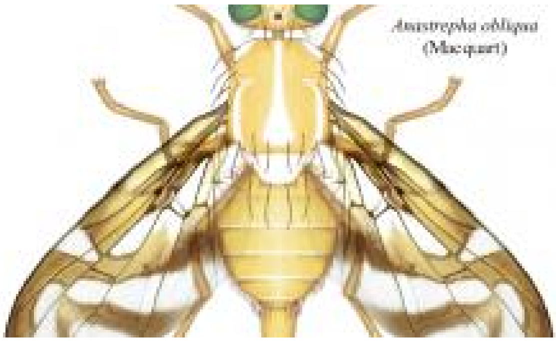
EPPO Datasheet: *Anastrepha obliqua*

Last updated: 2021-01-08

IDENTITY

Preferred name: *Anastrepha obliqua*
Authority: (Macquart)
Taxonomic position: Animalia: Arthropoda: Hexapoda: Insecta: Diptera: Tephritidae
Other scientific names: *Acrotoxa obliqua* (Macquart), *Anastrepha fraterculus mombinpraeoptans* Sein, *Anastrepha fraterculus var. ligata* Lima, *Anastrepha fraterculus var. mombinpraeoptans* Sein, *Anastrepha trinidadensis* Greene, *Tephritis obliqua* Macquart, *Trypeta obliqua* (Macquart)
Common names: Antillean fruit fly, West Indian fruit fly
view more common names online...
EPPO Categorization: A1 list
view more categorizations online...
EU Categorization: A1 Quarantine pest (Annex II A)
EPPO Code: ANSTOB



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Notes on taxonomy and nomenclature

This species was first described by Macquart (1835) as *Tephritis obliqua*, although for many years that name was confused and was not recognized as pertaining to this species (Steyskal, 1975), thus it has been known by a variety of other names. The current combination was proposed by Schiner (1868). The species has also been described as *Anastrepha fraterculus* var. *mombinpraeoptans* Seín (1933), *Anastrepha fraterculus* var. *ligata* Lima (1934), and *Anastrepha trinidadensis* Green (1934), which are synonyms. Most records of *Anastrepha acidusa* (Walker) are misidentifications of this species, although *A. acidusa* is also a valid but rare species. Name, host plant, and distribution data for *A. obliqua* and other fruit flies are available under Fruit Fly Databases on the USDA Compendium of Fruit Fly Host Information (https://coffhi.cphst.org/).

HOSTS

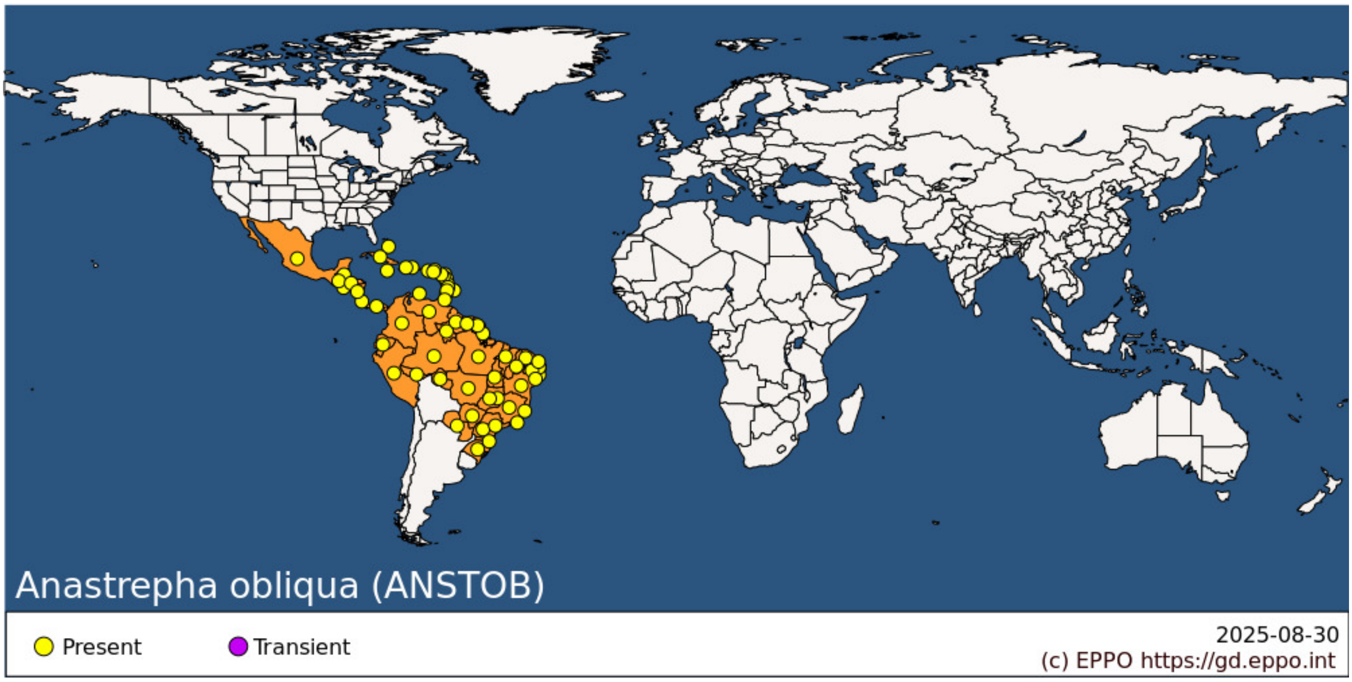
This species is one of the most significant pests of mango (*Mangifera indica*) and hog plums and mombins (*Spondias* spp.). It also attacks carambola (*Averrhoa carambola*), guavas (*Psidium* spp.), and a range of other fruit crops. A total of 90 species have been reported as natural hosts, although the records for a few of these hosts are questionable. *Citrus* species are only occasional hosts. An additional 21 commercial fruit species have been infested under artificial conditions (Norrbom, 2004).

Host list: *Anacardium occidentale*, *Anacardium*, *Averrhoa carambola*, *Campomanesia guazumifolia*, *Citrus*, *Eugenia myrcianthes*, *Eugenia stipitata*, *Eugenia uniflora*, *Malpighia glabra*, *Mangifera indica*, *Plinia cauliflora*, *Psidium acutangulum*, *Psidium guajava*, *Sarcomphalus joazeiro*, *Sideroxylon obtusifolium*, *Spondias dulcis*, *Spondias mombin*, *Spondias purpurea*, *Spondias tuberosa*, *fruit trees*

GEOGRAPHICAL DISTRIBUTION

Anastrepha obliqua is one of the most widespread species of *Anastrepha*, occurring from Mexico and the West Indies to northern Argentina. It is invasive in the Lesser Antilles (CABI, 2008).

Reports of its introduction to Bermuda were erroneous (Woodley & Hilburn 1994). Records from the Bahamas (White & Elson-Harris 1992) are also doubtful. It was temporarily invasive in Key West, Florida (USA) in the 1930s (Steck, 2001), and is infrequently trapped in the Rio Grande Valley in Texas. It has been intercepted in Chile but is not established.



North America: Mexico
Central America and Caribbean: Antigua and Barbuda, Bahamas, Barbados, Belize, Costa Rica, Cuba, Dominica, Dominican Republic, El Salvador, Grenada, Guadeloupe, Guatemala, Haiti, Honduras, Jamaica, Martinique, Montserrat, Netherlands Antilles, Nicaragua, Panama, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, Virgin Islands (British), Virgin Islands (US)
South America: Brazil (Acre, Alagoas, Amapa, Amazonas, Bahia, Ceara, Distrito Federal, Espirito Santo, Goias, Maranhao, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Para, Paraiba, Parana, Pernambuco, Piaui, Rio de Janeiro, Rio Grande do Norte, Rio Grande do Sul, Rondonia, Roraima, Santa Catarina, Sao Paulo, Sergipe, Tocantins), Colombia, Ecuador, French Guiana, Guyana, Paraguay, Peru, Suriname, Venezuela

BIOLOGY

As in *Anastrepha* spp. generally, eggs are laid in fruits. In the case of *A. obliqua* they are laid singly, just below the skin with the short anterior lobe that is believed to have a respiratory function, projecting slightly outside the fruit (Murillo & Jirón, 1994, Aluja *et al.*, 1999). Mean development time for eggs, larvae and pupae together is 48.5 days, depending on the host fruit and temperature and other environmental conditions (Birke *et al.*, 2013). Larvae pass through three instars and feed in the pulp of the fruit (Aluja *et al.*, 1999). Mature larvae exit the fruit and pupariate in the soil. Females mark fruit in which they have oviposited with an oviposition deterring pheromone (Aluja *et al.*, 1999). Adult males produce a pheromone and lek to attract females for mating. Calling occurs in the day, with the highest peak in the morning (Birke *et al.*, 2013). Adults occur throughout the year (Christenson & Foote, 1960), with a pronounced peak associated with the fruiting season of mango and *Spondias* (Hedström, 1994; MIDA, 2013).

DETECTION AND IDENTIFICATION

Symptoms

Attacked fruit have tiny oviposition punctures, but these and other symptoms of damage are often difficult to detect in the early stages of infestation. Considerable damage may occur inside the fruit before symptoms are visible externally, often as networks of tunnels accompanied by rotting.

Morphology

Immature stages

The identification of larvae of *Anastrepha* species, as is the case for most fruit flies, is extremely difficult. Larvae have been described for only 9% of the species of *Anastrepha* (Steck *et al.*, 2019). *Anastrepha obliqua* is included in the key of Steck *et al.* (1990) and the interactive key of Carroll *et al.* (2004) for third stage larvae, but it cannot be reliably distinguished from similar species such as *A. fraterculus* and *A. suspensa*. Steck et al. (1990), White & Elson-Harris (1992), Carroll *et al.* (2004) and Frías *et al.* (2006) provided descriptive information for the third instar.

The larvae of *A. obliqua* feed in the pulp of their host fruits. As is the case for other *Anastrepha* species, the larvae are whitish, 7.5-9.0 mm long, lacking an external head capsule. The two mandibles, or mouthhooks, are strongly developed. The body is tapered anteriorly and truncate posteriorly. The posterior spiracular plate is weak, unpigmented, without a peritreme, and with three openings arranged with their medial ends converging, the dorsal and ventral ones subparallel or oriented at less than 90°. There are 6-11 oral ridges, and 9-18 tubules on the anterior spiracle. Thoracic segments 2 and 3 have 2-5 rows of spinules dorsally, but dorsal spinules are absent on the abdominal segments. The posterior spiracular openings are about 3 times as long as wide, and the spiracular hairs are in dorsal and ventral bundles of 8-17 hairs and lateral bundles of 4-12 hairs branched on the apical third. The anal lobes are large, protuberant and not grooved (Rodriguez *et al*., submitted).

The eggs of *A. obliqua* are distinctive compared to most other species of *Anastrepha*. They bear a short lobe on the anterior end distal to the micropyle. Although the eggs have not been described for the majority of *Anastrepha* species, to date only that of *A. barbiellinii*, a non-pest, is known to have a similar short lobe.

Adult

As for other *Anastrepha* species, adults of *A. obliqua* are easily separated from other tephritids by a simple wing venation character; vein M_1, the longitudinal vein that reaches the wing margin just behind the wing apex, curves strongly forward before meeting the costa on the wing margin without a visible angle. Furthermore, as is the case for most *Anastrepha* species, *A. obliqua* has a characteristic wing pattern composed of 3 orange and brown bands: the 'C-band' on the anterior margin from the base to near midlength; the 'S-band', a sideways S-shaped band from the wing base, curving forward across the middle of the wing (in *A. obliqua* usually narrowly connected to the C-band, but with a triangular marginal hyaline area between them), then running along the anterior margin to the wing apex; and the 'V-band', an inverted V-shaped band on the posterior apical half of the wing.

Identification to species is more difficult. It is essential to examine the aculeus (which is usually inside the oviscape, the basal tube-like part of the ovipositor) of a female specimen to achieve positive identification. The only comprehensive identification tool for *Anastrepha* is the online key by Norrbom *et al.* (2012). Adults, especially males, of *A. obliqua* are difficult to separate from those of *A. fraterculus* and various other similar species of the *fraterculus* group; if necessary, specimens should be referred to a specialist. Adult females of *A. obliqua* can be distinguished from those of other species of *Anastrepha* by the following combination of characters: Setae orange brown to dark red brown; mesopleuron and scutum without brown markings, without brown spot medially on scuto-scutellar suture; subscutellum entirely yellow to orange; mediotergite usually narrowly brown laterally; V-band proximal arm extending more than 1/3 distance from apex of vein M_4 to apex of vein CuA+CuP; oviscape 1.5–1.9 mm long, 0.52–0.61 times mesonotum length; aculeus 1.30–1.75 mm long; tip 0.15–0.25 mm long, with distal 0.67–0.82 distinctly serrate and with lateral margin of serrate part slightly curved dorsally; 0.08–0.12 mm wide. Gravid females can be distinguished from similar pest species such as *A. fraterculus* by the lobe on the egg.

Molecular

Anastrepha obliqua can be distinguished from many other species of *Anastrepha* based on differences in the DNA barcode region of the cytochrome oxidase I gene (Barr *et al.*, 2017a), but it cannot be distinguished from some species in the *fraterculus* group, including *A. fraterculus*, by this region. It can be distinguished from *A. suspensa* by differences in the ITS2 region (Barr *et al.*, 2017b). Ruiz-Arce *et al*. (2012) explored the phylogeography of *Anastrepha obliqua* using two mitochondrial genes (COI and ND6), and Passos *et al.* (2018) explored the genetic structure and diversity in Brazilian populations based on COI. Scally *et al.* (2016) investigated intra-specific relationships within *A. obliqua* using a multi-locus data set (7 nuclear and 2 mitochondrial loci).

Detection and inspection methods

No specialized male lures are available for *Anastrepha* species. Monitoring for adults utilizes traps with protein-based or other ammonia-emitting lures, which are much less effective than the male lures used for various dacine fruit flies (Diaz-Fleischer *et al.*, 2009). McPhail traps baited with torula yeast, hydrolyzed protein, or other fermenting protein lures, or Multilure traps baited with ammonium acetate and putrescine are typically used for the capture of *Anastrepha* species (Thomas *et al.*, 2001; Adaime *et al.*, 2011).

PATHWAYS FOR MOVEMENT

Anastrepha adults are capable of long-distance dispersal, thus natural movement is an important means of spread (Aluja *et al.*, 1999).

In international trade, the major means of fruit fly dispersal to previously uninfested areas is via transport of fruit containing live eggs or larvae. For the EPPO region, the most important imported fruit liable to carry *A. obliqua* is *Mangifera indica*, and to a lesser extent, various other hosts. There is also a risk of the transport of fruit fly puparia in soil or packaging.

PEST SIGNIFICANCE

Economic impact

Anastrepha species are the most serious fruit fly pests in the tropical Americas (Norrbom & Foote, 1989), along with the introduced *Ceratitis capitata* and *Bactrocera carambolae*. *Anastrepha obliqua* is considered the most important fruit fly pest in the West Indies, and it and *A. ludens* are the most significant pest fruit flies in Mexico and Central America, especially on mango (Whervin, 1974, Enkerlin *et al.*, 1989). In South America *A. obliqua* is second in importance in many areas only to the *A. fraterculus* complex and *Ceratitis capitata*.

Control

Bait sprays, typically a mixture of Spinosad, malathion, or other insecticides and a food-based attractant, such as hydrolyzed yeast, are the most common type of chemical control for *A. obliqua* (Bateman, 1982; Roessler, 1989). Cultural practices, such as destroying all fallen and infested fruits, are also used. Soil drenches around host plants with appropriate pesticides are used to kill larvae and pupae during eradication programs (Stark *et al*., 2014). Biological control has had limited success (Niklaus-Ruiz and Basedow, 1997, Ohashi *et al.*, 1997), but *Diachasmimorpha longicaudata* (Braconidae) continues to be mass reared and released in Mexico (Ramírez y Ramírez *et al*., 2020). Sterile insect technique (SIT) is used for suppression and eradication in area-wide management programs to control *A. obliqua* in Mexico, primarily in the north to maintain fly free areas (Ramírez y Ramírez *et al*., 2020).

Phytosanitary risk

Anastrepha obliqua has a broad range of hosts and is a major pest throughout its range, especially on mango. It is invasive at least in the Lesser Antilles (CABI, 2008) and has been trapped in California, Florida, Texas and other states in the USA (Steck, 1991). Fu *et al.* (2014) modelled its potential geographic distribution and predicted its ability to establish throughout much of the tropical and subtropical areas of the world. It occurs primarily in lowland, tropical areas with hot climates, and is not capable of surviving the cold winters of the northern and central part of the EPPO region, thus the risk of establishment of *A. obliqua* is limited to the warmer southern parts of the EPPO region. Populations might enter and multiply during the summer months. In southern areas, some such populations might survive one or more winters, though in any case the direct losses from such introductions would probably not be high. The major risk for EPPO countries arises from the probable imposition of stricter phytosanitary restrictions on exported fruits (particularly to America and Japan) if any *Anastrepha* sp. enters and multiplies, even temporarily.

PHYTOSANITARY MEASURES

Consignments of fruits of *Citrus* spp., *Eugenia* spp., *Mangifera indica*, *Prunus persica*, *Psidium* spp., *Spondias* spp., Syzygium spp., and other reported host plants from countries where *A. obliqua occurs* should be inspected for symptoms of infestation, and suspected infested fruits should be cut open to look for larvae. Such fruits should be imported from areas where *A. obliqua* does not occur or from a place of production found free from the pest by regular inspection for 3 months before harvest. Some fruits may be treated in transit by cold treatment (e.g., 13, 15 or 17 days at 0.5, 1.0 or 1.5°C, respectively), by hot water immersion (Nascimento *et al*., 1992) (for mango, 46°C for 65 to 110 minutes depending on fruit size), by vapour heat (e.g., at 43°C for 4-6 h) (USDA, 2020), forced hot-air quarantine treatment (Mangan & Ingle, 1992), or irradiation. Ethylene dibromide was previously widely used as a fumigant but is now generally withdrawn because of its carcinogenicity. Methyl bromide is approved on a very limited basis; e.g., 1 treatment schedule (T101-j-2-1; 40 g/m^3 for 2 h at 21-29.5°C) is currently approved by USDA (2020) to treat oranges, tangerines and grapefruit from Mexico under pre-clearance. Irradiation at 70 gy is considered effective treatment for immature stages of *Anastrepha obliqua* (USDA, 2020).

Plants of host species transported with roots from countries where *A. obliqua* occurs should be free from soil, or the soil should not contain fruits or seeds or be treated to kill any puparia.

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Datasheet history

This datasheet was first published in the EPPO Bulletin in 1983, revised in the two editions of 'Quarantine Pests for Europe' in 1992 and 1997, as well as in 2020. It is now maintained in an electronic format in the EPPO Global Database. The sections on 'Identity', 'Hosts', and 'Geographical distribution' are automatically updated from the database. For other sections, the date of last revision is indicated on the right.

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