

West Indian Fruit Fly, *Anastrepha obliqua* (Macquart) (Insecta: Diptera: Tephritidae)¹

H. V. Weems, Jr., J. B. Heppner, G. J. Steck, and T. R. Fasulo²

Introduction

The West Indian fruit fly, *Anastrepha obliqua* (Macquart), occurs throughout the Caribbean, south to southern Brazil. It is the most abundant species of *Anastrepha* in the West Indies and Panama. *Anastrepha obliqua* is a major pest of mangoes in most tropical countries, making the production of some varieties unprofitable. Some varieties, however, are little damaged. Like the Caribbean fruit fly, *A. suspensa* (Loew), it also attacks other tropical fruits of little economic importance. *Anastrepha obliqua* has also been called the Antillean fruit fly.

Synonyms

Anastrepha obliqua was described originally by Seín in 1933 as a variety of *Anastrepha fraterculus* (Wiedemann). The type series was from Rio Piedras, Puerto Rico. It was first reported from Florida in the early 1930s as an unnamed species.

The species was widely known by its synonym, *A. mombinpraeoptans* Seín, or as a variety of the continental Neotropical species, *Anastrepha fraterculus* (Wiedemann) (Berg 1979, Weems 1970), and is one of several closely related species of *Anastrepha* (Weems 1980).

Anastrepha fraterculus var. *mombinpraeoptans* Seín, 1933

Anastrepha mombinpraeoptans Seín

Anastrepha acidusa authors (not Walker)

Anastrepha trinidadensis Greene, 1934

Anastrepha ethalea Greene (not Walker)

Anastrepha fraterculus var. *ligata* Costa Lima 1934

Acrotoxa obliqua (Macquart)

Tephritis obliqua Marquart

Trypeta obliqua (Macquart)

Distribution

Anastrepha obliqua is found throughout the greater and lesser Antilles, Jamaica, Trinidad, Mexico to Panama, Venezuela, Ecuador, and the vicinity of Rio de Janeiro, Brazil. The Brazilian population may represent an introduction of the species at the port of Rio de Janeiro.

In the United States it is found in the Rio Grande Valley of Texas, and was once found in Florida.

Anastrepha obliqua was first discovered in Florida in 1930. As a result of that discovery, a large fruit fly survey and

1. This document is EENY-198 (originally published as DPI Entomology Circulars 101 and 339), one of a series of Featured Creatures from the Entomology and Nematology Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Published March 2001. Revised June 2012. This document is also available on Featured Creatures website at <http://entomology.ifas.ufl.edu/creatures>. Please visit the EDIS website at <http://edis.ifas.ufl.edu>.

2. H. V. Weems, Jr. (retired), J. B. Heppner (retired), and G. J. Steck, Florida Department of Agriculture and Consumer Services, Division of Plant Industry, and T. R. Fasulo, Entomology and Nematology Department, University of Florida, Gainesville, FL 32611.

eradication campaign was conducted from 1930 until 1936. Eradication actions began in 1934 and included widespread fruit removal and destruction, and biweekly insecticidal sprays. During this time, numerous *A. obliqua* specimens were collected, all from Key West

Anastrepha obliqua is intercepted frequently in mangoes and several other fruits from various countries. There are Florida records for several adult females in 1957 [since disputed - specimens were probably actually collected in 1935 (Steck 2001)] from Key West and one larva in mango from Ft. Lauderdale, June 25, 1963, which was identified by Dr. R.H. Foote as "*Anastrepha* species, possibly *mombinpraeoptans (obliqua)*." In fact, this larva may have been a harbinger of the large colonization by Caribbean fruit fly, *Anastrepha suspensa* in south Florida, where adults were first detected in 1965 (Steck 2001).

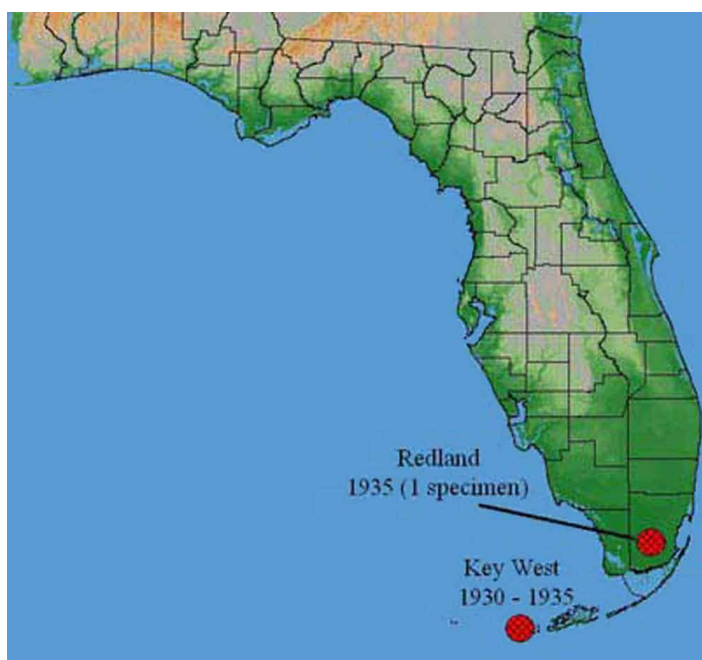


Figure 1. Incidence of the West Indian fruit fly, *Anastrepha obliqua* (Marquart), in Florida.

Credits: Drawing by: G. J. Steck and B. D. Sutton, Division of Plant Industry.

There is no confirmed evidence of the presence of *A. obliqua* in Florida since 1935. Apparently, the control actions of 1931–1936 indeed eradicated this pest from Florida, as no adult *A. obliqua* has ever again been detected in the field, despite the presence of many thousands of fruit fly detection traps that have been run throughout the Keys and peninsular Florida continuously and year-round since 1956 (Steck 2001).

Description

Adult

The adult is a medium sized yellow-brown fly. The mesonotum is 2.6–3.3 mm long, yellow-orange, lateral stripe from just below transverse suture to scutellum, and scutellum pale-yellow; pleura yellow-brown, a stripe below notopleuron to wing base and metapleuron paler; metanotum orange-yellow. The sides are usually somewhat darkened. Macrochaetae dark brown; pile predominantly dark brownish except for a pale-yellow pile of median thoracic stripe.

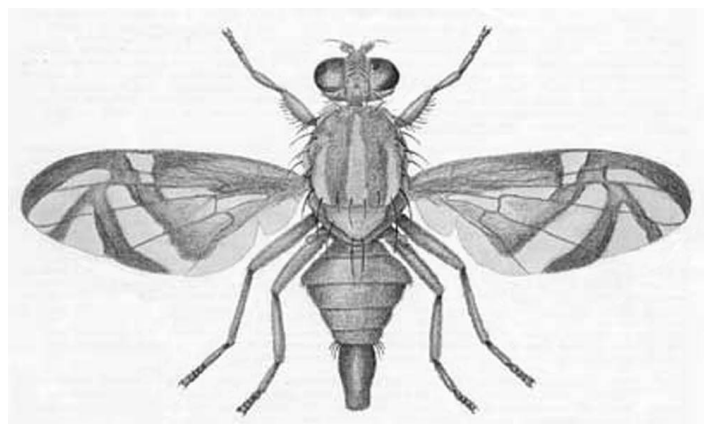


Figure 2. Adult female West Indian fruit fly, *Anastrepha obliqua* (Macquart).

Credits: Division of Plant Industry

The wing is 5.85–7.5 mm long, the bands yellow-brown, costal and S bands touching on vein R_{4+5} ; V band completely joined to S band, often broadly so. Ovipositor sheath of female 1.6–1.9 mm; ovipositor 1.3–1.6 mm long, moderately stout, the base distinctly widened, the tip rather short, tapering, with rather acute serrations on the apical two-thirds or more. *Anastrepha obliqua* bears a close resemblance to *A. fraterculus* (Wiedemann), but it may be distinguished by the differences in the ovipositor of the female and a combination of several characters.

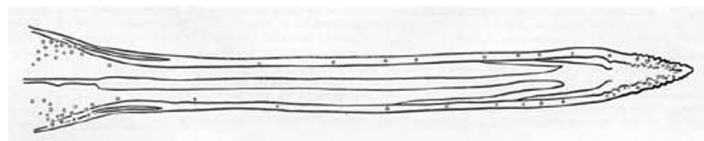


Figure 3. Ovipositor of West Indian fruit fly, *Anastrepha obliqua* (Macquart).

Credits: Division of Plant Industry

The pile of the mesoscutum is sublaterally dark brownish black, of the median stripe yellowish white, the contrast very pronounced in *A. obliqua*, whereas in *A. fraterculus* the mesoscutellar pile is rather uniformly yellow-brown, that of the sublateral stripes scarcely darker than the ground color. The black area on the side of the metanotum of *A. obliqua* is usually reduced and the inner margin of the black

area is not sharply defined, the postscutellum not darkened laterally, the wing bands usually all connected, whereas in *A. fraterculus* the black on metanotum usually extensive, and the inner margin sharply defined, the postscutellum darkened laterally, and the wing bands often disconnected.

Anastrepha suspensa (Loew) also resembles *A. obliqua*, but differs from it in the same way as does *A. fraterculus*. Furthermore, *A. obliqua* lacks the pronounced median scutoscutellar black spot typically found in *A. suspensa*.

Larva

Larva white; typical fruit fly shape (cylindrical-maggot shape, elongate, anterior end narrowed and somewhat curved ventrally, with anterior mouth hooks, ventral fusiform areas, and flattened caudal end); last instar larvae range in length from 8–10 mm; venter with fusiform areas on segments 2 through 10; anterior buccal carinae usually 9 to 10 in number; anterior spiracles asymmetrical in lateral view with center depressed, and with tubules averaging 12 to 14 in number.

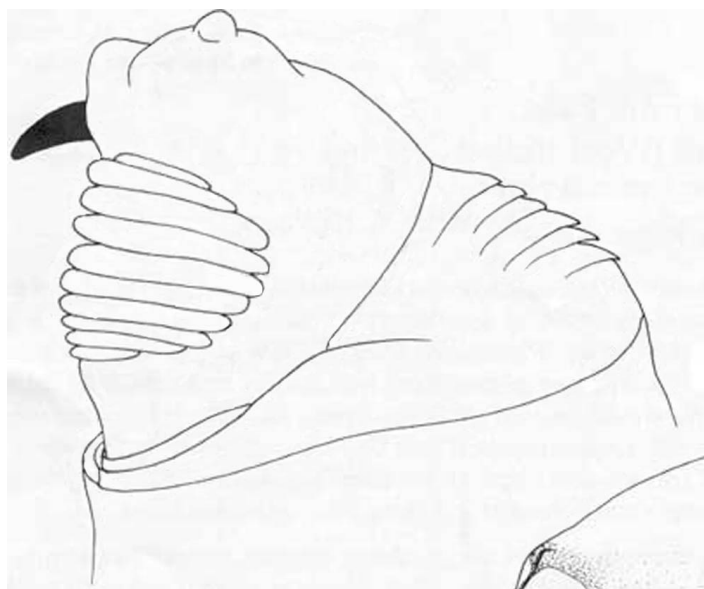


Figure 4. Larval head and buccal carinae of West Indian fruit fly, *Anastrepha obliqua* (Macquart).

Credits: Division of Plant Industry

Cephalo-pharyngeal skeleton with large pointed convex mouth hook each side, with rounded dorsal lobe, and each hook about 2.5X hypostome length; hypostomium with thin subhypostomium; post-hypostomial plates curved to dorsal bridge fused with prominent sclerotized rays of central dorsal wing plate; parastomium broadly elongate; dorsal wing plate with several prominent rays and strong

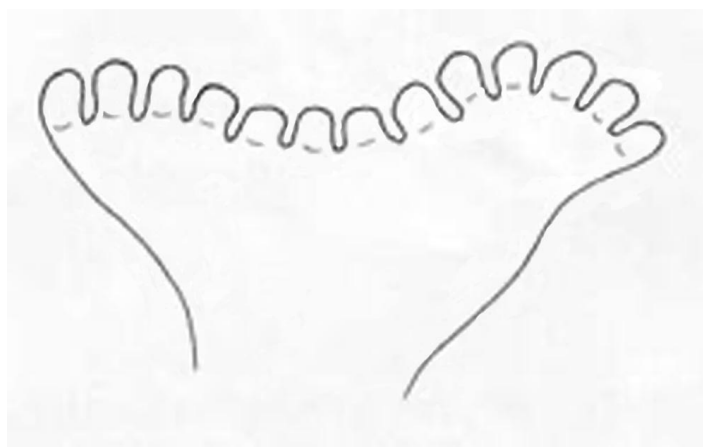


Figure 5. Anterior spiracles.

sclerotization on ventral border; dorsal bridge relatively evenly sclerotized, merging to a strongly sclerotized dorsal edge of pharyngeal plate; a prominent hood on pharyngeal plate.

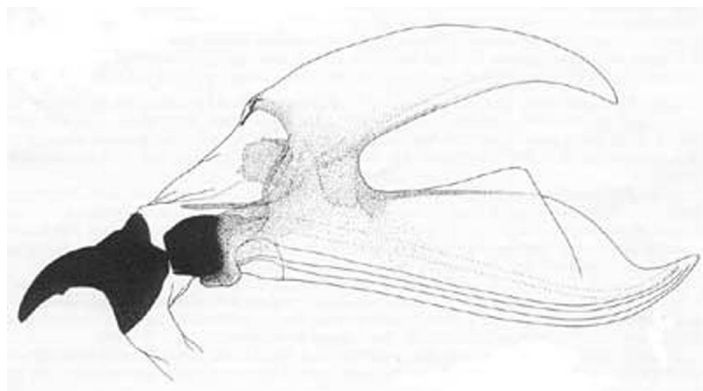


Figure 6. Larval cephalo-pharyngeal skeleton (left side) of West Indian fruit fly, *Anastrepha obliqua* (Macquart).

Credits: Division of Plant Industry

Caudal end with paired dorsal papillules (D1 and D2) close together and angled about 45 degrees from each spiracular plate; intermediate papillules 3 in number, with I1-2 in a nearly horizontal line on a slight elevation; I3 faint and distant dorso-laterally and nearer to L1, which is on dorso-lateral edge of caudal end; V1 faint and about twice as distant from I1-2 as from anal lobes; posterior spiracles as 3 elongated peritremes (length = 5X width) on each spiracular-plate, with ventral 2 peritremes angled to center from ventral direction and remaining peritreme angled from dorso-lateral angle; interspiracular processes (hairs) well developed, at 4 sites on each plate, and tips sometimes bifurcate; anal lobes entire.

Anastrepha larvae in this species complex are all relatively similar but careful observations of the buccal carinae,

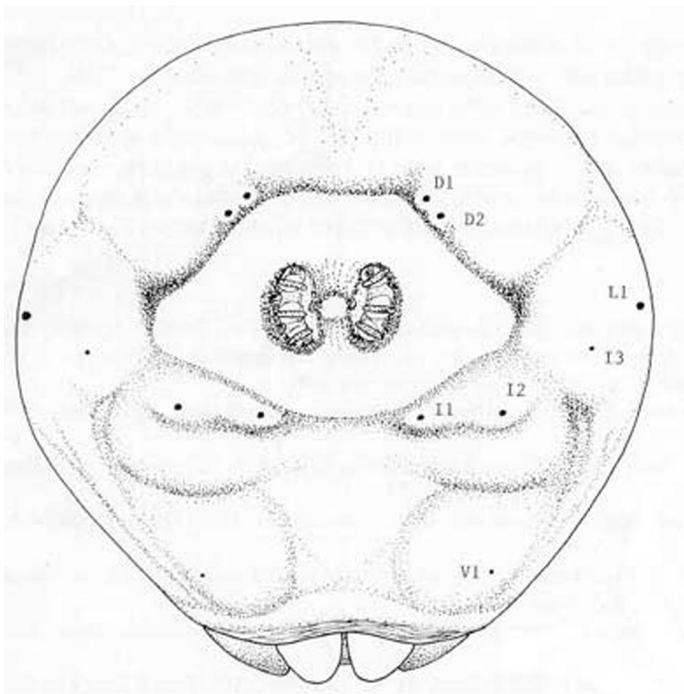


Figure 7. Caudal end of last instar larva of West Indian fruit fly, *Anastrepha obliqua* (Macquart).
Credits: Division of Plant Industry

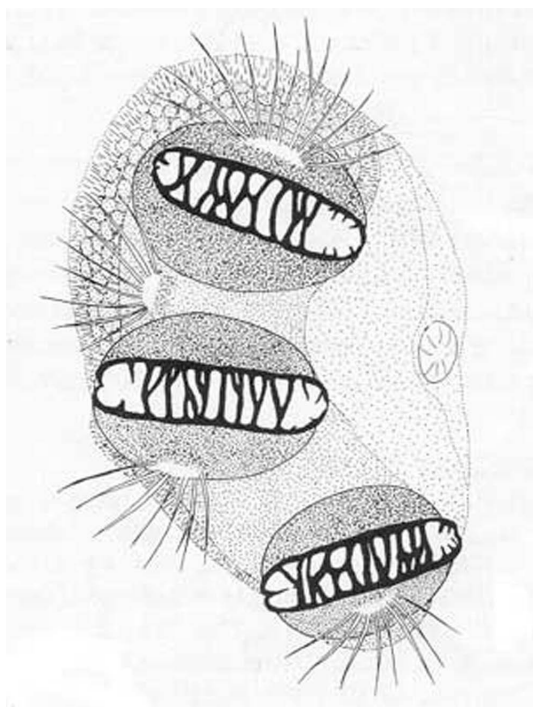


Figure 8. Larval ostior spiracles (left side) with detail of one peritreme of West Indian fruit fly, *Anastrepha obliqua* (Macquart).
Credits: Division of Plant Industry

anterior spiracles, and papillule position of the caudal end will distinguish the species (see Heppner 1984, 1990; Steck et al. 1990). *Anastrepha obliqua* has anterior spiracles like *Anastrepha ludens* (Loew) but with fewer tubules and *A. ludens* usually has the anal lobes bifid. *Anastrepha suspensa* (Loew) is more similar but has the anterior spiracles more

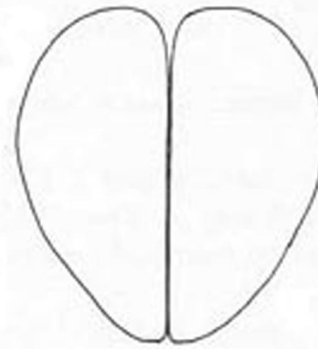


Figure 9. Anal lobes.

symmetrical than *A. obliqua*. On the caudal end *A. ludens* and *A. suspensa* have I1-2 angled and not horizontal like *A. obliqua*, while in *Anastrepha interrupta* Stone there also is a faint I4 present. D1-2 are closer together in *A. obliqua* than in the other related species. *Anastrepha fraterculus* has the anterior spiracles with a higher tubule number (15 through 17) than *A. obliqua*.

Life History

The preoviposition period in Puerto Rico varies from about a week in summer up to two to three weeks in winter. Eggs are laid singly, generally in mature green fruits except for some varieties of mangoes, which may be attacked when they are very small. The larval stage lasts 10 to 13 days in summer, slightly longer in winter, and the pupal stage occupies about the same length of time. Possibly six or seven generations develop annually.

Hosts

Many host plants have been noted for the West Indian fruit fly, but due to confusion between *A. obliqua* and *A. fraterculus*, and others in this species complex, it is unclear what the true host range is for each species. Weems (1980) noted numerous tropical fruit hosts for the “*fraterculus* complex.” A long list of recorded hosts for the West Indian fruit fly was also noted by Noorbom and Kim (1988), with mango (*Mangifera indica* L.), guava (*Psidium guajava* L.), and hog plums (*Spondias* sp.) being most often mentioned. Citrus is sometimes attacked in Dominica, but never in Cuba, Guyana, Trinidad, or Tobago.

Anastrepha obliqua has been recorded from many hosts belonging to the families Anacardiaceae, Annonaceae, Bignoniaceae, Fabaceae, Myrtaceae and Rosaceae. The favored food plants are the mombins, jobos, or hog plums of the genus *Spondias*, followed by mango, rose-apple and guava.

Anacardium occidentale, cashew

Annona hayesii, pawpaw

Averrhoa carambola, carambola

Citrus aurantium, sour orange; *C. grandis*, pumelo; *C. paradisi*, grapefruit

Coffea arabica, arabica coffee

Diospyros digyna, black sapote

Dovyalis hebecarpa, kitambilla or Ceylon gooseberry

Eriobotrya japonica, loquat

Eugenia jambos, jambos, rose-apple or pomarosa; *E. malaccensis*, Malay-apple or pomerack; *E. nesiotica*

Mangifera indica, mango

Pouteria mammosa, sapote

Prunus amygdalus, bitter almond; *P. dulcis*, almond

Psidium guajava, guava

Spondias dulcis, vi-apple or Otaheite-apple; *S. mombin*, yellow mombin; *S. nigrescens*; *S. purpurea*, purple or red mombin

The species also has been reared experimentally from:

Annona glabra, pond-apple

Chrysobalanus icaco, coco-plum

Manilkara zapota, sapodilla

Passiflora quadrangularis, a passion-flower, the giant granadilla

Prunus persica var. *nectarina*, nectarine

Vitis vinifera, California grape

Heppner JB. 1984. Larvae of fruit flies I. *Anastrepha ludens* (Mexican fruit fly) and *Anastrepha suspensa* (Caribbean fruit fly) (Diptera: Tephritidae). Florida Department of Agriculture and Consumer Services, Division of Plant Industry Entomology Circular 260: 1-4.

Heppner JB. 1990. Larvae of fruit flies 6. *Anastrepha interrupta* (Schoepfia fruit fly) (Diptera: Tephritidae). Florida Department of Agriculture and Consumer Services, Division of Plant Industry Entomology Circular 327: 1-2.

Norrbom AL, Kim KC. 1988. A List of the Reported Host Plants of the Species of *Anastrepha* (Diptera: Tephritidae). U.S. Department of Agriculture, APHIS (PPQ) 81-52: 1-114.

Pruitt JH. 1953. Identification of Fruit Fly Larvae Frequently Intercepted at Ports of Entry of the United States. University of Florida (Gainesville). MS thesis. 69 pp.

Seín F Jr. 1933. *Anastrepha* fruit flies in Puerto Rico. Puerto Rico Department of Agriculture Journal 17: 183-196.

State Plant Board of Florida Eleventh Biennial Report for the period July 1, 1934-June 30, 1936. Jan. 1937. pp. 15-21. *Anastrepha acidusa*.

Steck GJ, LE Carroll, Celedonio-Hurtado H, Guillen-Aguilar J. 1990. Methods for identification of *Anastrepha* larvae (Diptera: Tephritidae), and key to 13 species. Proceedings of the Entomological Society of Washington 92: 333-346.

Steck, GJ. 2001. Concerning the occurrence of *Anastrepha obliqua* (Diptera: Tephritidae) in Florida. Florida Entomologist 84: 320-321.

Stone A. 1942. The Fruit Flies of the Genus *Anastrepha*. U.S. Department of Agriculture Miscellaneous Publication No. 439, Washington, DC. 112 pp.

Weems HV Jr. 1980. *Anastrepha fraterculus* (Wiedemann) (Diptera: Tephritidae). Florida Department of Agriculture and Consumer Services, Division of Plant Industry Entomology Circular 217: 1-4.

White IM, Elson-Harris MM. 1994. Fruit Flies of Economic Significance: Their Identification and Bionomics. CAB International. Oxon, UK. 601 pp.

Selected References

Berg GH. 1979. Pictorial Key to Fruit Fly Larvae of the Family Tephritidae. San Salvador: Organ. Internac. Reg. Sanidad. Agropec. 36 pp.