

Pepper Fruit Fly *Atherigona orientalis* (Schiner) (Insecta: Diptera: Muscidae)¹

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The Featured Creatures collection provides in-depth profiles of insects, nematodes, arachnids and other organisms relevant to Florida. These profiles are intended for the use of interested laypersons with some knowledge of biology as well as academic audiences.

Introduction

Atherigona orientalis (Schiner) is commonly referred to as the pepper fruit fly or tomato fruit fly. Despite its common names, it is not a true fruit fly in the family Tephritidae, but rather a member of the Muscidae, the same family to which the common house fly belongs. The pepper fruit fly is found in most tropical and subtropical areas of the world and is usually considered a secondary pest or “trash fly.” However, it can sometimes be a primary pest of certain agricultural crops, most notably plants in the family Solanaceae. Thus, in a few tropical/subtropical countries where the fly has not been found, such as Guatemala and New Zealand, it is considered a pest of regulatory importance (Biosecurity New Zealand 2011, World Trade Organization 2003).



Figure 1. Adult *Atherigona orientalis*.

Credits: Gary Steck, Florida Department of Agriculture and Consumer Services, Division of Plant Industry

Synonymy

Acritochaeta excisa Thomson

Acritochaeta orientalis (Schiner)

Atherigona excisa var. *flavipennis* Malloch

Coenosia excisa Thomson

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Atherigona magnipalpis Stein

Atherigona trilineata Stein

Acritochaeta pulvinata Grimshaw

Life History and Description

Eggs are laid in cracks of splitting-ripe to rotting fruit, in oviposition sites of other insects, and even in carrion or feces, as females do not possess a sharp, strong ovipositor able to puncture hard tissues. The eggs are about 0.9 mm in length and are usually inserted so that one tip is exposed. Maggots (larvae) hatch in about 12 hours at 85°F, and there are three instars that together last about five days. The first and second instars are small and undescribed, but the 3rd and final instar grows to a length of 4–6 mm (Skidmore 1985). The maggots feed on a wide variety of material and can even be predators of other fly maggots. Pupae are unusually short and broad for this group of flies; shiny to matte in appearance, dark orange to dark red in color and enclosed in puparia (last larval skin). The puparial stage lasts about 6 days at 85°F (Skidmore 1985). Adults are small yellowish-gray flies with a body length of about 4 mm (Olsen 1996). Wing length is 2.5 to 3 mm. The head profile is almost square.

Distribution

Worldwide

Skidmore (1985) states that *Atherigona orientalis* is pan-tropical species, occurring within 20 degrees north and south of the equator. Outside of that range it has been reported from Australia, China, Korea, and the United States but may be in other countries as well.

United States

The fly has been reported from California, Florida, Georgia, Hawaii, Pennsylvania, Louisiana, and Texas (GBIF, 2024; CABI 2000).

Florida

Although this fly may occur throughout Florida, the Division of Plant Industry of the Florida Department of Agriculture and Consumer Services has confirmed records only from the following counties: Brevard, Broward, Collier, Hillsborough, Indian River, Manatee, Martin, Miami-Dade, Okeechobee, Orange, Osceola, Palm Beach, Pinellas, Polk, Sarasota, and St. Lucie.

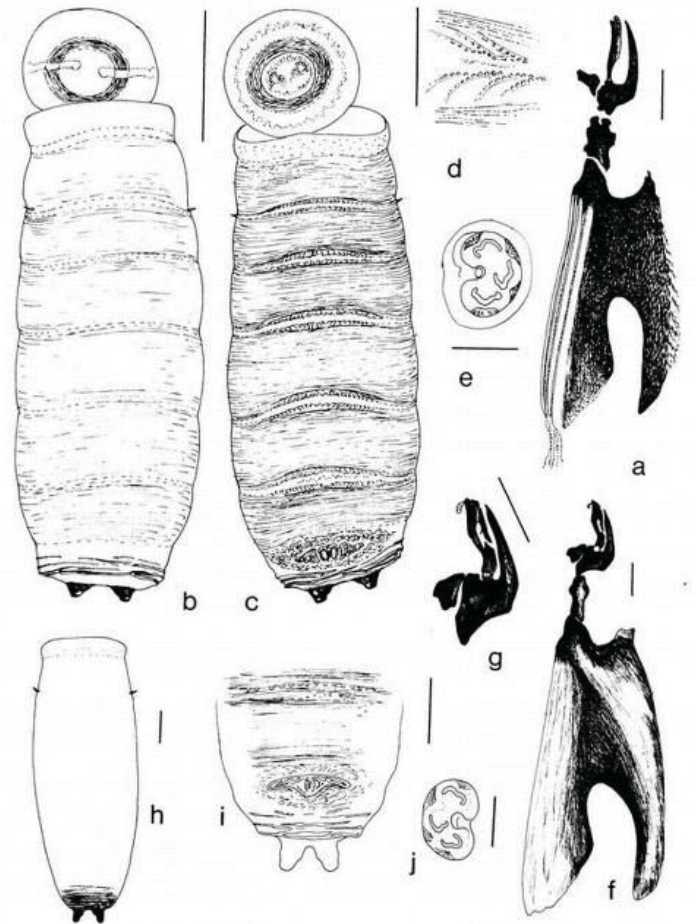


Figure 2. *Atherigona orientalis* puparium from Skidmore, P. 1985. The Biology of the Muscidae of the World. Page 291, figure 85. Figure 85 *Atherigona* (*Acritochaeta*) *orientalis*: a) cephalopharyngeal skeleton from puparium; b) puparium (dorsal view); c) same (ventral view); d) detail of spiculation on ventral abdominal welt 3; e) anal spiracle of puparium; A. (*A.*) *longipalpis*: f) cephalopharyngeal skeleton from puparium; g) detail of oral sclerites of same; h) puparium (dorsal view); i) posterior end of puparium (ventral view); j) anal spiracle of puparium. (Scales: a, d, e, f, j 0.10 mm; b, c 1.0 mm; g 0.12 mm; h, i 0.61 mm) (Orig.).

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Hosts

Worldwide

This fly is highly polyphagous. Maggots feed and develop on live and decaying plant material, feces, carrion, and even the live larvae of other insects including the tobacco caterpillar (*Spodoptera litura* Fabricius). It is known to lay eggs in oviposition sites of other insects, and it is suspected that the maggots of *Atherigona orientalis* feed on the maggots of *Bactrocera* spp. (Uchida et al. 2006) and *Dacus* spp. (Skidmore 1985) fruit flies.

Major Plant Hosts

Common host plants of *Atherigona orientalis* include cabbage and cauliflower (*Brassica oleraceae*), bell pepper (*Capsicum annuum*), orange (*Citrus sinensis*), melon (*Cucurbit melo*), tomato (*Lycopersicon esculentum*), beans (*Phaseolus* spp.) and sorghum (*Sorghum bicolor*). Ogbalu et al. (2005) reported that *Atherigona orientalis* is a major primary pest of bell pepper in Nigeria, stating that the fly oviposits on the fruit at the calyx, the grooves, and blossom end. He further indicates that the maggots can cause serious damage to both unripe and ripe fruit of most pepper cultivars in Nigeria. An information kit published by the government of Queensland, Australia, lists *Atherigona orientalis* as a primary pest of tomato because the female fly will lay eggs in the cracks of the fruit and the developing maggots damage the fruit (Queensland Government 1998).

Minor Plant Hosts

Onion (*Allium cepa*), cucumber (*Cucumis sativus*), carrot (*Daucus carota*), peach (*Prunus persica*), aubergine (egg-plant) (*Solanum melongena*), wheat (*Triticum aestivum*), and maize (*Zea mays*) are occasionally attacked by *Atherigona orientalis*.

Unusual Hosts

Human and pig feces, carrion, decaying plant matter, dead insects, and the live maggots of *Dacus* spp. fruit flies also are consumed (Skidmore 1985).

Florida

Atherigona orientalis is frequently captured in traps set among plants, but it is not known whether the fly is attracted to the plant or the trap lure. In Florida, the fly has been reared from fruit of the following plants: calamondin (*X Citrofortunella microcarpa*), grapefruit (*Citrus x paradisi*), tangerine (*Citrus reticulata*), Surinam cherry (*Eugenia uniflora*), *Ficus citrifolia*, kumquat (*Fortunella japonica*), creeping cucumber (*Melothria pendula*), avocado (*Persea americana*), tropical soda apple (*Solanum viarum*), and rose apple (*Syzygium jambos*) (Florida Department of Agriculture and Consumer Services, Division of Plant Industry Entomology Specimen Reports).

Pest Status in Florida

In contrast to some areas of the world, *Atherigona orientalis* is seldom a noticeable plant pest in Florida, despite the presence of hosts such as bell pepper and tomato, which can be heavily infested elsewhere. In Florida, *Atherigona orientalis* appears to be largely restricted to attacking

previously damaged fruit, and therefore, is not a pest of major concern.

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