An Insect Pest Review/Preview

In Part 2 of a rogue's gallery of bug thugs, we take a look at scales, coneflower culprits and even more oddities. These are among the critters that have caused trouble in the past year, and they're poised to emerge again this season.

PART 2

By Joe Boggs

Spring is just around the corner, and with it we can expect the annual reappearance of bug brigades. Of course, we can't cover every possible insect and mite pest that you may encounter, or even posit a guess as to which ones will make your "Top 10" list in 2016. We will again focus on some insects and an eriophyid mite that became emerging issues in 2015 because they were either consistently overlooked or commonly misidentified.

Scaly problems

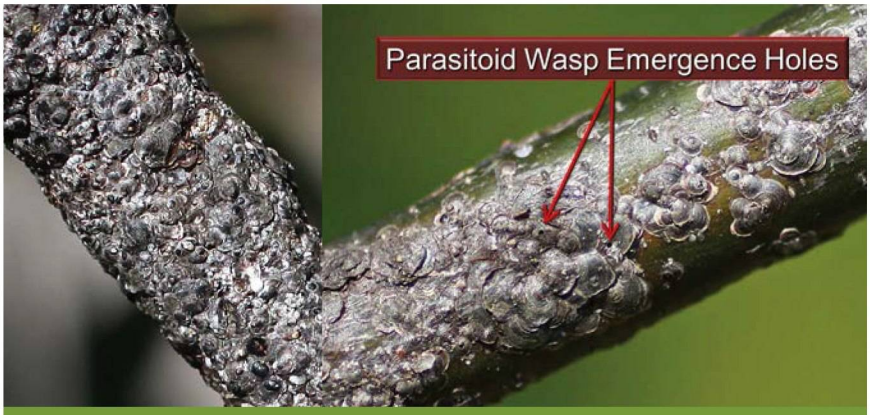
Obscure scale (*Melanaspis obscura*) is a type of "armored scale" (= hard scale), so-named because scales of this group cover themselves in a hard, waxy shield that provides some protection against predators and parasitoids. Their shield also prevents topical insecticides from coming into contact with the scale. The flattened, disc-shaped mature females are about 1/8-inch in diameter. Their small size, coupled with their mottled silvery gray coloration that allows them to blend with the bark, can make this scale difficult to detect until damaging populations develop, thus the "obscure" in the common name.

Obscure scale has a wide host range, including beech (*Fagus* spp.), dogwood (*Cornus* spp.), hickory (*Carya* spp.), maple (*Acer* spp.), oak (*Quercus* spp.) and willow (*Salix* spp.). However, it is most often found on oak and is considered a key pest species of pin oaks. As with all armored scales, obscure scale uses its piercing-sucking mouthparts to extract sap from its host tree. The scale seldom kills established trees; however, heavy feeding damage can weaken trees, contributing to canopy dieback and making heavily infested trees susceptible to other pest and disease problems.

Early detection of obscure scale is essential in preventing the development of heavy, damaging populations. Heavy infestations are notoriously difficult to suppress for three reasons:

- First, the efficacy of systemic neonicotinoid insecticides against this scale appears to be inconsistent requiring the use of topically applied insecticides.
- Second, the hard waxy cover protects the females, which means 1st instar nymphs (crawlers) are the most susceptible stage. However, the crawlers commonly settle beneath the overlapping bodies of females, placing them out of the reach of contact insecticides.
- Finally, eggs are laid and hatch over an extended period time, from early June into early September, meaning that multiple topical applications must be made.

Unfortunately, insecticides targeting the crawlers may also kill predators and parasitoids that have been shown to be important for naturally suppressing obscure scale populations. Reports in the literature indicate that the impact on bio-allies may be minimized by confining most of the applications to mid-August when crawler numbers peak and the bio-enemies of this scale are least active.



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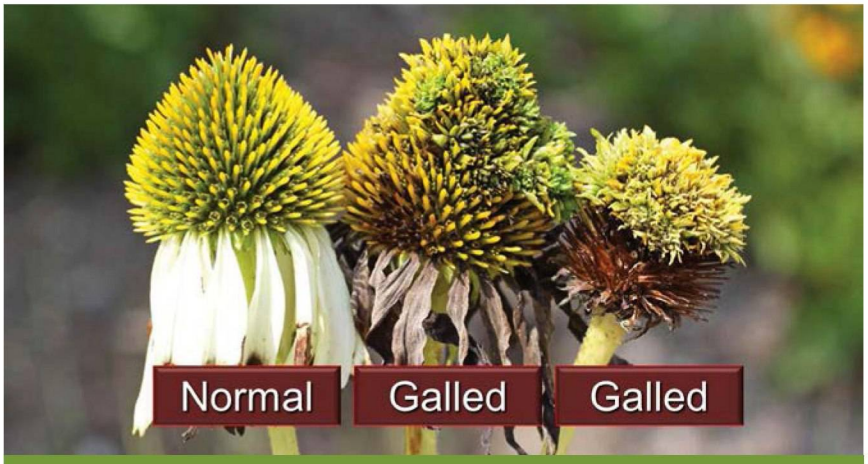
Calico scale (*Eulecanium cerasorum*) is a non-native globular "soft" scale, which means mature scales are protected by a soft shell. The scale was accidently introduced into California from eastern Asia in the 1920s. Since that time, it has moved into the central and eastern U.S. where it is fast becoming one of the most destructive soft scales attacking trees in nurseries and urban forests.

The scale's common name is derived from the starkly contrasting calico pattern of black-and-white markings on the hemispherical-shaped shells of mature females. Mature females measure about ¼-inch in diameter and their distinct markings make them easy to recognize, particularly on bark and branches that are blackened by sooty mold.

As with all soft scales, calico scale adults and nymphs (crawlers) feed by inserting their piercing-sucking mouthparts into phloem vessels to extract amino acids that are dissolved in the sugary plant sap flowing through the vessels. They discharge excess sap from their anus in the form of sticky, sugary "honeydew" (a.k.a. scale poo) that drips onto the leaves, stems and branches of scale-infested trees as well as understory plants, parked cars, sidewalks, lawn furniture and slow-moving entomologists. The honeydew then becomes colonized by black sooty molds.

Calico scale can infest a wide variety of deciduous trees, including dogwood (*Cornus* spp.), elm (*Ulmus* spp.), honeylocust (*Gleditsia* spp.), magnolia (*Magnolia* spp.), sweetgum (*Liquidambar styraciflua*), witchhazel (*Hamamelis* spp.), zelkova (*Zelkova* spp.) and ornamental fruit trees. One of most obvious symptoms of a heavy infestation is blackened branches created by black sooty molds. Although sooty molds cause no harm, they do create an unsightly appearance.

Calico scale is seldom a direct killer of established landscape trees; however, heavily infested trees may suffer branch dieback, and the accumulated stress caused by substantial sap loss may cause them to succumb to other stress related factors.



The sick and twisted coneflower rosette gall mite causes sick and twisted growth.

Calico scale has one generation per year and overwinters on twigs as partially developed nymphs. As spring progresses, the nymphs feed, molt and mature into globular adults. Eggs are laid in late spring to early summer, and the hatching 1st instar nymphs migrate to the undersides of leaves where they attach themselves to veins to suck fluid from phloem vessels. Females die and turn a faded orangish brown after they lay their eggs. Practitioners sometimes mistake this normal adult seasonal mortality and color change for a response to an insecticide application.


The strange growth and deformed cone seen here are the work of the coneflower rosette gall mite, which lives inside the developing flower buds.

This is one of the most difficult soft scales to control. An efficacy trial conducted in 2014 in southwest Ohio by Dr. Dan Herms, Ohio State University, Department of Entomology, targeted summer crawlers attached to the underside of leaves; applications were made on July 25. Data collected 53 days after treatment showed Onyx (bifenthrin) provided the best suppression with 0.8 percent survival of the nymphs compared to 63 percent on the untreated trees. Systemic insecticides failed to provide adequate suppression.

Coneflower calamities

Coneflower rosette gall mite (unknown species) is an eriophyid mite (family Eriophyidae) that has yet to be taxonomically categorized, so it has no scientific name or approved common name. However, the mite is generally referred to as the coneflower rosette gall mite based on the damage that it causes to coneflowers. The mites live inside the developing flower buds and suck nutrients from the base of the flowers. As a result, green to reddish green, elongated, rosette-like tufts of stunted and distorted flower parts will sprout from the tops or sides of the cones of coneflowers.

The damage caused by the rosette

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Dangling flower heads are a sure sign of sunflower head-clipping weevil infestation.

The sunflower head-clipping weevil can be spotted on compass plant and coneflower.

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gall mite is not only unsightly; it can also seriously reduce seed production and thus natural reseeding. Sanitation is key to managing the mite. Cutting and destroying flower heads deformed by mite activity will reduce mite populations.

Sunflower head-clipping weevil (*Haplorhynchites aeneus*) is a well-documented pest of cultivated and wild sunflowers (*Helianthus* spp.) in the Great Plains. This native prairie weevil is also known to infest other members of the aster family (Asteraceae = Compositae), including various members of the *Silphium* genus such as compass plant (*S. laciniatum*), wholeleaf rosinweed (*S. integrifolium*) and prairie dock (*S. terebinthinaceum*). Indeed, the weevil is sometimes called the "Silphium weevil" owing to its strong association with plants in this genus.

However, few reports in the literature mention coneflowers as a host. In recent years, this weevil has become a serious pest of coneflowers in mass landscape plantings and naturalized areas in parts of Indiana, Ohio and Kentucky. The weevil causes flower heads to drop from plants, diminishing aesthetics as well as natural seed production.

In recent years, the sunflower head-clipping weevil has become a serious pest of coneflowers in mass plantings.

The shiny black to brownish black weevil is a little over ¼-inch long with the measurement including an exceptionally long, curved snout. As with all weevils, this beetle's mouthparts are located at the end of their snout. The females insert their snouts into the flower stems to chew a ring of holes around the stem about 1 inch below the flower head. The flower stem is not completely cut; the damaged stem just breaks-over, causing the flower head to hang from the stem on a thin strand of tissue.

Males and females move into the damaged flower head to feed on pollen and to mate. The females then lay eggs on the dangling head. Eventually the flower head breaks from the stem and drops to the ground. Heavily deflowered coneflower plantings look like a collection of soda straws. The eggs hatch once the flower heads drop to the ground and the weevil's grub-like larvae feed on the decaying flower head tissue. It is speculated that the female weevil's odd head-clipping behavior reduces larval exposure to plant defense chemicals and prevents other insects from competing with their offspring in utilizing the flower head. Mature weevil larvae leave the flower heads and crawl into the soil to spend the winter. Pupation occurs the following spring to early summer, and adults appear sometime in late June to early July. There is one generation per year.

The best method for controlling this weevil is to remove and destroy the dangling flower heads as well as heads that have dropped to the ground. This will prevent weevil larvae from completing their development. If the flower heads are removed gently to avoid disturbing the hidden adults, the heads can be dropped into a bucket of soapy water to kill the adults. This will reduce the weevil population and thus reduce damage to flower heads. Insecticides are not a good option. First, there are no insecticides labeled for flowering landscape plants that include this weevil on the label. Second, since coneflowers attract a wide array of important pollinators, insecticide applications could potentially cause collateral damage to these "good bugs."

Insect oddities

White masses on redbud stems are commonly mistaken as an insect egg mass or a sucking insect such as a scale, planthopper or mealybug. However, these odd-looking structures are none of the above. They are the sticky, frothy "egg plugs" of a treehopper (family Membracidae). The exact treehopper in question depends on the host. Originally, the culprit was referred to as the two-marked treehopper, and this treehopper continues to retain the scientific name, *Enchenopa binotata*. A web search using the common or scientific name will yield reports of this treehopper on redbud, walnut, viburnum and common hoptree or wafer ash (*Ptelea trifoliata*).

The two-marked tree hopper, seen here on redbud, deposits telltale egg plugs along the branches of several species of host plant.

Black-and-white, live female calico scales produce honeydew on a honeylocust branch. The sticky substance drips onto anything unfortunate enough to be close by, and it's then colonized by black sooty mold.

Calico scale crawlers have colonized the underside of honeylocust leaflets, snuggling comfortably around the veins, where they'll suck fluid from phloem vesicles.

However, it was recently discovered that there are actually several species of treehoppers involved depending upon the host plant. The two-marked treehopper found on wafer ash does not infest redbud or any of the other hosts; the treehopper on redbud is specific to redbud, and so on. Regardless of the host, all of the treehoppers look the same. They also have the same life cycles and practice the same egg-laying behavior. This group of treehoppers is now referred to as either the "two-marked treehopper species complex," or the "*Enchenopa binotata* complex," or simply the "*Enchenopa* complex." It is believed that they were all once a single interbreeding species existing over the same geographical area that have gradually evolved into new species. In biological circles, these are called "sympatric species."

Researchers have found that the treehopper's host plants were the driving force behind the speciation. The mechanism responsible for the divergence sounds simple, because it's simply sound. Male treehoppers entice females by vibrating on plant stems to create a "come hither" sound that resonates through the stems to attract a mate. However, differences in the way sound is transmitted through the different host plant stems affects the sound frequencies traveling through the stems. A male treehopper vibrating on a redbud transmits a different sound compared to a male on a walnut. Eventually, females that would respond to the sound produced on redbud would not respond to the sound produced on walnut and vice-versa. Thus, the treehopper's host plants are responsible for the splits in species.

The adults of all members of the two-marked treehopper species complex are dark brown with two elongated yellowish white marks positioned in tandem on the top of their backs. One of their most distinguishing features is an elongated pronotum (the thoracic segment behind the head) that extends knob-like over the head.

There is one generation per season. Eggs are laid in late summer with females using their saw-like ovipositors to cut slits in the bark of their host trees. After they insert their eggs, they cover the bark wound with a white, sticky substance that serves to protect the eggs. The "egg plugs" also contain a chemical attractant that draws other females to lay their eggs in close proximity to one another. The resulting collection of raised, circular to slightly elongated white material on plant stems is easily mistaken for scale insects. Although both the adults and nymphs suck juices from leaf veins and petioles, they appear to cause no appreciable harm to their plant hosts even when high populations occur. So, control of these treehoppers is not generally required.

An infestation of dead calico scale females encircles callus tissue.

There is no doubt that you will encounter many more plant pests during the 2016 growing season than the few presented in this two-part pest review series. However, as noted, these plant problems became emerging issues in 2015 because they were commonly overlooked or misidentified. The narrow focus of this short review is intended to sharpen your scouting skills. Don't look past the weevils, beetles, sawflies and scales presented here.

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