

## DEVELOPMENT OF BIOLOGICAL CONTROL AGENTS FOR AVOCADO THRIPS

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Since its introduction into southern California, the avocado thrips, *Scirtothrips perseae*, has become the most serious economic pest in avocado. Currently there are number of predators that attack the avocado thrips, including the predatory mite, *Euseius hibisci*, the green lacewing, *Chrysoperla* spp., the black hunter thrips, *Leptothrips mali*, and a new, as yet unnamed species of *Franklinothrips*. There may be some additional predation by Hemipterans such as Reduviidae or Anthocoridae, but this has not been well documented.

During the 1999 thrips season, I used the green lacewing, *Chrysoperla rufalabris* at the rate of 25,000 eggs per hectare every other week to control the avocado thrips in a grove of about 72 hectares. Releases began in late February and lasted until the fruit were about 2.5 cm in diameter, which occurred in late June. Control was excellent although we treated about 7 hectares which bordered another grove with one application of Agrimek and oil (11 ml Agrimek and 500 ml NR 415 Oil per 100 liters of water applied at 3,000 – 4,000 liters per hectare).

It should be noted that 1999 was a year of light and unpredictable pest pressure from the thrips. In typical years the lacewing may not be able to control the pest even at our release rate of about 200 eggs per tree per month. Indeed, all pest control data taken in San Diego County during 1999 must be considered suspect because of the unpredictable nature of the pest that year.

An effort has been under way to find the natural enemies of the avocado thrips in its presumed area of origin, an area from Mexico City to Guatemala City. The most desirable natural enemy would be a parasitic wasp or fly, such as *Thripobius semiluteus*, which attacks the greenhouse thrips, *Heliiothrips haemorrhoidalis*. These parasites are very host specific and, when successful, keep pest numbers well below those that cause economic damage. However, to date, only predators have been found, all of which have been predaceous thrips. While it is uncertain that the importation and establishment of these predators will control the pest, it is quite possible they will and thus is a valuable line of research against this costly pest.

In field observations, the predator that occurs most frequently, and whose numbers seem to rise and fall in response to pest populations, is the new *Franklinothrips* sp. established here already. In an effort to pursue this natural enemy as a possible control agent, Dr. Mark Huddle at the University of California at Riverside developed a basic culturing method for this predator. Although there are still many hurdles to overcome in order to produce very large numbers of this insect dependably, several commercial insectaries are exploring this possibility.

To effectively evaluate a natural enemy, large-scale releases must be made to account for the immigration of pests from adjacent areas and emigration of the control agent from the release sites. If sufficient numbers can be reared, releases will be made in the spring of 2000 on tens to hundreds of hectares. It is hoped that these trials will, at best, lead to an effective control program using biological control agents, and at least help us to develop the infrastructure to produce a more promising predaceous thrips discovered in the pest's area of origin.