers

Boxwood Leafminer

An unusual phenomenon was observed (heard) last season involving boxwood leafminer *(Monarthropalpus flavus)*. In late April, landscape managers and home gardeners in central and southern Ohio began reporting that they were hearing faintly audible crinkling or rustling noises emanating from boxwoods.

Thorough examinations of the shrubs and extensive observations failed to reveal birds, or rodents, or any other familiar noise-maker cavorting among the branches or under leaf debris. Indeed, the sounds seemed to come from the plants themselves!

It was eventually determined that boxwood leafminer pupae were the noisemakers. This tiny 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. The pupae are also orangish-yellow in color, and they are very active wigglers.

They not only wiggle about within the leaf mines, but as adult emergence approaches, the pupae wiggle themselves partially out of the mines. This generally occurs at about the same time weigela begins to bloom. This wiggling pupal activity was considered to be the source of the faint crinkling sounds.

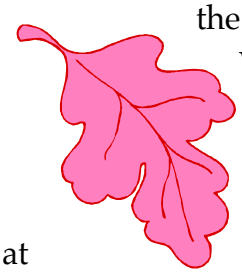
Unusual noises aside, this leafminer can become a very serious pest. Larvae feed on parenchyma tissue within leaves and they may produce multiple blister mines. The mines turn yellowish-brown in the late spring, and damaged leaves are often evident throughout the summer. Heavy infestations may weaken plants by causing severe branch dieback.

Adults generally begin to emerge in early May and can be seen flittering among the leaves of boxwoods. The small, gnat-like flies have abdomens that are about the same orangish-yellow color as the larvae and pupae.

While adulticide applications may provide some reduction in populations, the best control options target the larvae. Larval control options to prevent mines include applications of imidacloprid *(e.g.,* Merit) made in the fall or in the spring as a soil drench, or acephate *(e.g.,* Orthene) as a foliar spray in mid-to-late May.

Oak Shothole Leafminer

The dramatic handiwork of the oak shothole leafminer *(Agromyza viridula)* was once again very evident this past season on oaks in many areas of the state, particularly on bur and chinkapin oaks. This tiny fly is related to the holly and inkberry leafminers.



Females wing their way to oak leaves just as the leaves begin to emerge from the bud. Unable to penetrate leaves with their lapping mouthparts, the females use their sharp, flexible ovipositors to puncture the new leaves. They then lap up the sap issuing forth from the wounds and insert eggs into these feeding holes, one egg per wound.

Larvae feed as leafminers and develop rapidly, usually before the leaves have fully expanded. The mature larvae drop from the mines to pupate, leaving behind a circular area of necrotic tissue that falls from the leaf.

These small holes enlarge as the leaves expand. The holes may remain distinct, imparting a Swiss-cheese appearance to the leaves, or coalesce, giving the appearance that large sections of the leaves

have been removed. This may cause the leaves to look tattered. Indeed, it has been speculated that this insect could account for some of the symptoms generally ascribed to the leaf injury phenomenon known as oak tatters.

It has been reported that oak shothole leafminer has several generations per year. However, only the first generation produces appreciable damage since it occurs when the greatest number of new leaves are available for feeding and oviposition. Regardless, the damage is seldom severe enough to cause serious harm to the tree, so controls are generally not recommended.

Borers

Emerald Ash Borer

In 2003, the non-native emerald ash borer *(Agrilus planipennis)* was found in five counties in Ohio. Four of the infestations were found in counties located in the northwestern part of the state, near the area in Michigan where this insect was first discovered in the United States. Franklin County, in the central part of the state, was the fifth county where an infestation was discovered.

By far, this was the most significant borer found in the state this past season. The emerald ash borer is thoroughly discussed in a comprehensive article included in this Special Circular titled *Emerald Ash Borer: The Beginning of the End of Ash in North America?*

White Pine Weevil

White pine weevil *(Pissodes strobi)* was commonly found in central and western Ohio in 2003, although the most significant damage was observed in the northeastern part of the state.

Overwintered females lay eggs in conifer terminals in the spring. The resulting white, legless, slightly curved, grub-like larvae tunnel downward just beneath the bark until pupation occurs in mid- to late summer. The tops of infested trees eventually become wilted, turn brown, and die. Tunneling often 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.

As the common name implies, the weevil infests white pine. However, it will also attack Scotch, jack, red, and pitch pine, as well as Douglas-fir, Colorado blue, and white spruce. Although the weevil has a traditional range that includes all of Ohio, it has been most prevalent in the northern and central parts of the state. White pine weevil has long been a serious Christmas tree production pest, but it is rapidly becoming a very significant nursery and landscape pest.

Look for dead or dying conifer tops. Main leaders are often curved into a shepherd's crook. Larval feeding activity causes the bark to darken and become paper-thin, and to appear slightly sunken. Removing the bark will reveal groove-like tunnels filled with dark, moist material, as well as white slivers of wood.

Larvae tunnel downwards, so they are usually found at the lower ends of the tunnels. Pupation occurs within 1/2"-long oval-shaped "chip cocoons" consisting of white excelsior-like material that is tightly bundled into depressions excavated into the surface of the xylem. There is one generation per year.

Management of the weevil includes insecticide applications in the spring to prevent egg laying and the removal and destruction of infested terminals later in

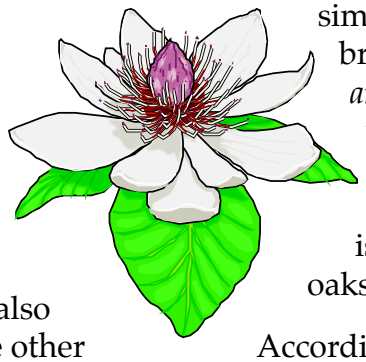
the season to reduce adult populations. Spring insecticide applications can be best targeted using adult monitoring traps.

These traps were researched and perfected by Rayanne Lehman, Pennsylvania Department of Agriculture, and are based on the Tedders Trap sold by Gempler's Supply (1-800-382-8473, Cat. No. R01960) to monitor for plum curculio and pecan weevil. The traps must be modified to use them for detecting white pine weevil.

Instructions are provided by Lehman at the following web site (in pdf file format): **http://ctrees.cas.psu.edu/pdfs/whitepinewvtraps.pdf**

Asian Ambrosia Beetle

Classic evidence of larval activity of the Asian ambrosia beetle *(Xylosandrus crassiusculus)* was once again observed this past season on small caliper magnolias in nurseries in northeastern Ohio. The trees were festooned with tan-colored toothpick-like spines of boring dust protruding from small holes in the bark.



This normally southern pest was found last year for the first time in Ohio nurseries. It was primarily found on sweetbay magnolia, but it will also infest oaks and cherries. Unlike other ambrosia beetles that attack stressed plants, this beetle attacks healthy plants as well as stressed plants. The beetle also shows a distinct preference for small caliper trees.

The tiny (approximately 2/16" long), dark-brown beetles feed in the xylem and pith where they introduce the ambrosia fungus into the wood. Making a cut a few days after the beetle has entered the plant will expose the fungus; it is very easy to see on the cut surface. The fungus is white, soft, and hairy and continues to grow through the xylem, disrupting vascular flow. Branches or the entire tree may eventually die from the fungus and the beetle damage.

The adults and larvae bore into twigs, branches, or small-caliper trunks and make a tiny entrance and exit hole. They excavate tunnels and introduce the ambrosia fungus, upon which they feed.

Frass is exuded as they bore and clings together to produce the toothpick-like spines. Wind and rain may knock the protruding frass off infested trees, resulting in an accumulation of frass at the base of the tree. Controls include a residual bark spray at four-week intervals throughout the growing season.

Hornbeam Borer

Hornbeams were observed this past season in Ohio exhibiting distinct horizontal ridges on the trunks, similar to those produced by bronze birch borer *(Agrilus anxius)* on birches. The culprit was the twolined chestnut borer *(A. bilineatus)*. However, this is not the same beetle that is most often associated with oaks.

According to current taxonomic positioning, there are two subspecies of the twolined chestnut borer. The subspecies *A. bilineatus bileneatus* attacks oaks and chestnuts, and the subspecies *A. bilineatus carpini* attacks hornbeams (both *Carpinus* and *Ostrya),* as well as beeches.

Host feeding preference studies conducted on beetles collected from hornbeams indicated that the adult beetles had a distinct preference for hornbeam foliage. Indeed, they would not feed on oak

foliage, a host that is preferred by adults of the other subspecies.

The hornbeam beetles also appear to have a deeper metallic color, almost metallic blue, and the two faint longitudinal stripes were less evident than on the oak/chestnut subspecies.

Petiole Borers

The two petiole borers associated with maples and buckeyes/horsechestnuts were once again very active this past season in Ohio. The moth *Proteoteras aesculuana,* a petiole borer with no common name, produced minor, but often conspicuous damage to buckeyes and horsechestnuts.

Larvae bore into leaf petioles, causing the new leaves to turn black and droop. Symptoms superficially resemble frost or freeze damage. Look for off-colored, drooping leaves, and a single small hole in the petiole. Small quantities of frass may hang from the hole.

There may be two generations per year, so damage may be observed late in the season. This insect seldom causes significant leaf loss, so no control recommendations are advised.

The maple petiole borer *(Caulocampus acericaulis)* is a sawfly that bores into the maple petioles. Unlike the petiole boring moth on buckeyes/horsechestnuts, affected maple leaves usually fall from the tree. Heavy leaf drop in May often signals an infestation of this insect.

The tiny sawfly larvae tunnel out the inner tissues of the petiole. This causes the leaves to turn brown, droop, and the petioles to break a short distance from the leaf blade. Larvae remain inside the portion of the petiole attached to the twig, so raking and destroying fallen leaves will not reduce the population.

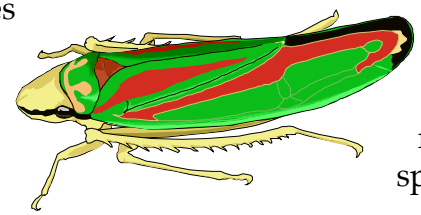
There is only one generation per year and damage is seldom severe enough to cause serious harm to the tree.

Sucking Insects

Potato Leafhopper

Potato leafhopper *(Empoasca fabae)* activity on nursery and landscape trees was very evident in Ohio during the 2003 season, particularly on maples in the central and northern parts of the state. This insect cannot overwinter in Ohio but is annually reintroduced into the state by prevailing winds blowing from the south.

Potato leafhopper is highly attracted to leguminous hosts such as alfalfa, where populations can build rapidly. It is also attracted to vigorously growing Norway and sugar maples, basswood, beeches, birches, apples, chestnuts, redbuds, and other tree species.



Generally, leafhoppers blown from the southern United States first establish and build populations on alfalfa. The insects then move to trees with the first cutting of the alfalfa.

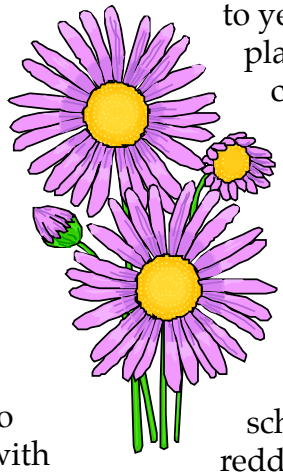
The leafhopper will feed on succulent tissues of both leaves and shoots of its host trees. Feeding on Norway and sugar maples can result in extensive foliage injury marked by blackened necrotic tissue and twisted leaves, severe stunting of new growth, and the development of multiple leaders.

Maples being propagated in nurseries should be carefully monitored. Trees

should be treated when leafhoppers are seen and treatments repeated as needed.

Leafhoppers began appearing in the Lima area in mid- to late May and in northeastern Ohio in late May. Very high populations and damage to maples, birch, beech, and basswood were reported in central Ohio in mid-June.

A second generation was reported in the Lima area in mid-June and in central Ohio in late June. Indeed, clouds of leafhoppers were seen swarming around street lights in the Columbus area the last week of June.



Lace Bugs

Lace bugs were very active in Ohio during the 2003 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.

Yucca Plant Bug

The yucca plant bug *(Halticotoma valida)* continued to cause extensive damage in southwestern Ohio, but reports of high populations and significant injury were also made from locations in the central and northwestern parts of the state.

Intense feeding activity by this insect can cause considerable damage to foliage, and past occurrences of heavy populations have resulted in the demise of some yucca plantings in the Cincinnati area.

Small, white spots (stippling) produced by plant bug feeding may coalesce, causing the foliage to appear light-green to yellow. Also, blades on infested plants become covered with white cast skins and tarry waste specks — causing yucca to look yucky!

Adults of this small (3/16" long) native of the southwestern United States have black wings and orangish-red legs, head, thorax, and abdomen. The nymphs share this striking color scheme, but they appear more reddish in color since their black wing pads fail to cover their entire abdomen. Both adult and immature yucca plant bugs have an almost oval body shape.

This insect has multiple, overlapping generations, so populations can build rapidly. Insecticides labeled for use on yucca can provide effective control of this insect; however, applications should be made early in the season to prevent damage.

Spiny Witchhazel Aphid

Early-season infestations of the spiny witchhazel aphid *(Hamamelistes spinosus)* were reported throughout much of Ohio. The aphids reside on the underside of birch leaves, and their feeding activity induces the formation of characteristic leaf corrugations. All birches are susceptible; however, river birch appears to be a preferred host.

The aphid may alternate between birch and witchhazel, but it gets its name from the spiny, reddish-green, oblong bud galls

produced on witchhazel. The galls are not considered harmful to witchhazel, and the insect seldom causes serious damage to birch trees, beyond the effect on leaf aesthetics.

Pine Bark Adelgid

The pine bark adelgid *(Pineus strobi)* is potentially a very damaging pest to its conifer hosts. While this insect has not been uncommon in Ohio landscapes and nurseries in past seasons, it seemed particularly widespread during the 2003 season.

In May, overwintered females transform themselves into white puff-balls, making trunks of affected pine trees appear flocked. The adelgids may be found on many species of pines but seem to have a particular affinity for eastern white pine. High populations of this sucking insect can cause a gradual decline of infested trees.

The waxy, cottony material covering the females interferes with insecticide penetration. However, it is no match for a high-pressure stream of water, an alternative control approach.

The water dislodges and washes off the adelgids, sending them to the ground and certain doom. The water pressure available in most homes is sufficient to wash adelgids from small trees.

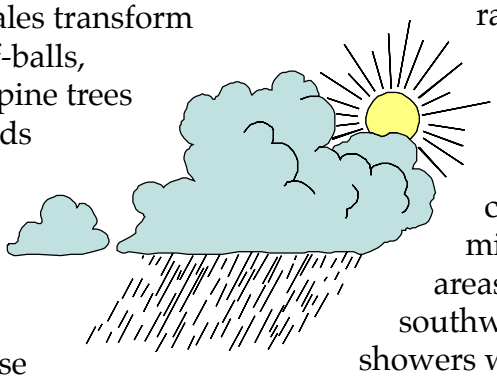
Larger trees may require the use of a pesticide sprayer, without the pesticide. Machines delivering high-pressure water for cleaning purposes are not recommended because they may damage bark.

Mites

Spruce Spider Mites

The spruce spider mite *(Oligonychus ununguis)* is a cool-season mite with damaging populations occurring in the spring and the fall. Damage symptoms include tiny yellow speckles, or stippling, on needles which may coalesce to intense yellowing or bronzing of the foliage.

During the 2003 season, damage from fall (2002) mite feeding activity began to appear in late spring to early summer throughout Ohio. However, heavy spring rains appeared to wash mites from trees, limiting spring feeding damage that would show up later in the summer. Rains continued to affect the mites during the fall in most areas of the state; however, in southwestern Ohio where rain showers were spotty and localized, damaging populations were observed.



Rust Mites

Damaging infestations of eriophyid rust mites were also observed in many areas of the state. Unlike the eriophyids that produce plant galls, rust mites are "free living," meaning they can survive on the surface of their host's foliage. Stippling and yellowing of needles on spruces and hemlocks are often attributed to spruce spider mites, but eriophyids may actually be the cause of the damage. Owing to their small size, eriophyids are often literally overlooked.

Eriophyid rust mites are very different from spruce spider mites. The eight-legged spruce spider mites are ovoid-shaped and apparent to the naked eye. When dislodged from the foliage using

the "beating-tray" method, spider mites can be made even more obvious by using a finger to lightly smash and smear the mites — mushed mites appear as greenish-brown streaks.

Eriophyid rust mites are carrot-shaped, and they only have four legs that appear to extend from their anterior end. Even more challenging, rust mites are almost microscopic. When magnified using a standard 10X hand lens, the mites look like dust particles. The magnification provided by a 30X dissecting microscope is required to see details.

Rust mite feeding behavior differs from spider mites; however, damage symptoms may appear almost indistinguishable from spider-mite injury unless viewed under high magnification.

The spruce rust mite *(Nalepella halourga),* which feeds on spruces, and the hemlock rust mite *(N. tsugifolia),* which feeds on hemlocks and firs, are the two most common rust mites found on conifers in Ohio. These are truly cool-season mites — they are active very late in the fall and early in the spring.

A major difference between rust mites and spider mites is that rust mites can be controlled using some standard insecticides, such as carbaryl *(e.g.,* Sevin). A 1% horticultural oil solution mixed with a properly labeled pyrethroid insecticide is also effective. However, oils may wash the "blue" off blue spruce.

Baldcypress rust mite *(Epitrimerus taxodii)* and the privet rust mite *(Aculus ligustri)* were both observed affecting their hosts this past season. Rasping damage by the baldcypress rust mite appears first as very fine spots, or stippling. The needles eventually become yellowish and then reddish brown or rusty in color. Inner needles are generally affected first.

Feeding activity of the privet rust mite causes privet leaves to become pitted and yellowish-brown; then they curl and turn brownish-black. Heavy populations can produce severe defoliation.

Pearleaf Blister Mite

Pearleaf blister mite *(Phytoptus pyri)* was a common occurrence on ornamental pears in southwestern and central Ohio, and localized populations seemed to be unusually heavy this year. 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 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.

Gall Makers

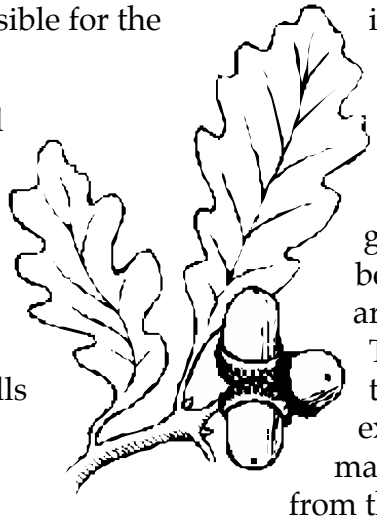
Galls produced by the usual suspects were once again common in Ohio during the 2003 growing season. However, one very unusual oak gall dominated galling reports.

Acorn Plum Galls

In mid- to late August, acorn plum galls were found in large numbers beneath red oaks in the Cincinnati and Dayton areas, as well as in and around Lima.

The galls grow from the sides of acorn caps. They are approximately 1" in diameter and may be rounded, or slightly plum-shaped. The general shape and

point of attachment are responsible for the common name of these galls.



Acorn plum galls are produced by the cynipid wasp, *Amphibolips prunus*. Gall aficionados may recognize that this genus includes the gall wasp *(A. confluenta),* which produces the more commonly found oak apple galls on red oaks. As with oak apple galls, acorn plum galls contain a single wasp larva housed in a seed-like cell located at the center of the gall.

Another common trait of the two galls is that once the wasp larvae complete their development, the "mature" galls detach from the host tree and drop to the ground.

As with most oak galls, the acorn plum gall causes no significant harm to oak hosts, so no controls are recommended. However, large numbers of these odd galls found beneath infested oaks may startle home gardeners.

The most striking feature of the acorn plum galls is their color. They have a tannish-brown surface that is shot-through with vibrant blood-red or purplish-red streaks and blotches.

The inside of the gall is densely fleshy, almost to the point of being "woody," making them difficult to slice open with a knife. However, if the galls are carefully cut, they ooze a purplish-red fluid that will stain fingers and clothing.

Indeed, this feature is shared with similar oak galls found in Europe and was exploited during the Middle Ages to produce ink. But, unlike most inks produced at the time that were based on a suspension of pigments, the fluid from oak galls is actually a dye — the color is produced by a chemical reaction involving tannic acid.

European ink makers found that the overall color of the gall extract will deepen and become darker when iron salts are mixed with the gall fluid. This color change occurs as the mixture oxidizes with exposure to air. This reaction may also be observed when iron from the blade of knives or pruners reacts with the tannic acid in the gall fluid. The oxidation and subsequent color change are very rapid.

Turf Pests

Japanese Beetle

Adult Japanese beetles *(Popillia japonica)* began to appear on schedule in southern Ohio in late June. However, the expected thundering herd failed to make an appearance in that area of the state, as well as in other areas. In general, it was a relatively quiet Japanese beetle season, although a few localized heavy infestations were observed.

Speculations regarding reasons for the low populations centered on heavy spring rains drowning pupae, and drought conditions during the 2002 season reducing egg survival. Grubs can easily climb up and hide on the soil surface in a drier location. However, the immobile pupae are unable to relocate themselves to dry soil, and studies have shown they die if submerged for over a week.

Studies have also shown that the year following a late-season drought often results in at least localized low Japanese (and other annual grub species) beetle populations. This explains why few grubs

or pupae have been found in some of the drier counties.

European Chafer

European chafer *(Rhizotrogus majalis)* appeared to have been much less affected by last season's drought, or this season's heavy rains. Northeastern Ohio once again experienced a significant emergence of European chafer adults. 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 imadacloprid or halofenozide. So far, this non-native beetle has only been found in the northeastern part of the state.

Bluegrass Billbug

As with the 2002 season, 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.

Overwintered adults began appearing in late April in central Ohio, when Vanhoutte spirea and horsechestnut were in full bloom. By late June, larvae had reached third- or fourth-instar stages in that part of the state. These are the stages when the legless, grub-like larvae begin feeding on turfgrass crowns which can cause significant plant injury.

Billbug larvae will feed on any cultivar of Kentucky bluegrass, as well as perennial ryegrass and fescues if sufficient levels of endophytes are not high enough to kill or repel the billbugs. During normal seasons, billbug injury is often mistaken for summer drought dormancy.

Infestations can be diagnosed in mid-summer using the "tug test." Stems damaged by billbugs break off easily at the crown. A close examination will reveal that the stems are hollow and filled with whitish frass left by the larvae.

Preventive applications of imidacloprid in early May, or halofenozide in early June, will protect the turf from billbug injury.

Chinch Bugs

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.

Studies conducted by Dave Shetlar have shown that imidacloprid *(e.g.,* Merit), bifenthrin *(e.g.,* Talstar), and deltamethrin *(e.g.,* DeltaGard) provided excellent control of an ongoing chinch bug infestation.

As with other top-feeding insects, incorporating endophyte-enhanced turfgrass cultivars into existing stands will also reduce chinch bug populations.

Household and Nuisance Pests

Asian Lady Beetle

Research conducted in recent years on the soybean aphid *(Aphis glycines),* a pest of soybeans that was accidently introduced into the United States from Asia, revealed a strong connection between population numbers of this insect and populations of the multicolored Asian lady beetle *(Harmonia axyridis).*

It appears the aphid serves as rich fodder for the lady beetle. Indeed, during the 2002 season, high soybean aphid populations failed to develop in Ohio, and populations of the lady beetle were correspondingly insignificant.

However, during the 2003 season, soybean aphid populations exploded with the result being that lady beetle populations also appear to be rebounding. Although reports of multicolored Asian lady beetles coming into Ohio homes in the fall seemed lower than in past outbreak years, they were certainly more common than during the fall of 2002.

Foreign Grain Beetle

In 2003, new home construction in Ohio achieved a record high. Consequently, encounters with the foreign grain beetle *(Ahasverus advena)* were also very common throughout the state.

The consistent connection between this beetle and newly constructed homes has caused some entomologists to propose that it be renamed *New House Beetle.*

The 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 nearly 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. The 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 fungus-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 by using de-humidifiers.

New and Unusual

Oriental Chestnut Gall Wasp

The oriental chestnut gall wasp *(Dryocosmus kuriphilus)* was found during the 2003 season in samples of Chinese chestnut collected from a location near Akron. This is the first time this non-native cynipid wasp has been detected in Ohio.

The wasp is a native of Korea and Japan, and it has decimated Chinese chestnut orchards in Georgia since it was accidently introduced into the state in 1974 by way of infested cuttings. Indeed, this gall-making wasp has nearly eliminated the chestnut industry in that state.

Most of the biology and the impact information on this insect in North America has been developed from research conducted in Georgia. In that state, the 1/8″-long female wasps emerge the last week of May and the first week of June. So far, no males have been found in this species.

The females lay three to five eggs inside vegetative and flower buds. Buds may be targeted by multiple females and contain up to 25 eggs. Egg hatch occurs after about 40 days, and first-instar larvae develop slowly through the autumn and winter.

Larval development accelerates in the spring, and the immature wasps stimulate buds to form 1/3″- to 1/2″-long green or reddish-green oblong-shaped galls. The galls may contain portions of developing leaves, stems, petioles, and flowers. The oriental chestnut wasp has one generation per year in Georgia, Japan, and Korea.

Gall formation suppresses leaf and shoot growth and reduces fruit development. Trees that suffer multiple years of severe infestations may lose vigor and die. After adult emergence, galls dry out and become woody. They remain attached to the tree and unsightly for several years.

Efforts to suppress this wasp chemically have yielded highly variable results. Natural enemies have been imported into Georgia to help suppress this wasp, but populations continue to develop. Pruning and destroying infested plant material remains the most effective method of control.

Although infestations may expand over short distances by the flight of adult wasps, spread over long distances generally occurs by the movement of infested plants, twigs, or shoots. Early detection and destruction of infested plants outside infested areas remains the most effective method to avoid the spread of this insect. Thus, Ohioans are urged to report suspected infestations to the Ohio Department of Agriculture.

Oriental Beetle

Oriental beetle *(Anomala (= Exomala) orientalis)* has been existing in the extreme northeastern part of Ohio since the mid-1990s, but it has failed to move beyond that area of the state. However, in 2003, this scarab beetle was found in central Ohio, in the Columbus area.

Since this native of Japan was first discovered in Connecticut in the 1920s, it has moved into most of the New England states, as well as into New York, New Jersey, Pennsylvania, and the Carolinas. It was discovered causing damage to nursery stock in the mid-90s in Ohio.

Oriental beetle grubs produce plant injury that is very similar to damage caused by root weevil larvae, such as the larvae of black vine weevil *(Otiorhyncus sulcatus).* The grubs consume roots and may occasionally girdle plants just below the soil level.

To distinguish between scarab beetle grubs and root weevil larvae, look for the legs. Scarab beetle grubs have legs, whereas weevil larvae are legless.

Both the oriental beetle and black vine weevil have similar life cycles. They both have one generation per year, and both insects overwinter as late-instar larvae. However, black vine weevil adults appear much earlier in the season than oriental beetle adults.

Oriental beetle grubs may also be confused with other scarab grubs found in the plant root zone, such as Japanese beetle *(Popillia japonica)* grubs. Japanese beetle grubs will feed and develop on decaying organic matter and typically injure roots through collateral damage. They are far less destructive to the roots of nursery stock.

White grubs are identified based on the shape of their anal slits and on patterns of bristles found on the underside of their posteriors. This area is called the raster.

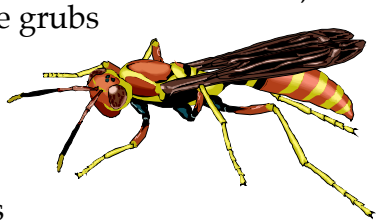
Japanese beetle grubs have a distinctive raster spine pattern that looks like a V. Oriental beetles have two parallel rows of small bristles, each row with about 14 spines. May-June beetle grubs have a similar raster pattern, but they also have a broad V-shaped anal opening, while oriental beetle grubs have an anal opening in the form of a transverse curve.

Oriental beetle adults are around 3/8" long, and they have varying color forms. Adults may be entirely brownish-black, or they may be black with patches of brown, or brown with patches of black. Usually the head is a solid dark brown, and the pronotum is dark in the center, and outlined in straw color.

The adults do little feeding, but they are occasionally found on flowers, particularly daisies. However, they cause little damage and are not considered the most damaging stage of this insect.

European Wasp

The European or dominulus wasp *(Polistes dominulus)* is an exotic, invasive species native to countries around the Mediterranean Sea. It was first discovered in Cambridge, Mass., during the late 1970s.



In the 30 some years the wasp has been in the United States, it has spread to Maine, Vermont, Connecticut, New York, New Jersey, Maryland, Pennsylvania, Ohio, Michigan, California, and Washington. It was first reported in Ohio in 1991. The European 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 frequently observed nesting in dense trees and shrubs.

This nesting behavior increases the possibility of danger for landscapers, nurserymen, and homeowners encountering these wasps while working on or around ornamental trees and shrubs. During the 2003 season, nests of varying sizes with accompanying wasps were observed in several types of trees and shrubs including arborvitae, privet, Alberta spruce, and viburnum.

A chance encounter with these wasps while pruning, digging, moving, or planting could be disastrous. For control measures, see OSU Extension Fact Sheet HYG-2077-97, *Paper Wasps and Hornets,* at: **http://ohioline.osu.edu/hyg-fact/2000/2077.html.**

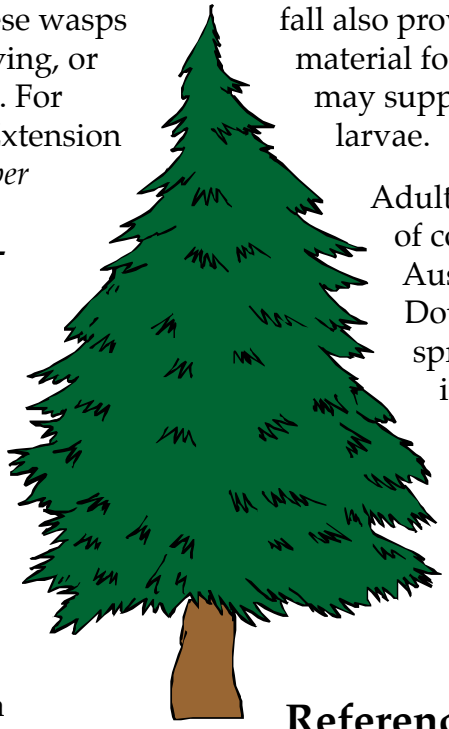
Pales Weevil

This past season, the C. Wayne Ellett Plant and Pest Diagnostic Clinic (CWEPPDC) at Ohio State received a sample of pales weevil *(Hylobius pales)* adult feeding damage on a white pine growing in a landscape far from any Christmas tree plantations. Adults feed by removing bark at the base of lateral shoots. Twigs on the sample had been completely girdled causing shoots to turn brown and die.

This weevil is usually considered a Christmas tree production pest since stumps left from the fall harvest of Christmas trees provide a bountiful supply of larval feeding material. Overwintered females are drawn by the odor of fresh pine resin oozing from the stumps, and they lay eggs on the bark. Once eggs hatch, the legless, grub-like larvae burrow into bark of the stump to feed on phloem tissue.

Larval development is completed during the summer, and new adults emerge by late summer to early fall. The new adults move to living trees to feed on stem tissue, causing shoots to turn brown, or "flag." They may also kill seedlings by feeding on the main stems.

So where did the weevils come from that caused damage to the white pine in a landscape? Conifers that have died in the fall also provide excellent larval feeding material for this weevil. A large tree may support hundreds of developing larvae.



Adults will feed on a wide range of conifers, including Scotch, Austrian, and white pine; Douglas-fir; true firs; and some spruces. Larval development is limited to pines and, occasionally, Douglas-fir. Dead pines should be removed from landscapes to avoid providing reproduction material for this weevil.

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