



Olive Fruit Fly (OLF) Update 2006 For The Olive Industry OLF Management FAQ's/University Of California Recommendations

Determining Need to Treat for Olive Fruit Fly (OLF)

Will trapping OLF adults help determine the level of damage? No. Adult trap counts do not reliably correlate with fruit damage. Trapping adult OLF allows you to monitor fly activity and population trends in your own grove. More importantly, the efficacy of your sprays can be evaluated with the traps by comparing OLF counts before and after treatment.

Will I need to spray for OLF this year? Yes, OLF is present throughout the olive production areas of the state. If you want assurance your fruit will be free from OLF injury, prophylactic applications of insecticide will be required. OLF has generally infested both rural and urban areas. During the last five years, spring populations of OLF in some locations have increased each year over the preceding year. All olive trees are now at risk if left untreated. Table olive processors will not allow OLF infested fruit in their products and cannot readily separate infested fruit during processing. Table olive processors have essentially set a "zero tolerance" for OLF infested loads. **The tolerance for OLF in oil olives depends on the individual processor, but is usually around 10% damage.** You need to control OLF.

Trapping to Monitor OLF Adults

If I want to monitor, how do I do it? Use yellow-panel traps with both a spiroketal pheromone lure and a feeding attractant such as ammonium bicarbonate or ammonium carbonate. Also, check the expiration date on the spiroketal pheromone lure to ensure attractancy. A more effective trap is the plastic McPhail trap baited with a liquid mixture of Torula yeast tablets and borax in water. To evaluate treatment efficacy, a minimum number of two traps per block of trees (e.g., 5-10 acres) are recommended at this time. However, using more traps within a block should provide better detection of OLF adults. Based on experience over the last 5 years, it

is recommended that Trece's Pherocon® AM/NB Traps with Supercharger food attractant or the plastic McPhail Traps be used.

Place traps in fruiting trees no later than March 1 (OLF tend to occupy fruiting trees more than fruitless trees) in at least the second tree row in from the grove's edge to avoid contamination with dust. Position traps in the shade (north side of tree) in an open area within the mid-canopy (avoid locations where leaves may block traps). Inspect traps weekly for OLF adults and record your captures. Males have rounded abdomens and females have pointed abdomens. Pherocon® AM Traps should be changed at intervals based on manufacturer or supplier recommendations, or more frequently if the trap's sticky surface becomes covered with non-target insects, dust or other debris. To count the number of olive flies in a McPhail trap, the solution must be poured through a sieve that captures the flies. McPhail type traps should have the yeast solution changed once per month. Use 3-4 Torula yeast tablets per liter of water. Pour the old solution into a bucket and remove it from the orchard – do not dump it on the ground because it could attract flies away from the trap.

Obtaining Traps

For trapping supplies, check with local pesticide and fertilizer dealers. If unavailable locally, OLF yellow-panel traps with pheromone and food lures are available from Trece Inc. in Adair, Oklahoma (Phone: 918-785-3061; website: www.trece.com), and Suterra LLC in Bend, Oregon (Phone: 866-326-6737; website: www.suterra.com/). McPhail Traps and Torula Yeast are available in California from: ISCA Technologies Inc., Riverside, CA (Phone: 909-686-5008; website: www.iscatech.com) and Better World Manufacturing Inc., Fresno, CA (Phone: 559-291-4276; e-mail: bettertrap@aol.com).

What will my trap counts mean? Numbers of trapped flies indicate flight trends over time and relative OLF population levels within the grove. This information is useful in evaluating a spray program's efficacy. The

absence of flies on a trap does not always mean that an infestation does not exist in a grove, especially during periods of high summer temperatures ($\geq 100^{\circ}\text{F}$). Rotate traps among trees to ensure flies are encountering traps. Make sure to change spiroketal pheromone lures and feeding attractants as needed based on manufacturers' recommendations.

Treating OLF with GF-120

What materials can I use commercially? Currently, GF-120 NF Naturalyte Fruit Fly Bait (a formulated Spinosad bait produced by Dow AgroSciences LLC) is all that is available as a sprayable insecticidal material. It currently has a Section 18 emergency registration so a permit will be required for its application to any property. As a Section 18 material, it must also be applied by a qualified applicator. It is also approved for organically grown olives. Check with your local Agricultural Commissioner to see if an exception can be made for non-commercial trees.

How much GF-120 do I use? The GF-120 label allows between 10 and 20 fluid oz. of formulated product per acre per application, with a minimum of seven days between applications. Based on prior experiences in California and Europe, an application rate of 14 fluid oz. per acre is recommended for 2006.

Dilution

In areas where fly populations are low to moderate, GF-120 may be diluted to 1:1.5 (1 part GF-120 to 1.5 parts water) up to 1:4 (1 part GF-120 to 4 parts water). If populations are high (typically the coastal areas), a dilution of 1:9 (1 part GF-120 to 9 parts water) may be more effective in reducing these populations than a more concentrated dilution. NOTE: Diluted solutions of GF-120 should be used IMMEDIATELY because microorganisms may grow in them and the product may become ineffective. If not used, diluted solution can be REFRIGERATED briefly.

How is the bait applied? Ground application is recommended; aerial applications may be less effective due to resulting small droplet size. For best effect, large droplets (4–5 mm in diameter) are needed so they do not dry out quickly.

When using an "all terrain vehicle" (ATV), the solution should be applied to the upper half of each tree, in every other row each week (divide the amount of solution per acre by the number of trees per acre to determine the amount of solution to apply per tree). The following week, the alternate unsprayed rows should be treated in a similar manner.

If using a handgun applicator for individual trees, cover approximately a 2-foot diameter area within the tree canopy on the north or east side of each tree. Do not use flat fan nozzles. For best results, about three to six 5 mm diameter droplets per square foot of foliage are necessary. At the dilution rate of 1:4 GF-120 to water and an application rate of 14 oz. /acre of GF-120, the volume of the diluted spray solution will be 70 oz. /acre (14 oz. of GF-120 added to 56 oz. of water). Higher concentrations (e.g., 1:1.5) may be more difficult for your spray equipment to easily deliver without becoming clogged.

How do I time the sprays? Timing of the first one or two sprays should occur when increasing numbers of flies are trapped. If springtime weather conditions are unusually warm, first sprays should be started before June 1 (usually around March or April depending on the weather). After June 1, or about 2 weeks before pit hardening, initiate weekly protective insecticide sprays. Although OLF may start stinging fruit (laying eggs) earlier, the period of fruit susceptibility starts around the time of pit hardening. Until then, the eggs and larvae do not survive. Control depends on protecting the fruit by reducing the number of flies. If flies are present in an orchard in the spring, it would be worthwhile to apply a spray early to control that generation perhaps even before bloom.

How often do I have to spray? To ensure effective control through each OLF generation, we recommend GF-120 be applied to every other row every seven days from the time of pre-pit hardening until harvest. There will be little additional cost to implement this procedure because only one half of the orchard is being sprayed each time.

What about a post-harvest application? No. More effective control can be obtained with springtime sprays as discussed above or post-harvest sanitation.

Other Methods of Control

What about post-harvest sanitation? Olives remaining on the tree after harvest are the primary source of next year's infestation by providing a place for continuing development of the fly. Remove remaining fruit from trees as soon as possible after harvest and destroy them on the ground by any method possible including mulching or disking. If fruit are buried, they must be at least 4 inches deep. Remove fruit from all olive trees within 1/2 mile of your orchard. Note that if OLF infestations are high in your surrounding area, sanitation may provide minimal protection.

Does mass trapping work? Mass trapping of OLF adults has not been demonstrated as a highly efficient management technique in California. It could possibly lower adult populations in orchards, but economically significant fruit damage can occur. Mass trapping may be most effective in locations where the OLF adult numbers are already low and the olives are processed into oil.

What is the status of Attract & Kill Traps? The attract and kill device (Magnet OL®), manufactured by AgriSense, uses a food attractant and sex pheromone to attract OLF adults and is impregnated with a pyrethroid insecticide to kill them. The traps have been registered for use in California. These traps will be marketed by Monterey AgResources (Fresno, CA). The traps are hung in the trees and will last for up to 5 months. They are not recommended as a stand-alone control unless OLF populations are very low. Two years of research in small orchards in coastal northern California have indicated that the attract and kill device may provide adequate control in isolated populations for olives intended for oil production. The devices may be particularly useful in non-commercial settings where convenience is paramount; they could be put up once a season to give some control and hopefully keep OLF populations from exploding. For more information: Monterey AgResources (559) 499-2100.

What about Kaolin Clay as a protectant against OLF? Kaolin clay has been used to protect plants from various insect pests. Kaolin clay is registered for olive fruit fly control in California. It is a protective barrier film (brand name: Surround WP) that is produced by Engelhard Corporation. Label directions call for applications every 7-14 days throughout the season. Surround WP contains highly refined kaolin clay, with a small particle size, as well as a spreader sticker. Data from several small-scale trials in California indicated very good success with the product. It is applied every 5-6 weeks starting at pit hardening, when the fruit becomes vulnerable. The efficacy of Surround WP is still being investigated for OLF control in California, and no recommendations for its use can be made currently.

The Impact of Summer Heat on OLF

Does summer heat kill OLF? Laboratory, greenhouse, and field cage studies indicate that high summer temperatures in parts of the Central Valley can kill olive fruit fly eggs, 1st instar larvae and adults. OLF eggs within fruit die quickly (about 2 days) at temperatures of 100°F and greater. First instar larvae within fruit exposed to similar high temperatures take about 5 days to die but some (about 10%) may survive the high temperatures. OLF adults that have plenty of water and food (e.g., honeydew) can withstand long periods of high temperatures (100°F and greater). However, flies that are unable to obtain both food and water can die within 5 days time if temperatures remain high. Work is underway to understand what proportion of the OLF population is unable to find food and water during hot periods. Control of black scale populations via cultural controls may deprive OLF adults of food (i.e., honeydew) needed to survive the hot periods.

Should GF-120 treatments be halted during hot periods? Presently, we are unable to accurately predict whether high summer temperatures will kill enough flies to eliminate the need for bait spray treatments during the summer. Based on analysis of climatic maps, it is apparent that periods of high summer heat (e.g., 100°F or greater for 3 to 5 days in length) vary dramatically within and between the San Joaquin and Sacramento Valleys. Behavioral observations also show that OLF adult behavior changes at temperatures greater than 95°F. The absence of captured flies in monitoring traps during hot periods does not necessarily mean that flies have died, but may mean that flies are remaining inactive to survive the heat. Work is continuing to better understand the interaction between OLF and high temperatures. Of significant importance is the necessity of protecting the olive crop when temperatures decline in the latter part of August and early September and beyond. Flies that survive the high temperatures will return to their normal activity when temperatures decrease. This decline will happen at different times within the Central Valley.

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