



# Pest Profiles



Pecan IPM Toolbox

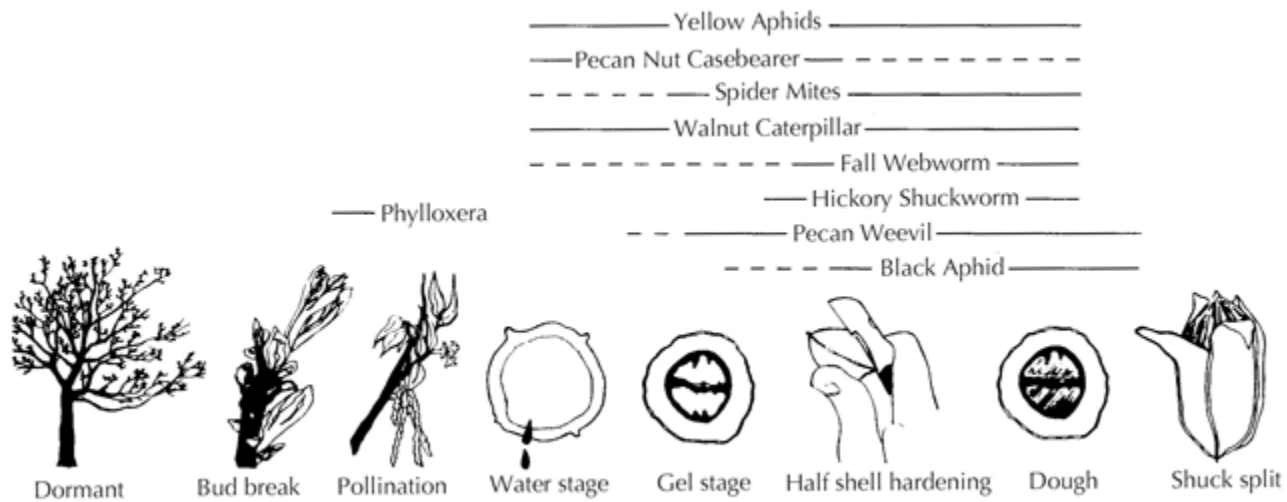
- ☞ **Pecan arthropod pests** can occur throughout the growing season. Fortunately, most of them are not usually a threat to pecan production because they are controlled by **natural enemies**, adverse weather, defensive or repair mechanisms of the pecan itself and other factors.
- ☞ Regular **pesticide application is not recommended** to control these pests for several reasons:
  - too expensive
  - resistance to pesticides will develop
  - natural enemies may be killed
  - non-target pests will become problems
  - unnecessary use of pesticides pose dangers to the applicator and to the environment
- ☞ Pesticides should be used only when a pest is present in **damaging numbers** and no other management method will be effective.
- ☞ The **ability to recognize** these pests and their natural enemies is key in making these management decisions.

### Developmental Stages of the Pecan

Dormant	Period from leaf drop to bud break
Bud break	The bud scale splits and the leaf begins to expand
Pollination	Catkins are shedding pollen and stigmas are receptive
Water stage	Nut interior is filled with water
Gel stage	Interior of the immature kernel is filled with a gel-like substance.
Half-shell hardening	Resistance can be felt when making a cross-section cut through the middle of the pecan nut
Dough	The gel of the kernel begins to solidify
Shuck split	Shucks begin to split, exposing the shell.

# Pecan Stages and Pests

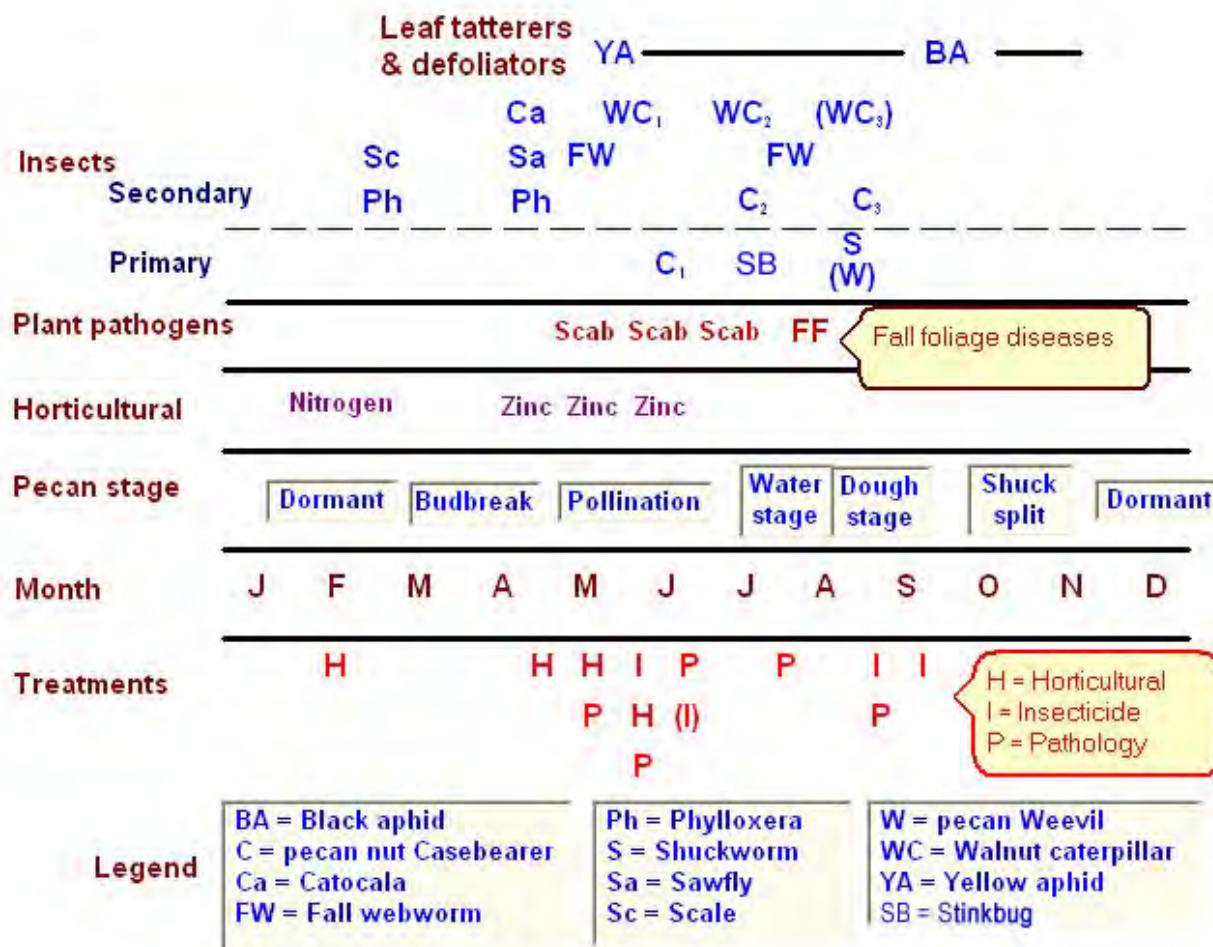
## Pest Profiles



# Regional Pest Profiles — Texas Overview

## Pest Profiles

### Pest and Management Overview





### Central Texas

### Seasonal Insect Pest Profile

#### Legend

BA = Black aphid  
 C = pecan nut Casebearer  
 Ca = Catocala  
 Lc = Leaf casebearer  
 M = Mites  
 Ph = Phylloxera  
 S = hickory Shuckworm  
 Sa = Sawfly  
 Sp = Spittlebug  
 T = Twig girdler  
 W = pecan Weevil  
 WC = Walnut caterpillar  
 WW = fall Webworm  
 YA = Yellow aphid  
 SB = Stinkbug

PhS

Leaf tatterers  
& defoliators

YA

BA

Ca

WC<sub>1</sub>

WC<sub>2</sub>

WC<sub>3</sub>

Sa

M

Lc

WW<sub>1</sub>

WW<sub>2</sub>

T

Ph

Sp

Secondary  
pecan  
insect pests

C<sub>2</sub>

C<sub>3</sub>

C<sub>1</sub>

SB

S

W

Primary  
pecan  
insect pests



Stage of Crop

Dormant

Budbreak

Pollination

Water stage

Dough stage

Shuck split

Leaf drop

Months

J

F

M

A

M

J

J

A

S

O

N

D

Minimum treatments needed for  
key insect pests in normal year

One for first summer  
generation casebearer

Two for pecan weevil (same  
as hickory shuckworm)



# Southeast Texas

## Pest Profiles



### Southeast Texas

### Seasonal Insect Pest Profile

#### Legend

BA = Black aphid  
C = pecan nut Casebearer  
Ca = Catocala  
Lc = Leaf casebearer  
M = Mites  
Ph = Phylloxera  
S = hickory Shuckworm  
Sa = Sawfly  
Sp = Spittlebug  
T = Twig girdler  
WC = Walnut caterpillar  
WW = fall Webworm  
YA = Yellow aphid  
SB = Stinkbug

PhS

Leaf tatterers  
& defoliators

YA

BA

Ca

WC<sub>1</sub>

WC<sub>2</sub>

WC<sub>3</sub>

Sa

M

Lc

WW<sub>1</sub>

WW<sub>2</sub>

T

Ph

Sp

C<sub>2</sub>

C<sub>3</sub>

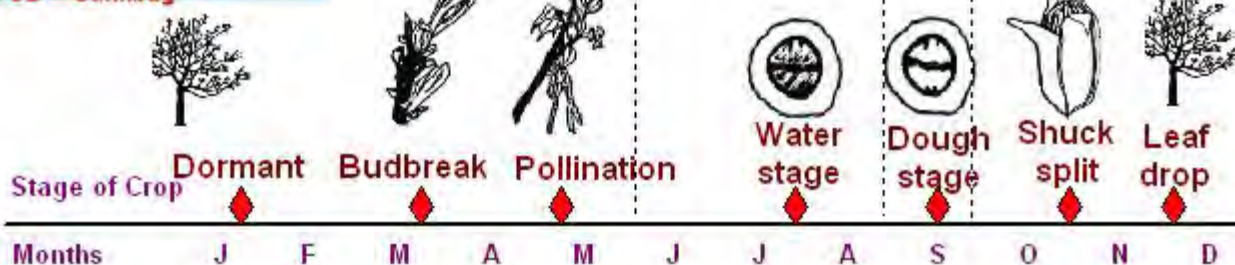
C<sub>1</sub>

SB

S

Secondary  
pecan  
insect pests

Primary  
pecan  
insect pests



Minimum treatments needed for  
key insect pests in normal year

One for first summer  
generation casebearer

Two for hickory shuckworm

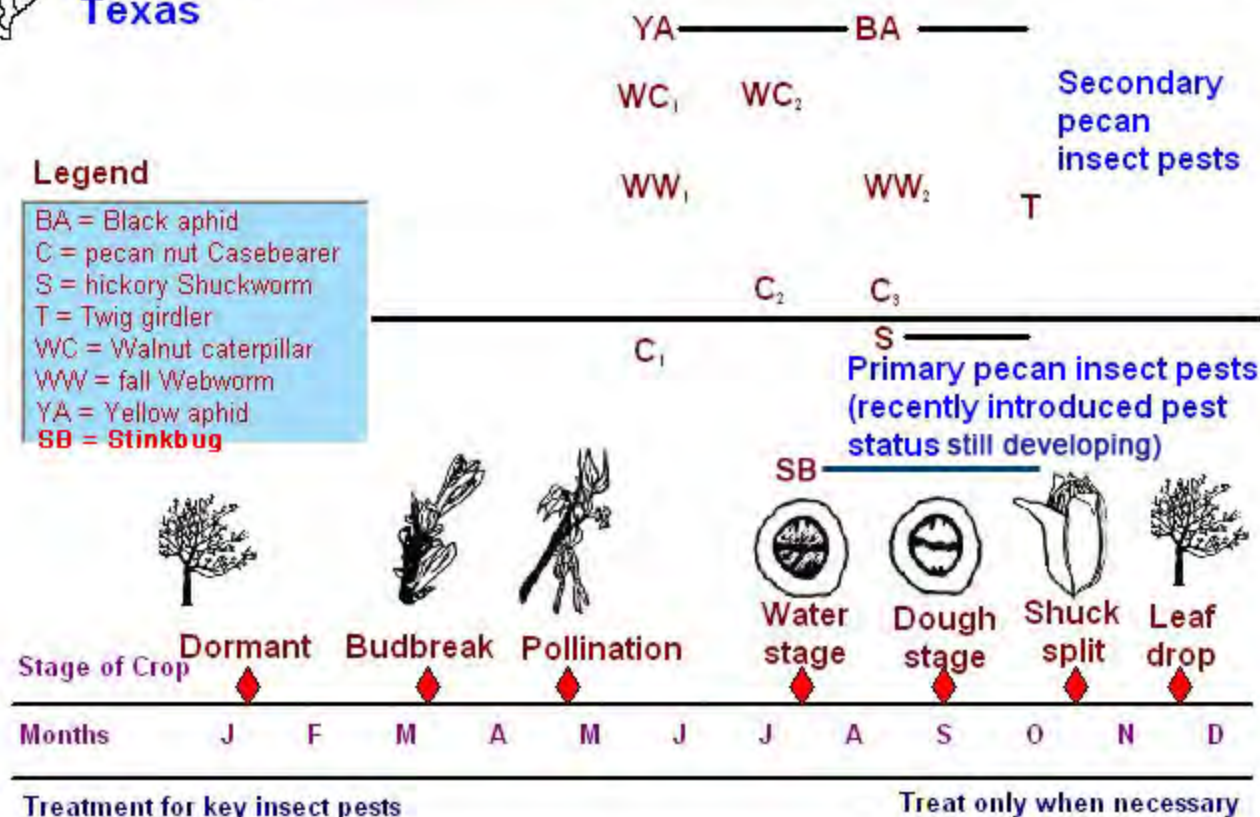


West  
Texas

### Seasonal Insect Pest Profile

#### Legend

BA = Black aphid  
C = pecan nut Casebearer  
S = hickory Shuckworm  
T = Twig girdler  
WC = Walnut caterpillar  
WW = fall Webworm  
YA = Yellow aphid  
**SB = Stinkbug**





- ☞ The development of various **pecan pests** is usually closely related to the **seasonal development of the pecan**.
- ☞ Although the severity of insect problems cannot be predicted on a seasonal basis, producers should frequently determine tree and nut development to aid them in predicting insect problems and **planning control strategies**.
- ☞ The following seasonal **pecan pest profiles** indicates the possible insect problems associated with various developmental stages of the pecan. The profiles are seasonal to **Texas**.

# Important Pests

## Pest Profiles

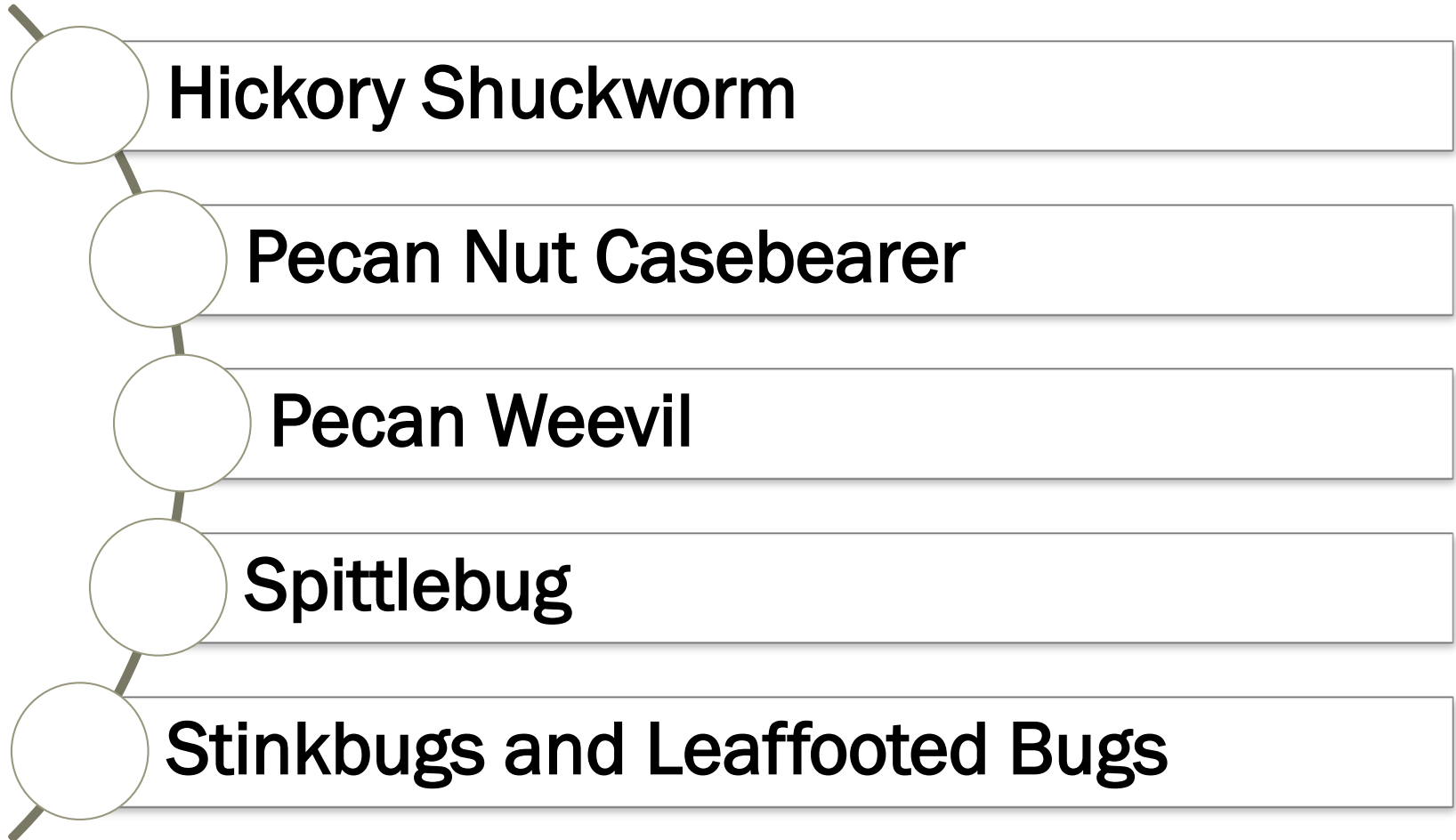
- ∞ In Texas, three species of insects attack the pecan nut and may require management.
- ∞ These nut feeders have coevolved with the pecan.
  - pecan nut casebearer
  - pecan weevil
  - hickory shuckworm



Top photo: Pecan nut casebearer moths. Allen Knutson.

Middle photo: Pecan weevil, adult. Photo by [Jerry Payne](#).

Bottom photo: Hickory shuckworm. Photo by [Louis Tedders](#).



### Hickory Shuckworm Damage

- ☞ Important late-season pest of pecans
- ☞ Larvae tunnel into the shuck interrupting the flow of nutrients and water necessary for normal kernel development.
- ☞ Infested nuts are late in maturing, of poor quality and scarred.
- ☞ Damaged shucks stick to the nuts and fail to open, creating "sticktights" that reduce harvesting efficiency.
- ☞ Infestations occurring before shell hardening may cause nuts to fall.



Hickory shuckworm, larva. Photo by Jerry Payne, [Bugwood.org](http://Bugwood.org)



Hickory shuckworm damage, "sticktights." Photo by Jerry Payne, [Bugwood.org](http://Bugwood.org)

### Hickory Shuckworm: Biology

Adult is a dark brown to grayish-black moth about 3/8-inch. Moths active in the spring before pecan nuts are available. Moths deposit eggs on hickory nuts and on pecan buds. Larvae on pecan feed in phylloxera galls in the spring. Later in the season when pecan nuts are present, moths deposit their eggs singly on the nuts.



Hickory shuckworm, adult. Photo by Jerry Payne, [Bugwood.org](http://Bugwood.org)



Hickory shuckworm, oviposit sites. Photo by H.C. Ellis, [Bugwood.org](http://Bugwood.org)

- ☞ Egg is attached to the shuck with a creamy white substance visible on the surface of the shuck.
- ☞ Egg hatches in a few days and the tiny larva burrows into the shuck to feed for about 15 to 20 days.
- ☞ Mature larvae are about 1/2-inch long, cream-colored, light brown heads.
- ☞ Pupation occurs in the shuck and the moth soon emerges.
- ☞ Several generations are completed each year.
- ☞ Overwinter as full-grown larvae in old pecan shucks on the tree or orchard floor.

### Hickory Shuckworm – continued

#### Control

- ☞ Pecans are most susceptible to hickory shuckworm damage after the **gel stage**.
- ☞ If the orchard has a history of shuckworm damage, insecticide treatment should be made when pecans reach the **half-shell hardening** stage.
- ☞ A **second application** 10 to 14 days later may be needed.
- ☞ Removing and destroying old shucks and dropped nuts, in which shuckworms overwinter, can **reduce infestations**.
- ☞ **Pheromone traps** that attract and capture hickory shuckworm moths are available commercially.
- ☞ **Guidelines** for using trap catches to determine the need for treatment have not been validated in Texas.



### Pecan Nut Casebearer

#### Damage

- ☞ PNC (*Acrobasis nuxvorella*) **most damaging insect** pest of Texas pecans and found in almost all the pecan growing areas of Texas
- ☞ Can cause **serious crop loss** every year if left uncontrolled.
- ☞ Casebearer larva or caterpillar feeds **inside pecan nuts**.
- ☞ **First generation** larvae feed inside small nutlets from April to June.
- ☞ This generation is most damaging as a **single larva** often destroys all the nutlets in a cluster.
- ☞ Larvae of **later generations** require just one or two nuts to complete their feeding because pecans are larger at that time.



Pecan nut casebearer damage. Photo courtesy of Louis Tedders,  
[Bugwood.org](http://Bugwood.org)

### Pecan Nut Casebearer - continued

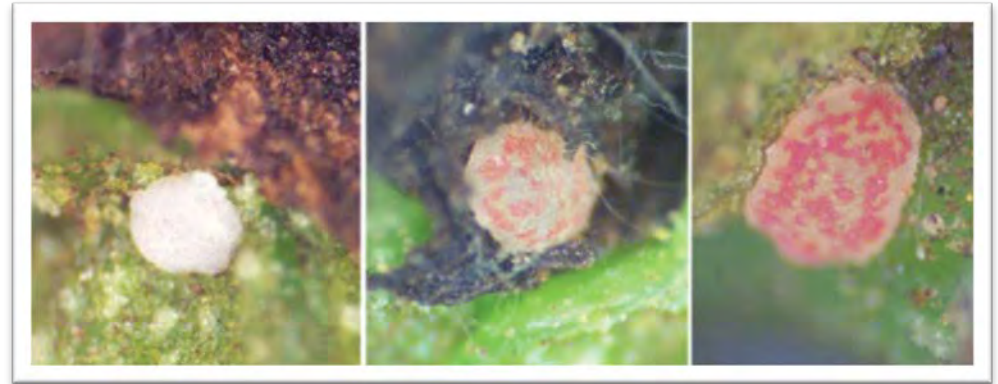
- ☞ Adult casebearer is a gray moth about 1/3- inch long.
- ☞ Ridge of dark scales runs across the forewings.
- ☞ Moths are active only at night when they mate and lay eggs on pecan nuts.



### Pecan Nut Casebearer

#### Life Stages: Eggs

- ☞ Most eggs found on the tips of the **nutlets**
- ☞ Each female lays **50 to 150 eggs** during her 5-to 8-day life.
- ☞ Eggs are **greenish-white to white**, changing to pink or red prior to hatch.
- ☞ Eggs hatch in 4 to 5 days and young larvae crawl to **nearby buds** below the nuts to begin feeding.
- ☞ Empty **egg shell** is white and remains on the nut.



Pecan nut casebearer eggs, egg color change.  
Photo courtesy Oklahoma Cooperative Extension, [Publication EPP-7189](#).

### Pecan Nut Casebearer - continued

#### Development

- ☞ Tiny larvae feed for a day or two on a **bud** below the nut cluster and then enter the pecan nut, often tunneling in at the base.
- ☞ Silk and black **frass** (excrement) are often visible on the outsides of infested nuts.
- ☞ Larvae feed inside pecan nuts for 3 to 4 weeks, depending upon the **temperature**.
- ☞ Larvae are **olive to gray** and reach a length of about ½-inch.
- ☞ Full-grown larvae **pupate** in the pecan nut and the adult moth emerges about 9 to 14 days later.

### Pecan Nut Casebearer Biology : Adults

- ☞ PNC completes several generations each year.
- ☞ Adults of the overwintering generation emerge in April and May and lay eggs on pecan nutlets soon after pollination.
- ☞ First generation larvae mature to moths, which lay second generation eggs in grooves on the tips or bases of nuts, or on buds.
- ☞ Second generation larvae attack the nuts in mid-summer about 42 days after nut entry by first generation larvae.
- ☞ Third generation eggs are deposited on nuts from late July to early September.

- ☞ These larvae feed only in the shucks if the pecan shells have hardened to prevent penetration into the kernel.
- ☞ Many third and later generation larvae do not feed, but crawl to the base of a dormant bud and construct a tough, silken cocoon in which to spend the winter. In the spring, these immature larvae leave the cocoon, which is called a hibernaculum.
- ☞ They feed on buds and tunnel in developing shoots until they are full-grown. Larvae then pupate in shoot tunnels or in bark crevices.
- ☞ Casebearer moths soon emerge to lay first generation eggs on nutlets.

### Pecan Nut Casebearer Control

- ☞ Insecticide applications must be accurately timed to control newly hatched casebearer larvae before they enter the nuts. Once inside the nuts, larvae are protected from insecticides.
- ☞ Nuts should be carefully examined for casebearer eggs in the spring to determine if treatment is necessary and to determine the correct timing of the insecticide application.
- ☞ Insecticides should be applied within 2 to 3 days after the first eggs hatch.
- ☞ At this time, the first larvae will begin entering the nuts.
- ☞ Infested clusters can be flagged to monitor egg hatch.
- ☞ By delaying the treatment until the first nut entry occurs, the residual activity of the insecticide is maximized.
- ☞ However, the time required to treat the orchard, and possible delays caused by weather, should be considered so that the insecticide can be applied before significant nut entry occurs.



### Pecan Nut Casebearer Control

- ☞ Often a single, carefully timed insecticide application provides adequate control for first generation casebearers. A second insecticide application may be required if unhatched eggs are found 7 to 10 days after the first application.
- ☞ Peak egg lay often occurs during a 2-week period in late April to early May in the southern and coastal areas, or late May and early June in north Texas. Spring temperatures influence casebearer development; cool, rainy weather can delay moth activity and egg laying. Thus, the period of egg laying can vary as much as 2 weeks from year to year depending upon spring weather.

### Pecan Nut Casebearer Control

- ☞ Several methods have been used to determine when to look for first generation casebearer eggs. One of the most successful is the use of a computer model that predicts egg laying activity and nut entry based upon spring temperatures.
- ☞ The computer model should not substitute for field scouting for casebearer eggs. The date of first significant nut entry, as predicted by the computer model, is the optimum predicted spray date. Begin scouting for eggs at least a week before the predicted date, as local weather conditions near the spray date can influence egg laying.

### Pecan Nut Casebearer Control

- ☞ Growers should inspect nuts to determine if casebearer infestations are large enough to justify treatment.
- ☞ A sampling plan has been developed to determine if infestations warrant an insecticide application.
- ☞ The plan is based upon the assumption that treatment is justified when infestations are large enough to destroy 5 percent or more of the nuts expected to be harvested.

### Pecan Nut Casebearer Control

- ☞ The sampling plans based upon research in Texas:
  - Begin searching for eggs at least a week before the predicted date of first nut entry as described above. Tag egg infested clusters to monitor egg hatch.
  - Begin intensive sampling when the first casebearer eggs hatch. This date is predicted by the casebearer computer model but should be confirmed by monitoring actual egg hatch in the orchard.
  - Examine 10 nut clusters per tree. A cluster is considered infested if it has a casebearer egg or nut entry. Treat if two infested clusters are found before 310 clusters (31 trees) are examined. If fewer than two of 310 clusters are infested, stop sampling.
  - Sample again 3 to 5 days later or 1 to 2 days before the date of first significant nut entry as predicted by the computer model.

### Pecan Nut Casebearer Control

- Treat if two infested clusters are found before 310 clusters are examined, as before. Otherwise, stop sampling after 310 clusters.
- Sample a third time 2 days later. A third sample is especially important if cold, rainy nights have delayed egg-laying.
- If three infested clusters are found before 310 clusters have been inspected on the third sample, then treatment should be considered.
- Pecan nuts should also be examined for second generation casebearer eggs about 6 weeks after first generation eggs were found.
- Treatment should be considered if 2 percent of the pecans are infested with eggs.

### Pecan Weevil (*Curculio caryae*)

- ☞ Where it is found, pecan weevil is the **most damaging** late-season pest.
- ☞ Infestations are often **localized** and vary a great deal within orchards.
- ☞ **Adult weevils** begin to emerge from the soil in August and feed on nuts in the **water stage**, causing them to drop.
- ☞ After the kernel has entered the **dough stage**, the nut is susceptible to egg laying and attack by pecan weevil larvae.
- ☞ Infested nuts remain on the tree while the developing larvae consume the kernel.
- ☞ Full-grown larvae chew a round hole through the shell and emerge from the nut in late fall or early winter.



### Pecan weevil (*Curculio caryae*) - continued Biology

- ☞ The life cycle of the pecan weevil - egg, larva, pupa and adult - usually completed in 2 years but can require 3.
- ☞ Adult weevils begin emerging from the soil in August; their numbers peak from late August through early September.
- ☞ Rainfall, soil moisture and soil type influence the ability of the weevils to emerge from the soil.
- ☞ Drought can delay adult emergence until rain or irrigation loosens the soil.
- ☞ Adult weevils feed on nuts and live for several weeks.

### Pecan weevil (*Curculio caryae*) – continued Biology

- ☞ Once nuts reach the gel stage, they are suitable for egg laying. For this reason, early-maturing varieties are infested first.
- ☞ The female weevil drills a hole through the shell and deposits one or more eggs within the developing kernel.
- ☞ A single female lays eggs in about 30 nuts.
- ☞ **Larvae** hatch from the eggs and feed for about 30 days inside the nut, destroying the kernel.
- ☞ Emergence of full-grown larvae from nuts begins in **late September** and continues as late as December.

### Pecan weevil (*Curculio caryae*)

#### Biology

- ☞ Larvae burrow 4 to 12 inches into the soil and **construct a cell**, where they remain for 8 to 10 months.
- ☞ Most of the larvae then **pupate** and transform to the adult stage within a few weeks.
- ☞ However, the adults remain in the underground cell for an additional **(second) year** before emerging from the soil the following summer.
- ☞ Those larvae (about 10%) that do not pupate after the first year remain as larvae for 2 years and then emerge from the soil as adults the **third year**.

### Pecan weevil (*Curculio caryae*) - continued Control

- ☞ Foliar insecticides are currently the most effective treatment for pecan weevil.
- ☞ Once nuts reach the gel stage, insecticide should be applied if adult weevils are present.
- ☞ It may be necessary to continue spraying at 7- to 10-day intervals until shuck split, as long as monitoring shows weevils are emerging in significant numbers.
- ☞ Certain trees have greater weevil infestations than others. These "scout" trees can be used to monitor the presence of adult weevils.
- ☞ One monitoring method involves jarring limbs to knock adult weevils onto a sheet placed on the ground.

### Pecan weevil (*Curculio caryae*) - continued Control

- ☞ Wire cone traps also can be placed beneath trees to capture adult weevils as they emerge from the soil.
- ☞ The number of captured weevils can be recorded periodically.
- ☞ Trap information can help you decide when and how long to continue insecticide sprays in relation to crop maturity. Information on the construction and operation of wire cone traps is available from your county Extension agent or Extension entomologist.

### Pecan weevil (*Curculio caryae*) - continued Control

- ☞ Pecan weevil infestations **spread slowly** unless aided by humans.
- ☞ Infested nuts can be the source of a new infestation and should not be **transported** to uninfested orchards.
- ☞ Also, infested nuts should be **destroyed** after harvest.
- ☞ Early harvest, before **weevil grubs** have exited from the nuts, also aids in control.
- ☞ Since grubs are physically removed from the orchard by early harvest, this practice can **reduce weevil infestations** if done each year.



### Spittlebug

- ☞ White spittle masses are produced by the **nymphs** of spittle bugs.
- ☞ This **sucking insect** is frequently seen on **nutlets** and tender **stems**.
- ☞ High populations on nut clusters can result in nut loss.
- ☞ Currently there are no well-defined guidelines for treatment thresholds.

☞ Provado® is a **selective insecticide** for sucking insects and could be used to treat spittlebugs and not disrupt **beneficial insects**.



### Stinkbugs and Leaffooted Bugs

- ☞ Several species of **stink bugs** and **leaffooted bugs** feed on pecan **nuts**.
- ☞ Infestations often develop on **field crops or weeds** and then move into pecans.
- ☞ Stink bugs and leaffooted bugs **suck sap** from developing nuts.
- ☞ Nuts injured before the shells harden fall from the tree.
- ☞ Feeding after shell hardening causes **brown or black spots on the kernel**.
- ☞ Affected areas **taste bitter**.
- ☞ As adults, these bugs **overwinter** under fallen **leaves** and in other **sheltered places on the ground**.

### Stinkbugs and Leaffooted Bugs - continued

- ☞ Adults lay eggs on many crops and weeds, where populations increase in summer.
- ☞ Fields of soybeans, other legumes and sorghum may be sources of adults that fly to pecans.
- ☞ Infestations are usually greatest from September through shuck split.
- ☞ **Weed control** in and near the orchard helps **suppress stink bugs** and lower the possibility of their moving into pecans.
- ☞ Cypermethrin (Ammo®, Cymbush®), esfenvalerate (Asana® , azinphosmethyl (Guthion®) or carbaryl (Sevin®) applied for other pests may also control stink bugs and leaffooted bugs.

### Stinkbugs and Leaffooted Bugs - continued

- ☞ These **kernel-feeding insects** can also be managed by planting certain host or "**trap crops**" that lure adult stink bugs and leaffooted bugs away from pecans in **September, October and November**.
- ☞ Planting **plots or single rows of peas** (blackeye, purple hull, crowder, etc.) along the **edge of the pecan orchard** in the last week of **July** through the first week of **August** produces an attractive trap crop for these pests.
- ☞ The trap crop does not have to be continuous around the entire orchard.
- ☞ **Small plantings** in several selected locations can be enough.
- ☞ **Stagger the plantings** by a couple of weeks to help ensure having an attractive trap crop longer into the fall.

### Stinkbugs and Leaffooted Bugs - continued

- ☞ **Monitor the peas** for adult leaffooted and stink bugs when the plants begin to **bloom** and set **Pods**.
- ☞ Apply an insecticide to the **trap crop** to kill stink bugs and leaffooted bugs once the crop stops blooming and setting **Pods**.
- ☞ This treatment is **necessary to kill the bugs** before they have a chance to leave and **fly into the pecans**.
- ☞ Before planting a trap crop, consider these factors:
  - having available **water** to obtain a stand
  - planting a variety of pea suited to the **soil type and soil pH** of the orchard
  - **weed** control
  - wildlife and livestock **grazing**

# Insect Pests of Foliage

## Pest Profiles

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[Black Aphid](#)

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[Pecan Catocola](#)

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[Fall Webworm](#)

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[Mites](#)

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[Pecan Phylloxera](#)

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[Sawfly](#)

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[Walnut Caterpillar](#)

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[Yellow Aphid](#)

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[Spring Leaf Feeders](#)

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[Leaf Tatterer and Defoliator](#)

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### Black Aphid (*Melanocallis* sp.)

#### Damage

- ☞ The black pecan aphid is much more **destructive** than the yellow aphid species.
- ☞ Three black pecan aphids per compound leaf can cause **severe leaf damage** and defoliation.
- ☞ Like the yellow aphids, the black pecan aphid feeds on the **undersides of leaves** and occurs throughout the pecan growing region of Texas.
- ☞ While feeding, the black pecan aphid injects a **toxin** that causes the **leaf tissue** between **major veins** to turn bright yellow.
- ☞ These damaged areas, up to 1/4 inch across, turn **brown** and **die**.
- ☞ Infested leaves soon fall.
- ☞ **Premature defoliation** reduces nut fill and the following year's **production**.

### Black Aphid (*Melanocallis* sp.) - continued Biology

- ☞ The black pecan aphid is **pear-shaped**.
- ☞ **Nymphs** are **dark olive-green** while **adults**, which may be winged, are **black**.
- ☞ Like the yellow aphids, all **summer forms are females** that reproduce without mating.
- ☞ **Male and female forms appear in the fall** and females deposit eggs, which overwinter on branches.
- ☞ Densities often are very low until **August or September**, when infestations often **increase** rapidly.



### Black Aphid (*Melanocallis* sp.) - continued Control

- ☞ **Monitor** the orchard frequently for black pecan aphids and their characteristic **leaf injury**.
- ☞ Since these aphids **feed singly** and can be **damaging in low numbers**, examine leaves closely.
- ☞ Pecan varieties differ in their **susceptibility** to black pecan aphid injury.
- ☞ Consider the extent of leaf damage and aphid numbers.
- ☞ In general, **treat** when black pecan aphids average more than **three per compound leaf**.
- ☞ In most cases, black pecan aphids are not as difficult to control with insecticides as are the yellow aphids.
- ☞ **Natural enemies** are important in maintaining low numbers of black pecan aphids.

### Pecan Catocala (*Catocala sp.*)

- ☞ Pecan catocala commonly **feed** on pecan, hickory, and other trees.
- ☞ **Damage** - The amount of foliage lost is generally minimal unless outbreaks occur in conjunction with other defoliators (e.g., sawflies, unicorn caterpillars, etc.). Repeated or heavy defoliation of younger trees can affect the hardiness of that plant, making it more susceptible to winter injury or other problems.
- ☞ **Biology** - Adults emerge from late April to early May. They mate and begin laying eggs shortly after emergence. The larvae will feed on leaves up to about mid-June. Economic damage is rare in well managed orchards. The larvae will eventually spin a loose cocoon attached to the foliage and the pupal stage will overwinter at this site. There is one generation per year.

### Pecan Catocala (*Catocala* sp.) Description



- Adult catocala **moths** are **large, quick flying insects** that often inhabit the **tree trunks** of pecan.

- One species, *C. cerogama* is extremely well **camouflaged**, with shades of **dull gray** and **white**, blending in particularly well on tree bark.
- Other species may possess **brightly colored hindwings** with shades of **pink or orange**.
- This explains the common name of this group, known as the **ilia underwings**.
- The adult **wingspan** may attain a width of 2 to 3-1/2 inches.
- The forewings are generally held rooflike over the body and appear mottled gray or brownish.

### Pecan Catocala (*Catocala sp.*) - continued Description

- ☞ The **hindwings** are not revealed until the moth takes flight. When fully grown, the **larvae** can be 2-½ to 3 inches and are **dark gray**.
- ☞ This **coloration** allows them to **blend in** quite well with the **tree bark**, where they commonly hang out.
- ☞ Larvae also sit very still unless disturbed, which is when they will **whip their bodies violently** from side to side.
- ☞ This serves as a **deterrent** to most predators.



### Fall Webworm (*Hyphantria cunea*)

- ☞ Fall webworm caterpillars build large silken webs in pecan trees.
- ☞ 100 or more caterpillars may be found inside the web, where they feed on pecan leaves.
- ☞ Large infestations may cover the tree with webs and cause severe defoliation.

### Biology

- ☞ Mature larvae are about 1-inch long, pale yellow or green, covered with tufts of long, white hairs.
- ☞ The adult is a white moth with dark spots on the wings.
- ☞ Female moths emerge in the spring, deposit eggs in masses of several hundred on the undersides of pecan and other tree leaves.

### Fall Webworm (*Hyphantria cunea*) - continued Biology

- ☞ Eggs are greenish-white and covered by grey hairs left by the female.
- ☞ Two to four generations each year, depending upon locality in the state.
- ☞ The last or fall generation is usually the most damaging (see Extension publication, [Fall Webworms](#)).

### Control

- ☞ Many insect **parasites and predators** feed on fall webworm larvae and reduce their numbers.
- ☞ Also, insecticides applied for other pecan pests help reduce webworm **densities**.
- ☞ If **webs** are common and the potential defoliation appears unacceptable, spot-spraying of infested trees may be practical.
- ☞ The **insecticide spray** must penetrate the web to be effective.

### Mites

- ☞ The **pecan leaf scorch mite** is the most important spider mite attacking pecans.
- ☞ **Damage**

Large numbers of these **tiny mites** feed under thin, silken webs often found on the undersides of pecan leaves.
- ☞ Mites suck **plant sap**, causing irregular **brown spots** on infested leaves.
- ☞ Infestations often develop first along the **leaf midrib**.
- ☞ Damaged leaves appear **russeted or scorched**.
- ☞ Large infestations can result in leaf loss, especially if trees are under **moisture stress**

### Mites – continued Biology

- Scorch mites overwinter as adults in the rough bark of limbs.
- Adult females begin laying eggs in the spring.
- Mites can complete a generation in 5 to 15 days and are more numerous during hot, dry weather.
- Natural enemies of scorch mites, including predatory mite species, are important in controlling these pests.



### Mites – continued

#### Control

- ☞ **Scorch mites** prefer the **shady**, interior portion of the tree and significant damage can occur before infestations are detected.
- ☞ Check **water sprouts** and shady, lower branches to detect early mite infestations.
- ☞ Mites may **increase** following the use of some insecticides (e.g. **Sevin®**) applied for hickory shuckworm, aphids or other pests.
- ☞ **Monitor** the orchard for mites when the weather is **hot and dry** and after insecticides are used.
- ☞ **Spray** when mites are present and damaging leaves.
- ☞ Mark infested trees or areas to determine if **spot treatment** is practical.

### Pecan Phylloxera (*Phylloxera* sp.)

#### Damage

- Phylloxera are **tiny, soft-bodied** insects closely related to **aphids**.
- These insects cause conspicuous swellings, called **galls**, to form on leaves, twigs and nuts.
- The two most important species attacking pecans are the pecan leaf phylloxera and the pecan phylloxera.
- The pecan leaf phylloxera forms galls on leaves only and extensive infestations may cause some defoliation.
- The pecan phylloxera is the most damaging species because it attacks the shoots and nuts.
- Extensive infestations of this species can destroy the **nut crop** and reduce the tree's **vitality** and subsequent **production**.

### Pecan Phylloxera (*Phylloxera* sp.) – continued

#### Biology

- ☞ Phylloxera survive the winter as eggs in bark crevices.
- ☞ In spring, the tiny nymphs emerge during budbreak and feed on new growth.
- ☞ Nymphs secrete a substance while feeding that stimulates plant tissue to develop abnormally, creating galls.
- ☞ The young phylloxera are soon completely enclosed in the galls, which range in size from 1/10-inch to 1-inch in diameter.
- ☞ Phylloxera feed inside the gall and complete two generations.
- ☞ Galls then crack open and winged, adult phylloxera emerge to lay eggs.
- ☞ In the case of the more destructive pecan phylloxera, no additional galls are formed.

### Pecan Phylloxera (*Phylloxera* sp.) – continued Biology

- ♀ Females hide in protected places on the bark and die, with their eggs remaining inside the protective bodies of the mothers throughout the winter.
- ♀ Some adult females of the pecan leaf phylloxera that emerge from spring galls may also overwinter.
- ♀ However, other females lay eggs and the hatching nymphs form a second or third generation of galls during one season, if new growth is available.

### Pecan Phylloxera (*Phylloxera* sp.) - continued Control

- ☞ **Native trees** and improved varieties vary in their susceptibility to phylloxera.
- ☞ Phylloxera cannot fly far and infestations **move slowly** from tree to tree.
- ☞ For these reasons, control is often achieved by treating only those trees with **phylloxera galls**.
- ☞ **Survey** the orchard in May and mark trees with galls for treatment the following spring.
- ☞ Insecticides for phylloxera must be applied after egg hatch in the spring but before **nymphs** are protected inside galls.

### Pecan Phylloxera (*Phylloxera* sp.) – continued Control

- ☞ Treat after **bud break** when growth is 1 to 2 inches long.
- ☞ Phylloxera infestations also can be reduced with a **dormant oil spray** applied to tree trunks and limbs during the dormant season.
- ☞ **Thorough coverage** is **essential** to ensure that eggs are killed.



### Sawfly (*Periclista marginicollis*)

- ☞ **Larvae** feed on **foliage** of many trees including pecan.
- ☞ **Hosts** include black and English walnuts, butternut, pecan, pin oak and various species of hickory.
- ☞ Excessive numbers of these caterpillars can **defoliate the trees** and severely affect tree vigor, yield, and nut quality.
- ☞ The **earlier** the defoliation, the more harmful the damage.
- ☞ Trees can withstand 2 or 3 consecutive years of **heavy defoliation** before they die.
- ☞ Epidemics were rare when standard, petroleum-based insecticides were used; however, now that many of the **biorationals** have been heavily adopted for insect control in pecan, these insects have assumed a more prominent role.
- ☞ It is unlikely that they will assume the status of a major pest.

### Sawfly (*Periclista marginicollis*) – continued Biology

- ☞ **One generation** of this pest per year in Oklahoma.
- ☞ Wasps emerge in **early spring** to deposit their **eggs** on new foliage.
- ☞ **Larvae** feed on the leaves in **April and May**.
- ☞ The **larvae** are often gregarious and feed in groups, but do not spin webs in which to feed.
- ☞ Larval feeding on the foliage initially causes tiny **holes in the leaves**.
- ☞ As the caterpillars mature and if numbers are excessive, the leaves assume a very tattered appearance, looking like they were shot with a shotgun.
- ☞ Mature larvae leave the trees and pupate in the soil to overwinter.





### Sawfly (*Periclista marginicollis*) – continued Description

- ☞ Sawfly **adults** are **small , stingless wasps** that are generally darker in color.
- ☞ They **do not appear** to have the constricted waist of many stinging wasps.
- ☞ **Female** sawflies have a short, stout, **saw-toothed ovipositor** they use these to cut into plant material and deposit their eggs.
- ☞ The **larvae** are small translucent **green** caterpillars.



### Sawfly (*Periclista marginicollis*) – continued Description

- ☞ Butterflies and moths will have 1 to 4 set of abdominal **prolegs**.
- ☞ Unlike the caterpillars of moths and butterflies, sawfly **larvae** possess six sets of abdominal **prolegs**.
- ☞ The larval stage of this insect can often assume a **slug-like appearance**, looking somewhat shiny and expanded at the head end.
- ☞ As they increase in size (up to 2/3 of an inch), the caterpillars will have assumed a somewhat **spiny** appearance.

Source: Oklahoma State University, [Department of Entomology](#)

### Walnut Caterpillar (*Datana integerrima*)

- ☞ Walnut caterpillars feed together in **large numbers** on pecan leaves, but do not construct silken **webs** like fall webworms.
- ☞ **Larvae** eat leaves, leaving only the **mid-ribs and leaf stems**
- ☞ Large infestations can defoliate entire trees.



- ☞ Although economic infestations are uncommon, severe and widespread **outbreaks** of walnut caterpillar have occasionally occurred in Texas.

### Walnut Caterpillar (*Datana integerrima*) – continued Biology

- ☞ Walnut caterpillar **moths** emerge in the spring
- ☞ Deposit **eggs** in masses of 500 or more on the undersides of leaves.
- ☞ Egg masses are **round**, about the size of a half-dollar and are not covered with hairs or scales.
- ☞ **Eggs hatch** in about 10 days; larvae feed for about 25 days.
- ☞ **Young larvae** are **reddish-brown** with yellow lines running the length of the body.
- ☞ **Full-grown** larvae are about 2 inches long, black with grayish lines and are covered with long, soft, gray hairs.



### Walnut Caterpillar (*Datana integerrima*) – continued Biology

- ∞ **Larvae** congregate in large masses on the **trunk** and scaffold branches to shed their skins before crawling back to complete their feeding on leaves.
- ∞ Most of the foliage is consumed by these **final stage larvae** and defoliation can occur very quickly.
- ∞ Mature larvae crawl to the **soil to pupate**.
- ∞ A generation is completed in about **6 to 8 weeks** and there are two to three generations each year (See Extension publication, [Walnut Caterpillar](#))



### Walnut Caterpillar (*Datana integerrima*) – continued Control

- Since the walnut caterpillar does not construct **tents or webs**, infestations often go unnoticed until leaf damage becomes obvious.
- Look for **egg masses** or leaf feeding to detect infestations early.
- Egg masses can be detected at night by shining a **flashlight** on the undersides of leaves and looking for white spots about the size of a half dollar.
- Caterpillars cause **80 percent** of their damage during the last 3 to 4 days of feeding.
- Smaller larvae are easier to kill with **insecticides** than larger larvae, and control of this stage prevents serious damage.
- Insecticide treatment may be **necessary** if large infestations threaten to defoliate trees.





### Yellow Aphid (*Monellia sp.*)

- ∞ **Small, soft-bodied** insects that suck sap  
from pecan leaves
- ∞ **Two species** of "yellow aphids, both bright yellow
  - yellow pecan aphid
  - blackmargined aphid
- ∞ Damage, biology and control are **similar.**

### Yellow Aphid (*Monellia sp.*) – continued Damage

- ☞ **Piercing-sucking mouthparts** for removing water and plant nutrients from leaf veins.
- ☞ As they feed, aphids excrete **honeydew** - large amounts of sticky material made of excess sugars – on leaves.
- ☞ Honeydew serves as a food source for **sooty mold**, which can cover leaves during conditions of high humidity.
- ☞ Shading effect of sooty mold can reduce **photosynthesis**.
- ☞ Studies have also shown that aphid feeding can reduce **leaf efficiency** and large, late-summer infestations can defoliate trees.
- ☞ This leaf injury and loss can reduce current and subsequent yields and quality because of **lower carbohydrate** production.



### Yellow Aphid (*Monellia sp.*) – continued Biology

- ☞ Yellow aphid eggs **survive** the winter hidden in bark **crevices** on twigs and tree trunks.
- ☞ Immature aphids, called **nymphs**, hatch from the eggs in the spring and begin to feed on newly expanded leaves.
- ☞ Nymphs mature in about a week and give birth to **live young**.
- ☞ All individuals are **females** that reproduce without males during the spring and summer.
- ☞ In late September and October, males and females develop and females deposit **overwintering eggs**.
- ☞ Aphids have a **short life cycle** and **high reproductive capacity**, so infestations can quickly increase during favorable conditions.

### Yellow Aphid (*Monellia* sp.) – continued Biology

- ☞ Yellow aphid infestations often reach a **peak** by mid-summer and then suddenly decline after 2 to 3 weeks.
- ☞ **Natural enemies**, including lacewings, lady beetles, spiders and other insects, can suppress aphid infestations if they are present in sufficient numbers.
- ☞ **Insecticides** applied for aphids or other pests can sometimes destroy these natural enemies, allowing aphids to increase to even greater densities than before treatment.

### Yellow Aphid (*Monellia sp.*) – continued Control

- ☞ **Insecticides** do not consistently provide adequate control of yellow aphids.
- ☞ Aphids may become **tolerant** to an insecticide used frequently in an orchard.
- ☞ An insecticide that is effective in one orchard may be ineffective in a nearby orchard.
- ☞ A number of studies have shown that in some cases the application of **pyrethroid** insecticides (Asana®, Ammo®, Cymbush®) for casebearer or aphid control may be followed by large increases in yellow aphids.
- ☞ Several soil applied **systemic insecticides** are registered for aphid control in pecans.

### Yellow Aphid (*Monellia* sp.) – continued Control

- ⌘ These treatments are preventive and may be justified in areas where aphids annually exceed economically damaging levels.
- ⌘ The use of these soil applied insecticides is discouraged in areas where ground water contamination could occur.
- ⌘ Frequently inspect leaves to monitor yellow aphid **densities**.
- ⌘ **Examine** trees throughout the orchard to obtain a representative sample.
- ⌘ Yellow aphids increase more rapidly on some varieties (e.g., **Cheyenne**) than on others.

### Yellow Aphid (*Monellia* sp.) – continued Control

- ☞ Treatment should be considered when yellow aphids average **25 or more** per compound leaf.
- ☞ **Scouting the orchard** on a 4 to 5-day schedule will determine if yellow aphid numbers are increasing or decreasing and indicate the need for insecticide treatment.
- ☞ Do not base the need for treatment on the amount of honeydew alone, as infestations often decline rapidly ("**crash**") because of weather or physiological effects.
- ☞ Thorough **spray coverage** is important in controlling aphids.

### Spring Leaf Feeders

- ∞ A sporadic occurrence
- ∞ A variety of leaf feeders attack pecan foliage in the spring between bud break and pollination.
- ∞ They are present every year, but natural environmental forces usually keep them at sub-economic levels.
- ∞ Pest outbreaks can occur in any given year, so pecan foliage should be surveyed during the spring to insure that these pests do not inflict significant damage to the leaf crop.

### Leaf Tatterer and Defoliator

#### Survey

SAMPLING	TIME
(a) Rate insects on 5 leaves on each monitor tree *	(a) April through mid-May
(b) Rate each leaf **: 0 = 0 larvae per leaf 1 = 1 - 2 larvae per leaf 2 = 3 - 5 larvae per leaf 3 = 6 + larvae per leaf	(b) Rate on weekly interval

\* Survey 5-10% of trees in orchard.

\*\* Sum ratings from 5 leaves per tree and divide by five to obtain tree rating. Record one rating for each tree. Average tree ratings to obtain orchard rating and the need to spray.

### Leaf Tatterer and Defoliator – continued Action Levels

Pest	Orchard rating
Sawfly	.5
Cigar leaf casebearer	1.0
Pecan leaf casebearer	1.0
Catacola	.2
Maybeetles	.5
Leafminers	1.0
Spittlebugs ***	.1

\*\*\* Inspect 5 shoots instead of 5 leaves if spittlebug is suspected to be a problem. Rate number of shoots with spittlebug.





Asian Ambrosia Beetle

Obscure Scale

Twig Girdler

### Asian Ambrosia Beetle



- ∞ Infestations of the Asian ambrosia beetle can be identified by the **toothpick-like projections** from the trunk or the main scaffold limbs.
- ∞ Infested trees should be removed and surrounding trees should be **treated** with lindane or chlorpyrifos (Lorsban®).
- ∞ This is an **early season pest** with most infestations observed in April or May.
- ∞ Infested trees should be **burned or shredded** to prevent the adults from from emerging from the wood.

### Obscure Scale

- Obscure scale attacks hickory, oak, and other trees including pecan and can become a significant pest, if neglected.
- Scale source of nourishment comes from drawing sap out of tree branches.
- Heavy populations will weaken trees and entire limbs may die.
- Trees are more susceptible to wood borers, and leaves on infested limbs become weak and more subject to the effects of foliage diseases.
- These factors combine to reduce pecan yields.

### Twig Girdler (*Oncideres pustulatus* LeConte)

- ☞ Adults of the twig girdler emerge from twigs in August or September and mate.
- ☞ Females then girdle living twigs and lay eggs in the part that will die.
- ☞ One generation per year
- ☞ Gathering and burning twigs in the winter will help reduce the problem.
- ☞ Twig girdler overwinters as a partially grown larva



### Twig Girdler (*Oncideres pustulatus* LeConte) - continued

- ☞ In spring and summer the twig girdler completes its development and pupates.
- ☞ Cycle repeats
- ☞ Reported to be an occasional problem in far west Texas.



### Red Imported Fire Ant

- Fire ants can lower pecan production when they **interfere** with operations such as grafting, mowing and harvesting.
- They also may **damage drip or sprinkler irrigation** systems.
- Chlorpyrifos (Lorsban®) is registered for use in pecan orchards as an **orchard floor spray** for fire ants. Logic Fire Ant Bait® is registered for use only in non-bearing pecan orchards.
- Fire ants have been known to protect **pecan aphids** by destroying beneficial insects in pecan orchards.
- Fire ants should be controlled or at least kept out of pecan trees.
- Lorsban 4E at 2 pts/acre as a ground spray is labeled for fire ant control. <sup>(1)</sup>

<sup>(1)</sup>[Commercial Pecan Insect Control \(Bearing Trees\)](#), Will Hudson, Extension Entomologist, [Georgia Extension Pecan Team](#), University of Georgia.