

Progress Report
Western IPM Center Grants Program
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- **Grant Agreement #:** Campus Subaward No. 009607-Sonoma
- **Title:** *Monitoring and mass trapping olive fruit fly*
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- **First year funded and number of years funded:** January 1, 2005 to March 14, 2006 (extended to September 14, 2007)
- **Funding amount:** \$59,281

Introduction:

The recently introduced olive fruit fly (OLF) is the most economically significant pest of olives in California. Because the fly larvae feed on olives as they develop, tunneling through the fruit and destroying the flesh, the tolerance for fly damage in California pickling olives is 0%. The widely cited European tolerance for damage in oil olives is 10%. The validity of this threshold for California producers has not been tested. In order to minimize the environmental impact of control measures, an integrated approach to managing olive fruit fly is important. The standard treatment for OLF is a bait formulation of spinosad, a fermentation by-product of bacteria. Mass-trapping has had considerable success in Europe on OLF and in the control of various tephritid fruit flies in other locations. A barrier film made from kaolin clay, Surround, is also registered for use on olives. The purpose of this study was to compare the various spray treatments and mass trapping for the control of OLF. Monitoring for the OLF to determine a treatment threshold might help reduce the amount of pesticide required over the season, so the trial included extensive monitoring with yellow sticky traps, and correlation with harvest damage levels. In addition, an examination of the sensory effects of fly damage on olive oil was conducted to establish more accurate damage thresholds. Olives are a popular landscape tree in California, and those trees are a safe harbor for OLF outside commercial orchards. Public outreach on the issue was part of the project, seeking to educate residential olive growers about control measures.

Update on 2nd Year Accomplishments:

The weather in 2006 caused numerous problems with the trial. The olive crop was poor (lowest in history) and infestation levels were extremely uneven; some of the sites had no OLF at all, others had extraordinary pressure. In one location with the latter situation, the only fruiting trees on the property, Ascolanos, sustained serious damage despite

treatments known to be effective. The trees treated with Spinosad bait had 59% OLF damage, and the kaolin treated trees had 11.76%. The damage averages for 2006 were as follows: OLIFE 24.58%, McPhail-type 3.43%, kaolin clay 3.13% and Spinosad bait 11.43%. The damage on the untreated control trees was much lower than in previous years: 35.82%.

Overall, the success of traps used to monitor fly numbers and predict damage at harvest was spotty at best. In some cases there was a correlation between large trap catches and high damage, or low trap catches and low damage, but in many instances there was no correlation at all. The conclusion was that it is precarious to depend solely on trap catches to determine the need for treatment. Monitor traps might still be very useful for indicating general flight trends, but should never be taken as a guarantee of the absence of OLF.

Sensory analysis of the oils made from olives with different degrees of OLF damage showed a tremendous difference. One variety with 100 % damage and no rot yielded an oil that did not show any obvious classic defects. The oil was quite pungent, as would be expected of fairly green fruit, but at the same time had a fruity character that was almost over-ripe. Another batch of the same variety containing a small percentage of rotten olives, on the other hand, produced an oil that was both rancid and fusty. Another variety with damage from 0 to 50% with no fruit rot also fared well in blind tastings.

We now know the relative efficacy for various treatment alternatives for controlling olive fruit fly in coastal California. Mass trapping can be used to reduce overall fly numbers, which will likely reduce the number of spray treatments making control more efficient and less expensive. Torula yeast proved to be the best attractant for the liquid based traps and is being used throughout the state. We found that landscape trees can become heavily attacked, serve as reservoirs for infesting other trees, and that this damage is best controlled with kaolin clay, which repels flies. In small-scale commercial orchards that are somewhat isolated, growers can use kaolin clay, or spinosad bait sprays as well as several mass trapping alternatives (putting a trap in every tree), or various combinations thereof.

Current Work:

Further research using the results from the two previous years is currently being conducted (summer of 07) to evaluate the use of a combination of mass trapping treatments with good timing and a minimum of spray treatments. This along with early harvest and prompt processing to avoid fruit breakdown (rot), should achieve adequate control with minimal financial cost or environmental contamination. It should also provide excellent quality extra virgin olive oil from olives with no rot and below the 50% damage threshold. This work should be completed by December 2007.