

Specialty Crops Research Program  
Quarterly Report:

Report Period: Inception of Project - September 30, 2003

Project Title: Ecological Management System for Controlling Olive Fruit Fly in California Olives

Principal Investigator(s): Frank G. Zalom and Louise Ferguson

Summary: Systematic collections of olive fruit flies were begun in September, 2002, in 12 California counties which represent diverse climatic zones suitable for conducting phenology studies. The number of sites has now been expanded to include about 20 sites in all. Fly and weather data collected from temperature loggers placed at each site are being transmitted electronically to the Zalom lab. Female flies are being dissected to determine mating status and reproductive maturity. Seven additional sites have been selected for field caging studies, and this aspect of the project has been ongoing throughout this spring and summer. Systematic collections of fruit were begun by the Ferguson lab in May, 2003, in the same 7 field caging locations, and at additional sites with differing temperature regimes. Coordination of the fly caging studies with fruit development will permit linkage of fly and fruit data to determine periods of fruit susceptibility and to determine factors influencing attraction and host suitability.

Major Activities: Protocols were refined for monitoring olive flies at all collection sites for the 2003 field season, with the deployment of plastic McPhail traps to replace the yellow sticky panels used at the initiation of the project. Research to compare trap efficiency was conducted during the spring, and the plastic McPhail traps were found to capture more females than the yellow panels with less dessication of captured females so as to facilitate dissection to determine mating status and reproductive maturity. Fly capture and weather data from the study sites are being transmitted to UC Davis for analysis and are also being presented as graphs on the UC Davis Fruit and Nut Center website. Olive fly colonies needed for field cage infestations and other studies being conducted by the Zalom lab have been successfully established and maintained. Field caging of olive flies on fruit began during this period and will continue through the fall.

Protocols were established for evaluating fruit development. Fruit are being collected from all of the sites where the fly caging studies are being conducted and fly phenology data are being gathered. Samples are being sent to the Ferguson lab at UC Kearney Agricultural Center where fruit dimensions and volume are obtained. Procedures for measuring puncture, color, and oil content have been determined and are being implemented as those fruit development stages are reached.

Objectives Addressed:

1. Determine seasonal phenology for olive fruit fly in selected table and oil cultivars throughout the various climatic zones of California. Progress - olive fruit fly phenology data collections were initiated in September, 2002, in diverse climatic zones and are continuing. Fruit gathered in association with these sites are being evaluated for stings and larval infestation. Fly caging on selected table and oil cultivars have been initiated at 7 study sites.



2. Adapt or develop an olive fly degree-day model for California. Progress - a literature search for olive fruit fly phenology and general development information was completed. Preliminary model validation will begin after the fly collections currently in progress are completed for 2003.
3. Develop a degree-day model to determine timing of fruit development in olives. Progress - fruit collection associated with this objective commenced in May, 2003, and will continue through this Fall.
4. Instruct growers and pest managers in use of the phenology models to improve olive fly management and reduce damage to olives. Progress - Zalom, Ferguson and Graduate Student Hannah Burrack have made presentations at industry meetings on the project and on what is known about olive fly phenology and development. A web site has been implemented through the Fruit and Nut Research and Information Center: [HTTP://Fruitsandnuts.ucdavis.edu](http://Fruitsandnuts.ucdavis.edu). A draft *UC Pest Note* on olive fly for homeowners and urban residents has been written by Zalom, Burrack and Dr. Robert Van Steenwyk of UC Berkeley. The *UC Pest Note* is in the University's peer review process at present.

Procedures and Methods Established: Protocols for trapping flies and collecting weather data were established and subsequently revised in June, 2003, for our cooperators in the Agriculture Commissioner's Offices. Data for 2002 have been transmitted to the Zalom lab, and data for 2003 is now being collected. Procedures for dissecting flies to determine mating and reproductive status were evaluated during the spring, and methods for determining mating status and for determining reproductive maturity been evaluated and those selected are being used. Seven sites for trapping, fruit collection and fly caging were established and cooperating Cooperative Extension Advisors or Pest Control Advisors trained. A technique for lab rearing of field collected flies which are needed for the field cage experiments was successfully developed and colonies are being maintained in the Zalom lab.

Significant Observations, Results or Impacts: Fly populations are much greater in coastal areas than in the central valley. Flies remain attracted to yellow pheromone and ammonium bicarbonate baited sticky panel traps throughout the year in coastal areas, but are not commonly trapped by this method during mid-summer or winter in the central valley. McPhail traps appear to be more attractive to olive fruit flies during mid-summer and indicate that adults are present and can be trapped by this method. Knowledge obtained on the use of plastic McPhail traps via a visit to the yellow panels has resulted in a change by our CDFA Detection Program cooperators to the use of plastic McPhail traps. We have also observed that although fruit can be stung by olive flies at a relatively early stage of development, the fruit is not able to host fly development until much later in the summer - perhaps August.

Narrative Summary of Budget Activities and Anticipated Activity for the Next Quarter:

Graduate Student Researchers are employed in both the Zalom and Ferguson labs. Funds for these individuals are primarily being drawn from funds obtained by the California Olive Committee (COC) at this time, and we are waiting to transfer these salaries and associated travel to this grant after the COC funds are expended. Some expenses for the Ferguson lab have been charged to this grant, and it is anticipated that more, perhaps as much as \$5500 will be charged to the grant over the next 2 quarters.