

Introductions for Biological Control in Hawaii: 1985 and 1986

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The Plant Pest Control Branch of the Hawaii Department of Agriculture has maintained a beneficial organism introduction program for many years. This paper provides notes on the status of some pests and their purposely introduced natural enemies and a list of beneficial organisms introduced and released for biological control during 1985 and 1986 (Table 1). All beneficial introductions are thoroughly screened and studied in a quarantine facility and must be approved by the Board of Agriculture prior to being released in Hawaii.

INSECT PEST CONTROL

Aleurodicus dispersus Russell (spiraling whitefly)

Due to excellent biological control by purposely introduced natural enemies, the spiraling whitefly project was terminated in October 1986. The natural enemies are three species of coccinellids (*Delphastus pusillus* (LeConte), *Nephaspis amnicola* Wingo, *N. bicolor* Gordon) and two species of aphelinids (*Encarsia* sp., *E. ?haitiensis* Dozier). This was one of the Department's major and most successful projects in recent years. Although whitefly populations occasionally reached heavy densities on a few favored hosts during the summer months and in localized windy areas, infestations have generally been at non-pestiferous levels throughout the State. Control efforts focused on field collection of natural enemies and redistribution to problem areas.

Aleurothrixus floccosus (Maskell) (woolly whitefly)

Although the purposely introduced parasitoids, *Amitus ?spiniferus* (Brethes) and *Cales noacki* DeSantis, were established since 1982 and contributed in reducing *A. floccosus* infestations, an undescribed species of *Eretmocerus*, discovered on Oahu in 1982, continued to be the dominant factor in controlling the whitefly. A study conducted on Kauai in 1985 revealed that in most citrus leaf samples, over 80% of the whiteflies were parasitized by this species. Because of the extremely good control, the whitefly population remained at a low level and the State did not experience any serious losses. This project was terminated in September 1985.

Brontispa chalybeipennis (Zacher) (coconut leaf beetle)

The coconut leaf beetle was discovered on coconut trees at City Hall in Honolulu, Oahu in October 1985. Subsequent surveys revealed widespread infestations on coconut trees, 30 to 70 feet tall, in the Makiki,

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TABLE 1. Introduction and Liberation of Beneficial Organisms in Hawaii: 1985 and 1986.

Pest	Organism Introduced	Source	Sender	Date of Initial Release	No. Released 1985-1986	Release Site
<i>Brontispa chalybeipennis</i> (Zacher) (coconut leaf beetle)	<i>Tetrastichus brontispae</i> (Ferriere) (Hymenoptera: Eulophidae)	Mangilao, Guam	R. Muniappan	Sept 1986	10,600	Oahu
<i>Plutella xylostella</i> (L.) (diamondback moth)	<i>Diadegma semiclausum</i> (Hellen) (Hymenoptera: Ichneumonidae)	CIBC, Pakistan Stn.	A.I. Mohyuddin	July 1985	12,200	Oahu

Punchbowl, Pauoa, Kakaako, and Honolulu Harbor areas. The heaviest damage was observed on the trees at Roosevelt High School in lower Makiki Heights. To date, no coconut leaf beetle infestations have been found on neighbor islands. An eulophid, *Tetrastichus brontispae* (Ferriere), was introduced through the courtesy of R. Muniappan, University of Guam, to aid in the control of *B. chalybeipennis* and liberations of the parasite began in September 1986. No recovery of *T. brontispae* has yet been made.

Carpophilus humeralis (F.) and *C. hemipterus* (L.) (pineapple souring beetles)

A total of 14,500 adults of the souring beetle parasite, *Zeteticontus utilis* Noyes, was liberated on Maui, Lanai, and Oahu to supplement field established populations. Recoveries of this parasitoid have been made on all islands on which it has been released. Propagation of *Z. utilis* was terminated in January 1986 due to the successful establishment of this parasite. Survey traps set in West Maui in August 1986 indicated an increase in the parasitoid population following a high beetle population in June.

Keiferia lycopersicella (Walsingham) (tomato pinworm)

The tomato pinworm project was terminated in September 1986 due to difficulties in propagating *Campoplex* n. sp. at the Maui and Kauai insectaries. Despite numerous releases, this parasitic wasp has not been recovered to date.

Liriomyza spp. (leafminers)

Propagation of *Halticoptera circulus* (Walker) (= *H. patellana* Dalman) and four other leafminer parasitoids was terminated on Oahu in April 1985 and February 1986, respectively, since all five species are well established in the State. Final releases of *Chrysocharis parksii* Crawford, *Opius dissitus* Muesebeck, *Chrysonotomyia punctiventris* (Crawford), and *Ganaspidium hunteri* (Crawford) were made on Oahu, Maui, Molokai, and Kauai. Mass propagation of *Chrysocharis ?giraulti* Yoshimoto was continued and adults were released in leafminer problem areas on Oahu and Kauai in an effort to get this species established.

Plutella xylostella (L.) (diamondback moth)

Diadegma semiclausum (Hellen) (= *D. eucerophaga* Horstmann), received through the courtesy of A.I. Mohyuddin, CIBC, Pakistan Station in July 1983, was propagated in the Insect Quarantine Laboratory and initially released in July 1985. This is the third of three species introduced in 1983 for diamondback moth control. While the Taiwan strain of *Cotesia plutellae* (Kurdjumov) quickly became established, *Diadromus* (= *Thyraeella*) *collaris* (Gravenhorst) and *D. semiclausum* have yet to become established. A combined total of 51,400 adults of the three species was propagated and liberated on Oahu, Kauai, and Maui.

Tetranychus cinnabarinus (Boisduval) (carmine spider mite)

Propagation of the spider mite predator *Amblyseius californicus* (McGregor), continued in the Oahu insectary. A total of 17,500 predators

was released on Oahu; 500 were released on Maui. *A. californicus* is not known to be established in the State.

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