

Field Management Plan and Biocontrol Rearing System for Citrus Peelminer

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Objective 1 - Development of a pheromone-based monitoring system. Valley-wide trap deployment in the San Joaquin Valley took place from February to October with new lures developed by Dr. Jocelyn Millar, UC/Riverside. Fifty-one commercial orchards, 9 citrus/other hosts sites, plus 4 pummelo sites were utilized in the study. The trap data were inconclusive this year – there was about 1 flight per month, with adjacent crops having a large effect on subsequent citrus infestations.



Figure 1. A typical trap deployment as used in the pheromone studies.

In conjunction with the laboratory study described below, a field survey of four pummelo orchards was begun on 14 April 2005 and continued through the end of October 2005. Traps with pheromone and a control (Figure 1) were sampled on a weekly basis and also involved surveying all fruit on sample trees and the in-orchard temperature. The data obtained from the field populations of peelminer will be used to make comparisons between the development rates from the laboratory. We will use the new data obtained from the laboratory studies described below to repeat field trapping and development in 2006.

Objective 2 - Development of a degree-day model. Laboratory growth studies of peelminer on zucchini were conducted at the Cal Poly, San Luis Obispo campus (Figure 2). Developmental data were recorded daily and involved monitoring 120 individuals per temperature from the egg stage through adult stages (Figure 3). This study provided excellent results which are being used to develop a degree day model that includes the lower and upper developmental thresholds.

Objective 3 - Biological Control Introduction and Augmentation. Mass production: Currently only two generations of parasitoids are able to develop on peelminer infesting zucchini in laboratories. Oleander, and fukumoto and pummelo seedlings are currently being tested as an alternative peelminer source for parasitoid production.



Figure 2. Growth chambers used for developmental studies of peelminer on zucchini.



Figure 3. Examination of infested fruit to determine peelminer stages.

Exploration in Mexico: Many new insights were gained from work conducted in Mexico in July. Technicians working in the Hermosillo area of Sonora collected peelminer in limes using lures developed the previous year by Dr. Millar. There is a large population that develops in late June-early July, followed by a partial second generation which dies out from extreme heat. In December, adults were caught in a trap in grapefruit indicating a final, partial generation. We discovered parasites active at end of the first generation in July. At least two species of parasites (maybe 3) were collected. We have a far better understanding of the seasonal dynamics in Mexico to help us plan for parasitoid collections in the future. All of the Mexico work is conducted using funds from the Buy California grant program with no charges to the CRB.

Objective 4 - Develop ArcIMS as a tool to map peelminer infestations. This year we had excellent grower/PCA participation in the interactive web-based mapping pages. Trap data for peelminer adults was entered by growers and PCA's covering 51 orchards. There was an additional training session on June 28th, with more to follow. Deliverables: we have been able to provide regional interactive maps, monthly static maps, and variety reports for growers wishing to better understand peelminer activity and impacts in the San Joaquin Valley.



Figure 4. Parasitoid species of peelminer in Mexico.

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