



Pepper Weevil

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Order: Coleoptera

Family: Curculionidae

Species: *Anthonomus eugenii* (Cano)

Introduction

The pepper weevil, *Anthonomus eugenii* (Cano), is a sporadic pest of pepper in Virginia. The insect is predominately a pest in the southern U.S., where it can inflict significant damage to that crop. Though adult weevils may feed on numerous plant species within the family Solanaceae, oviposition and subsequent larval development is specific to plants within the genera *Capsicum* (peppers) and *Solanum* (nightshades). Individuals may live 3-4 months and there are multiple generations (often 5-8) per year. The pepper weevil is an uncommon pest in Virginia, but if it occurs, infestations can result in the loss of entire pepper crops.

Life cycle and identification

Adult. Pepper weevil adults share a general appearance with other weevils of the same genus, having a long, stout beak and strongly arched body with thorax and elytra covered with scales (Fig. 1). They are generally 2 - 3.5 mm long and 1.5 - 1.8 mm wide, though if larval diet was lacking nutritionally adult size may be stunted. Beetles are light brown immediately following eclosion, darkening to a greyish black color (Fig. 2). Adult pepper weevils generally mate within 2 days following emergence from the pupal state and begin laying eggs a day or two later.

Egg. Pepper weevil eggs are deposited within the bud, pod, or wall of pepper fruit. The female weevil forms a cavity using her mouthparts, deposits an egg, and then seals the puncture with a clear yellowish fluid that darkens and hardens as it dries. Eggs are laid singly and measure approximately 0.53 mm in length and 0.39 mm wide. They are pearly white in color when first laid, darkening to yellow over time. Eggs are an oblong-oval shape usually, but may take on the shape of the cavity in which they are laid. The incubation period of eggs ranges from 3-5 days. Female weevils have a fecundity of about 340 eggs, and generally lay 5-7 per day.



Fig. 1. Pepper weevil adults (image courtesy of Dr. Alton N. Sparks, Jr., University of Georgia, Bugwood.org).

Larva. Pepper weevil larvae feed on the bud or r pod wall of the pepper after hatching from the egg. They have 3 instars, measuring approximately 1 mm long at the smallest and maturing to a final length of about 6 mm. The body is white but may appear grey with accumulation of matter in the digestive tract, the head being yellowish-brown with brown margins (Fig. 2). Grubs are relatively aggressive, offering to bite when disturbed and readily cannibalizing others of the same species. Development time is greatly dependent upon temperature and humidity, as well as food quality; it may take anywhere from 4-24 days for a grub to develop and pupate.



Fig. 2. Pepper weevil larvae (image courtesy of Dr. Alton N. Sparks, Jr., University of Georgia, Bugwood.org).

Pupa. Pupal cells are excavated by 3rd instar larvae and lined with a material made from fecal material that will harden and become brittle. Pupae resemble the adult form except that they lack fully developed wings (Fig. 3). Pepper weevil pupation typically lasts 3-6 days.



Fig. 3. Pepper weevil larvae (image courtesy of Dr. David Riley, University of Georgia, Bugwood.org).

Distribution

Native to Mexico and Central America, this insect was first found in the Southwest in the early 1900s, the pepper weevil is now established across the southern United States from California to Florida, as well as in Hawaii and some Caribbean islands. Weevil populations spread to new areas by adults flying when temperatures are high enough, as well as transport of infested pepper fruit or plants. The pepper weevil is not known to diapause, and so its potential range is limited to locations in which the host plants are present year-round. Though it may be introduced to more northern locations via shipped transplants, it will not persist there beyond the growing season. In 2007, pepper weevil was first detected in coastal Virginia; the source of this infestation was unknown since no transplants had been brought to that or any other nearby location.

Damage

The most important damage done to pepper crops is to the blossom buds and immature pods. Stems of infested pods will begin to yellow and wither at their attachment to the plant, and the pods themselves may prematurely take on a yellow/red color and fall from the plant. Significant fruit drop is perhaps the most easily observed indicator of pepper weevil infestation. Though some fruit in an infested field may not show symptoms of weevil damage, the crop may still be harboring the pest, and thus the grower may be hesitant to send the produce to market.

Management

Cultural. Perhaps one of the most important things a grower can do to control the pepper weevil is to disc or plow under pepper plants and cull piles of fruit following harvest, eliminating a potential reservoir for infestation between crop plantings. It is also important to eliminate nightshade weeds that can act as an alternate host; these may be found growing along roadsides or next to buildings. If an infestation occurs, it is critical that fallen or culled fruit be removed from the site or destroyed.

Biological. Although there are a few species of hymenopterous parasitoids that attack pepper weevils, including the pteromalid *Catolaccus hunter* and the braconids *Triaspis eugenii* and *Urosigalphus* sp., the impact of parasitoids on pepper weevil populations is limited, and so they should probably not be relied upon as a primary control measure. Very little is known about predation of this pest, and given that eggs and larvae are typically protected within the pepper plant, predation is probably minimal.

Chemical. Insecticides are somewhat effective in controlling weevil infestations. , Chemical applications need to target adults prior to oviposition. Some insecticides used for pepper weevil by commercial growers that have provided effective control include permethrin, oxamyl, esfenvalerate, and cryolite. Action thresholds for this pest are extremely low, i.e., 1 adult weevil per 400 terminal buds, or 1% infested buds. Sampling for this pest may be performed by visual examination, by using yellow sticky traps placed 10-60 cm from the soil, or by using boll weevil pheromone traps baited with either male pepper weevils or pheromone extract. It should be noted that pepper weevil distribution within a field may occur in clumped patterns, especially at the margins in response to a male aggregation pheromone.