

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

Kenneth L. Hibbard and William A. Overholt²

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).

Synonymy

Acritochaeta excisa Thomson

Acritochaeta orientalis (Schiner)

Atherigona excisa var. *flavipennis* Malloch

Coenosia excisa Thomson

Atherigona magnipalpis Stein

Atherigona trilineata Stein

Acritochaeta pulvinata Grimshaw



Figure 1. Adult *Atherigona orientalis*.

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

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.

1. This document is EENY-539, one of a series of the Entomology and Nematology Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date September 2012. This document is also available as a Featured Creature at <http://entomology.ifas.ufl.edu/creatures>. Visit the EDIS website at <http://edis.ifas.ufl.edu>.
2. Kenneth L. Hibbard, biological scientist, Florida Department of Agriculture and Consumer Services, Division of Plant Industry; and William A. Overholt, professor, Entomology and Nematology Department, University of Florida, Gainesville, FL 32611.

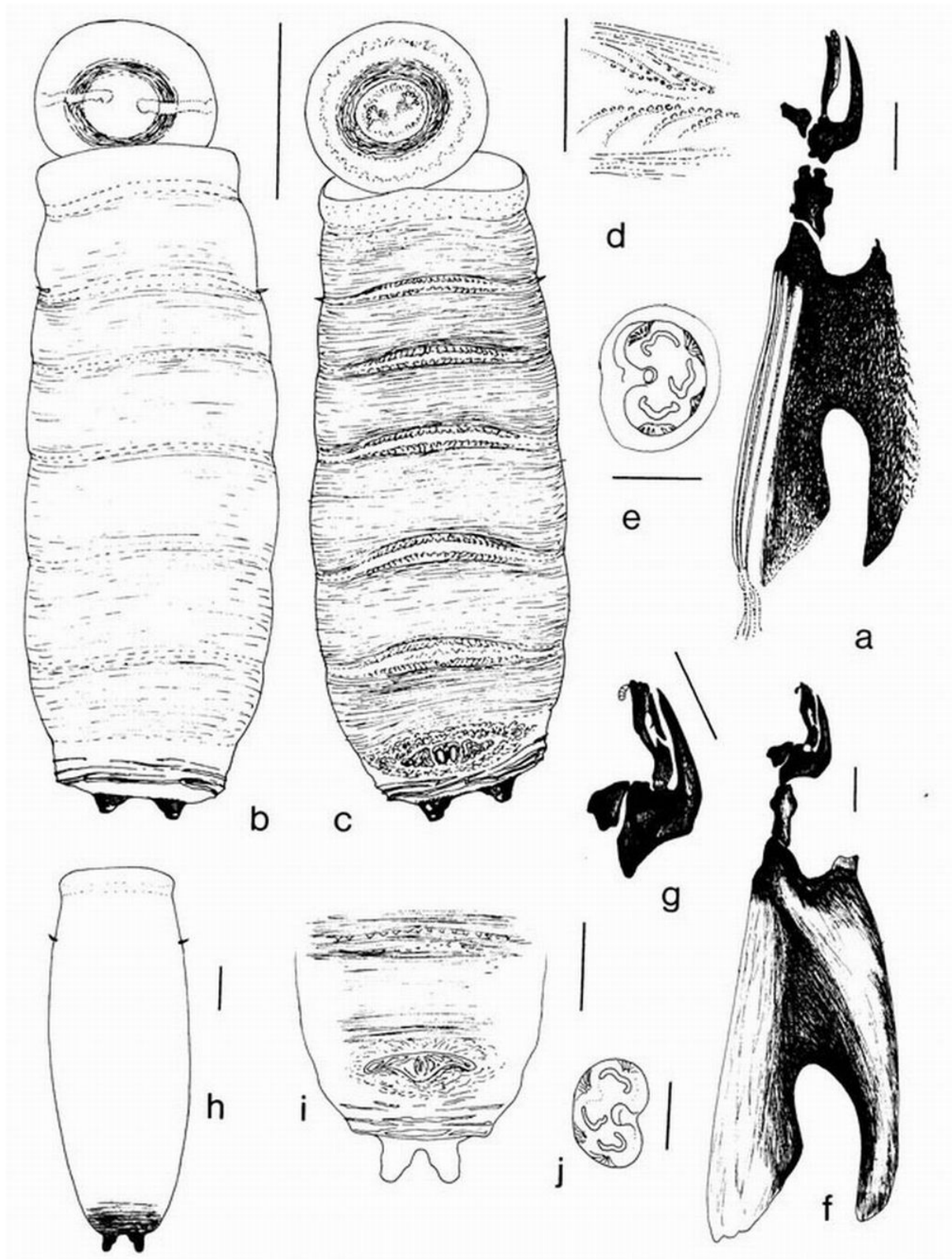


Figure 2. *Atherigona orientalis* puparium from Skidmore, P. 1985. The Biology of the Muscidae of the World. Page 291, figure 85. *Figure 85 Atherigona (Acritochaeta) orientalis* : a, cephalopharyngeal skeleton from puparium; b, puparium (dorsal view); c, same (ventral view); d, detail of spiculation 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 0.10mm; b, c 1.0 mm; g 0.12 mm; h, i 0.61 mm) (Orig.).

Credits: Originally published by Dr. W. Junk Publishers, Dordrecht, the Netherlands. Used by kind permission from Springer Science+Business Media B.V.

Eggs hatch in about 12 hours at 85°F, and there are three larval instars that together last about five days. The first and second instar larvae are small and undescribed, but the 3rd and final instar grows to a length of 4-6 mm (Skidmore 1985). The larvae feed on a wide variety of material and can even be carnivores of larvae of other flies. 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 cocoons. The pupal 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 within 20 degrees north and south of the equator. Outside of that range it has been reported from Australia, China, and the United States but may be in other countries as well.

United States: The fly has been reported from California, Florida, Georgia, Hawaii, and Texas (CABI 2000).

Florida: Though the fly may occur throughout Florida, the Division of Plant Industry of the Florida Department of Agriculture and Consumer Services only has definite records 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.

Hosts

Worldwide: The fly is highly polyphagous. Larvae 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). The fly is known to lay eggs in oviposition sites of other insects, and it is suspected that the larvae of *Atherigona orientalis* feed on the larvae of *Bactrocera* spp. (Uchida et al. 2006) and *Dacus* spp. (Skidmore 1985) fruit flies.

Major plant hosts: cabbage and cauliflower (*Brassica oleraceae*), bell pepper (*Capsicum annuum*), orange (*Citrus sinensis*), melon (*Cucurbitis 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 larvae 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 larvae will ruin the fruit (Queensland Government 1998).

Monor plant hosts: onion (*Allium cepa*), cucumber (*Cucumis sativus*), carrot (*Daucus carota*), peach (*Prunus persica*), aubergine (*Solanum melongena*), wheat (*Triticum aestivum*), and maize (*Zea mays*).

Unusual hosts: human and pig feces, carrion, decaying plant matter, dead insects, and the live larvae of *Dacus* spp. fruit flies. (Skidmore 1985)

Florida: *Atherigona orientalis* is frequently trapped in a variety of plants, but it is not known if 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, at this time, is not a pest of major concern.

Selected References

- Biosecurity New Zealand. (2011). [Unwanted Organisms Register](#). (17 August 2012).
- CAB International. (2000). [Data Sheet Appendix 1](#) pg. 5. (17 August 2012).
- Ogbalu OK, Emelike NJT, Amachree EI, Uche F, Thomas CN. 2005. Characterization and preferred oviposition sites of *Atherigona orientalis* (Schiner) on Nigerian pepper fruits. *Journal of Applied Sciences and Environmental Management* 9: 19-23.
- Olsen AR. 1996. *Fundamentals of Microanalytical Entomology*. 2000. CRC Press, Inc. Boca Raton, Florida
- Queensland Government. (1998). [Tomato Information Kit, reprint](#). (17 August 2012).
- Skidmore P. 1985. *The Biology of the Muscidae of the World*. Dr. W. Junk Publishers, Dordrecht, the Netherlands.
- Sivannarayana P, Rao AS, Reddy GPV. 1985. Identification of New Parasites on Tobacco Caterpillar *Spodoptera litura* Fabricius) *Andhra Agricultural Journal* 32: 284.
- Uchida GK, Mackey BE, Vargas RI, Beardsley JW, Hardy DE, Goff ML, and Stark JD. 2006. Response of nontarget insects to methyl eugenol, cue-lure, trimedlure and protein bait bucket traps on Kauai Island, Hawaii, USA. *Proceedings of the Hawaiian Entomological Society* 38: 61-71
- World Trade Organization. (2003). [G/SPS/N/GTM/19](#). Committee on Sanitary and Phytosanitary Measures. (17 August 2012).