Mexican Fruit Fly, *Anastrepha ludens* (Loew) (Diptera: Tephritidae)[1]

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INTRODUCTION: Mexican fruit fly is a very serious pest of various fruits, particularly citrus and mango, in Mexico and Central America. Its natural distribution includes the Rio Grande Valley of Texas, where populations routinely attain pest status if control measures are not practiced. It is a frequent invader in southern California and Arizona. Mexican fruit fly represents a particular threat to Florida because of its special affinity for grapefruit, of which Florida is one of the world's leading producers. Although larvae are transported widely in infested fruits, the discovery of adults in Florida has been surprisingly rare. A single specimen was detected in a McPhail trap in Sarasota in 1972 which initiated an extensive survey program that yielded no further specimens (see Clark *et al.* 1996); and two specimens (one male and one female), labeled "Key West, 22-IX-34, at *Spondias mombin* Jacq., O.D. Link Coll., S.P.B. Acc. No. 52582" are present in the Florida State Collection of Arthropods.

TAXONOMY: The genus *Anastrepha* comprises about 200 species distributed throughout the Americas. Most species are characterized by their yellow to brown body and wing coloration, distinctive wing pattern of costal-, S-, and inverted V-bands (C, S, and V in Fig. 2), and females with relatively long, tubular ovipositor sheaths. The medial vein (M_1) curves forward at the wing tip. *Anastrepha ludens* seems to be a well-defined and clearly distinct species, although there is a possibility of a separate but nearly indistinguishable form in the extreme southern part of its distribution in Costa Rica (Jiron *et al*. 1988). The first comprehensive treatment of *Anastrepha* taxonomy, which remains fundamental and useful, is that of Stone (1942).

DESCRIPTION: Typical in appearance to other members of the genus *Anastrepha*, but notable for the female's long ovipositor and sheath relative to its body size (Fig. 1). The ovipositor is 3.35-4.7 mm long. Mexican fruit fly is readily distinguished from the Caribbean fruit fly, *Anastrepha suspensa* (Loew), by its much longer ovipositor (only 1.45-1.6 mm long in *suspensa*), wing band color (pale yellow in *ludens* vs. dark brown in *suspensa*), width of S-band (narrow apically, not extending to medial vein in *ludens* vs. wide and extending to medial vein in *suspensa*), and color of thoracic setae (uniformly pale in *ludens* vs. dark in *suspensa*). See Figs. 2 and 3.

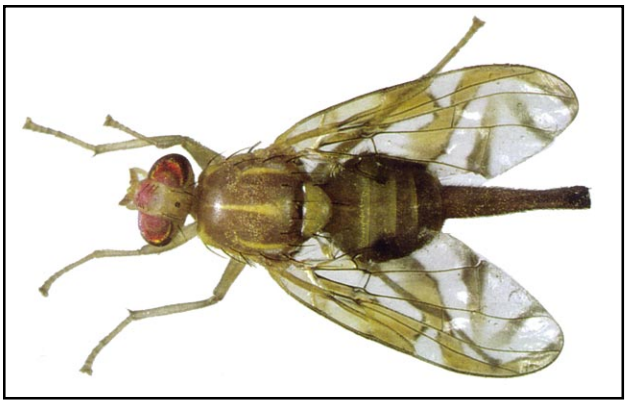

Fig. 1. *A. ludens* female. Photography credit: Jack Clark, University of California Cooperative Extension

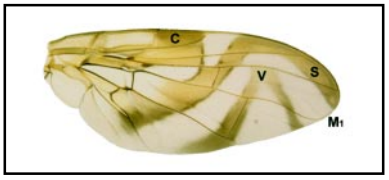

Fig. 2. *A. ludens* wing. Photo credit: Jeffrey Lotz, Division of Plant Industry

Fig. 3. *A. suspensa* wing. Photo credit: Jeffrey Lotz, DPI

BIOLOGY: Like other *Anastrepha* species, *A. ludens* does not respond to any known sex attractant that can be usefully employed in a detection trapping system. This is in sharp contrast to some other serious fruit fly pests, such as Mediterranean fruit fly (*Ceratitis capitata* (Wied.) and Oriental fruit fly (*Bactrocera dorsalis* Hendel) for which powerful male sex attractants are available and used in traps to detect populations early in the invasion process. Instead,

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detection systems for pest *Anastrepha* species rely on the use of non-specific, wet, protein-baited McPhail traps, which act as general food attractants, especially for young females searching for protein to produce eggs. Adults may be very long-lived, up to 11 months, and highly fecund, laying 1,500 eggs or more. Extensive further details on the biology and ecology of the Mexican fruit fly are given by Baker et al. (1944); see also extensive references in Aluja (1994).

HOSTS:

Anacardium occidentale (cashew)
Annona cherimola (cherimoya)
Annona reticulata (custard apple)
Annona squamosa (sugar-apple)
Carica papaya (papaya)
Casimiroa edulis (white sapote)
Casimiroa tetrameria (matasano)
Citrus aurantiifolia (lime)
Citrus maxima (pummelo)
Citrus aurantium (sour orange)
Citrus limetta (sweet lime)
Citrus x paradisi (grapefruit)
Citrus medica (citron)
Citrus reticulata (tangerine)
Citrus sinensis (sweet orange)
Coffea arabica (arabica coffee)
Cydonia oblonga (quince)
Diospyros kaki (Japanese persimmon)
Feijoa sellowiana (feijoa)
Inga spp.
Malus domestica (apple)
Malus pumila (paradise apple)
Mammea americana (mammey apple)
Mangifera indica (mango)
Mastichodendron capiri
Passiflora edulis (purple granadilla)
Persea americana (avocado)
Pouteria sapota (sapote)
Prunus persica (peach)
Psidium guajava (common guava)
Psidium littorale (strawberry guava)
Punica granatum (pomegranate)
Pyrus communis (pear)
Sargentia greggii
Spondias purpurea (red mombin)
Syzygium jambos (rose-apple)

List taken from White and Elson-Harris (1992) and Hernandez-Ortiz (1992).

CONTROL: Mexican fruit fly infestation is not readily controlled on a small scale, for example by homeowners. Egg and larval stages inside the fruit are safe from treatment. The adult stage is susceptible to poisoning, usually by a short-lived "bait spray" comprised of a contact insecticide mixed with protein and carbohydrate. This is applied as fine droplets to host plant foliage where adults feed. Adults are highly mobile, however, and move easily from any nearby untreated trees back to treated trees after a few days. On a larger commercial scale such as a citrus grove, host trees may be treated with bait spray as described above, and immigration of new adults can be minimized by removal of other host plants in a surrounding buffer area. Area-wide control is also possible using mass release of laboratory-reared and sterilized males to compete with wild fertile males and reduce the number of fertilized eggs laid.

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