

**GREENHOUSE THRIPS, *Heliothrips haemorrhoidalis*,
IN CALIFORNIA AVOCADO ORCHARDS:
BIOLOGICAL CONTROL STUDIES**

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Greenhouse thrips, *Heliothrips haemorrhoidalis* (Bouché), on avocado in California, is another case, like pear thrips, of a species being present for many decades but only recently increasing to major pest status. Damaging infestations, previously occurring only sporadically and mainly in areas within a few kilometers of the coast, now are common in the interior districts of Ventura and San Diego Counties in southern California. Greenhouse thrips causes scarring of fruit, mainly on the Hass variety, reducing its market value. The problem has brought about an increased use of insecticides by avocado growers, who generally avoid spraying thereby encouraging control of most arthropod pests by resident natural enemies. This paper summarizes investigations conducted over the past several years on the most common indigenous natural enemies and on introduced parasitoids of *H. haemorrhoidalis* in California.

Native Natural Enemies

Franklinothrips vespiformis (Crawford). This predaceous thrips has been recorded as an obligate predator, mainly on thrips but also on mites, leafhoppers and whiteflies in tropical America, Florida and Texas (Callan 1943, Entwistle 1972). Subtropical southern California

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high percentage of *H. haemorrhoidalis* eggs in heavy infestations in California. Extensive studies in two orchards where the parasite was abundant showed that parasitization of thrips eggs sometimes reached 40-50%. However, these studies suggested that *M. mymaripenne*, by itself, was not a regulating factor of greenhouse thrips populations (Hessein & McMurtry 1988).

Introduced Natural Enemies

***Goetheana parvipennis* Gahan.** This eulophid parasitizes larvae of greenhouse thrips as well as the red-banded thrips, *Selenothrips rubrocinctus* (Giard) and *Hercothrips insularis* Hood (Callan 1943). Biological studies of this parasitoid are reviewed by Entwistle (1972) and Hessein & McMurtry (1989). *G. parvipennis* was introduced from West Africa to Trinidad in 1935, and became established there and in other parts of the Caribbean (Callan 1943, Entwistle 1972, Bennett & Baranowski 1982). It was introduced into California in 1963 (McMurtry & Johnson 1963) and again in 1982. Although a few recoveries of this parasitoid were made at colonization sites in the same season as the releases, there is no evidence of permanent establishment.

***Thripobius semiluteus* (Boucek).** This hymenopterous parasitoid, also in the Eulophidae, was introduced to California in 1986 from New South Wales, Australia, where it is common on *H. haemorrhoidalis* infesting *Liquidambar* (sweet gum) trees (G. A. C. Beattie, personal communication). Parasitized greenhouse thrips, collected in 1988 by J. A. McMurtry in the state of Minas Gerais in southern Brazil, also yielded *T. semiluteus*, a new record for the New World (LaSalle & McMurtry 1989). Releases of *T. semiluteus* in California were started in late 1986 and continued through 1989. The parasitoid has been recovered for three to four years at some of the initial release sites, indicating that it has become established in southern California and has survived both cold and hot weather extremes of the region.

In one instance, after an initial release of fewer than 10,000 parasitoids, parasitization of up to 60% was noted throughout the orchard within two years. Detailed studies in two orchards indicated

that thrips populations declined when the parasitization rate increased to 50-60% (McMurtry, Johnson & Newberger, unpublished data). It appears that *T. semiluteus* has the potential to become an important control agent of *H. haemorrhoidalis* on avocado in California. Widespread colonization is now possible as the parasitoid is commercially available. Additional studies are needed to better document the potential of *T. semiluteus* to carry over and impact thrips populations from one year to the next.

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