



# Arizona Department of Agriculture

## Plant Services Division

### Pecan Pests

Arizona's pecan industry was valued at \$61.6 million dollars in 2010, and along with New Mexico's, accounts for 28% of all pecan production in the United States (USDA NASS). With increasing demand and interstate shipping, comes an increasing risk that exotic pecan pests from infested areas outside Arizona will find a pathway into our state. To help protect Arizona's important nut industry, the Arizona Department of Agriculture is actively trapping or inspecting for the following pecan pests: Hickory Shuckworm (*Cydia caryana*), Pecan Weevil (*Curculio caryae*), Pecan Leaf Casebearer (*Acrobasis juglandis*), and Pecan Nut Casebearer (*Acrobasis nuxvorella*).

#### Hickory Shuckworm (*Cydia caryana*)

[Lepidoptera : Tortricidae]

**Distribution:** Georgia and South Carolina west to Texas and New Mexico.

**Description: Adults** are 8-9 mm in size, gray to dark gray with dark and light marks along the leading edge of the front wings (Figure 1).

**Eggs** are 0.5-1 mm in size, light tan to white, flat, and found on surface of shucks.

**Larvae** are 9-10 mm when mature, creamy-white with reddish-brown heads (Figure 2).

**Pupae** are 8-9 mm in size and light reddish brown.

**Life Cycle:** 2 to 5 generations per year. Mature larvae overwinter inside fallen pecan shucks. They create thin "windows" over the larval entrance holes in the shuck prior to pupation, providing an easy exit for pupae or adult moths; pupation takes place within or on the surface of the shuck. First generation moths emerge from February to May, usually several weeks before pecan nut set. These early females lay eggs on hickory nuts (if available), pecan foliage, or even phylloxera galls. Larvae issuing from eggs laid on pecan foliage rarely survive; consequently, few pecan trees are infested with first generation larvae. If an alternative host is available, later generations lay eggs on the surface of pecan shucks. Throughout the summer and fall, larvae continue to feed in, develop in, and pupate in or on fallen pecan nuts. Mature, last generation larvae overwinter in fallen pecan nuts or occasionally in nuts remaining on the tree.

**Damage:** Before nutshells harden, larvae tunnel into nuts, causing early drop. After the shells harden, larvae tunnel in the shucks and prevent kernels from developing properly. Injured portions of the shucks may stick to the nutshell, interfering with processing.

**Similar Arizona Species:** Mesquite Moth (*Cydia mimbrosa*) and Mesquite Bean Moth (*Ofatulena duodecemstriata*) are often found in Hickory Shuckworm pheromone traps. Separating these native species from Hickory Shuckworm can sometimes be difficult, but they are usually smaller and/or more colorful (Figure 3). Larvae of the Navel Orangeworm (*Amyelois transitella*) (Figure 10) are similar in appearance to larvae of the Hickory Shuckworm and cannot be easily differentiated in the field.



Figure 1: Hickory Shuckworm Adult



Figure 2: Hickory Shuckworm Larva



Figure 3: (a) Mesquite Moth and (b) Mesquite Bean Moth

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**Pecan Weevil** (*Curculio caryae*)

[Coleoptera : Curculionidae]

**Distribution:** New York to Iowa, south to Oklahoma, and across the southeastern states from Florida to Texas. Occasionally found in New Mexico, but under eradication there.

**Description: Adults** are 12 mm in size, light brown to gray with a very long curved beak (Figure 4).

**Eggs** are 1-2 mm in size, white, oval and are laid inside on the developing nut kernel.

**Larvae** are 10-12 mm when mature, C-shaped, legless, and have dark reddish-brown heads (Figure 5).

**Pupae** are 12-14 mm in size, white, resemble adults and are found in earthen cells 10-30 cm deep in the soil near the host tree (Figure 6).

**Life Cycle:** Takes 2 or more years to complete a life cycle. Adults emerge after August rains, feed and find mates. Females lay 3-4 eggs per nut. Eggs hatch in 6-14 days. Larvae mature in 40-45 days. Mature larvae chew their way out of the nut, drop to the soil, and form an earthen chamber (Figure 6). After almost a year, the larvae pupate, but will remain in the soil for another 3 weeks before emerging. However, adults will not always emerge from the earthen chambers unless environmental conditions are right. They may remain in the soil for an additional 1-2 years.

**Damage:** Weevil feeding during the early “gel” stage of nut development can cause nuts to drop early or can result in the shuck adhering to the nut, interfering with processing. Adult feeding and egg laying can also leave characteristic circular feeding scars on the surface of the shuck. Larval feeding within the pecan causes complete destruction of the kernel.



Figure 4: Adult Pecan Weevil



Figure 5: Pecan Weevil Larvae



Figure 6: Pecan Weevil Pupa

**Pecan Nut Casebearer** (*Acrobasis nuxvorella*)

[Lepidoptera : Pyralidae]

**Distribution:** Florida to southern New Mexico.

**Description: Adults** are 8-10 mm in size, uniformly gray to dark gray, with a dark band of raised scales running across the base of both wings (Figure 9, arrow).

**Eggs** are 0.5-1 mm in size, white, and changing to pink prior to hatching.

**Larvae** when mature are 10-17 mm in size, purplish-brown, but lighter colored when young.

**Pupae** are 6-9 mm in size and are yellow brown.

**Life Cycle:** Adults emerge in late spring and lay eggs singly on tips of nutlets. The first generation young larvae feed on developing buds and nutlets. As larvae mature, they bore into the base of one or more nuts, where, after 4-5 weeks, they pupate and emerge in 9-14 days as adults. This cycle repeats two or three more times before the end of fall. Second-generation larvae feed primarily on shucks, causing little economic damage. Young larvae of the last generation of the season feed little as they search for an overwintering site to form a small silken hibernaculum near a bud. These overwintering larvae emerge in spring in time to feed within developing shoots where they later pupate.

**Damage:** First generation larvae feed on buds and newly set nuts. A single larva may destroy from one nut to all the nuts in a cluster; infested nuts are often held together with frass-covered silk (Figure 8). This is the most damaging generation. Later generation larvae feed on a single nut or, if the shell has hardened, only at the shuck base, where it does little



Figure 7: Pecan Nut Casebearer Adult



Figure 8: Larval Frass and Damage from Pecan Nut Casebearers



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damage. Light infestations may result in desirable thinning; heavy infestations may ruin the entire nut crop.

**Inspection Tips:** Look for exit holes at the base of shoot diebacks. Small larvae can be found feeding on buds just below the nut cluster. Once the larvae have begun to feed on a nutlet, silk and black frass often become visible on the outside (Figure 8). Open damaged nut clusters and inspect for larvae and pupae. Inspect for silk cocoons (hibernacula) at bud unions on bare root nursery stock.

**Similar Arizona Species:** Adult Pink Bollworms (*Pectinophora gossypiella*) are often found in pheromone traps and are sometimes confused with Pecan Nut Casebearer. Pink Bollworm is similar in size and color to the Pecan Nut Casebearer, but lacks the characteristic dark band of raised scales running across the base of both wings (Figure 9). Larvae of the common Navel Orangeworm (*Amyelois transitella*) (Figure 10) are often mistaken for the larvae of PNC when inspecting nuts. Larvae of the Navel Orangeworm are light colored with a distinctly darker head. The larvae of Pecan Nut Casebearer are dark, purplish-brown with a head color that is very similar to its body color.



Figure 9: Pink Bollworm



Figure 10: Navel Orangeworm

**Pecan Leaf Casebearer (*Acrobasis juglandis*)**

[Lepidoptera : Pyralidae]

**Distribution:** Found in Ontario, Canada and in the United States from Vermont to Florida and North Dakota to New Mexico.

**Description: Adults** are 9-10 mm in size, grayish brown with a patch of white and reddish scales just behind a dark band of raised scales running across the base of both wings (Figure 11).

**Eggs** are 0.5-1 mm in size, white, oval, and usually found on the underside of leaflets.

**Larvae** when mature are 16 mm in size, dark green with shiny dark brown heads (Figure 12). Young larvae are lighter green. Larvae develop and feed from inside a case made of silk (Figure 13).

**Pupae** are 6-9 mm in size, yellow brown, and found within a larval case made of webbing and larval excrement (Figure 13).

**Life Cycle:** One generation per year, with young larvae overwintering in silk cocoons attached near buds. With arrival of warmer weather, the young larvae exit their cocoons and bore into nearby buds. As the larvae age, they move to the undersides of leaflets, create protective silken cases, where they remain and feed until they mature. Pupation occurs within the case and adults emerge and find mates from mid-May through August. After mating, females will lay eggs on the underside of leaflets.

**Damage:** During early spring small larvae attack unfolding buds and foliage and, when infestations are heavy, they can keep trees partially defoliated for several weeks. Late season larvae feed sparingly on undersides of leaflets and do little damage.



Figure 11: Pecan Leaf Casebearer Adult



Figure 12: Pecan Leaf Casebearer Larva

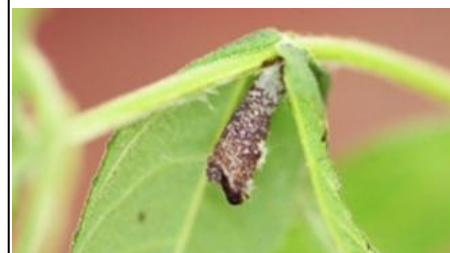


Figure 13: Pecan Leaf Casebearer Larval Case

References are available upon request.

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