

Invasive Insects* of Concern to Georgia



Center for Invasive Species
and Ecosystem Health
UNIVERSITY OF GEORGIA

Front cover: spotted lanternfly (*Lycorma delicatula*) by Emelie Swackhamer, Penn State University, Bugwood.org

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About Invasive Insects*

Why is there a * next to the word insects in the title?

The use of the * next to “insects” in the title is to indicate that not all species contained within this text fall within the order Insecta. There are two arachnid species described: a spider and a tick species. Due to the public familiarity with the word “insect” as opposed to the word “arthropod,” which would have been more technically correct, it was decided that “insect” was more recognizable and accessible to the public.

Why are these insects* of concern to Georgia?

These arthropods have been shown or are suspected to significantly alter the ecosystems they are introduced to or they have gained the public’s interest or attention and should be discussed. Invasive species disrupt the food chain, reduce yields in crops and working forests, alter ecosystem structures, and negatively impact these ecosystems in many other ways. These species may also incite a quarantine or restrict import and export of goods when their presence is detected.

What is an invasive species?

An invasive species is “a non-native organism whose introduction causes or is likely to cause economic or environmental harm, or harm to human, animal, or plant health.” Native species can be pests, but the introduction of exotic species has the potential to cause greater damage due to a lack of effective population restricting factors, such as parasites, predators, and competitors. As such, they can rapidly develop large populations in the ecosystems they are introduced to. These large populations can disrupt vital ecosystem functions by out-competing, displacing, or killing native species. This booklet provides descriptions of non-native species that are in or are a threat to Georgia. Some of these species are already established in or near Georgia and causing significant harm, others have limited established populations that may not be near Georgia but could reach the state and would cause harm, or they are species threatening to become established in Georgia.

Where do these invasive insects come from?

The species in this booklet are native to other continents, but there are instances where species are native to one ecosystem but invasive in another while still being located in the same country. Often the species are invading locations and ecosystems that are similar to their originating ecosystem or habitat. Invasive species are often accidentally introduced as “hitch-hikers” on cargo materials, on exotic plants or animals, etc. Though there are instances where the species’ origins and how they arrived in a new location are unknown.

Are all non-native species invasive?

Only a small fraction of introduced species become invasive to a new area. Most fail to establish and they may never even reproduce at all. Some may only establish after repeated or intentional introductions and even then they may not appear to cause any harm to the environment, human health, or the economy. In an attempt to know which species are a threat to becoming invasive in new ecosystems, programs and agencies are evaluating species before they are introduced for the risk to our ecosystems. Additionally, some introduced species can be locally established in a new ecosystem for many years before they build up their population and are noticed. It can be challenging to predict the species that will become invasive in new ecosystems, even with risk assessments and/or known histories.

How can I contribute in the fight against invasive insects?

Prevention is the most cost- and time-effective strategy in the fight against invasive species. Preventing introduction involves inspections and monitoring programs at many points along the known pathways for invasive insect spread. Many groups, from State and Federal government agencies to academia to non-profits, have developed guidelines that the public and professionals can follow to prevent the spread of invasive species.

Recreational activities are a common pathway for invasive species spread. Gardening, fishing, hunting, camping, boating, and even just driving a vehicle are known pathways by which anyone can spread invasive species. Invasive organisms often hide in or on gardening and outdoor gear, such as firewood, clothes, tires, trowels, etc. Inspecting plants and their containers before you purchase them, cleaning your vehicle and equipment before visiting another area, and purchasing local firewood (per the Don't Move Firewood program: from the same county or within fifty miles of where you will burn it) helps to minimize introduction and transport of invasive species.

It is important to educate yourself and keep up-to-date on the status of the species listed in this publication and other invasive species resources. Information on what to look for and how to control non-native species are available through your local county extension office (<https://extension.uga.edu/county-offices.html>) and many websites, including these:

- <https://www.bugwood.org>
- <https://www.invasive.org>
- <https://www.eddmaps.org>
- <https://www.invasivespeciesinfo.gov>
- <https://www.gainvasives.org>
- <http://pest.ceris.purdue.edu/>
- <https://www.dontmovefirewood.org/>
- <https://www.forestpests.org/>

Rapid identification of newly introduced species and reporting any sightings to your local County Extension Agent or through a mapping and reporting website (such as EDDMapS) may help to minimize the introduction, spread, and impact of invasive species. You can also help by telling your neighbors if you see invasive species on their property. Volunteering with natural resources agencies or programs to control invasive species aids many types of public and private lands and reduces the potential of spread. Controlling small populations is more effective and economical compared to well-established, rapidly spreading infestations.

tawny crazy ant

Nylanderia fulva

Overview

Tawny crazy ant is native to South America and was detected in Texas in 2002. It is found in Alabama, Florida, Georgia, Louisiana, Mississippi, and Texas. It forms large super colonies, often in rotting wood, soil and leaf litter, in potted plants, and under debris and landscaping objects.

Danny McDonald, SHSU, Bugwood.org



Life Stages

Eggs are tiny and translucent white.

Larvae are tiny, white, and go through several instars before pupating.

Pupae are creamy white and have no cocoon.

Adults of the different castes look very similar except for a few features. They are golden-brown to reddish-brown, smooth, glossy, with dense hairs. Abdomen may appear to be striped after feeding. Antennae have 12 segments and are nearly twice the width of the head. *Workers* (sterile females) are 0.07-0.09 in (2.0-2.3 mm) long. *Males* are 0.09-0.1 in (2.4-2.7 mm) long and have 13 antennae segments. *Queens* (reproductive females) are 0.16 in (4 mm) long with a larger abdomen.

Joe MacGown, MS State University, Bugwood.org



Male

Joe MacGown, Mississippi State University, Bugwood.org



Infestation sign (dead ants)

Fudd Graham, Auburn, Bugwood.org



More Info

Displaces the invasive red imported fire ant (*Solenopsis invicta*) in the southern US.

Attracted to electricity and causes disruptions in electrical systems.

sirex woodwasp

Sirex noctilio

Overview

Sirex woodwasp is native to Europe, Asia, and northern Africa and was detected in New York in 2004. It has also been found in Connecticut, Michigan, New Jersey, Ohio, Pennsylvania, and Vermont. Its primary hosts are pine trees, and it is a threat to many US pine forests. A generation takes 1-3 years, with a one year life cycle expected in the southeastern US.

Larva



Dark spine

V. Klasmer, INTA, Bugwood.org

Exit Holes



Dennis Haugen, Bugwood.org

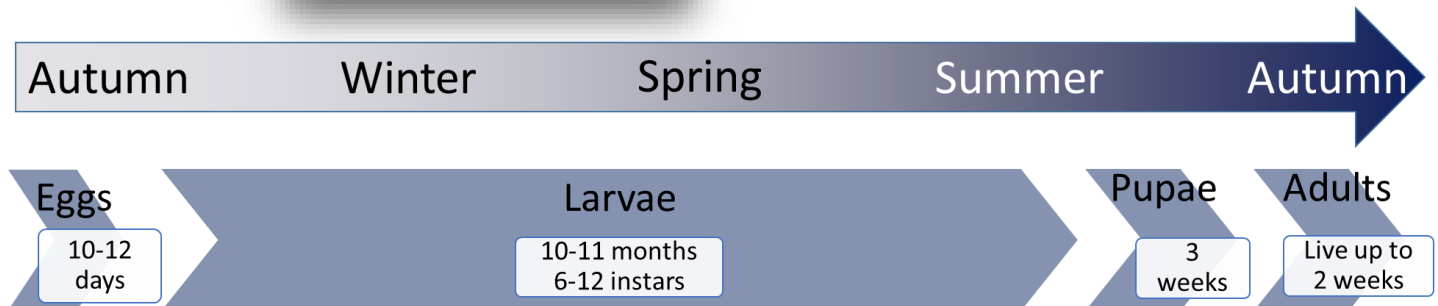
Life Stages

Eggs are tiny, white, soft, smooth, and elongate. Females lay 1-3 eggs at a time (up to 400 in their life) in pine sapwood.

Larvae feed on the fungus that is deposited when the eggs are laid. Larvae are up to 1.5 in (3.8 cm) long, creamy white, legless, and have a dark spine at the end of their abdomen. They create U-shaped galleries into the heartwood.

Pupae are creamy white to nearly black as they mature.

Adults emerge from the trees in summer to autumn, leaving irregular holes. They mate, and females immediately begin laying eggs. Males live longer than females, with females generally only living a few days.

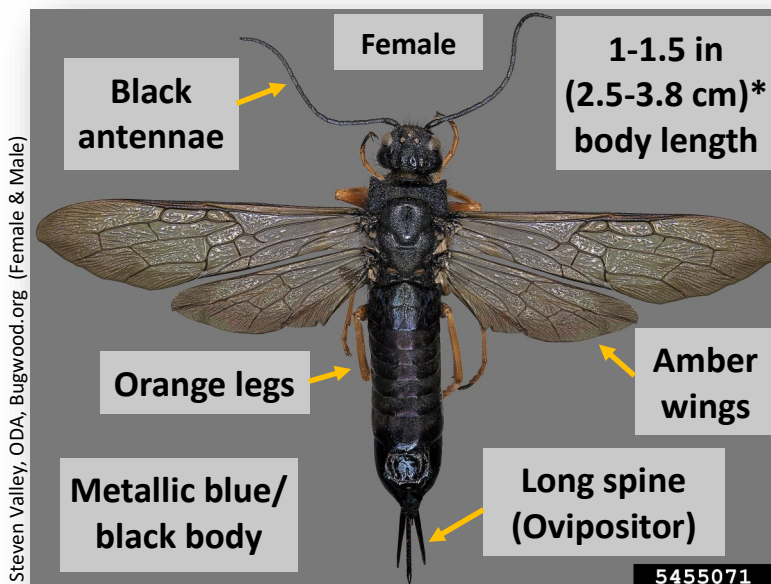


More Info

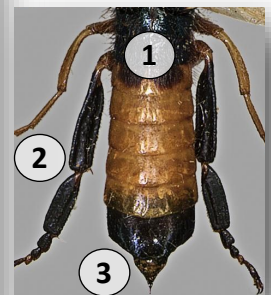
When depositing eggs, females also inject a toxic mucus and spores of the *Amylostereum areolatum* fungus.

Tree symptoms include irregularly sized exit holes, crown chlorosis, wilting, and needle fall.

*Enlarged to show detail



Male



1. Orange band on abdomen
2. Thick black hind legs
3. Short spine

northern giant hornet

Vespa mandarinia

Overview

The northern giant hornet (previously Asian giant hornet) is native to East Asia, South Asia, Mainland Southeast Asia, and parts of the Russian Far East. Outside its native range, it has been detected in Washington and British Columbia (Canada). ***It has not been found in any US state other than Washington (August 2022).***

Brown antenna with yellow/orange base



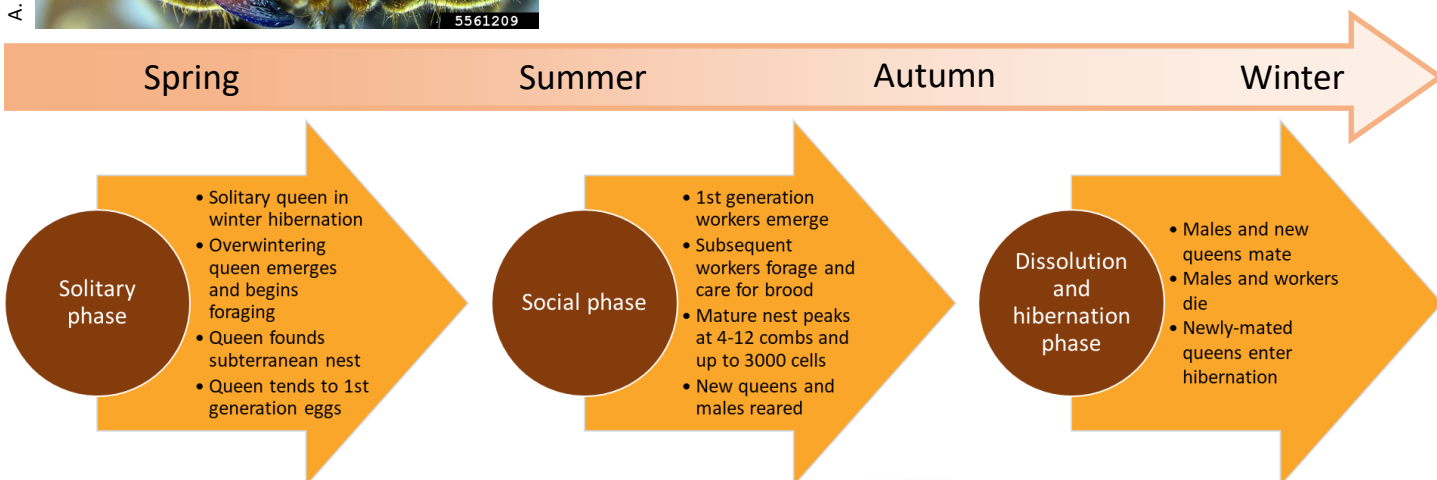
A. Smith-Pardo, USDA APHIS PPQ, Bugwood.org

Life Stages

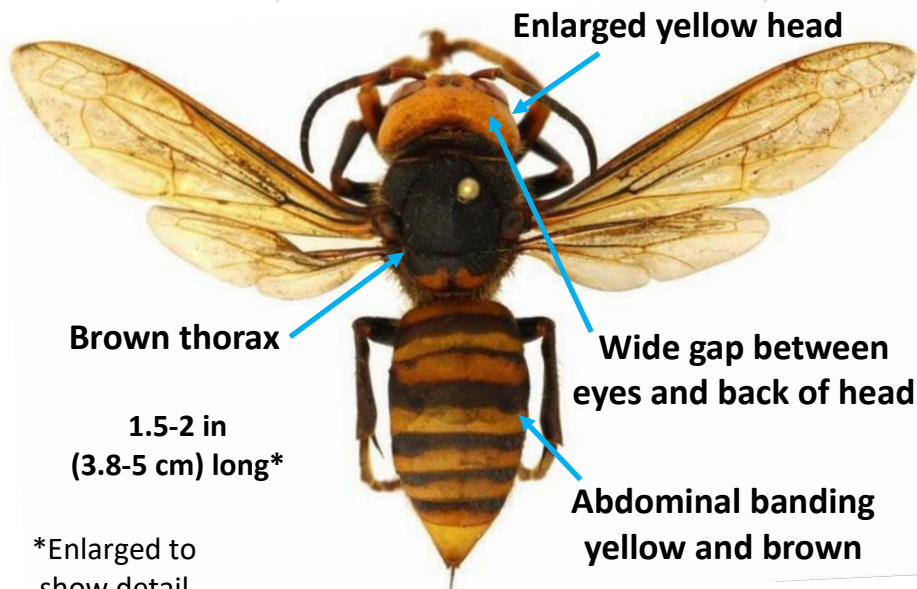
Eggs, up to 1000, are laid by the queen in comb cells in Spring-Summer. The first generation of eggs are laid in small nests of about 40 cells and tended by the queens; subsequent generations are tended by workers.

Larvae and pupae develop through five instars in the comb cells and are fed regurgitated food by the queen and then workers.

Adults are queens (reproductive females), workers (sterile females), and drones (males). Queens build the first nest of the season and produce offspring. Workers provide food, and enlarge and protect the nest. Drones mate with the queen to produce offspring.



Washington State Department of Agriculture, Bugwood.org



More Info

Predators of honey bees, they quickly decapitate the bee and harvest the thorax for food.

Nests in the ground.

A mature nest will have 4-12 combs with up to 3000 cells.

Easily confused with other native and non-native insects; key characteristics include:

- Size
- Thorax and abdomen color
- Enlarged head

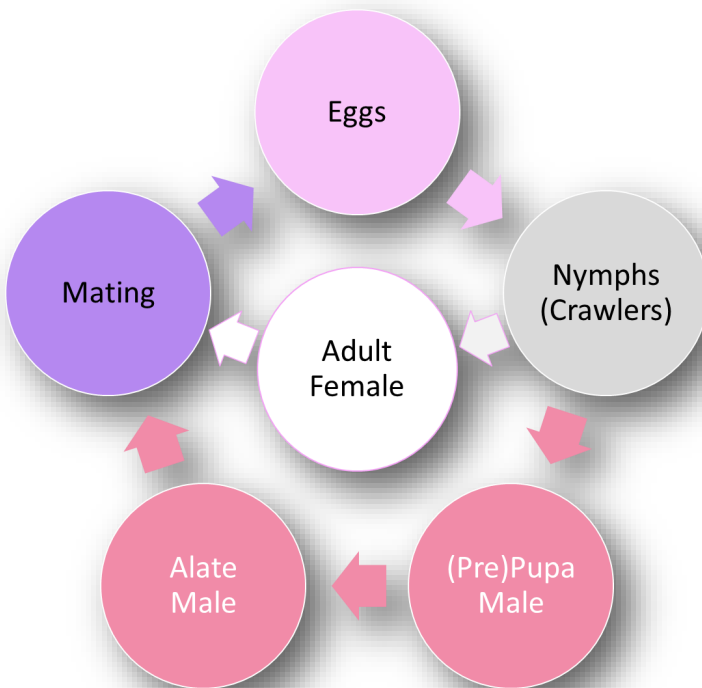
*Enlarged to show detail

crapemyrtle bark scale

Acanthococcus lagerstroemiae

Overview

Crapemyrtle bark scale is native to Asia and was detected in Texas in 2004. Infestations are scattered around the southern US. Primary hosts in the US are crapemyrtle (*Lagerstroemia indica*) and American beautyberry (*Callicarpa americana*), but several other hosts have been identified in the US and Asia. Depending on climate, there are 2-4 generations per year.



Life Stages

Eggs are not easily seen, as females lay approximately 100-300 pink eggs inside their felt-like sac.

Nymphs are tiny pink crawlers when young, older nymphs are pink, gray, or brown and 0.01-0.02 in (0.3-0.5 mm) long.

Male nymphs develop into a white felt-like prepupa then a pupa, 0.03-0.04 in (0.8-1 mm) long.

Adult females are stationary and covered in a felt sac around their bodies, and are 0.04-0.11 in (1.1-2.9 mm) long and 0.02-0.07 in (0.6-1.8 mm) wide. Females only lay eggs once.

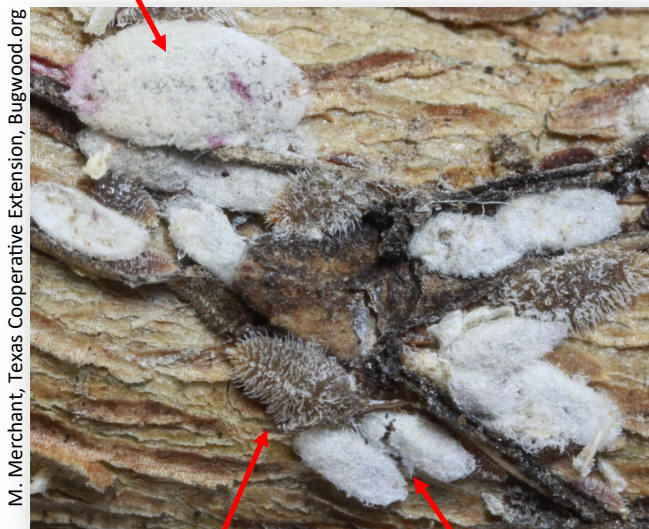
Adult males are winged (alate), mobile, and rarely seen. They are pink, have two long white filaments at the tip of the abdomen, and have no mouthparts.

More Info

Damage is mostly aesthetic.

Gravid Female

Looks very similar to the azalea bark scale, but azalea bark scale is not found on crapemyrtle.



Female

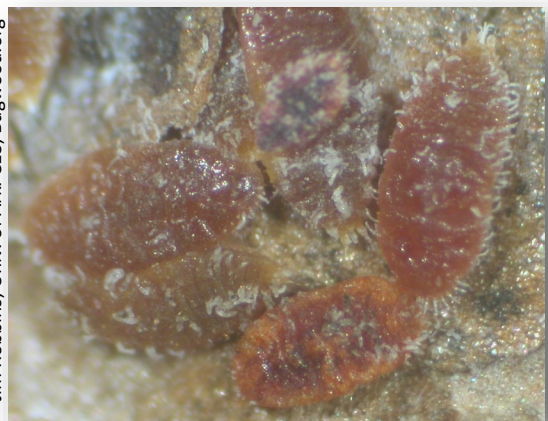
Male (Pre)Pupa

Eggs & Gravid Female



Helene Doughty, Virginia Tech, Bugwood.org

Nymphs



Jim Robbins, Univ. of Ark. CES, Bugwood.org

hemlock woolly adelgid

Adelges tsugae

Overview

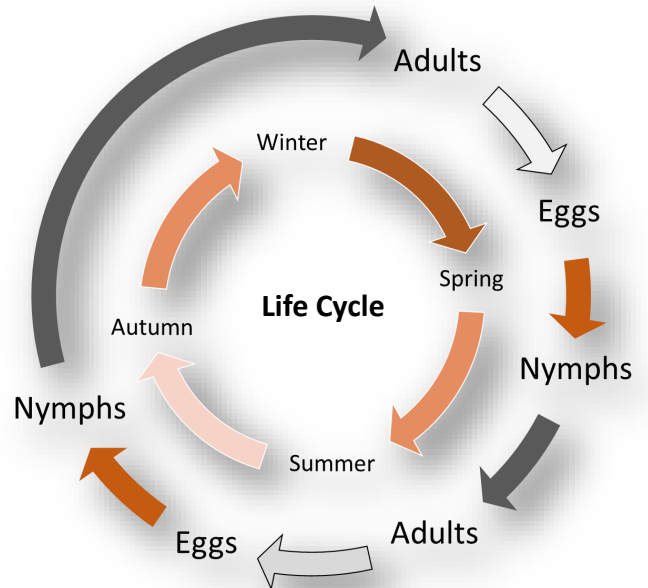
Hemlock woolly adelgid is native to China, Japan, and the western US. However, eastern US populations were introduced from Japan. It was detected in Virginia in 1951, is now present throughout the eastern US and has two generations per year. Trees are killed in as little as 2-3 years in the southern part of the hemlock range.

Life Stages

Eggs are contained in white sacs in masses of up to 300, are orange and darken as the embryo matures.

The crawler nymphal stage searches for a feeding site and molts after settling. Then it exudes white cottony/waxy tufts and continues to develop through other nymphal stages under the protective woolly covering.

Adults are 0.03 in (0.74 mm), reddish-purple, oval shaped, aphid-like insect that covers itself with a white, waxy mass that is 0.1 in (3mm) wide. Both winged and wingless forms are present, though the winged form has no host in the eastern US.



Eggs and Nymphs

Lorraine Graney, Bartlett Tree Experts, Bugwood.org



Crawler Nymph



K. Oten, NC Forest Service, Bugwood.org

More Info

Hosts in eastern US are eastern hemlock (*Tsuga canadensis*) and Carolina hemlock (*T. carolinensis*).

Crawlers are spread by birds, other animals, and wind.



Shimat Joseph, UGA, Bugwood.org



Kelly Oten, NC Forest Service, Bugwood.org



USDA Forest Service, SRS, Bugwood.org

Infestation

sweetpotato whitefly

Bemisia tabaci

Overview

Sweetpotato whitefly, also known as silverleaf whitefly, has an unknown native range but is possibly from the Middle East. A more impactful strain (biotype B) was detected in the US in 1986, though biotype A had existed as an occasional pest since the late 1800s. Biotype B is a pest of over 500 plants, primarily crops and cultivated plants, including plants in greenhouses worldwide. In the field, it has spread across most southern states.



Life Stages

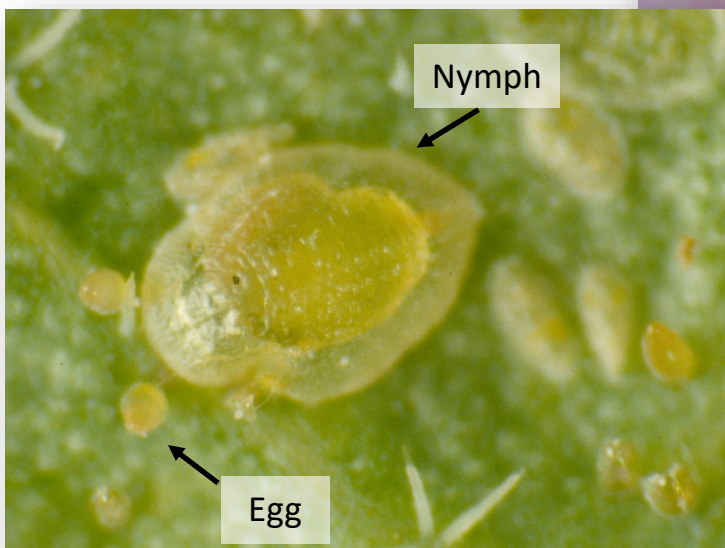
Eggs are small, oval, somewhat tapered towards one end, and on a short stalk. They are laid white, but turn orange, then brown over time. They hatch in 6-7 days.

Nymphs go through four instars and are 0.01-0.03 in (0.27-0.66 mm) long. First instar is called a crawler and is mobile. The second, third, and fourth instars are stationary. They are whitish-green to yellow, flattened, and oval with black eyes.

“Pupae” look similar to fourth instar, except they have red eyes, are less flattened, and more yellow. This is also called the “red-eyed nymphal stage.”

Adults are light yellow with white wings, black eyes, and 0.03-0.04 in (0.82-0.96 mm) long. They hold their wings slanted, roof-like, over their body. There is often a gap between the wings.

Infestation



More Info

Damage appears as streaking, silvery-looking leaves, reduced vigor, reduced yield, seedling death, and more.

Transmits several viruses which cause yield losses and other damage.

brown marmorated stink bug

Halyomorpha halys

Overview

Brown marmorated stink bug is native to Asia and was detected in Pennsylvania in 1998. It is now found broadly throughout the US and is moving into Canada. Several hundred host plants, including fruit trees, nuts, vegetables, ornamental trees, and shrubs have been confirmed.

Adults

Patrick Marquez, USDA APHIS PPQ, Bugwood.org



Life Stages

Eggs are barrel shaped and white to pale-green; 20-30 are laid side-by-side in a mass on the underside of leaves.

There are five nymphal stages. First instars remain near eggs, feeding on them before moving on. Second instar looks like a black tick. Third-Fifth instars are mottled brown with a red, black, and white abdomen.

Adults are up to 0.625 in (1.6 cm) long, marbled brown, and have the typical stink bug “shield” shape. They have two white bands on the antenna, banded abdominal edges, one white band on legs, and a smooth edge on its rounded shoulders.

40-60 Days from Egg to Adult

Egg

- 20-30 eggs in a mass
- First generation eggs laid in mid-spring

Nymph

- 5 instars
- Wing buds appear on later instars

Adult

- Can lay several egg masses
- Overwinter in bark cracks, leaf litter, and structures

Eggs & 1st Instar

Joe Eger, Dow AgroSciences, Bugwood.org



Egg Burster

A black triangle appears inside the egg before hatching. Bug pushes on the triangle to crack shell.

Late Instar

Susan Ellis, UGA, Bugwood.org



spotted lanternfly

Lycorma delicatula

Overview

Spotted lanternfly, an invasive planthopper, is native to parts of China and Southeast Asia and was unintentionally introduced to South Korea. In the US, it was detected in Pennsylvania in September 2014, but it has since spread to several other states across the Midwest and Mid-Atlantic. It poses a serious threat to US grape, orchard, and logging industries, as well as to natural ecosystems.

Egg masses

With waxy cover Without waxy cover



Richard Gardner, Bugwood.org

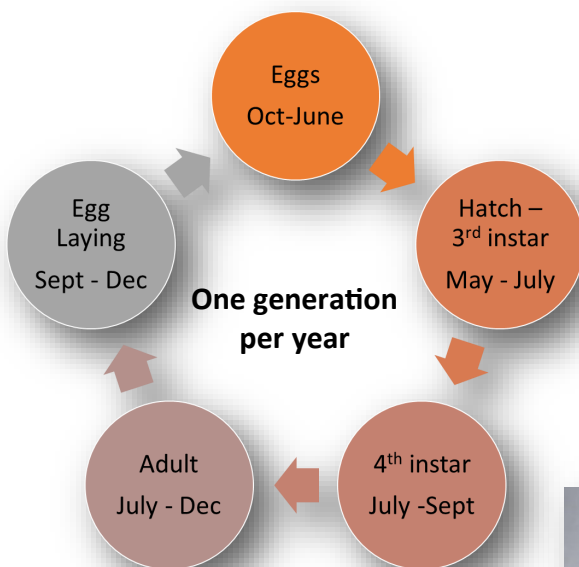
Life Stages

Eggs are usually laid on smooth surfaces of host plants but also on materials with flat surfaces, such as bricks, stones, and lumber. They hatch from spring to early summer.

The nymphal stage has four instars, the first three are black with white spots. Fourth instar nymphs are red and black with white spots.

Adult are 0.81-1.04 in (2-2.6 cm) long from head to the end of the folded wing. They have red, black, grey, and white wings and a black and yellow body. Adults appear in late July and begin laying eggs in September.

Life Cycle



1st-3rd instar



Lawrence Barringer, PA Dept of Ag, Bugwood.org

4th instar



Emelie Swackhamer, Penn State, Bugwood.org

Adult



PA Dept of Ag, Bugwood.org

Hosts

Feed on the sap of almonds, apples, apricots, cherries, grapes, nectarines, oak, peaches, pine, plums, poplar, walnut, and more.

Often associated with tree-of-heaven (*Ailanthus altissima*).

pink hibiscus mealybug

Maconellicoccus hirsutus

Overview

Pink hibiscus mealybug is native to Southeast Asia and was detected in Florida in 2002. It is found in Florida, Georgia, and California. It has hundreds of known hosts, including crops, ornamentals, and native plants. They have a life cycle of 23-30 days and have up to 15 generations per year.

FL DPI, FL DACS, Bugwood.org



Life Stages

Eggs are in clusters of up to 600 orange-pink eggs inside cottony sacs.

Nymphs are tiny, 0.01 in (0.3 mm) long pink crawlers that spread by wind and walking.

Male nymphs develop wing buds within a cocoon of mealy wax.

Adult females are 0.125 in (0.3 cm) long, pink, wingless, stationary, and covered in a white mealy sac. Females only lay eggs once and die after.

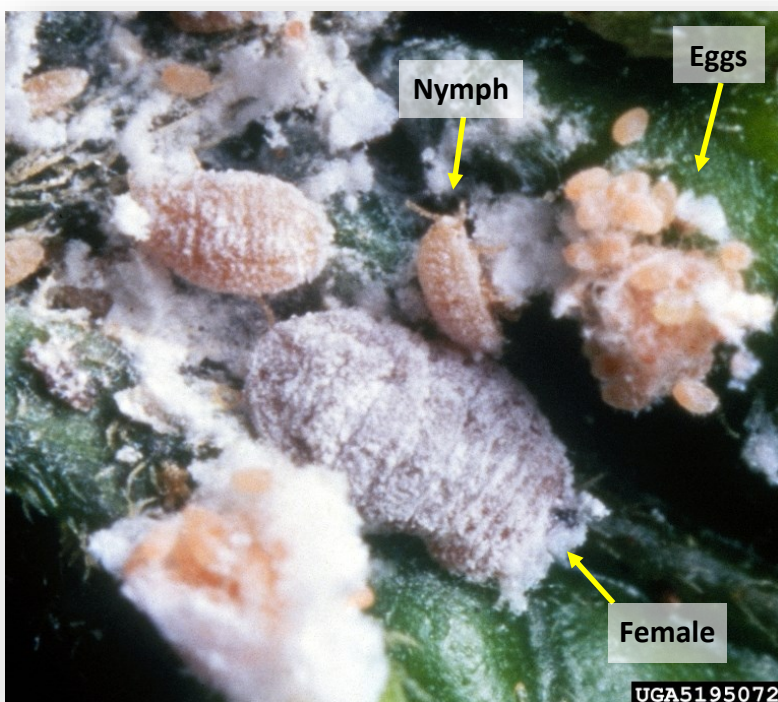
Adult males are winged (alate), 0.125 in (0.3 cm) long, pink, have two long white filaments at the tip of the abdomen, and have no mouthparts.

Male

FL DPI, FL DACS, Bugwood.org



Jeffrey W. Lotz, FL DACS, Bugwood.org



More Info

Feeding causes stunting, lower flowering/ yield, twisting, sooty mold, and, in high numbers, plant death.

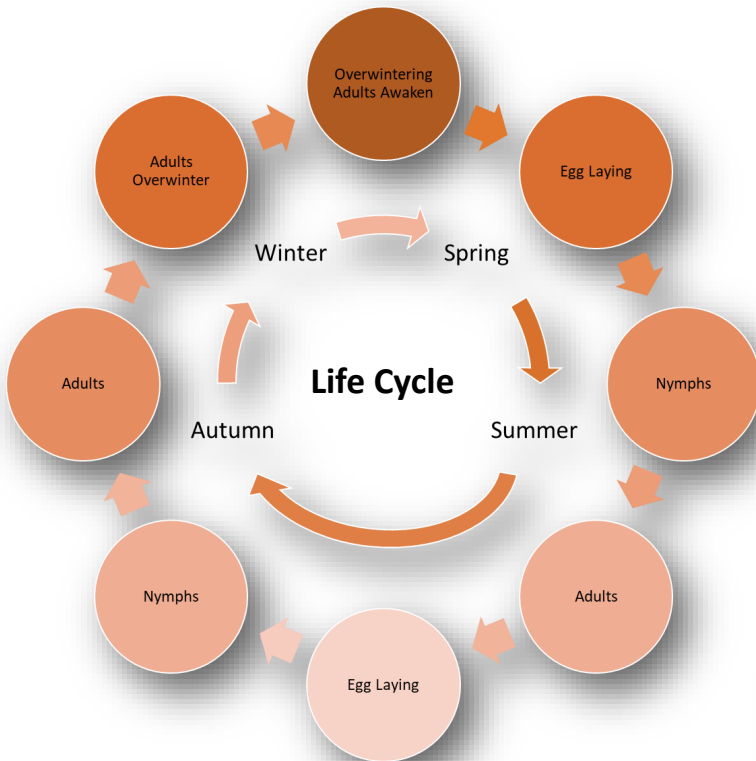
Spreads by movement of infested plants and fruits, wind, and wildlife.

kudzu bug

Megacopta cribraria

Overview

Kudzu bug is a shield bug that is native to Asia and was detected in Georgia in 2009. It is now spread broadly throughout the southern United States. There are two generations per year.



Life Stages

Eggs are barrel shaped and white to white-pink and 20-30 are laid in two rows deposited on leaves or vines.

There are five nymphal stages where they are oblong and hairy. The last nymphal stage has wing buds. This life stage lasts 6-8 weeks, depending on the temperature.

Adults are up to 0.25 in (0.6 cm) long, mottled dark green to brown, and do not have the typical stink bug "shield" shape but are almost square shaped. They overwinter under tree bark, plant litter, and urban structures such as houses.

Eggs



Joe Eger, Dow AgroSciences, Bugwood.org

Hosts

Kudzu, soybean, wisteria, other legumes, and potentially more.

Nymphs



Michasia Dowdy, UGA, Bugwood.org

Ventral

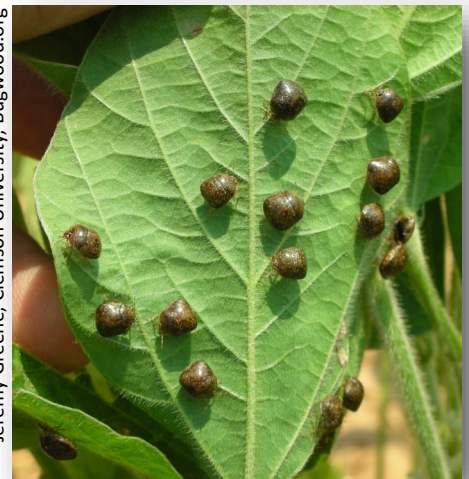
Adults

Dorsal



Emilie Bess, USDA APHIS PPQ, Bugwood.org

Infestation



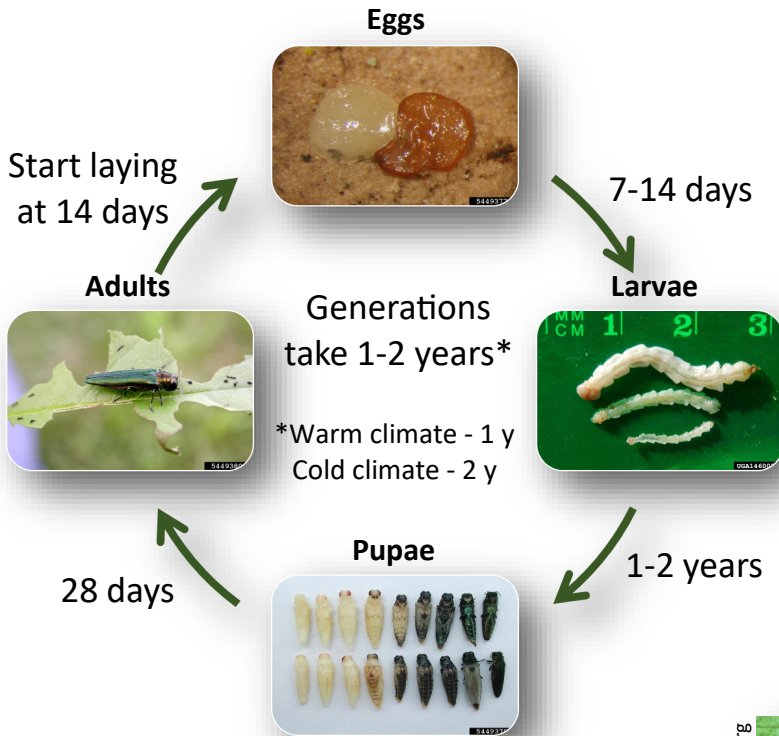
Jeremy Greene, Clemson University, Bugwood.org

emerald ash borer

Agrilus planipennis

Overview

The emerald ash borer is an invasive beetle that is native to Asia. It was first detected in the US in the 1990s, but was not identified until 2002. It was likely introduced as a contaminant in solid wood packaging materials. It has been found in most US states and several Canadian provinces.



Life Stages

Eggs are laid by females in bark cracks in summer and are initially light-yellow, turning to brownish-yellow. They hatch in 1-2 weeks.

Larvae bore into the tree trunk after hatching and feed summer through next spring (in a one year cycle). They are creamy white, 1–1.25 in (2.5–3.2 cm) long, flat, broad, and segmented.

Pupation occurs during spring, takes place in the frass-filled galleries, and usually takes about 28 days.

Adults emerge from the tree in late-spring to early-summer leaving a D-shaped exit hole. Adults live 30-60 days. Females generally feed on leaves.

Eggs, Pupa, Adult - D. Miller, USFS, Bugwood.org
Larva - David Cappaert, Bugwood.org

0.3-0.5 in body length*

**Metallic green;
with blue, gold,
or red
undertones**

**Lookalikes can be
differentiated by:**

- Size
- Coloration
- Host

Projecting spine

*Enlarged to
show detail



Adult



D-shaped exit hole



More Info

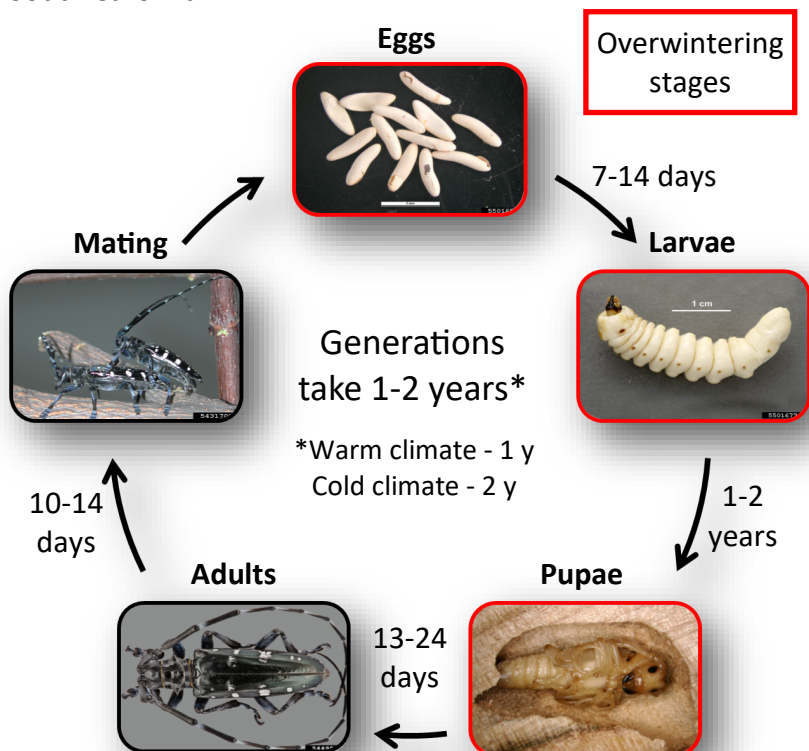
- US hosts include ash (*Fraxinus* spp.) and fringetree (*Chionanthus virginicus*)
- Symptoms include crown death and trunk and branch sprouts
- Spread is primarily by humans moving infested wood

Asian longhorned beetle

Anoplophora glabripennis

Overview

The Asian longhorned beetle is native to eastern China and Korea. It was first detected in the US in 1996, likely introduced as a contaminant in solid wood packaging materials. It has been eradicated from Illinois, New Jersey, and Canada and current known infestations include New York, Ohio, Massachusetts, and most recently South Carolina.



Life Stages

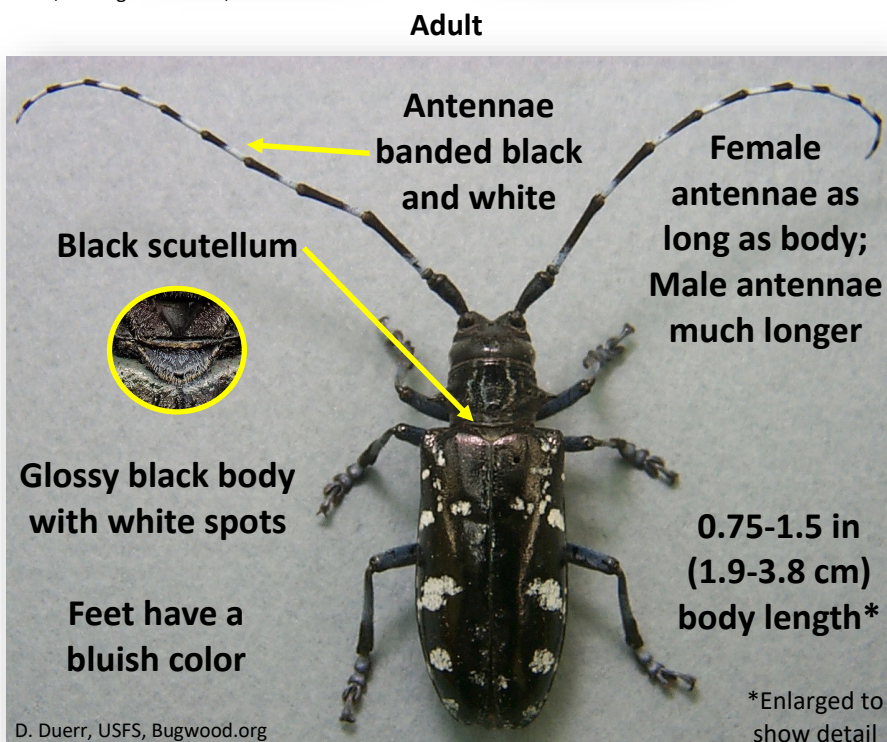
Eggs, up to 90 laid in a lifetime, are laid one per bark notch during spring - summer. Hatching is temperature dependent, but generally occurs in 7-14 days.

Larvae develop through at least five instars in the tree cambium and heartwood over 1-2 years. Larvae are yellow-white, up to 2 in long, and 0.25 in wide, with a dark brown head capsule. Overwinter as mature larvae most of the time.

Pupation occurs during spring in frass-filled chambers and usually takes 13-24 days.

Adults emerge from the tree spring-fall leaving a 0.4 in round exit hole. Adults live 50-60 days. They generally feed on leaves and tender bark of small twigs and branches.

Images from Bugwood.org: Eggs, Larva - PaDIL; Pupa - PA DCNR - Forestry; Adult - S. Valley, ODA; Mating - M. Keena, USFS



Exit Hole

Egg scar



D. Haugen, USFS, Bugwood.org

More Info

US hosts include maple, poplar, willow, elm, birch, and many more

Attacks healthy and stressed trees

Key characteristics include:

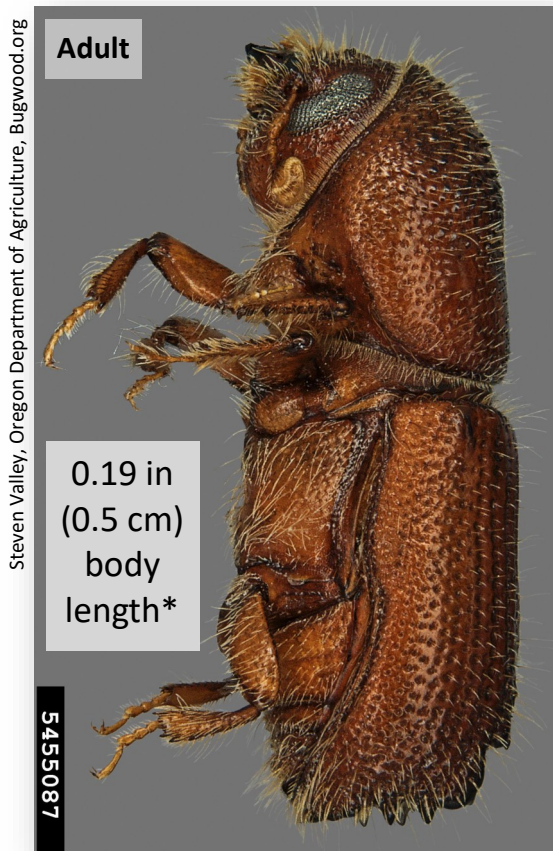
- Size
- Color
- Hosts

Mediterranean pine engraver beetle

Orthotomicus erosus

Overview

Mediterranean pine beetle is native to Europe, Middle East, northern Africa, and China. It has been introduced to southern Africa, South America, and North America. It was found established in California in 2004. It is associated with wood packaging and is a threat to a number of pines, including eastern white, shortleaf, and slash.



Life Stages

Eggs are smooth, ovoid, 0.04 in (1 mm) long, white, and translucent. Females lay 26-75 eggs in galleries beneath the host bark.

Larvae are 0.125 in (0.3 cm) long, legless, and white to cream colored. The head capsule is hardened and amber with dark, well-developed mouthparts.

Adults are approximately 0.19 in (0.5 cm) long and reddish brown. They have four pairs of spines on their hind end, which is sloped and slightly curved inwards. Exit holes are 0.06 in (0.1 cm) wide. Overwintering adults emerge in late winter and remain active until late autumn.

Damage



Galleries



William M. Ciesla, Forest Health Management International, Bugwood.org

More Info

Evidence of infestation includes leaves turning yellow or brown, reddish-brown boring dust, galleries under the bark, and pitch tubes.

Japanese beetle

Popillia japonica

Overview

Japanese beetle is native to Japan and was detected in New Jersey in 1916. It is established in the eastern half of the US with scattered reports in the west. Its host range is over 300 species, but is primarily associated with turf, ornamentals, fruit crops, and field crops. Generations take 1-2 years, depending on climate.

Life Stages

Eggs are laid in the soil in mid-summer. They are spherical, ellipsoidal or slightly cylindrical, translucent to white, approximately 0.06 in (1.5 mm) in diameter and grow larger as the embryo develops.

Larvae are 0.5-1.2 in (12.7-30.5 mm) long, six legs, C-shaped, and translucent white to cream colored. Head capsule is hardened and yellowish-brown. Overwintering occurs as late instars.

Pupae are 0.5 in (14 mm) long and pale cream to metallic green.

Adults emerge in summer and live for about two months. Females lay 40-60 eggs in multiple 3 in (7.6 cm) deep burrows in the soil. They are 0.3-0.5 in (8-11 mm) long and 0.25 in (5-7 mm) wide.



Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

Infestation

More Info

Larvae often feed on grass roots, adults on leaves and flowers.

Larvae



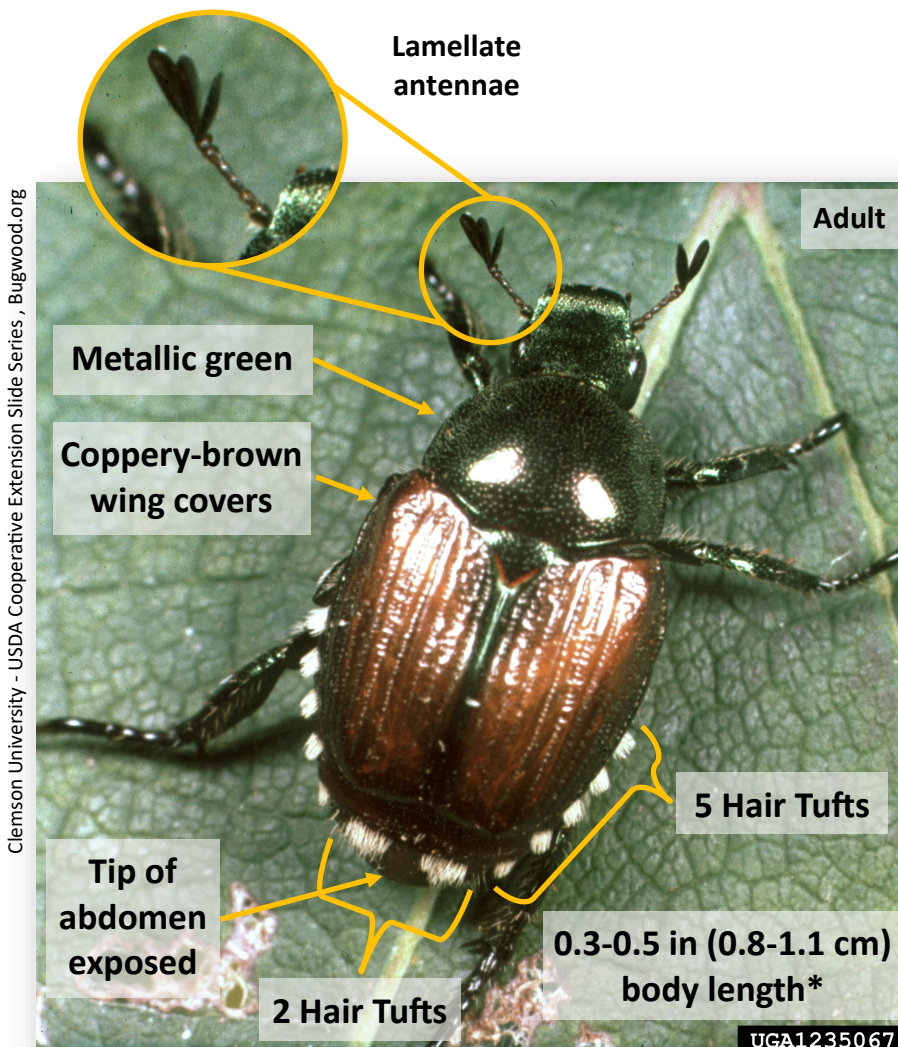
David Cappaert, Bugwood.org

Pupae



W. Cranshaw, CSU, Bugwood.org

*Enlarged to show detail



Clemson University - USDA Cooperative Extension Slide Series, Bugwood.org

larger pine shoot beetle

Tomicus piniperda

Overview

The larger pine shoot beetle is native to Europe and Asia and it was found established in Ohio in 1992. It is found in the US from Illinois to Vermont and south to Virginia. The larger pine shoot beetle is associated with unprocessed logs, firewood, tree trimmings, and lumber with the bark still attached. It is a threat to pines, fir, larch, and Douglas-fir.

Life Stages

Eggs are shiny, ovoid, 0.04 in (1 mm) long, and white. Females lay the eggs individually in galleries beneath the host bark. There is one generation per year.

Larvae are 0.125 in (0.3 cm) long, legless, C-shaped, and white to cream colored. The head capsule is hardened and amber colored.

Adults are dark brown, oblong, 0.19 in (0.5 cm) long, and the species is distinguishable by features on the ends of the wing covers. The antenna is six-segmented red-yellow ending in clubs. Exit holes are approximately 0.06 in (0.15 cm) wide, and overwintering adults emerge in late spring and fly until late autumn.

Galleries



Infested Tree



Infested Twig



Pitch Tube



More Info

Adults attack the tender twig shoots, which turn yellow to red, eventually break off, and fall to the ground.

Evidence of infestation includes reddish-brown boring dust, galleries under the bark, and pitch tubes.

redbay ambrosia beetle

Xyleborus glabratus

Overview

Redbay ambrosia beetle is native to Asia and was detected in Georgia in 2002. It has spread to infest redbay, sassafras, and other Lauraceae trees in the southeast US. It was likely introduced in solid wood packaging. The beetle has a symbiotic relationship with the laurel wilt fungus (*Raffaelea lauricola*).

Life Stages

Eggs are small, oblong, and white-translucent. Females lay the eggs individually in fungus-infected galleries beneath the host bark. There are multiple, overlapping generations per year.

Larvae are white, legless grubs that are 0.04-0.08 in (1-2 mm) long, and have an amber colored head capsule.

Pupa are creamy white and 0.08 in (2 mm) long.

Adults are a brown-black color, 0.08 in (2 mm) long, slender, and cylindrical. It has a nearly hairless (glabrous) wing case (elytra) and an abruptly ending, sloped abdomen. Expert identification is recommended due to similarity to other ambrosia beetles.

Wilt Damage



FL DPI, FL DACS, Bugwood.org

Adult



Michael C. Thomas, FL DACS, Bugwood.org

Frass "Toothpicks"



Albert (Bud) Mayfield, USFS, Bugwood.org

More Info

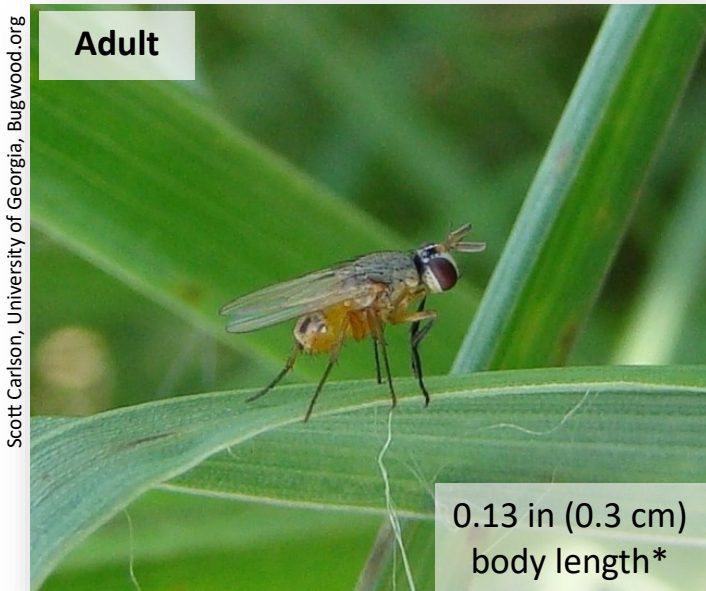
Will infest healthy trees, and death, primarily due to the fungal symbiont, can occur in weeks to months. Infestation symptoms include wilted foliage, sawdust "toothpicks" extending from the trunk, and, beneath the bark, blue stained wood, and feeding galleries.

bermudagrass stem maggot

Atherigona reversura

Overview

Bermudagrass stem maggot is native to south Asia and was first detected in the continental US in California in 2009 and Georgia in 2010. This invasive fly is abundant where bermudagrass is grown for forage in the southeastern US. It has multiple generations per year.



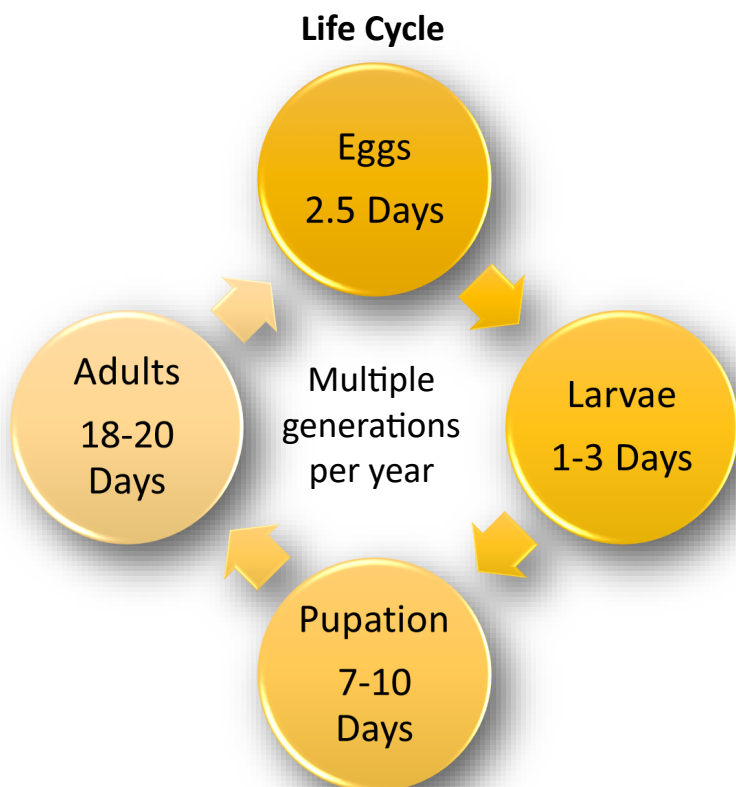
Life Stages

Eggs are likely laid near a leaf node, rounded, and white. They hatch in 2.5 days.

Larvae feed in the stem above the top node after hatching, and are a 0.13 in (0.3 cm) long, yellowish maggot with mouthhooks. They pupate after 1-3 days.

Pupation occurs in the soil and lasts 7-10 days.

Adults have an angular head, transparent wings, are gray and yellow, and 0.13 in (0.3 cm) long. Males are smaller than females and have a rounded abdomen. The female's abdomen is larger and pointed. Adults live 18-20 days.



More Info

US hosts include bermudagrass (*Cynodon dactylon*) and stargrass (*Cynodon nlemfuensis*).

Symptoms include yellowing (chlorosis) of top 2-3 leaves on each stem.

spotted-wing drosophila

Drosophila suzukii

Overview

Spotted-wing drosophila is an invasive vinegar fly (fruit fly) that is native to southeast Asia and was detected in California in 2008. It is now spread widely in the major US fruit producing regions. Due to similarity to native *Drosophila* spp., expert identification is required for confirmation.

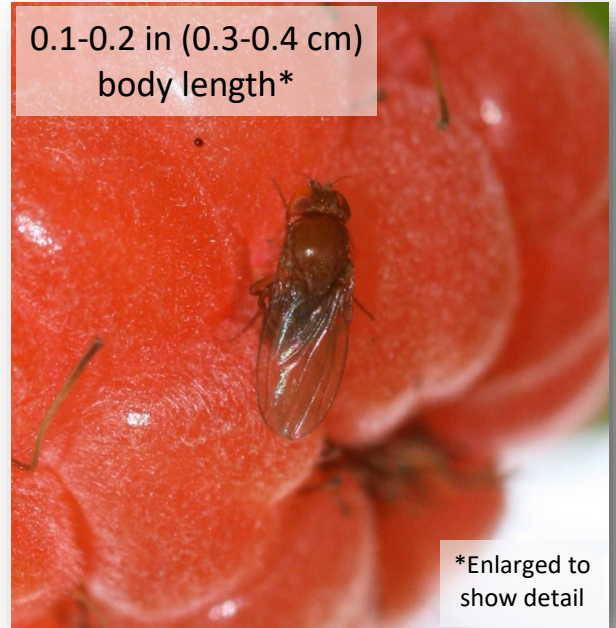
Life Stages

Eggs are translucent, milky-white, and glossy and hatch after 1-3 days in the fruit they are laid.

Larvae develop through three instars. They are 0.002-0.2 in (0.07-6 mm) long, milky-white, and cylindrical with black mouthparts and posterior spiracles (threadlike projections).

Pupae are 0.08-0.1 in (2-3 mm) long, cylindrical, reddish brown with two posterior spiracles. Pupation can occur either in the fruit or they drop to the ground to pupate in the soil.

Adults are 0.1-0.2 in (3-4 mm) long, have a brownish-yellow thorax, black stripes across the abdomen, and distinct red eyes. Males have dark spots on the wingtips and black foreleg combs. Females (right) have a very large serrated ovipositor to puncture ripe or ripening fruit and lay eggs.



Hannah Burrack, NCSU, Bugwood.org

Adult

Male

Spot

Females lack the wing spots

Hannah Burrack, NCSU, Bugwood.org

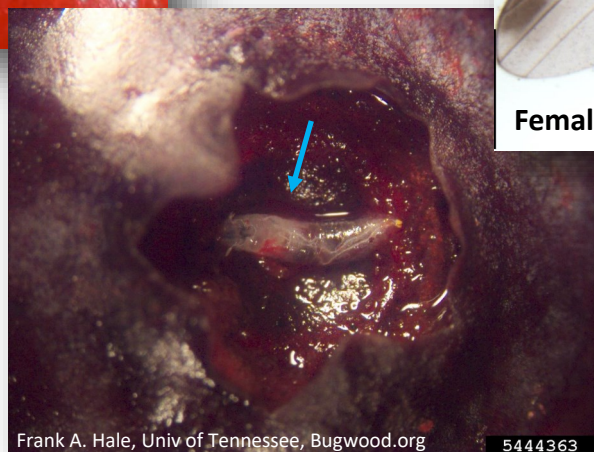
Strawberry "seeds"

Eggs

Larva

Hosts

Ripe fruit crops, especially soft summer fruits (i.e. blueberries, blackberries, raspberries, peaches, cherries, grapes, etc.)



More Info

Adults may subsist on honeydew excreted by piercing/sucking insects.

Damage allows entry for fungal fruit rot organisms.

box tree moth

Cydalima perspectalis

Overview

Box tree moth is native to East Asia and was accidentally introduced to the US on infested boxwoods from Ontario, Canada, in 2021. Though establishment is uncertain, it has been detected in Connecticut, Michigan, and South Carolina. Its primary hosts are boxwoods (*Buxus* spp.) with euonymus (*Euonymus* spp.) and hollies (*Ilex* spp.) as potential hosts. It has 1-5 generations per year, warmer climates have more generations.



Ferenc Lakatos, University of Sopron, Bugwood.org

Life Stages

Eggs are deposited on the underside of leaves in a yellow, overlapping translucent gelatinous mass of 5-20 eggs.

Females can lay over 42 clutches in their life.

Larvae feed on leaves and bark, causing defoliation and girdling. They are up to 1.5 in (4 cm) long, yellow-green with black stripes and white spots and hairs, and a shiny black head. Larvae of winter generation overwinter for 6-8 weeks.

Pupae are in webbed cocoons well hidden among leaves. They are 0.6-0.8 in (1.5-2 cm) long and green to light brown with a dark brown pattern as they mature.

Adults generally have white, slightly iridescent wings that have a dark brown band around the edges and a white spot on the forewings. Dark morphs occasionally (5-10%) appear, they are all brown, but still have the white forewing spot.

Life Cycle



Larva

Overwintering stage

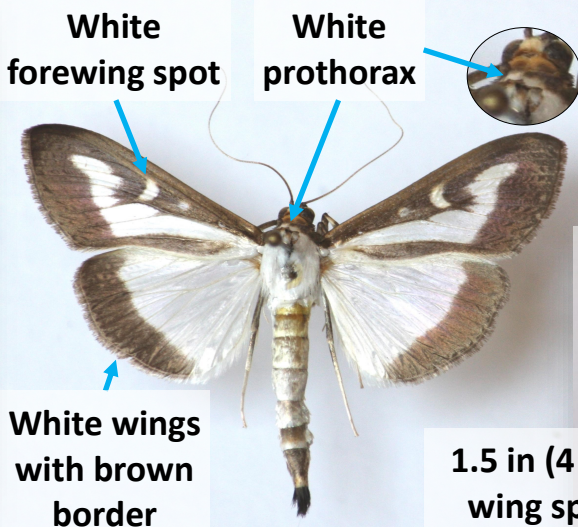
Adults

Lookalike (not pictured)

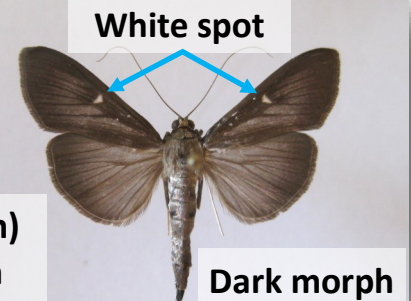


*Enlarged to show detail

S. Sáfán, University of West Hungary, Bugwood.org (Adults)



1.5 in (4 cm)
wing span



Melonworm (*Diaphania hyalinata*) is missing the white spot on the forewings and has solid brown prothorax (region behind head).

light brown apple moth

Epiphyas postvittana

Overview

Light brown apple moth is native to Australia and was identified in California in 2007 (under an eradication program) and is currently present in Hawaii. Moths have been detected in Oregon, but populations have not established. It has 2-4 generations per year depending on climate. Light brown apple moth was likely introduced on nursery and fruit stock shipments.

Life Stages

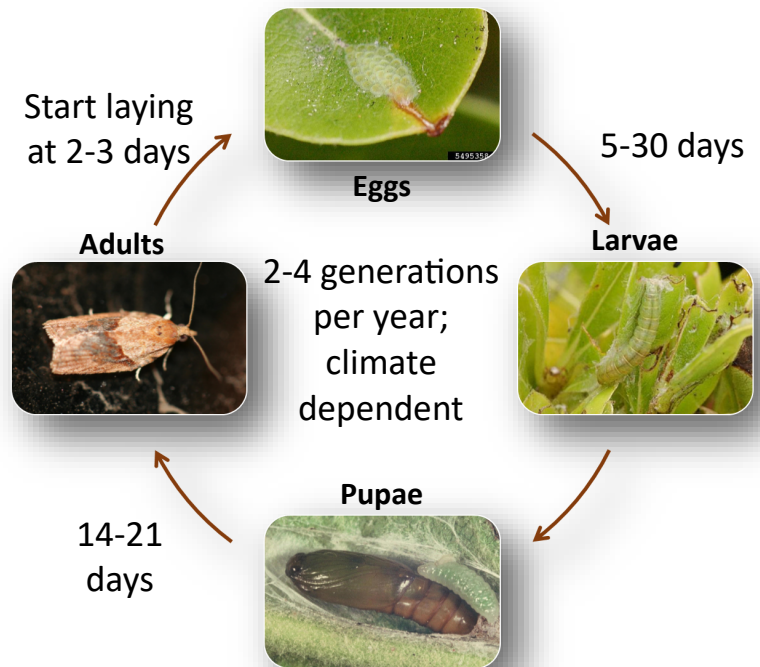
Eggs are laid in masses of 2-170 eggs on leaf or fruit surfaces. Eggs are 0.04 in (0.8-0.9 mm) in diameter, flat, and hatch after 5-30 days (temperature dependent).

Larvae grow to 0.4-0.7 in (1-1.8 cm) long and are yellow-green to green colored. Later instars have a dark green central stripe and two side stripes. The head capsule is hardened and light brown. Larvae often produce webbing on leaves and fruit when feeding. Overwintering usually occurs when larvae are in later instars.

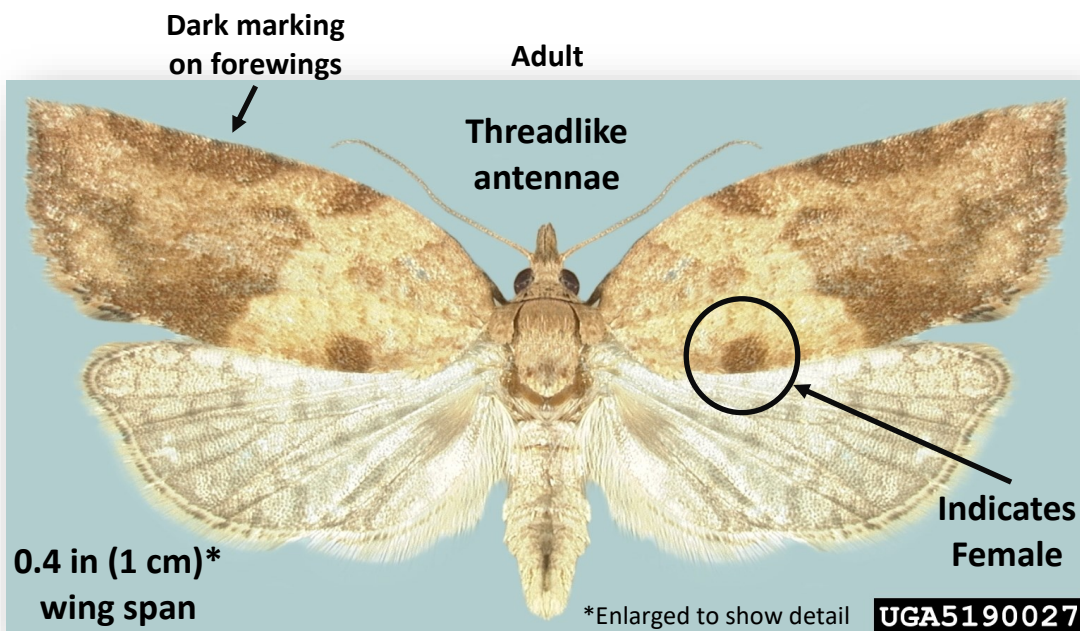
Pupae are 0.4-0.6 in (1-1.5 cm) long, mature quickly to brown, and are often contained in a silken cocoon within a leaf roll.

Adults are yellow-brown with dark markings on the forewings. They are approximately 0.4 in (1 cm) long with wings folded, and females have a dark mark on the hind margin of the forewings.

Life Cycle



Eggs, Larva - T. M. Gilligan & M. E. Epstein, CSU, Bugwood.org
Pupa - DPIW, Tasmania, Bugwood.org
Adult - Lesley Ingram, Bugwood.org



Natasha Wright, Braman Termite & Pest Elimination, Bugwood.org

More Info

Typically requires expert identification due to color variation and similarities to other brown moths.

Host range of over 250 species; primarily associated with landscape trees, ornamental shrubs, fruit crops, and certain vegetable crops.

Feeds on fruit and leaves.

spongy moth

Lymantria dispar

Overview

Spongy moths are native to Europe and Asia, and there are two subspecies in the US. *L. dispar dispar* was intentionally introduced to New England in the late 1800s in an attempt to rear an alternative silk producing insect and has established across the Northeast into the Midwest and Mid-Atlantic states. *L. dispar asiatica* has been unintentionally introduced several times to western North America since the 1990s, but it has been eradicated. Spongy moths have one generation per year.

Life Stages

Eggs are in masses of 500 - 1,000 and are velvety and buff-colored. The velvet is irritating hairs from the female moths. Females lay them on trees and sheltered outdoor objects.

Larvae emerge in spring and feed on the leaves of the host plant. Older instars are about 2 in (5 cm) long and have five pairs of blue spots on the body near the head followed by six pairs of red spots.

Pupal stage occurs in summer and is dark-brown.

Adults occur in summer to autumn. Male spongy moths are light tan to brown and have a 1.5 in (3.8 cm) wingspread with wavy dark bands across the forewing. Females are creamy white, flightless, and have a wingspread of 2.5 in (6.3 cm).

Larva

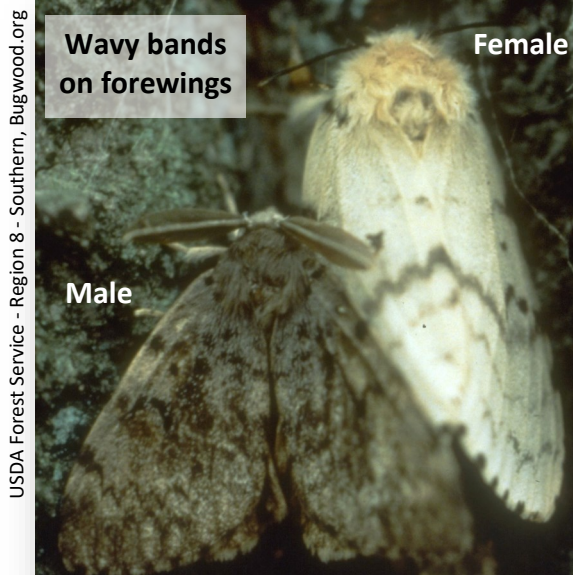


Bill McNee, Wisconsin Dept of Natural Resources, Bugwood.org

Adults

More Info

Egg masses laid on vehicles, shipping containers, export materials, etc. facilitate spread.



USDA Forest Service - Region 8 - Southern, Bugwood.org

Life Cycle



Hosts

Spongy moth feeds on over 300 trees and shrubs, including oak, apple, alder, basswood, birch, poplar, sweetgum, willow, and hawthorn.

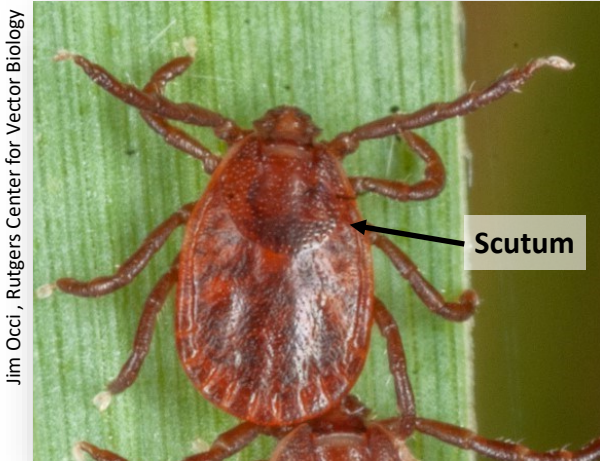
Asian longhorned tick

Haemaphysalis longicornis

Overview

Asian longhorned tick is native to East and Central Asia and was found established in New Jersey in 2017, but is believed to have been present for several years prior. It has since been found across the Mid-Atlantic region and into the southern US. It parasitizes mammals and birds and is a threat to livestock, wildlife, pets, and humans. They generally have one generation per year.

Adult (Dorsal)



Jim Occi, Rutgers Center for Vector Biology

Life Stages

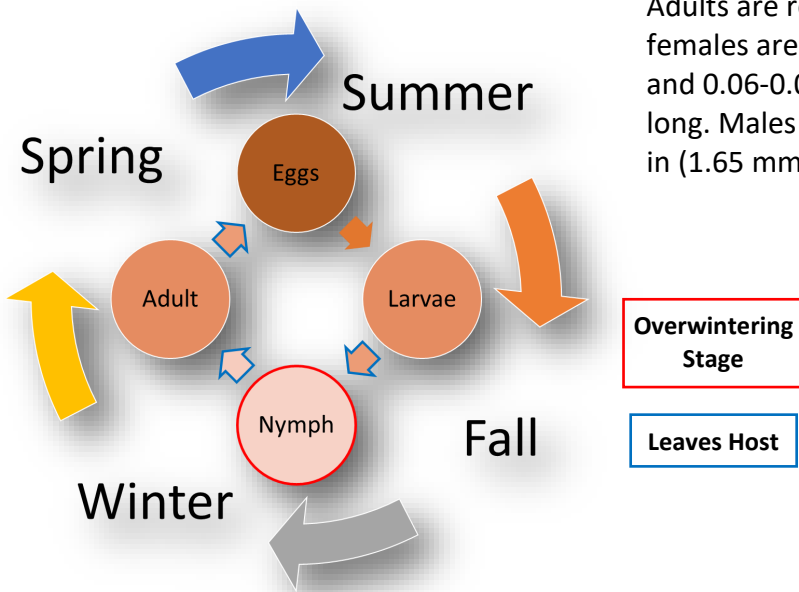
Eggs are produced by fully blood-fed females, up to 2,000 eggs are laid over 2-3 weeks. They hatch after about 25 days.

Larvae immediately search for a host and feed for 3-9 days. The larva has three pairs of legs and, unfed, is approximately 0.02 in (0.58-0.62 mm) long and 0.01-0.02 in (0.47-0.51 mm) wide. The scutum is 1.6 times as wide as it is long.

Nymphs latch onto a new host and feed for 3-8 days. Nymphs have four pairs of legs and, unfed, are approximately 0.07 in (1.76 mm) long and 0.04 in (1 mm) wide. The scutum is 1.25 times as wide as long, and its outline is broadly rounded.

The adult female attaches to a new host and feeds for 7-14 days. Then it drops from the host to lay eggs. It can reproduce sexually and asexually (by parthenogenesis). Adults are reddish-yellow and have four pairs of legs. Unfed females are approximately 0.11-0.13 in (2.7-3.4 mm) long and 0.06-0.08 in (1.4-2 mm) wide, with scutum as wide as long. Males are approximately 0.1 in (2.51 mm) long and 0.06 in (1.65 mm) wide, with scutum 1.3 times as long as wide.

Life Cycle



More Info

It can be spread over long distances by birds and other animals it parasitizes.

Like many tick species, it can spread pathogens, though research is being done to identify specific ones.

Due to similarity to native *Haemaphysalis* spp. and other ticks, expert identification is required for confirmation.

Adult Female (Ventral)



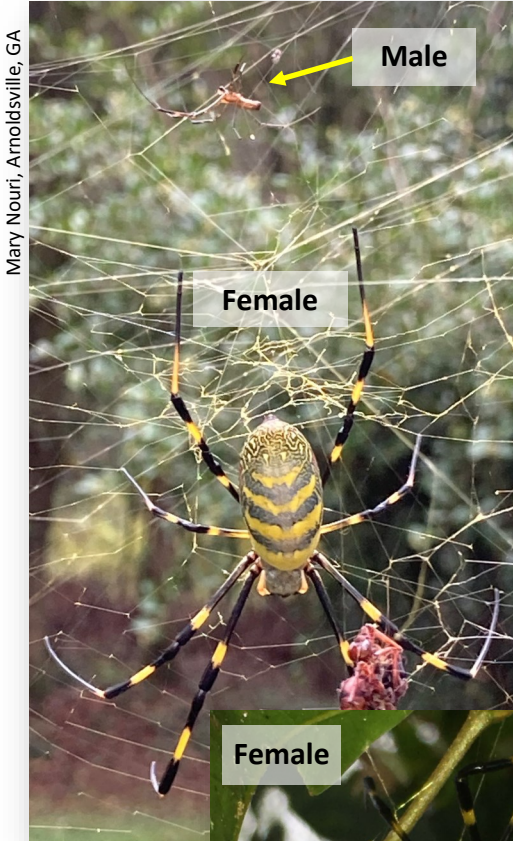
Eric R. Day, Virginia Tech, Bugwood.org

Jorō spider

Trichonephila clavata

Overview

Jorō spider is native to East Asia and was detected in Georgia in 2014. It has established populations in Georgia, North Carolina, South Carolina, and Tennessee and is spreading. It has one generation per year in its native range.



Mary Nouri, Arnoldsville, GA

Male

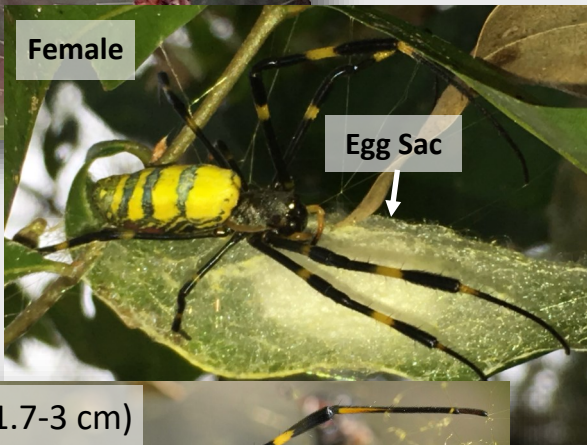
Female

Life Cycle

Egg sacs are laid mid-October to November and are dense, white silk sacs with 400-500 eggs. Egg sacs are attached to leaves, tree bark, and human-made structures.

Adult females become sexually mature in September and early October. Their body is 0.67-1.2 in (17-30 mm) long and is bright yellow, with broad, horizontal bluish-green bands on the top side of the abdomen, large red markings on the bottom side of the abdomen, and has long, black legs with yellow-orange bands or, rarely, all black legs.

Adult males mature by late August. Their body is 0.16-0.31 in (4-8 mm) long and their cephalothorax is light brown with two dark brown long stripes on both sides. The abdomen is elongate-oval with its topside a greenish-brown with two yellowish long stripes on both sides of the dark brown middle line.

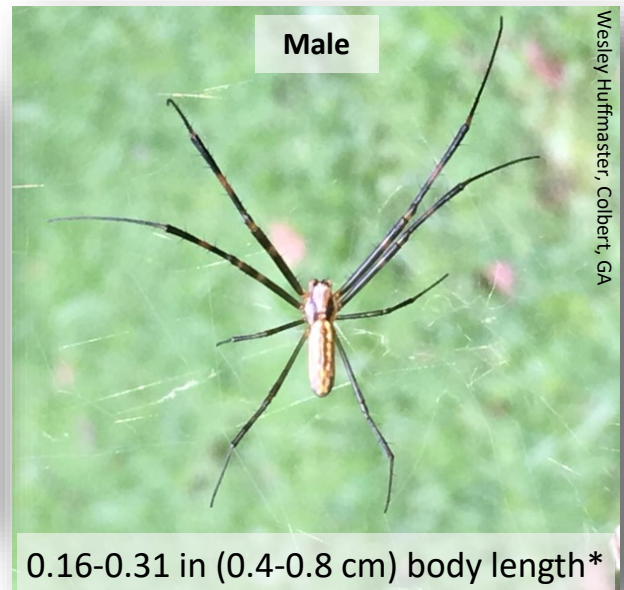


Wesley Huffmaster, Colbert, GA

Female

Egg Sac

*Enlarged to show detail



Wesley Huffmaster, Colbert, GA

Male

0.67-1.2 in (1.7-3 cm)
body length*



Female Ventral

Sarah Morgan, Cumming, GA

0.16-0.31 in (0.4-0.8 cm) body length*

More Info

The closest lookalike in the SE US is the golden silk orb-weaver (*Trichonephila clavipes*). The adult female golden silk orb-weaver has rows of silvery white spots on the abdomen instead of blue bands. The legs are yellow-orange with brown bands and three of four pairs have black tufts of hairs at the joints.

Glossary

Alate — An insect or life stage or form of an insect species that has wings or wing-like features.

Apterous — An insect or life stage or form of an insect species that is lacking wings.

Arthropod — Invertebrate in the Arthropoda phylum, which includes hexapods (which insects are within), crustaceans (e.g., crabs, lobsters, shrimp, woodlice, barnacles), arachnids (e.g., spiders, scorpions, mites, ticks), myriapods (e.g., centipedes, millipedes).

Cambium — In plants, the layer of tissue between the phloem and xylem where lateral/width growth occurs.

Caste — Individuals that belong to different groups within a colony that have often have specific appearances and roles.

Chlorosis — A lacking of chlorophyll in leaves, resulting in a yellowing or paleness of parts of or the entirety of a leaf.

Cocoon — A protective covering, often made of silk, an insect produces to cover a pupa.

Cornicle — Tubes projecting from an aphid's abdomen that can emit pheromones or defensive chemicals; usually one cornicle present on either side of the abdomen.

Crawler — The mobile life stage(s) of an insect species that also has a stationary stage.

Crown death — Death of the top part of a tree, including the branches, leaves, and reproductive parts.

Defoliation — Widespread loss or removal of leaves or needles from a plant. This can be part of the natural lifecycle of the tree, as with deciduous trees seasonally, or by disease, insects, or mechanical trimming.

Dorsal — In plants, the top side of a leaf; the side that faces away from the substrate. In insects; the top side of the body.

Egg scar — Notches in plants that are created by adults laying eggs.

Elytra — The forewings of some insect families, notably beetles (Coleoptera). Characteristically thickened, leathery, tough, and/or hard and serve to protect the hindwings and abdomen.

Emerge/Emergence — Adults leaving the pupal case or last instar skin.

Established — A species having a self-sustaining and reproducing population in a specified geographic area without the need for human intervention. Applies to both native and nonnative species.

Exit hole — Holes in plants and wood products that insects have used to exit the host. Size and shape of exit holes can help identify the species that was present.

Frass — The solid excretion of insects.

Gallery — The series of tunnels created by wood-boring larva(e) as they eat. Tunnel patterns can help identify the species that created them.

Generation — The entire life cycle of an organism.

Girdling — The removal of vascular tissue, xylem and phloem, from the circumference of a plant or parts of it, such as roots, branches, twigs, etc. Girdling will often deprive the sections above the wound of nutrients, causing death of parts of or the entirety of the plant.

Gravid — An adult with fully developed eggs within their body.

Head capsule — The fused plates that form the exoskeleton of the head.

Heartwood — The non-living, central wood of trees that is often harder and denser than other parts of the tree.

Honeydew — Clear, sugary waste fluid expelled from some plant-feeding insects. Attractive food source to some insects and is a substrate and food source for some fungi, such as sooty molds.

Host — The organism that a species feeds on and/or lives on or in.

Instar — The immature developmental stages of arthropods, including insects.

Introduced — A species brought to a new geographic area intentionally or unintentionally by humans. Common methods include ornamental introductions, contaminants in shipping materials or travel, exotic pet trade, contaminants in ships' bilge water, etc.

Invasive — A species that (a) is nonnative to a specified geographic area, (b) was introduced by humans (intentionally or unintentionally), and (c) does or can cause environmental or economic harm or harm to humans.

Larva(e) — The immature form of an insect that falls in the holometabolous (complete) metamorphosis life cycle; it does not resemble the adult as a nymph does.

Molt — The shedding of an insect exoskeleton.

Morph — A color or other variation of an organism within a species and not limited to a location.

Native — A species that occurs naturally in a specified geographic area. In the United States, this is defined as species that have been in North America since before Europeans arrived (before 1500s). There are instances that a species could be native to one ecosystem, but be invasive in another even though they are in the same country. This is frequently seen with aquatic species and their movement assisted by humans from one waterbody to another.

Node — Place on a plant stem where leaves grow.

Non-native — An organism, including its seeds, eggs, spores, or other biological material capable of propagating that species, that occurs outside of its natural ecosystem.

Nymph — The immature form of an insect that falls in the hemimetabolous (simple) metamorphosis life cycle; it resembles the adult form.

Overwinter — Waiting through the winter season/conditions; often references the life stage, place, etc. the insect spends the winter season/conditions.

Ovipositor/Oviposition — The egg-laying organ of some arthropods, used to insert eggs into the soil or plant or animal tissues. Located at the end of the abdomen, it often resembles a sword or needle. Some wasps and bees also use the ovipositor as a defensive stinging mechanism.

Parthenogenesis — A reproductive strategy where the nymphs or larvae develop from unfertilized eggs. The offspring are often genetically identical to the parent.

Pupa(e)/Pupate — The third stage of the life cycle of insects that go through the holometabolous (complete) metamorphosis life cycle. Certain categories of insects may have additional names for the pupal life stage, such as chrysalis for butterflies and tumbler for mosquitos. Some pupae may be contained within a cocoon, nest, or exoskeleton shell.

Sapwood — Layer of a plant containing the vascular tissue related to water transport and, at times, food storage.

Scutum/Scutellum — Dorsal plate of some arthropods that varies in size by species.

Spiracle — Tubes and openings that are part of the respiratory system of arthropods.

Strain/Biotype — A group within a species that shares characteristics; often tied to a geographic location

Stunting — Loss of vigor and stature of an organism, often due to infectious diseases, physical conditions, nutrient deficiencies, or injury due to physical, chemical, or pest causes.

Vector — An organism that transmits another organism to a new host. A vector may or may not be affected by the transmitted organism.

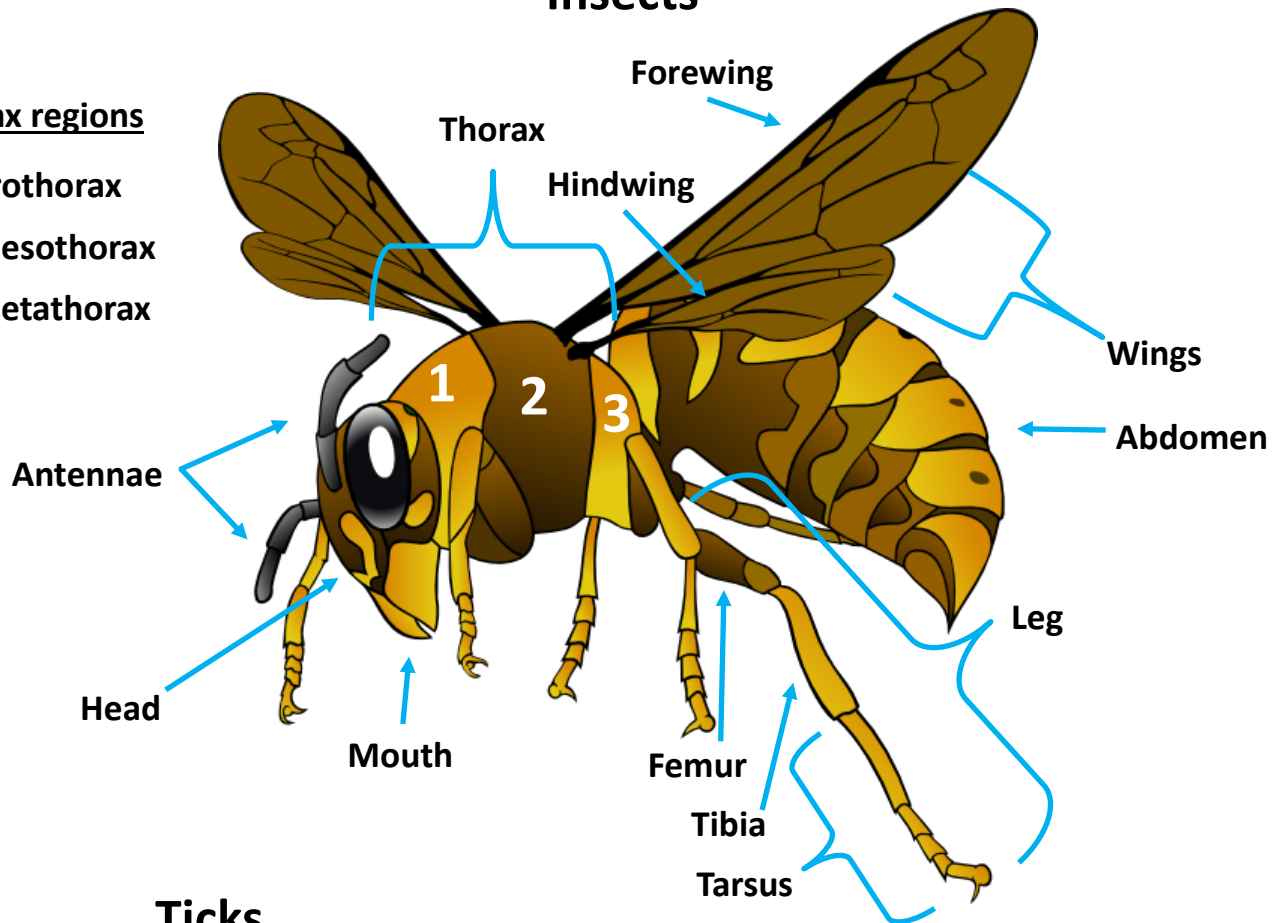
Ventral — In plants, the bottom side of a leaf; the side that faces the substrate. In insects; the underside of the body.

General Adult Morphology Diagrams

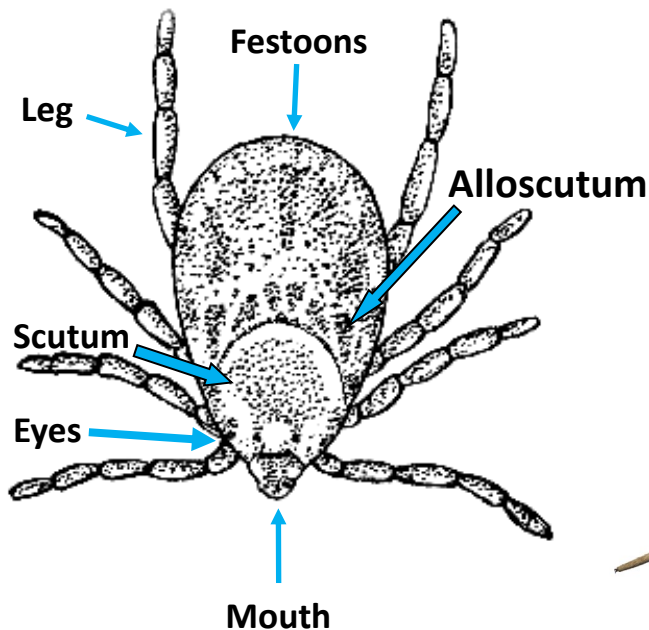
Insects

Thorax regions

- 1—Prothorax
- 2—Mesothorax
- 3—Metathorax



Ticks



Spiders

