

Quarterly Progress Report
6/15/2003

Grant Recipient: California Olive Committee; Manager, Jan Nelson,
and
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University of California Davis

Contract Number: # 02-0750

Project Name: Olive Fly Infestation Crises in California

Report Period: Inception of Project – June 15, 2003

Status of the Project:

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. Fly and weather data from each site are being transmitted electronically to the Zalom lab at UC Davis. Sites have been identified for the more intense field caging studies, and this aspect of the project has just been initiated. A technique for lab rearing of field collected flies which are needed for the field cage experiments was successfully developed this quarter.

Systematic collections of fruit were started in May, 2003 in 7 locations with differing temperature regimes. Site selection was coordinated with the fly caging studies to permit linkage of fly and fruit development data. Collection sites were equipped with continuous temperature loggers and sticky traps. Olive fruit samples and temperature records are being sent to the Ferguson lab at UC Kearney Agricultural Center (UCKAC).

Major Activities:

Olive Fly Phenology:

Fly protocols were established for trapping and monitoring olive flies in different climatic regions of California. Supplies and meteorological equipment were leveraged from other funding sources and deployed as part of this project. Biologists in cooperating Agricultural Commissioner's Offices were trained to do the monitoring, and olive fruit fly trapping and associated weather data were collected from 12 counties during this period. Data are being returned to UC Davis for summary and graphing. Sites and cooperators for the 2003 field season have been identified, as have sites for the more intense field caging studies which will yield information on when the fruit becomes damaged by the flies (data which will be critical to treatment timing decisions. 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. Monitoring and dissection of flies, and associated fruit development and weather data began again in the next quarter. Information on olive fruit fly and olive fruit development were presented at several industry meetings since the inception of the project, and a web site has been developed which will provide general olive fruit fly information and current trapping

results. The web site is already accessible to our cooperators in the Agricultural Commissioner's offices and UC Cooperative Extension offices. Public access to the web site is being planned.

Fruit Phenology:

Protocols were established for measuring fruit development in 7 different climatic regions. Samples are being sent to UCKAC where dimensions and volume are obtained using electronic calipers directly downloaded to a computer. These measurements are being plotted as a function of heat unit accumulations calculated from the temperature monitors at each site. Procedures for measuring puncture, color, and oil content have been developed and will be 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. Table and oil cultivars have been identified for more intensive study.
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.
3. Develop a degree-day model to determine timing of fruit development in olives. Progress - this objective commenced in May 2003.
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 Zalom's grad 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 is being prepared through the Fruit and Nut Research and Information Center: [HTTP://Fruitsandnuts.ucdavis.edu](http://Fruitsandnuts.ucdavis.edu)

Procedures and Methods Established: Protocols for trapping flies were established for our cooperators in the Agriculture Commissioner's Offices. Protocols for sending trapping data and meteorological data electronically to the Zalom lab was established and data for 2002 have been transmitted, data for 2003 is now being collected. Two procedures for dissection flies to determine mating and reproductive status were evaluated and one was selected for our research. Sites for trapping, fruit collections and caging of flies in 2003 have been identified. 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. Effect of fruit cultivar on olive fruit fly success will be assessed in the USDA germplasm grove at the UC Davis Wolfskill Experimental Farm and required permission to do so has been obtained.

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 the yellow panels has resulted in a planned change by our cooperators in the California Department of Food and Agriculture's detection program to the use of plastic McPhail traps.

Narrative Summary of Budget Activities and Anticipated Activity for the Next Quarter: During the initial quarter, Graduate Student Research Assistants were employed in the Zalom lab (PhD student) and the Ferguson lab (MS student). A small amount of supplies were also purchased for research conducted by both labs, and travel expenditures were made for research and training. In the next quarter, it is anticipated that the Zalom lab will spend about \$5600, primarily for student assistance and supplies, and the Ferguson lab about \$5600 primarily for lab assistance and travel. Ferguson has hired a qualified lab assistant to run the olive maturity tests which began late April, 2003.

Unexpected Problems or Cost Overruns:

Thus far there have been no unexpected major problems. However, the number of sites for caging flies with fruit may have to be reduced if sufficient flies cannot be produced in the laboratory, but at this time this aspect of the program is still on track. Similarly, the number of sites for developing a fruit phenology model were reduced as many areas have insufficient fruit available on requisite varieties this year..

Neither portion of the project is has experienced cost overruns thus far.

Public Outreach:

The project was presented to the Central Valley industry May 8th, 2003 at the Tulare Annual Olive Day. Dr. Zalom and Dr. Ferguson made presentations. An article and photo on the project was also published in Ag Access.

Additional Funding:

The olive fruit phenology portion of the study received additional funding in the form of free use of an Instron Pressure Tester, (\$37,500.00), a computer (\$1,500.00) and new software, (\$3,700.00) by cooperating with Dr. Carlos Crisosto. Use of a Minolta Colorimeter (\$2,500.00) was obtained from the Kearney Agricultural Center. A grant, submitted May 15, 2003, for use of the NMR facility at Davis to measure oil content is pending. We are also applying to the COC for a Zentex 550 oil meter that uses infrared to determine oil content in fruit on the tree. Funding was obtained from the UC Specialty Crops Research Program in October 2003 on a related project, which augmented this project to the amount originally requested.