

olive fruit fly *Bactrocera oleae* (Rossi) (Diptera: Tephritidae)

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INTRODUCTION

Damaged olive fruits were first noticed in 2019 in a field of olive trees (*Olea europaea*) that were planted in 2011 (Miyasaka et al. 2017) at the University of Hawai'i, College of Tropical Agriculture and Human Resources (UH-CTAHR), Lālāmilo Research Station in Waimea, Hawai'i Island. The first sample was collected by UH-CTAHR Extension Agent Randall Hamasaki on August 12, 2019. Several adult fruit flies were reared from the infested fruit and submitted to Hawai'i Department of Agriculture (HDOA), Plant Pest Control Branch, by Diagnostician Brian Bushe (UH-CTAHR). The specimens were forwarded to Allen L. Norrbom at the Systematic Entomology Laboratory, Agricultural Research Service, United States Department of Agriculture, who confirmed this species as *Bactrocera oleae* (Rossi). *B. oleae*, the olive fruit fly (OLFF), represents a new state record for Hawai'i.

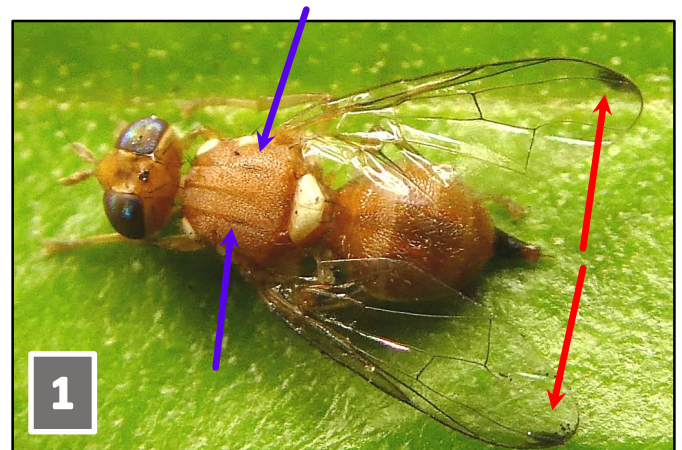


Fig. 1. Female OLFF. Red arrows showing black spots on the tips of wings. Blue arrows showing faint dark lines running down the scutum and the lack of a vertical yellow stripe at the base of each wing.

DESCRIPTION

OLFF adults collected from Hawai'i are orange-brown, sometimes with faint black lines running the length of their scutum and lack the vertical yellow stripe on the scutum at the base of each wing which is found on the other three Hawai'i *Bactrocera* species (i.e., *B. cucurbitae* = melon fly, *B. dorsalis* = oriental fruit fly, and *B. latifrons* = solanaceous fruit fly) (Fig. 1), and slightly smaller than those recorded elsewhere in the world at approximately 5mm (3/16"; Fig. 2). There are two black dots on the front of their faces (Fig. 3), as well as a black spot on the tips of their wings (Fig. 1).

HOSTS

The primary host of OLFF is the common olive (*O. europaea*), but it can attack all species of *Olea*. Initial surveys in Hawai'i concluded that all varieties of common olive were attacked by OLFF, but larger-fruited cultivars (Mission, Coratina, Pendolino, and Frantoio) had a relatively higher level of infestation. Olive cultivars with smaller fruit (Arbequina, Abrosana and Koroneiki) exhibited less damage and larval infestation.

olive fruit fly
Bactrocera oleae (Rossi)

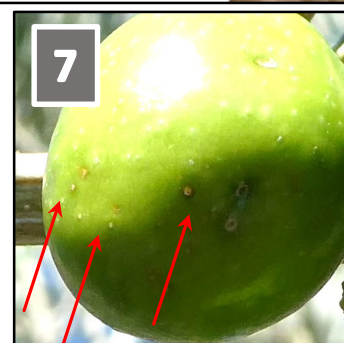
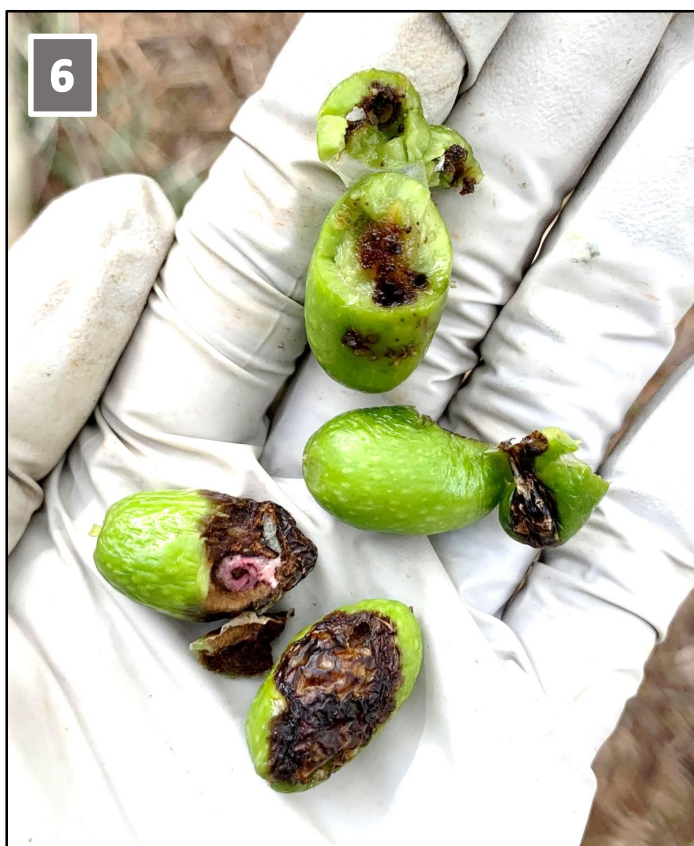
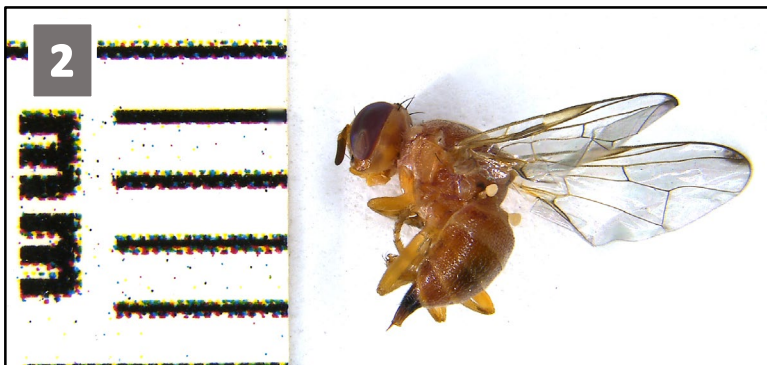


Fig. 2. OLFF female

Fig. 3. OLFF showing two black spots on the front of the face

Fig. 4. Larva feeding within olive fruit, showing brown internal decay

Fig. 5. Infested fruit on tree showing brown spots and exit holes (red arrows) on fruit

Fig. 6. Larval feeding damage to olive fruit, showing shriveling, brown internal decay. Photo: Andrea Kawabata

Fig. 7. Oviposition scars on young olives (red arrows)

DAMAGE AND ECONOMIC IMPACT

Females deposit eggs into ripening fruit where larvae eat the flesh of the olives, destroying the fruit and allowing secondary pests to enter and cause rot. Feeding may also lead to premature fruit drop (Zalom et al. 2009). Usually there will be only one larva per fruit, but under high pest pressure up to 11 per fruit have been reported (Yokohama 2015). Larvae will pupate either in the fruit or in the soil.

In the U.S., OLFF accounts for 5% of the olive industry's damage, resulting in approximately \$800 million a year in losses (Nardi et. al. 2005). While growers on Maui and Hawai'i currently cultivate olives for oil, OLFF infestations will impact production of this crop whether it is grown for table olives or for oil.

DISTRIBUTION

OLFF is found in most olive producing regions of the world, as well as areas with wild-growing *Olea*. In the U.S., it is only established in California.

In Hawai'i, OLFF has been found on Hawai'i Island and Maui. Fruiting olive trees in elevation areas with cooler climates are susceptible to OLFF invasion.

WHAT TO LOOK FOR

- Fruit with exit holes and premature ripening (Fig. 5)
- Fruit with brown internal decay and maggots inside (Figs. 4, 6)
- Rotten fruit on ground with feeding tunnels inside olives (Fig. 6)
- Fruit with indentations and small brown spots (oviposition scars) on olives made by egg-laying female (Fig. 7)

IF YOU SUSPECT INFESTATIONS

Hawai'i Island: 974-4146; Kaua'i: 241-7132; Maui: 873-3555, O'ahu: 973-9525

Or call: **643-PEST**

Email: HDOA.PPC@Hawaii.gov

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REFERENCES

- Miyasaka, S. C., R. T. Hamasaki, and R. T. Nagata. 2017. Reflective Guide to Growing Olives for Oil Production in Hawai'i. NPH-16. College of Tropical Agriculture and Human Resources, University of Hawai'i at Mānoa.
- Nardi, F., A. Carapelli, R. Dallai, G. K. Roderick, and F. Frati. 2005. Population structure and colonization history of the olive fly, *Bactrocera oleae* (Diptera, Tephritidae). *Mol. Ecol.* 14: 2729–2738.
- Yokohama, Y. Y. 2015. Olive fruit fly (Diptera: Tephritidae) in California table olives, USA: Invasion, distribution, and management implications. *J. Integr. Pest Manag.* 6(1): 1-18.
- Zalom, F. G., R. A. Steenwyk, H. J. Burrack, and M. W. Johnson. 2009. Olive fruit fly. UC IPM, University of California. <http://ipm.ucanr.edu/PMG/PESTNOTES/pn74112.html>.