

# **Controlling Olive Fruit Fly In Commercial Orchards**

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The Olive Fruit Fly (OLF) was discovered in Los Angeles in 1998. It spread rapidly and can now be found virtually anywhere olives are grown in California. OLF lays its eggs in olive fruit. The fruit is damaged when larvae hatch and tunnel through the fruit, allowing the entry of secondary bacteria and fungi which can rot the fruit. Some damaged fruit will drop prematurely. For table olive growers, the presence of even a few infested fruit can lead to rejection of the entire crop. Infested olives will produce lower-quality olive oil due to off flavors produced if the fruit decays. Due to increasing OLF populations, table olive growers will need to spray for olive fruit fly to assure uninfested fruit.

## **Life Cycle and Identification:**

**Adult:** The adult fly is about 1/4" in length, reddish-brown to amber in color (Figure 1). There are black spots on wing tips, and tan marking on the back behind the wings. Females will have a visible pointed ovipositor at the tip of the abdomen while males have rounded abdomen (Figure 2). Adults become active in March or April and lay eggs in last year's fruit. Adults feed on honeydew and nectar and may not stay in the olive orchard, but the adult females must return to olive trees to lay their eggs in the fruit. The second generation will lay eggs in the current season's crop starting around pit hardening and the third generation will lay eggs in ripening fruit. Three generations are typical in the Central Valley. Up to 5 generations are possible in areas with milder winters. A female fly will lay 10 to 40 eggs per day and 200 to 500 per generation. An OLF can complete one generation in 30 to 35 days under optimal conditions (68-86 °F).

The OLF eggs and young larvae are very small and difficult to see (Figures 3 and 4). After hatching, the larvae grow to about 3/16 inch in length in about 20 days (Figure 5). Generally the larvae pupate in the fruit during the summer (Figure 6), but leave the fruit and pupate in the ground during the fall and winter. However, some will overwinter in the fruit on the tree and pupate in the spring.

Distinguishing OLF stings from other abrasions and punctures can be difficult. Stings (marks from egg laying) will be a slightly sunken, round, brownish mark on the fruit (Figure 7). If the olive skin is carefully removed with a razor blade or if the olive is cut open, the flesh under the mark will be brown, and the initial feeding tunnels, may be visible and will look like a fine pencil line in the olive flesh. (Figure 4). Later in the season, feeding tunnels will be enlarged and exit holes will be visible where the larvae have exited the fruit and the fruit may have a lumpy appearance if the infestation occurred early in the season (Figure 8).

## **Monitoring and Trapping:**

Trapping is useful for monitoring fly activity and population trends and for evaluating spray efficacy. Trap catches cannot be used to predict potential OLF crop damage. It is best to use the same trap type over time for consistency.

Use yellow plastic McPhail-type or Mulipher traps baited with Torula yeast and borax dissolved

in water (Figure 9). The torula yeast and borax solution should be changed and the old bait solution removed from the orchard each time each time the traps are checked. Yellow-panel sticky traps baited with a pheromone lure and ammonium carbonate or ammonium bicarbonate (Figure 10) can also be used, but usually capture fewer OLF in the Central Valley. Trece's AM Supercharger yellow sticky trap is recommended over Champ yellow sticky traps. At least 2 traps per block should be used. Place the traps in fruiting trees by March 1<sup>st</sup>. They should be at least one row from the edge of the orchard and positioned in an open, shady area within the canopy. Check the traps weekly and change them when they are no longer sticky. Change the pheromone lures every 4 months and the ammonium carbonate or ammonium bicarbonate packets every 2 weeks. Note that the traps may stop catching flies following application of bait sprays, even if some flies are present.

### **Control:**

GF-120 NF Naturalyte Fruit Fly Bait, a formulated Spinosad bait produced by Dow AgroSciences LLC, is the only sprayable insecticide currently available for control of OLF. It currently has a Section 18 emergency registration and, therefore, requires a permit for application and must be applied by a qualified applicator. It is organically acceptable.

GF-120 can be applied at 10 to 20 ounces per acre, and cannot be applied more often than every seven days. Recommended for 2005 is an application to every other row every seven days at a rate of 14 ounces per treated acre (half the total acreage with an every other row treatment). An alternative timing would be every row every 2 weeks. Dilute 1 part GF-120 with 1.5 to 4 parts of water. Use the higher dilution rate if clogging is a problem (14 oz. GF 120 + 56 oz. water = 70 oz. of spray solution per acre). Mix thoroughly to make sure that the product is completely dissolved. Spray immediately after dilution. Apply GF-120 from the ground and use a nozzle that will produce large droplets which will dry slowly. Do not use fan nozzles. Larger acreages are usually treated with specialized spray equipment (Figure 11). Smaller acreages can be treated with inexpensive hand held sprayers (Figure 12). Spray the solution to the upper half of the tree and on the north side to retard drying. Store GF-120 in a cool location. Once open, use within the season.

Make the first application when trap catches indicate an increase in fly populations. Begin regular applications about 2 weeks prior to pit hardening (around June 1). Continue spraying weekly through harvest. If fruit remains on the tree and trap catches continue, spray until the first frost.

An attract and kill trap marketed by Monterey AgResources will be available in 2005 on a limited basis. This trap uses food and sex lures to attract the flies to an insecticide impregnated card (Figure 13). These traps would typically be hung in the trees at about 40 per acre and should last about 5 months. They are not recommended for stand alone use under heavy populations. Research is currently underway to determine how to best use these traps under California conditions. Eventually this type of trap may have application in non commercial settings where the traps could be put up once a year to keep OLF populations from exploding. Besides chemical treatment, an effort to destroy remaining fruit after harvest may be warranted. Removing and destroying fruit remaining on the trees as early as possible after harvest will

ensure no fruit is present for egg laying in the spring. Removing fruit later in the winter prior to March 1 will allow more time for mature larvae to fall to the soil and pupate, but should help reduce populations by eliminating old fruit that otherwise would become infested by overwintering and early emerging adults. Fly emergence from the soil can be prevented by burying the fruit at least 4 inches. Earlier harvest can also help keep populations lower. Untreated non commercial trees host large numbers of OLF. These trees should be removed or treated to control olive fly populations and reduce fruit infestation. Ornamental trees can be treated with florel or fruitstop at full bloom to drop the flowers. These treatments are usually not 100 percent effective and remaining fruit will need to be removed by hand.

Research funded by the California Olive Committee, University of California, USDA and CDFA related to OLF control is currently underway. This research includes: OLF biology, effect of cultural practices on fly populations, biological control, improving GF-120 efficacy and timing, identification and registration of alternative insecticides, development of degree-day models for OLF development to improve treatment timing, olive varietal susceptibility, OLF flight abilities and movement patterns and impacts of summer heat on OLF populations.

### **Vendors of OLF Traps and Controls:**

Check with local pesticide and fertilizer dealers for olive fly trapping supplies. Listed below are sources of trapping materials if they are not available locally.

Better World Manufacturing Inc., (559) 291-4276. email [bettertrap@aol.com](mailto:bettertrap@aol.com). McPhail traps and torula yeast.

Trece Inc., Adair, OK 918-785-3061, [www.trece.com](http://www.trece.com). Yellow sticky traps.

Suterra LLC, Bend, OR 866-326-6737, [www.suterra.com](http://www.suterra.com). Yellow sticky traps.

ISCA Technologies, Inc., Riverside, CA 909-686-5008 [www.iscatech.com](http://www.iscatech.com) yellow Multipher McPhail-type traps, yellow sticky traps and torula yeast (sold by the lb.).

Great LakesIPM, 989-268-5693, [www.greatlakesipm.com](http://www.greatlakesipm.com), yellow plastic McPhail-type traps, torula yeast, and yellow sticky traps.

Monterey AgResources, Fresno, CA 559-268-5693, [www.montereychemical.com](http://www.montereychemical.com). Attract and Kill traps.

### **For additional information:**

#### Websites:

[ceglen.ucdavis.edu](http://ceglen.ucdavis.edu)  
[www.ipm.ucdavis.edu](http://www.ipm.ucdavis.edu)  
[fruitsandnuts.ucdavis.edu](http://fruitsandnuts.ucdavis.edu)  
[cesonoma.ucdavis.edu](http://cesonoma.ucdavis.edu)

#### Contacts:

Butte County U.C.C.E. (530)538-7201  
Glenn County U.C.C.E. (530)865-1107  
Glenn County OLF Pest Control District (530)865-1133  
Tehama County OLF Pest Control District  
California Olive Committee (559)456-9096

## List of Photos and Captions

| Figure | Caption (English)                                       | Caption (Spanish) |
|--------|---|-------------------|
| 1      | Adult Female Fly  |                   |
| 2      | Female and Male Flies in a Sticky Trap                  |                   |
| 3      | OLF Egg   |                   |
| 4      | Larval Feeding Traces and 1 <sup>st</sup> Instar Larvae |                   |

|    |                               |  |
|----|-------------------------------|--|
| 5  | Mature Larvae                 |  |
| 6  | Pupae in Fruit                |  |
| 7  | Ovipositional Stings in Fruit |  |
| 8  | Heavily Infested Fruit        |  |
| 9  | Plastic McPhail Trap          |  |
| 10 | Yellow Panel Sticky Trap      |  |

|    |                       |  |
|----|-----------------------|--|
| 11 | ATV Sprayer           |  |
| 12 | Small Pump Up Sprayer |  |
| 13 | Attract and Kill Trap |  |