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UF UNIVERSITY of FLORIDA
IFAS Extension

EENY-266

South American Fruit Fly, *Anastrepha fraterculus* (Wiedemann) (Insecta: Diptera: Tephritidae)[1]

H. V. Weems, Jr.[2]

Introduction

This species is of great economic importance because of the wide variety of plants that it attacks and its extensive distribution. In most of South America, it probably is the most important species of *Anastrepha*. Despite its importance, it has no accepted common name. It has been called the South American fruit fly, but this is an inappropriate name because the species, as currently understood, occurs also throughout most of Central America northward to southern Texas. There is increasing evidence that what has been considered for many years to be a species, which varies widely throughout its range, is a species complex that represents two or more species, and possibly several biological rates, the Brazilian population being the true *A. fraterculus* described by Wiedemann.

Synonyms

Anastrepha fraterculus was described in the genus *Dacus* by Wiedemann (1830), based on specimens from Brazil. *Anastrepha fraterculus* is a species complex that has not yet been studied in sufficient detail to permit a clear separation of the included species. Members of this species have also been known as:

Tephriitis mellea Walker
Trypeta unicolor Loew
Trypeta fraterculus (Wiedemann)
Dacus fraterculus Wiedemann
Anthomyia frutalis Weyenbergh
Anastrepha soluta Bezzi (as *fraterculus* var.)
Anastrepha peruviana Townsend
Anastrepha brasiliensis Greene
Anastrepha pseudofraterculus Capoor
Anastrepha costarukmanii Capoor
Anastrepha scholae Capoor
Acrotoxa fraterculus (Wiedemann)
(From White and Elson-Harris 1994)

Alan Stone (1942) believed *A. fraterculus* to be a highly variable species ranging from Texas to central South America, and he identified specimens from peach and guava as *A. fraterculus*. However, he further stated that populations occurring from Texas to Argentina eventually may be found to represent a complex of species rather than a single one.

Dr. R.H. Foote (personal communication) stated that he believes there are at least four biologically distinct populations included in the *A. fraterculus* complex. There are several other species of *Anastrepha* which that resemble the *A. fraterculus* complex, so that there is great difficulty in determining specific limits. Further biological and taxonomic studies, including sampling populations throughout

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the range of this complex and in association with various fruit hosts, are needed to resolve these questions. Evidently, all forms of this complex attack economically important plants.

Distribution

The range of *Anastrepha fraterculus* is continental America from the Rio Grande Valley of Texas to Argentina, and the islands Trinidad and Tobago. There are records from Chile, but it is not established there (White and Elson-Harris 1994). This species has been trapped in abundance in Texas throughout the year, the peak of its occurrence being in January, with a smaller peak in August; it is least abundant there in March, April, and May (Stone 1942).

Description

Adults

Adult identification is based primarily on the female, as male specimens in most cases are still indeterminable. It may be possible eventually to determine males, but much work must be done, even to associate sexes, before this can be accomplished. Steyskal (1977) presented a good pictorial key to species of *Anastrepha*.

The following description of *A. fraterculus* is based primarily on Stone (1942). This species is a small to rather small fruit fly with a yellow brown coloring. The mesonotum is 2.75–3.3 mm long and also yellow brown. The humerus, median stripe widened posteriorly anterior to acrostichal bristles and barely including these bristles, lateral stripe from transverse suture to the bright yellow scutellum. A small diffuse scutoscutellar black spot may or may not be present. The pleura is yellow and yellow brown. The metanotum and postscutellum are rather broadly blackened laterally. The macrochaetae is yellow brown to black, with the pile yellow brown. Sternopleural bristle is slender.

The wing is 5.35–7.2 mm long, and the bands are yellow-orange and brown. As already stated, adult forms currently recognized within the *A. fraterculus* complex show substantial variation in the wing pattern. In the Brazilian form costal band typically touching S band and V band typically separated from S band.

Baker (Baker et al. 1944) considered the Mexican form distinct from *A. fraterculus*, noting differences between Brazilian and Mexican forms. He observed that the Brazilian *A. fraterculus* possesses wing markings that differ from those of the Mexican form. The inverted V is separated from the main pattern, the wing thus resembling that of *Anastrepha distincta* Greene. The Mexican form has the inverted V connected with the main pattern, the wing thus resembling that of *Anastrepha obliqua* (MacQuart). However, occasional specimens occur in South America in which the inverted V is connected, and some specimens have been found in Mexico, usually males, in which the connection fades out.

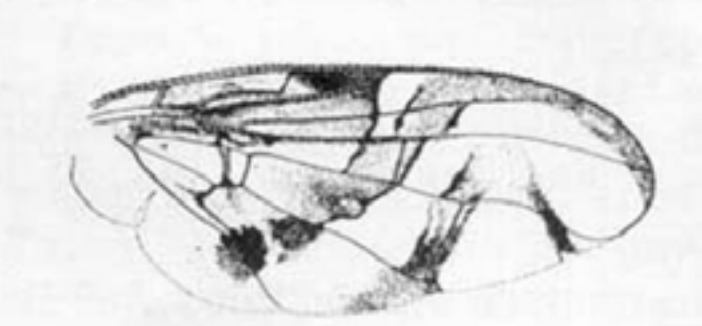

Figure 1. Right wing.

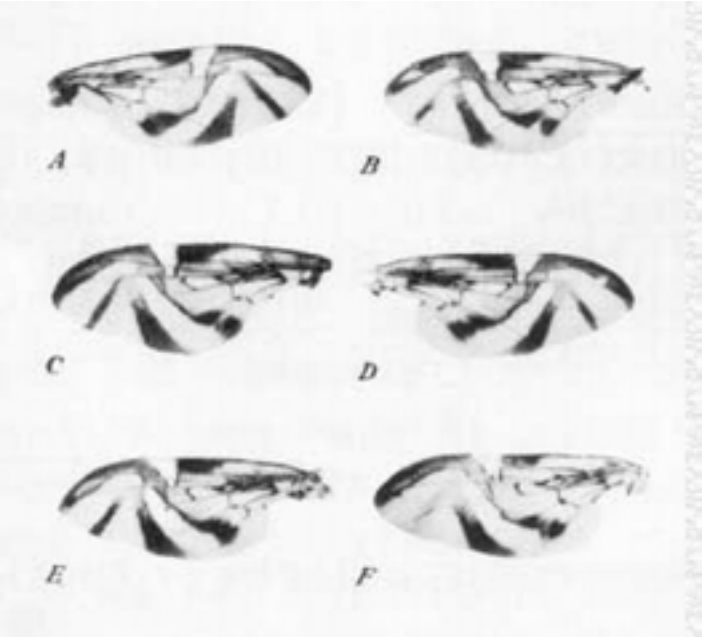

Figure 2. Various wing forms.

The ovipositor sheath is 1.65–2.1 mm long, and is stout, tapering apically. The spiracles are about 0.7 mm from the base. The rasper is a rather small patch of hooks in 4 or 5 rows. The ovipositor itself is 1.5–1.95 mm long and stout, with a base distinctly widened, and the tip narrowed beyond end of oviduct and before serrate portion. The serrations are blunt and rounded, extending little more than the half length of the tip, sometimes less.

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The ovipositors, too, differ slightly among specimens. Baker (1944) noted that those of the Mexican specimens vary very slightly from one host to another but that those from all hosts appear more tapered at the tip than do those of *A. fraterculus* from Brazil, and the opening seems slightly farther from the distal extremity.

Figure 3. Ovipositor of typical form from Brazil.

Eggs

The eggs of *A. fraterculus*, typical of the genus, are creamy white, elongate, and tapering at the ends, averaging 1.4 mm in length and 0.2 mm in width at the midpoint. The micropylar end is twisted and is subapical rather than apical, characters distinguishing it from many other species of *Anastrepha*. There is a diamond-shaped sculpturing around the micropylar end, and there is a small tuft of pile at the extreme tip. Emmart (1933) gave a detailed

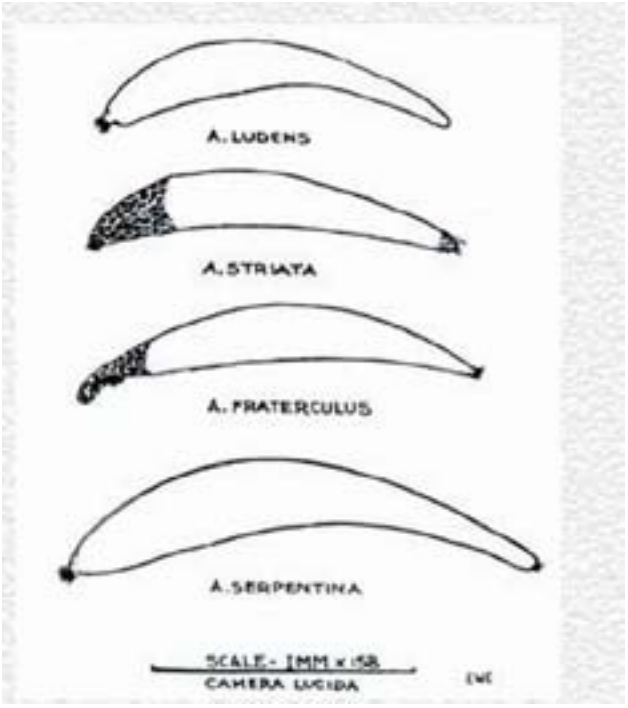

Figure 4. Eggs of common species of *Anastrepha* compared to *A. fraterculus*.

comparison of the eggs of Mexican "*A. fraterculus*" with those of three other common species of *Anastrepha*. While location of eggs in fruit is difficult, when they can be obtained, an early identification of the species may be possible when working with several known species. A gravid female inserts her eggs into the fruit of a plant host with an eversible, sclerotized ovipositor.

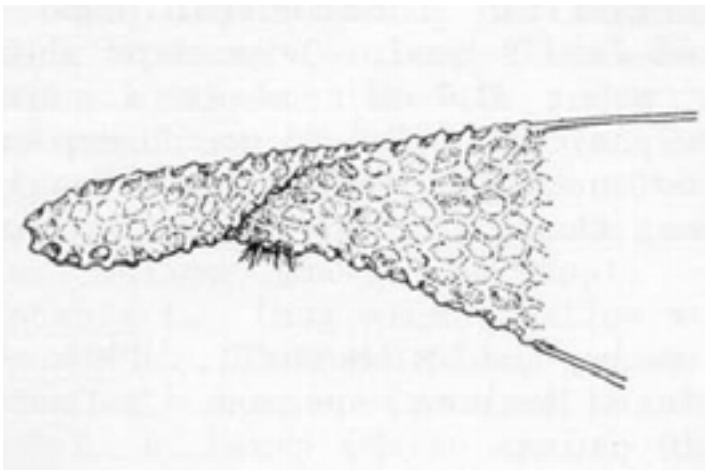

Figure 5. Micropyle.

Larvae

The developing larvae molt three times as they feed and grow. An inactive 4th-instar larval stage within the puparium precedes formation of a pupa. This process may occur within or on the host plant, but pupation occurs in the soil. The mature larva is 8–10 mm in length and 1.5 mm in diameter; pale yellowish white, tapering slightly toward the cephalic end; 11 segments of about equal length in addition to the head; a ventral fusiform area on anterior portion of each of segments 4 to 11. Head small, partly retractile; mouth hooks medium-sized, 1st part rather slender, 1st and 2nd parts black, 3rd part with brown infuscation at base, and remainder of joint hyaline. Anterior spiracles small, yellowish, chitinized, with 15 to 17 small rounded tubules arranged in an irregular row. Posterior spiracles small, located well above medio-horizontal line.

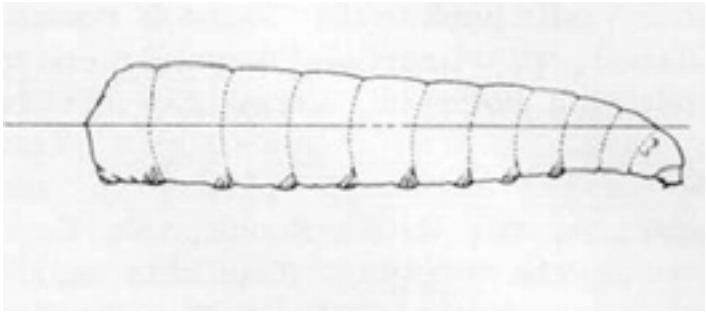

Figure 6. Larva.

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Larvae of the Veracruz population attacking tropical almond possess spiracular processes which resemble those of larvae of *A. obliqua* from Puerto Rico.

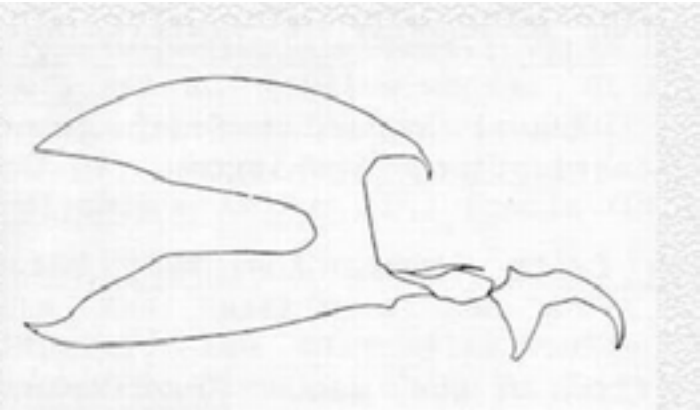

Figure 7. Mouth hook of larva.

Figure 8. Anterior spiracle of larva.

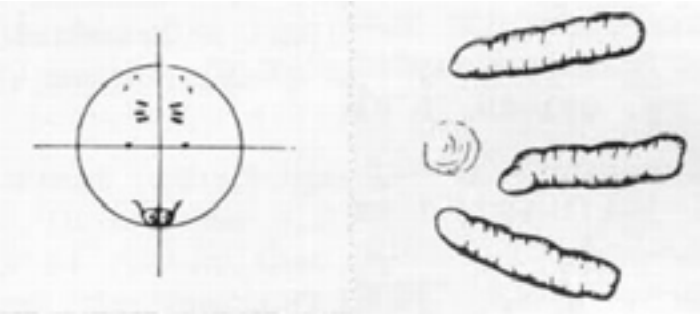

Figure 9. Posterior view of larva (left) and spiracle (right)

Pupae

The pupae are 4.5–6.0 mm long and 2–2.5 mm in diameter. The are cylindrical, with coloring a dull luteous to reddish-yellow or dark red. There are 11 distinct segments. Anterior spiracles are like those of the larva but much darker. The posterior spiracles are medium sized, dark reddish in color, and located in a faintly depressed hexagonal area, which is on but mostly below the medio-horizontal line. Greene (1929) gave a detailed description of both larva and pupa, based on material collected in Panama.

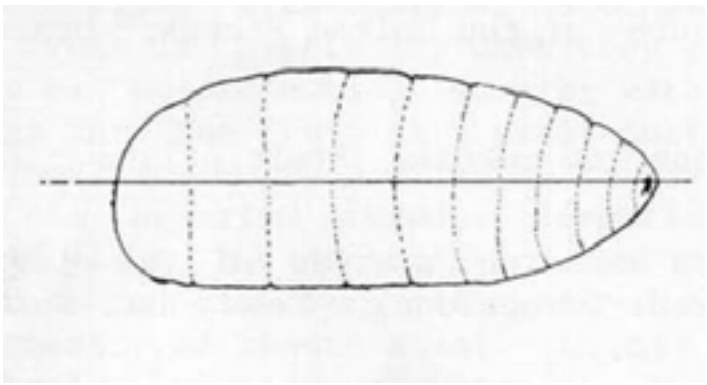

Figure 10. Pupa.

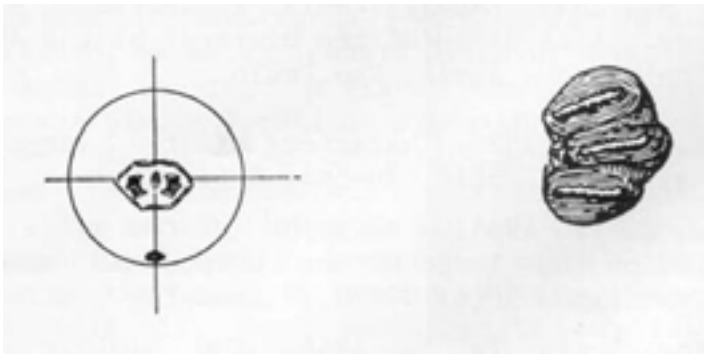

Figure 11. Posterior view spiracles of pupa.

Fruit fly larvae and pupae are difficult to identify to species, and much more research is needed in this area

Hosts

In South America, *A. fraterculus* attacks various fruits including peach, *Citrus*, guava, *Spondia* and *Eugenia*. The Mexican "*A. fraterculus*" has been reared from peach, guava, and rose apple. What appears to be the same thing, or very similar, was reared from tropical almond, but only in the city of Veracruz. Tropical almond is not recorded as a host of *A. fraterculus* in South America. It may be that the Veracruz population associated with tropical almonds is more closely related to the typical *A. obliqua* of the West Indies.

Populations of Mexican "*A. fraterculus*" in northern Mexico occur commonly in the vicinity of *Citrus*, but no infestation in sour orange or other *Citrus* has been found in that region. Baker (Baker et al. 1944) noted that attempts to rear the Veracruz form, which attacks tropical almond from *Spondias,* were unsuccessful, although Spondias is one of the common hosts of *A. fraterculus* in South America.

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The *A. fraterculus* complex has been reared from the following:

- *Annona cherimola*, cherimoya, chirimoya, custard apple or cherimalla
- *Citrus maxima* (=*grandis*), shaddock or pommelo; *C. paradisi*, grapefruit; *C. reticulata*, Mandarin orange, Satsuma orange, tangerine; *C. sinensis*, sweet orange
- *Coffea arabica*, common coffee
- *Cydonia oblonga*, common quince
- *Dovyalis hebecarpa*, kitembilla or Ceylon gooseberry
- *Eriobotrya japonica*, loquat, Japanese medlar or Japanese plum
- *Eugenia brasiliensis* (=*dombeyi*), Brazil cherry, grumichama or grumixameira; *E. uniflora*, Surinam cherry, Brazil cherry, Barbados cherry, Cayenne cherry or pitanga
- *Mangifera indica*, mango
- *Manilkara zapota*, sapodilla
- *Prunus persica*, peach
- *Psidium guajava* common guava, yellow guava or apple guava
- *Pyrus communis*, common pear
- *Spondias mombin*, hog plum, yellow mombin or jobo; *S. nigrescens*; *S. purpurea*, Spanish plum, red mombin, purple mombin or jocote
- *Syzygium* (=*Eugenia*) , rose apple or Malabar plum; *S. malaccense*, Malay apple or rose apple
- *Terminalia catappa*, tropical almond, Indian almond, kamani or myrobalan
- *Vitis vinifera*, wine grape or European grape
- *Ximenia americana*, tallow-wood

Of these food plants the Surinam cherry, peach, and guava seem to be particularly subject to attack. This species also has been reared experimentally from *Annona glabra*, pond apple; *Malus pumila*, common apple; and *Phyllanthus acidus*, Otaheite gooseberry or gooseberry tree.

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