

Pepper weevil, *Anthonomus eugenii* Cano (Coleoptera: Curculionidae)

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Pepper weevil (PW), *Anthonomus eugenii* Cano (Coleoptera: Curculionidae), is an economically important invasive insect pest of cultivated peppers in the southeastern United States. The pest is native to Mexico, and widely distributed in the southern United States, Mexico, Central American, and the Caribbean. Adult pepper weevils feed on fruit and leaf buds and lay eggs on flowers, buds and fruits. Larvae feed inside the fruit, causing premature fruit drop and often significant crop losses of 50% or more. Larger fruits do not immediately drop. Entire infested fields are often abandoned because of concern in shipping infested fruit to markets. Under heavy infestation, the entire pepper crop must be removed from the field because the infestation poses a serious threat to future pepper crops. Because young plants for transplanting are shipped northward each spring, the PW sometimes occurs in the northern States. In central and south Florida, adults are commonly found from March until June reflecting the availability of peppers, but a few can be found throughout the year except in December and January. In north Florida, the species can be found most of the year except mid-December to late-February. Under suitable weather conditions, the PW requires 20 to 30 days to complete its life cycle. Under insectary conditions in California, up to eight generations have been produced in a single year, but three to five generations is probably normal in most locations. The adults are long-lived and produce overlapping generations, so it is difficult to determine generation number accurately. The shipment of infested fruits and plants have regulatory and trade implications. Because of its minute size and cryptic nature, the weevil can also escape primary inspections at the port of entries.



Weevil feeding on an unopened flower.



Weevil larva feeding inside a pepper.



Adult weevil exit holes in jalapeno peppers.

Identification. Adult beetles are oval in shape, 2.0–3.5 mm long, 1.5–1.8 mm wide, mahogany-brown to black, with a strongly-arched body and a long, stout beak. The thorax and elytra are mostly covered with small scales. Antennae are long and markedly expanded at the tip. Each femur bears a sharp tooth. Pupae resemble adults in form, except that wings are not fully developed and large setae are found on the prothorax and abdomen. Pupae are white when first formed, but eventually become yellowish with brown eyes. Larvae are white to gray in color, with a yellowish brown head. Larvae lack thoracic legs and have few large hairs or bristles. Eggs are white when first deposited, but soon turn yellow. They are oval in shape and measure 0.53 mm in length and 0.39 mm in width.

Host Plants. Pepper weevils attack all species of pepper (*Capsicum* spp.) as well as nightshades (*Solanum* spp.). The American black nightshade, *S. americanum*, is an important alternative host plant.

Distribution. The origin of the pepper weevil likely is Mexico, but it is found throughout most of Central America, the Caribbean, and the southern United States. It was found in Texas in 1904, California in 1923 and Florida in 1935, and is now found across the southernmost United States from Florida to California. However because transplants are shipped northward each spring, pepper weevil sometimes occurs in more northern locations. The PW was first observed in Hawaii in 1933 and in Puerto Rico in 1982.

Damage. Destruction of blossom buds and immature fruits is an important form of pepper damage. Both adult and larval feeding causes bud drop. Adult feeding punctures appear as dark specks on the fruit, and are not very damaging. Sometimes the fruit is deformed. Fruit drop is very common and is the most obvious sign of infestation. Larval feeding within the mature pod is another important form of damage, causing the core to become brown, and often moldy. The stem of pods infested by larvae turn yellow, and the pod turns yellow or red prematurely. Punctures caused by pepper weevil allow penetration of the fungus *Alternaria alternata*.

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Monitoring and Pest Density

- Inspect two terminal vegetative buds per plant in the morning at least twice weekly.
- Sampling should be concentrated on field perimeters.
- Use yellow sticky traps and pheromone traps for adults.
- Use boll weevil traps baited with pepper weevil pheromones.
- Make direct adult weevil counts using whole plant inspections.
- Scout for feeding damage or egg laying in terminal bud clusters.

Biology and Ecology

- A female oviposits 5 to 7 eggs per day with a mean fecundity of 341 eggs per lifetime.
- Egg stage (4.3 days) is followed by the first (1.7 days), second (2.2 days), and third (8.4 days) instars, then pupa (4.7 days), and adult; hence, the duration from egg to adult emergence is 21.3 days.
- Pupation occurs within a flower or fruit and, upon emergence from the pupa, the adult escapes from the fruit by making a round exit hole. Maximum *A. eugenii* fecundity (3.1 eggs per female per day), shortest development time (12.9 days), and minimal mortality were obtained at 30 °C, the temperature for maximum population increase.
- One generation is completed in 20 to 30 days, and up to 8 or more generations can be completed depending upon the weather conditions and host plant availability.

Pest Management Strategies

- Two important parasitoids of PW are *Catolaccus hunteri* Crawford (Hymenoptera: Pteromalidae) and *Bracon mellitor* Say (Hymenoptera: Braconidae).
- Avoid locations with pepper weevil infestations when selecting sites for a new pepper crop.
- Scout fields weekly beginning at transplanting or before first bloom. Also scout nightshade plants and old pepper residue in the area to determine if a preplant cleanup is needed.
- Avoid carry-over of weevils from one season to the next. This is a problem where peppers are cut back to produce a second crop or crop residue is left standing after harvest.
- If weevils infest early in the season, begin controls at first bloom to prevent an early build-up of pepper weevil.
- Action threshold: 1 adult per 400 terminal buds or 1 adult per trap.
- Target insecticide sprays at the adults by getting good spray coverage and timing applications with the presence of adults or their emergence from fallen fruit.

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