Cooperative Agricultural Pest Survey (CAPS) Program

United States Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine
and the
Hawaii Department of Agriculture

Pest Detection

Semiannual Report
FY 2005 (July 1 to December 31, 2005)

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Project Category	Project Description	Completed or current HDOA Actions	Attachment
Infrastructure Development for Pest Detection	In 2002 and 2003, Federal (Homeland Security) funds were used to develop the infrastructure necessary to expand the Hawaii Department of Agriculture (HDOA) pest surveillance and reporting program on all the major Hawaiian Islands. In 2004, enhancing the infrastructure was continued using Federal Cooperative Agricultural Pest Survey (CAPS) Pest Detection funds. For 2005, infrastructure development is continuing.	Seven replacement computers and related peripherals are being purchased for the recording and disseminating of pest information, photos, and maps. A web server is being purchased for the public broadcast of pest information. Part of infrastructure development is staff training on the use of Geographic Information System (GIS) in conducting pest surveys. A two-day training session is being planned for March or April 2006. Micro-photography is a way to document the taxonomic characters of new pest insects, weeds and diseases and will help in their identification. A dedicated digital camera and software system will be purchased for this activity.	
Pest detection activities	The HDOA Survey Program conducts plant pest detection surveys on all islands. Through these surveys, new established pests are found and investigated to assess their impact to the State. Early detection of these pests allows for the quick implementation of control or eradication measures to minimize potential economic losses.	As of December 2005, there were 10 new insects and one plant disease detected Hawaii. Details are provided in Attachment #1. Information on new county (island) and host records are also provided.	Attachment #1. New Hawaii Insect and Plant Disease Records 2005.

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New Pest Advisories	Alerting the public about new significant pests recently found in Hawaii is done through the production of New Pest Advisory notices which are placed on the HDOA web pages.	In 2005, four New Pest Advisory notices were placed on the HDOA website: Erythrina gall wasp: http://www.hawaiiag.org/hdoa/npa/npa05-03-EGW.pdf Macadamia felted coccid: http://www.hawaiiag.org/hdoa/npa/npa05-01-MFC.pdf Pickleworm: http://www.hawaiiag.org/hdoa/npa/npa05-02-Pickleworm.pdf Ohia rust: http://www.hawaiiag.org/hdoa/npa/npa05-04-ohiarust.pdf In addition, updates to existing New Pest Advisories were also completed: Papaya mealybug: http://www.hawaiiag.org/hdoa/npa/npa04-03-PMB.pdf Nettle caterpillar: http://www.hawaiiag.org/hdoa/npa/npa01-03-netcat.pdf Little fire ant: http://www.hawaiiag.org/hdoa/npa/npa99-02-lfireant.pdf	Attachment #2. New Pest Advisory on Erythrina Gall Wasp. Attachment #3. New Pest Advisory on Macadamia felted coccid. Attachment #4. New Pest Advisory on Pickleworm. Attachment #5. New Pest Advisory on Ohia Rust. Attachment #6. New Pest Advisory on Papaya Mealybug. Attachment #7. New Pest Advisory on Nettle caterpillar. Attachment #8. New Pest Advisory on Little Fire Ant.

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Mapping of pest surveys in Hawaii	Use of Trimble Global Positioning System (GPS) units was initiated in 2003 to record field data on survey projects such as red imported fire ant (RIFA), banana bunchytop disease (BBTD), and soybean rust. From this data, pest distribution maps were produced. In 2004, the Trimble units continued to be utilized in the production of pest data tables. ArcView software was used to generate pest distribution maps. In 2005, newly detected pests in Hawaii continued to be mapped. These maps provide a spatial view of the distribution of plant pests which allows for better pest control or eradication decision-making.	In 2005, data tables and resulting distribution maps on the following insect pests in Hawaii were produced: • Red imported fire ant, (has not been detected in Hawaii) • Erythrina gall wasp (EGW) • Papaya mealybug • Glassy-winged sharpshooter (GWSS) • Pickleworm These data tables include GPS coordinates and related attributes. ArcView mapping software was used to process the data tables and generate pest distribution maps. Hawaii is using the NAD83 GPS system (instead of latitude/longitude) in order to utilize the State's GIS data layers, used in map generation. Additional information on the RIFA and papaya mealybug projects, including the pest data tables, is provided in the 2005 RIFA and Papaya Mealybug semi-annual reports.	Attachment #9. 2005 map showing RIFA survey sites in Hawaii (all sites were negative). Attachment #10a. 2005 map showing EGW distribution in the State. Attachment #10b. 2005 map showing EGW distribution on Oahu. Attachment #11. 2005 map showing Papaya Mealybug distribution on Oahu. Attachment #12. 2005 map showing GWSS distribution on Oahu. Attachment #13. 2005 map showing Pickleworm distribution on Oahu.

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Database on "Distribution & Host Records of Agricultural Pests and Other Organisms in Hawaii"	Part of a surveillance program for new pest organisms is maintaining information on existing pests in the State. The HDOA Survey Program's "Distribution & Host Records of Agricultural Pests and Other Organisms in Hawaii" database was started in the mid 1980's and continues to be maintained. It lists all agricultural pests and other organisms occurring on each island within the State. Attribute data such as year of detection, islands established, hosts, and references are also maintained in the database.	The Distribution & Host Records database continues to be routinely updated as new pest information is obtained. All new State, island (county), and host records for 2005 have been placed in the database. An Adobe Acrobat file of the most recent "Distribution and Host Records" listing is available to the public. Requests for the listing are made to HDOA.info@hawaii.gov as found on the HDOA web site, or directly to Ron.A.Heu@hawaii.gov.	
NAPIS Data Entry	The National Agricultural Pest Information System (NAPIS) is the national database for the CAPS Program. State and county data on insects, fungi, viruses, weeds, nematodes, and biocontrol organisms are collected from all 50 states and are held in the NAPIS database.	New Hawaii State and island pest records are entered on-line through the CAPS-NAPIS web site. Data for NAPIS entry was also provided by the University of Hawaii Center for Conservation Research & Training Mollusk Laboratory and the University of Guam Agricultural Experiment Station.	Attachment #14. Summary of pest records entered into NAPIS in 2005.

New Hawaii Insect and Plant Disease Records

2005

Large orange sulfur, *Phoebis agarithe* (Boisduval) (Lepidoptera: Pieridae). Adult specimens of this butterfly new to Hawaii were first found visiting *Momordica* flowers at Olowalu, Maui, in September 2004. In March 2005, larvae of the large orange sulfur were collected from opiuma, *Pithecellobium dulce* (also known as Manila tamarind), a leguminous tree that is naturalized in Hawaii. In January 2005, adult specimens were collected at Kalaeloa on Oahu for a new island record.

Macadamia felted coccid, *Eriococcus ironsidei* Williams (Hemiptera: Eriococcidae). This new scale insect called the macadamia felted coccid was found infesting macadamia trees at a commercial macadamia nut farm at Honomalino in South Kona in February 2005. Known from Australia, it gets its name from the felt-like sacs which enclose adult females and pupal cases of males. The scale infests all above-ground macadamia plant parts – foliage, stems, and flowers (racemes). Macadamia is the only known host of the scale. It is potentially a serious pest as uncontrolled infestations may adversely affect macadamia nut production by causing distortion and stunting of new growth and yellow spotting on older leaves. Severe infestations of the scale can cause dieback of trees and a reduction in the yield of nuts.

Erythrina gall wasp, *Quadrastichus erythrinae* Kim (Hymenoptera: Eulophidae). Samples of leaves and stems of the coral tree, *Erythrina variegata* L., damaged by the erythrina gall wasp were first collected in Manoa, Oahu, in April 2005. The wasp, known from Singapore, Mauritius, Reunion and Taiwan, causes the formation of galls which appear as swellings and distortions of young leaves and shoots. Galls are induced by the plant as a reaction to wasp larvae developing within the young plant tissue. As the wasp infestation progresses, leaves curl and appear deformed while petioles and shoots become swollen. Other *Erythrina* affected by the wasp include the native wiliwili tree (*Erythrina sandwicensis*) and “tall erythrina” used as windbreaks and in landscaping.

Hibiscus psyllid, *Mesohomotoma hibisci* (Froggatt) (Hemiptera: Carsidaridae) This psyllid was found infesting the leaves and petioles of the hau tree (*Hibiscus tiliaceus* L.) at Makiki, Oahu, in May 2005. This species is reported to be common throughout the Pacific area. Host plants include *Hibicus tiliaceus*, *H. rosasinensis*, and *H. boryanus*. Adults of this insect were reportedly causing a nuisance by flying around people.

A eucalyptus gall wasp, *Epichrysocharis burwelli* Schauff (Hymenoptera: Eulophidae). Specimens of this eucalyptus gall wasp were first collected, at Aiea, Oahu, from the leaves of lemon gum eucalyptus, *Eucalyptus citriodora* in April 2001. Its identity was not known until July 2005. The wasp causes small blister-like galls on the leaves. This wasp is only known to attack lemon gum eucalyptus with the damage being cosmetic. Wasp larvae inject a toxin in the leaves which results in the formation of galls.

A glassy-winged sharpshooter egg parasitoid, *Gonatocerus ashmeadi* Girault (Hymenoptera: Mymaridae). Specimens of this egg parasitoid were first reared from egg masses of the glassy-winged sharpshooter collected around Honolulu in November 2004. This parasitoid has been reported as one of the more common and effective natural enemies of the sharpshooter in its native range of southeastern U.S. and northeastern Mexico. It was not purposely introduced into Hawaii but apparently is another case of fortuitous biological control where a biocontrol agent arrived in Hawaii in association with its host. Consistently high numbers of this parasitoid have contributed to a dramatic decline in sharpshooter populations.

Trilobite scale, *Pseudaonidia trilobitiformis* Green (Hemiptera: Diaspididae) Specimens of this scale were collected from crepe gardenia and crepe jasmine at Kailua-Kona on the island of Hawaii in December 2004. This armored scale, believed to be native to southern Asia, has spread throughout Africa, Malaysia, and Tropical America, and has been detected in the South Pacific. It has an extensive list of hosts, including ornamentals and fruit crops.

A mealybug, *Hypogeococcus pungens* Granara de Willink (Hemiptera: Pseudococcidae). Specimens of this mealybug were collected from hibiscus plants at a nursery at Waimanalo, Oahu island, in September 2005. This mealybug resembles that of the pink hibiscus mealybug, *Maconellicoccus hirsutus* (Green) and affects the terminal shoots of host plants.

A mealybug, *Rhizoecus americanus* Hambleton (Hemiptera: Pseudococcidae). Specimens of this root mealybug were collected from fishtail palm at a nursery in Panaewa on Hawaii Island in July 2005. This mealybug is known to infest ornamentals and is known from South and Central America, the Caribbean, and in the U.S. (Florida).

A thrips, *Thrips imaginis* Bagnall (Thysanoptera: Thripidae). Specimens of this thrips were collected from litter extractions from Haleakala National Park on the island of Maui in 2003. The identification of the thrips was completed in 2005. This thrips is known as the "plague thrips" in Australia. Hosts reported elsewhere include apples, pears, tomatoes, roses, and other flowers.

Ohia rust, *Puccinia psidii* Winter (Basidiomycetes, Uredinales). Rust pustules of this disease were first found on an ohia lehua plant, *Metrosideros* sp., at a native Hawaiian plant nursery in Waimanalo on the island of Oahu in April 2005. This disease is commonly known as the eucalyptus rust and the guava rust in Florida, the Caribbean, and Central and South America, but is called ohia rust in Hawaii. Subsequent surveys revealed that this rust was already widespread in Hawaii, occurring on various members of the family Myrtaceae on all the major Hawaiian islands. Hosts in Hawaii include ohia lehua, rose apple *(Syzygium jambos*), several species of *Eugenia*, guava.

New Island Detection Records

Pickleworm *Diaphania nitidalis* Cramer (Lepidoptera: Crambidae). New Maui record. Specimens of the pickleworm were found infesting cucumber at Ulupalakua on Maui in March 2005. The pickleworm was first found in Hawaii on Oahu in 2003 and later on Kauai (2004) and Hawaii Island (2004).

An armored scale, *Morganella conspicua* Brain (Hemiptera: Diaspidiae). New Hawaii Island record. Specimens of this scale were previously only recorded from Oahu.

A tortoise beetle, *Cassida circumdata* Herbst (Coleoptera: Chrysomelidae). New Maui record. Specimens of this beetle were found on sweet potato foliage in Kahului, Maui, in July 2005. This beetle was first found on Oahu in 1994 and later on Kauai in 2000.

An armored scale parasitoid, *Encarsia lounsburyi* (Berlese & Paoli) (Hymenoptera: Aphelinidae). New Hawaii Island record. This parasitoid emerged from live specimens of the macadamia felted coccid collected at Honomalino on Hawaii Island in April 2005. This parasitoid normally attacks a wide range of armored scales is know to be established on Oahu and Midway.

Papaya mealybug, *Paracoccus marginatus* Williams and Granara de Willink (Hemiptera: Pseudococcidae). New Oahu record. Specimens of the papaya mealybug were collected on papaya trees at Laie, Oahu, in December 2005. This mealybug was first found in the State on Maui in 2004.

White peach scale, *Pseudaulacaspis pentagona* (Targioni-Tozzetti) (Homoptera: Diaspididae). New Kauai Record. Specimens of this scale were collected from papaya trees at Wailua on Kauai in September 2005. This scale was first found in the State on the Big Island in 1997.

State of Hawaii
DEPARTMENT OF AGRICULTURE

Attachment #2
New Pest Advisory
No. 05-03 Updated November 2005

Figure 1. Erythrina gall wasp. Enlarged photo of an adult male (left) and female (right). Actual length of the male is about 1.0 mm and the female 1.5 mm.

Erythrina Gall Wasp

Quadrastichus erythrinae Kim

(Hymenoptera: Eulophidae)

Ronald A. Heu, Dick M. Tsuda*,
Walter T. Nagamine and Troy H. Suh

Introduction. Samples of gall-damaged leaves and stems of the coral tree, *Erythrina variegata* L., were first collected in Manoa, Oahu, on April 19, 2005, by a University of Hawaii graduate student. The galls were found to have been induced by the larvae of a tiny wasp which was subsequently identified as the erythrina gall wasp (EGW), *Quadrastichus erythrinae* Kim (family Eulophidae) by J. La Salle of the Commonwealth Scientific and Industrial Research Organization (CSIRO) in Australia.

Erythrina variegata, with its bright red flowers, is also known as tigers claw, Indian coral tree, and wiliwili-haole. It is a common landscape tree in Hawaii. A tall, columnar form of *E. variegata*, "Tropic Coral," known locally as "tall erythrina" or "tall wiliwili," is also used as a windbreak for soil and water conservation and for planting around farmsteads (Rotar et al. 1986).

Figure 2. *Erythrina variegata* leaves exhibiting light gall wasp damage (left) compared with undamaged leaves (right).

Figure 3. *Erythrina* petioles and leaflets exhibiting severe gall wasp damage.

Figure 4. "Tall erythrina" trees with severe gall wasp damage.

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Distribution and Hosts. The erythrina gall wasp was described in 2004 as a new species by Kim et al. (2004) from specimens from Singapore, Mauritius, and Reunion. It was recently found damaging coral trees in Taiwan (Yang et al. 2004). In 2005, it was found in Hong Kong and Guangdong Province in mainland China (J. LaSalle, pers. comm.). In Hawaii, gall wasp damage has been found throughout the island of Oahu. In July 2005, gall wasp damage was reported from Kona on the Big Island (D. Oishi, pers. comm.), Lihue Airport on Kauai (C. Kaneshige and E. Garcia, pers. comm.), and the Kahului area of Maui (M. Fukada, pers. comm.). In August 2005, it was detected on Molokai (R. Joy, pers. comm.) and in October 2005, it was observed on Kahoolawe (F. & K. Starr, pers. comm.) and Lanai (S. Joe, pers. comm.) In Hawaii, it affects the coral trees, *Erythrina variegata* L. (including "tall erythrina" and a variegated form known as the "sunshine tree"), *E. crista-galli* L., and the native *E. sandwicensis* Degener.

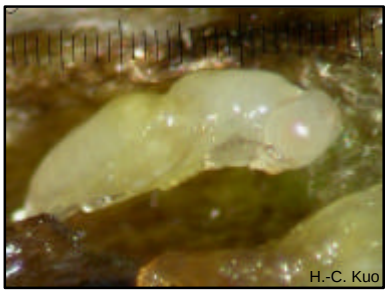

Figure 5. Erythrina gall wasp pupa dissected from gall.

Figure 6. Exit holes created by adult erythrina gall wasps.

Damage. Like other gall-forming eulophid wasps, eggs are inserted into young leaf and stem tissue. The wasp larvae, which develop within plant tissue, induce the formation of galls in leaflets and petioles (Figure 2). As the infestation progresses, leaves curl and appear deformed while petioles and shoots become swollen (Figure 3). After feeding is complete, larvae pupate within the leaf and stem tissue (Figure 5). After pupation within the galls, adult wasps emerge after cutting exit holes through to the outside (Figure 6). Heavily galled leaves and stems result in a loss of growth and vigor. According to Yang et al. (2004), severe infestations can cause defoliation and death of trees (Figure 4).

Biology. Studies conducted by HDOA thus far indicate a life cycle (egg to adult) of about 21 days. A one-day old female wasp contains about 85 mature eggs in its ovaries. The adult female wasp exhibited a preference for depositing eggs in very young terminal leaves and stems, but not mature leaves. Adult wasps not given any food survived less than 3 days (males - 2.5 days, females - 2.9 days) while those provided with honey lived longer (males - 10.3 days, females - 6.1 days). The sex ratio of emerging wasps in lab-infested plants was 7 males to 1 female. The detailed information on the biology of the gall wasp will be published elsewhere.

Management. In Taiwan, species of parasitic wasps in the families Encyrtidae, Eupelmidae and Pteromalidae, were reared from *Erythrina* twigs which were galled by the erythrina gall wasp (Yang et al. 2004). In South Africa, another species of *Quadrastichus*, along with a complex of parasitic wasps, is associated with galls on *Erythrina* (G. Prinsloo and M. Wright, pers. comm.). To date, no parasitoids have been reared from galls on *Erythrina* in Hawaii. In late November, an HDOA entomologist will be traveling to east Africa in search of biological control agents of the wasp.

Preliminary systemic insecticide trials suggest that an insecticide containing the active ingredient, imidacloprid, may help to reduce damage to erythrina caused by the gall wasp (A. Hara, D. Tsuda, G. Hera and J. Harada, pers. comm.).

Acknowledgement. We gratefully acknowledge H.-C. Kuo for collecting the first samples of this new plant pest and providing them to CTAHR. Thanks also to N. Reimer, D. Oishi, M. Ramadan, J. Yalemar, B. Kumashiro, B. Azama, D. Arakaki, M. Matsukawa, R. Tanaka, C. Okumoto, E. Garcia, C. Kaneshige, M. Fukada, R. Joy, P. Conant, C. Hirayama, M. Chun, R. Joy, F. & K Starr, D. Souza, and S. Joe for providing EGW observations or other assistance. HDOA surveys were supported and funded in part by the USDA, APHIS, Cooperative Agricultural Pest Survey (CAPS) Program.

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Kim, I.-K., G. Delvare, and J. La Salle. 2004. A new species of *Quadrastichus* (Hymenoptera: Eulophidae): A gall-inducing pest on *Erythrina* spp. (Fabaceae). J. Hym. Res. 13(2): 243-249.

State of Hawaii
DEPARTMENT OF AGRICULTURE

Attachment #3
New Pest Advisory
Updated April 2005 No. 05-01

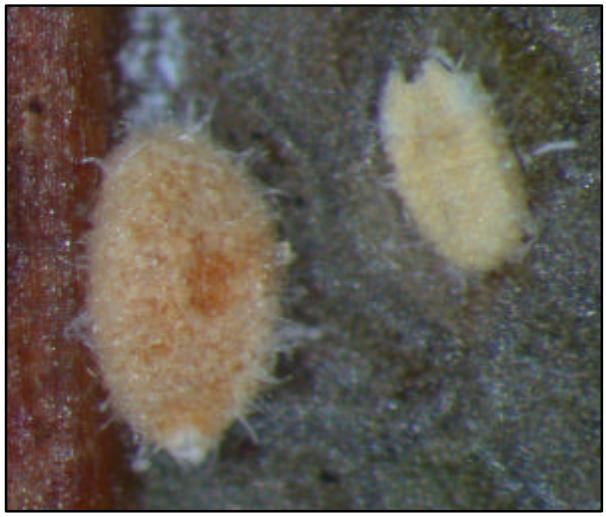

Figure 1. Macadamia felted coccid. Enlarged photo of adult female (left) and male pupa (right). Actual length of female is less than 1 mm.

Macadamia Felted Coccid

Eriococcus ironsidei Williams

[Hemiptera (Homoptera): Eriococcidae]

Patrick Conant, Dick M. Tsuda*,
Ronald A. Heu and Kenneth K. Teramoto

Introduction. An infestation of an insect believed to be the macadamia felted coccid (MFC), *Eriococcus ironsidei* Williams, was found infesting macadamia trees in South Kona on the island of Hawaii by staff of a commercial macadamia farm in late February 2005. Specimens were tentatively identified as the macadamia felted coccid by the University of Hawaii's College of Tropical Agriculture and Human Resources (CTAHR). On April 4, 2005, the identification was confirmed by D.R. Miller of the USDA Systematic Entomology Laboratory in Beltsville, Maryland.

Life History. The macadamia felted coccid is an insect belonging to the family Eriococcidae, whose members are similar to mealybugs, but having little or no wax on their bodies. It gets its name from the felt-like sacs which enclose adult females and pupal cases of males (Figure 1). Adult females do not have wings and are immobile. Adult males have wings and are gnat-like, but do not feed. Their only purpose is to locate and mate with immobile females. Mated females deposit eggs within their felted sac. After hatching, tiny crawlers move about and are able to disperse by wind or by hitchhiking on birds, people, vehicles, or farm equipment to other areas. After settling down, individuals feed by inserting their needle-like mouthparts into plant tissue and removing sap. Like other related Hemiptera (Homoptera - aphids, soft scales and whiteflies), MFC also excretes droplets of a sugary substance called honeydew which drop on lower branches.

Distribution and Hosts. The macadamia felted coccid is native to Australia. Its host plants are restricted to smooth and rough-shelled macadamia (Jones 2002). On the Big Island, infestations of the scale have been found at Honomalino in South Kona. No infestations have been reported on the other neighboring islands.

Figure 2. Macadamia felted coccid individuals on macadamia bark.

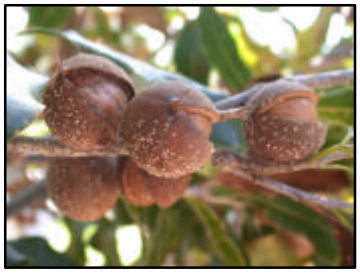

Figure 3. Macadamia felted coccid infesting macadamia nuts.

* CTAHR, University of Hawaii

Damage. Ironside (1978) reports that the MFC infests all above-ground parts of trees (Figures 2-4). It distorts and stunts new growth and causes yellow spotting on older leaves. Severe infestations can cause dieback (Figure 5). On bearing trees, nut yields are reduced and a delay is caused in the fall of mature nuts.

Figure 4. Macadamia felted coccid infesting macadamia foliage.

Figure 5. Dieback of macadamia branches caused by macadamia felted coccid.

Biological Control. In Australia, Ironside (1978) reported that the MFC has numerous natural enemies such as predaceous ladybird beetles, a predatory moth, tiny parasitic wasps, lacewings, and predatory mites. In South Kona, low numbers of several predaceous ladybug species have been observed in association with the MFC infestations. The Hawaii Department of Agriculture (HDOA) is investigating the possibility of importing tiny parasitic wasps from Australia for biological control of this insect.

Acknowledgement. We gratefully acknowledge H. Brown, M. Wright, and M. Nagao for providing MFC specimens to HDOA. Specimen preparations and preliminary identification were done by D. Tsuda with assistance from B. Kumashiro. Photos were by W. Nagamine and C. Hirayama. Thanks also to K. Onuma, and C. Hirayama for assistance with the South Kona surveys. HDOA surveys were supported and funded in part by the USDA, APHIS Cooperative Agricultural Pest Survey (CAPS) Program.

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State of Hawaii
DEPARTMENT OF AGRICULTURE

Attachment #4
New Pest Advisory
Updated April 2005 No. 05-02

Figure 1. Adult pickleworm moth, with wings spread.

Pickleworm

Diaphania nitidalis Cramer

(Lepidoptera: Crambidae)

Ronald A. Heu, Randall T. Hamasaki,*
Juliana A. Yalemar and Jari S. Sugano*

Introduction. In November 2003, specimens of a caterpillar previously not known to occur in Hawaii were found damaging cucumber fruits in central Oahu by members of the University of Hawaii (UH), College of Tropical Agriculture and Human Resources (CTAHR). Subsequent surveys revealed additional damage by this insect on zucchini and kabocha squash (pumpkin) in the central Oahu area. Specimens were tentatively identified as the pickleworm, *Diaphania nitidalis* Cramer by D. Tsuda, UH CTAHR and confirmed by M. Alma Solis, Research Entomologist with the USDA Systematic Entomology Laboratory in Beltsville, Maryland.

Distribution and Hosts. Pickleworm is a tropical insect and is known to invade much of the southeast U.S. each summer (Capinera 2000). On Oahu, the pickleworm has been found widely dispersed throughout the island. In September 2004, it was found infesting Japanese cucumber at Kalaheo, Kauai. In December 2004, specimens were obtained from pumpkin at Kainaliu, Kona, on the island of Hawaii. In late March 2005, it was also found infesting cucumber at Ulupalakua on Maui. Pickleworm caterpillars feed on cucurbits such as squash, pumpkin, cantaloupe, and cucumber, but rarely watermelon (Webb 2003). In Hawaii, the pickleworm has been found feeding on cucumber, zucchini, and kabocha squash.

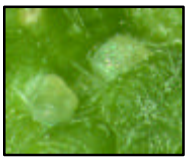

Figure 2. Pickleworm eggs.

Figure 3. Third and fifth instar pickleworm caterpillars.

Figure 4. Pickleworm pupa (left) and adult moth (right).

* CTAHR, University of Hawaii

Life History. According to Webb (2003) and Sorenson (1996), pickleworm moths are active only at night. They lay tiny eggs (Figure 2) singly or in small clusters on buds, flowers, and other actively growing plant parts. Each moth can deposit 300 to 400 eggs. Young larvae are light-colored with many dark spots and are typically found in flower buds. Spotting fades as the caterpillar reaches the final fifth instar stage (Figure 3). Pupation usually occurs outside of fruit, on leaf surfaces and leaf folds. The adult moth is yellow and purplish (Figure 4).

Damage. Young pickleworm caterpillars tend to feed in blossoms (Figure 5), destroying the plants capacity to produce fruit (Capinera 2000). Caterpillars also tunnel into fruits leaving a distinct circular hole. In some instances, caterpillars will excrete frass outside of the tunnels, which provide additional evidence that the pest is feeding within the fruits (Figure 6).

Figure 5. Pickleworm damage to kabocha squash bud (upper left) and flowers (lower left and right).

Figure 6. Pickleworm damage to cucumber fruit.

Management. Commercial growers should carefully monitor their cucurbit crops. At first sign of an infestation, treat with approved insecticides. Consult with the Cooperative Extenstion Service for latest recommendations. Insecticides with minimal residual activity should be used and applied late in the day to lessen the impact on honeybees which are necessary for crop pollination.

Biological Control. Natural enemies such as generalist predators and specific parasitoids are recorded to occur elsewhere, but have not reliably suppressed damage (Capinera 2000). In Hawaii, no parasitoids have been recovered, although predators such as lacewings have been observed attacking pickleworm caterpillars (Figure 7). The Hawaii Department of Agriculture (HDOA) is investigating the possibility of importing tiny parasitic wasps for added biological control of this insect.

Figure 7. Predaceous lacewing attacking pickleworm caterpillar.

Acknowledgement. We gratefully acknowledge D. Tsuda and B. Kumashiro for the identification of the pickleworm. Thanks also to the following people for providing information or assistance with pickleworm activities: R. Pandey, C. Hooks, R. Mau, R. Ebesu, R. Oyama, C. Kaneshige, W. Nagamine, P. Conant, B. Bushe, and M. Fukada HDOA surveys were supported and funded in part by the USDA, APHIS Cooperative Agricultural Pest Survey (CAPS) Program.

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State of Hawaii
DEPARTMENT OF AGRICULTURE

Attachment #5
New Pest Advisory
No. 05-04 Updated December 2005

Figure 1. Early symptoms of rust disease on ohia

A Rust Disease on Ohia

Puccinia psidii Winter

Eloise M. Killgore and Ronald A. Heu

Introduction. In April 2005, an ohia plant, *Metrosideros* sp., infected by a rust disease was submitted to the University of Hawaii (UH), College of Tropical Agriculture and Human Resources (CTAHR), Agricultural Diagnostic Service Center's (ADSC) Plant Disease Diagnostician Desmond Ogata by a Waimanalo (Oahu) grower who specializes in native plants. There are no records of a rust disease on ohia in Hawaii or elsewhere. In May 2005, rose apple, *Syzygium jambos*, heavily infected with a similar rust disease was observed on the Maunawili Trail by Department of Land and Natural Resources (DLNR), Division of Forestry and Wildlife (DOFAW) staff. In July 2005, two species of *Eugenia* – *E. koolauensis* and *E. reinwardtiana*, and guava *Psidium guajava* were observed in Makiki with a similar rust disease. Infected ohia plants have since been observed in Manoa, Makiki, and Kalihi. All the confirmed reports of this rust disease are from the island of Oahu.

Symptoms. Symptoms of the disease first begin as tiny bright yellow powdery eruptions in a circular pattern on the leaf or stem surface (Fig. 1). These infection loci or spots expand and become necrotic (Fig. 2), and spread over the entire leaf, stem, or shoot. Leaves and stems can be deformed by the disease (Fig. 3 and 4), and growing tips can die back if the infection is severe. These symptoms are more likely to be seen on tender, young growing points.

Figure 2. Rose apple with typical symptoms of yellow ring patterns on foliage followed by necrosis.

Figure 3. Rose apple with rust infection on new growth.

Figure 4. Advanced disease condition on ohia plant.

Although not yet seen in Hawaii, the disease can also cause similar symptoms on fruit.

Identification. Initial identification of this disease was based on records of a rust disease that is known to occur on ohia-related plant species, and was tentatively identified as *Puccinia psidii* Winter. In November 2005, Dr. Shaobin Zhong, UH CTAHR Plant and Environmental Protection Sciences Plant Pathologist, confirmed the identity of the rust as *Puccinia psidii* by comparing the DNA profiles of *P. psidii* spore samples from Florida and Brazil. This rust fungus has a very wide host range, which includes eucalyptus, paperbark tree, guava, rose apple, allspice, jaboticaba, Surinam cherry, species of *Eugenia*, and others in the Family Myrtaceae. Although referred to as eucalyptus rust and guava rust in Florida, the Caribbean, and Central and South America, it is called ohia rust in Hawaii.

Distribution. Since April 2005, surveys and request for disease sightings have shown that this rust is widespread in the State, occurring on various members of the Family Myrtaceae on all the Hawaiian islands (except Niihau).

Management. At the present time, there are no approved fungicides available. Good sanitation practices of early removal and destruction of infected plant parts, and keeping foliage dry will retard the spread and development of the disease. Although the disease is widespread, the Department is requesting that everyone refrain from transporting any ohia, guava, eucalyptus or other plants in the Family Myrtaceae between islands. Plants that appear to be healthy may harbor the disease. The incubation period of the rust disease (the point at which a plant becomes infected and the appearance of signs and symptoms) may range from one to three weeks. Growers are asked to destroy all infected plants.

Acknowledgements. Robert Hauff, Forest Health Coordinator, DLNR-DOFAW; Desmond Ogata, UH-CTAHR-ADSC Plant Disease Clinic for photo; Clyde Hirayama HDOA Technician for photo; and all those who called the Department for sightings of the rust.

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State of Hawaii
DEPARTMENT OF AGRICULTURE

Attachment #6
New Pest Advisory
No. 04-03 Updated October 2005

Figure 1. Papaya mealybug.

Papaya Mealybug

Paracoccus marginatus
Williams and Granara de Willink

(Hemiptera: Pseudococcidae)

Ronald. A. Heu and Mach T. Fukada

Introduction. Specimens suspected to be the papaya mealybug, *Paracoccus marginatus* Williams and Granara de Willink, were first observed infesting papaya in the central (Kahului) area of the island of Maui in early May 2004, by staff of the Cooperative Extension Service (CES) and Hawaii Department of Agriculture (HDOA). In June 2004, specimens were determined to be the papaya mealybug by the USDA, Animal and Plant Health Inspection Service (APHIS), Plant Protection and Quarantine (PPQ) in Honolulu and confirmed by coccidologist, Dr. Gregory Evans, at the USDA Communication and Taxonomic Services Unit in Beltsville, Maryland. In September 2005, mealybug specimens collected from papaya in Laie were determined to be the papaya mealybug by the University of Hawaii (UH) Insect Diagnostic Clinic and the HDOA.

The papaya mealybug is found on leaves and fruits of host plants. Adult females are yellowish with short waxy filaments around the margin and measure 3 mm in length (Figure 1). The dispersal stage is the first instar crawler. When individuals of the mealybug genus *Paracoccus* are placed in alcohol, a bluish-black color appears within a couple days.

Figure 2 (left). Heavy infestation of papaya mealybug on papaya stem.

Figure 3 (bottom). Deformed plumeria leaves caused by the papaya mealybug.

Photos by M. Fukada

Figure 4. Heavy infestation of papaya mealybug on hibiscus.

Hosts. Infestations of the papaya mealybug have been observed on papaya (Figure 2), plumeria, (Figure 3), hibiscus (Figure 4), and jatropha. Elsewhere, the mealybug is also recorded to feed on avocado, citrus, tomato, eggplant, peppers, beans, peas, sweet potato, mango, and others. The favored hosts appear to be papaya, plumeria, and hibiscus.

Distribution. The mealybug is native to Mexico and Central America. It spread to the Caribbean in the early 1990's and is now found throughout the Caribbean Islands, as well as in Florida. In 2002, the mealybug was found on Guam where it was presumably introduced via shipments of produce from Mexico.

On the island of Maui, papaya mealybug infestations are widespread. On Oahu, infestations have been found on planted papaya and hibiscus at Laie and on potted hibiscus at Waimanalo.

Damage. The mealybug injects a toxin as it feeds on leaves and fruit which results in chlorosis (yellowing), stunting, deformation, early leaf and fruit drop, and buildup of honeydew. Sooty mold growing on honeydew excreted by the mealybugs interferes with photosynthesis. Heavy mealybug infestations may kill plants.

Biological Control. The tiny parasitic wasps, *Anagyrus loecki, Pseudleptomastix mexicana* and *Acerophagous papayae* have provided excellent biological control of the papaya mealybug in Guam. These natural enemies were introduced from Puerto Rico to Guam in 2002. A year after introduction, a reduction of over 99% of papaya mealybug due to the parasitoids was observed (Meyerdirk et al. 2004). At Honokawai, Maui, samples of papaya mealybug exhibited high levels of parasitism by an unidentified species of *Anagyrus* (M. Fukada, pers. comm.).

In the HDOA Quarantine Facility, the parasitic wasp, *P. mexicana*, is being tested for host specificity (K. Murai, pers. comm.). It will be field released after testing is complete and approval for its release from quarantine is obtained. This wasp will parasitize only the mealybug and will not harm plants or people.

A predatory ladybug, *Hyperaspis silvestrii* Weise, was observed to be commonly feeding on the papaya mealybug on Maui and Oahu. On Oahu, several other predaceous ladybugs, *Cryptolaemus montrouzieri* Mulsant and *Curinus coeruleus* Mulsant were also found in association with the papaya mealybug and is providing some level of control.

Acknowledgement. We gratefully acknowledge J. McEwen of the Maui CES for providing the initial mealybug specimens to HDOA. Thanks also to Dr. R. Muniappan (University of Guam) and T. Watanabe (USDA, APHIS, PPQ), for tentatively identifying specimens as papaya mealybug. Assistance with the Maui surveys was provided by M. York and M. Simon (USDA, APHIS, (PPQ). The Oahu collections were made by S. Fukuda (CES) and J. Coughlin (UH). Identification of the Oahu collections were made by D. Tsuda (UH) and B. Kumashiro (HDOA). Oahu surveys were conducted by HDOA/USDA staff members T. Suh, R. Bautista, and R. Tanaka. Surveys were supported and funded in part by the USDA, APHIS Cooperative Agricultural Pest Survey (CAPS) Program.

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State of Hawaii
DEPARTMENT OF AGRICULTURE

Attachment #7
New Pest Advisory
No. 01-03 Updated July 2005

Figure 1. Nettle caterpillars.

Nettle Caterpillar
Darna pallivitta Moore

(Lepidoptera: Limacodidae)

Patrick Conant, Arnold H. Hara*,
Walter T. Nagamine, Chris M. Kishimoto
and Ronald A. Heu

Introduction. Specimens of a stinging nettle caterpillar were first found infesting rhapis palm at a nursery in Panaewa on the Big Island in September 2001. They were tentatively identified as *Darna pallivitta* Moore by D. Tsuda, University of Hawaii (UH) Insect Diagnostic Clinic, and B. Kumashiro, Hawaii Department of Agriculture (HDOA) and confirmed by Dr. M. Epstein of the Smithsonian Institution. This species occurs in Southeast Asia and is known to feed on palms (coconut and areca) and grasses (Cock et al. 1987).

Description. Nettle caterpillars grow to a maximum length of one inch and are covered with spines (Figure 1). A dark longitudinal stripe runs down the back of each caterpillar. The brownish cocoon is round and surrounded by a netting of silk (Figure 2). The adult moth is brown and is one-half inch in length (Figure 3).

Distribution. HDOA has confirmed additional infestations from Hawaiian Paradise Park which is several miles from the known range, indicating that they are probably hitchhiking on plant material. The highest known infestation is in Kurtistown (600 ft. elevation) which likely started in a similar manner. The caterpillars are well established in Waiakea and Waiakea Uka. Infestations in Keaau and Orchidland may be a range extension from the Panaewa infestations. All of these sites are either in Lower Puna or South Hilo District.

Figure 2. Nettle caterpillar, larva (left) and cocoon (right).

Figure 3. Nettle caterpillar adult.

Damage. The caterpillars have been found feeding on over 45 species of plants in 22 families including Arecaceae, Fabaceae, Poaceae, Agavaceae, Iridaceae, Rubiaceae, Melastomataceae, Apocynaceae, Caryophyllaceae, Bromeliaceae, Musaceae, Commelinaceae, Zingiberaceae, Polypodaceae, Hypoxidaceae, Urticaceae, Myrtaceae, Costaceae, Oxalidaceae, Liliaceae, and Euphoribiceae. Fecal pellets on the leaves are signs that the caterpillar is present.

* College of Tropical Agriculture and Human Resources, Hilo-Beaumont Reserch Center, University of Hawaii.

Health concern. The caterpillars are also a health concern due to the stinging spines which cause burning and itching sensations to the skin. Noticeable swelling may occur and welts may form that can last for several days followed by a persistent rash lasting for weeks. If there are any severe symptoms such as difficulty breathing, seek medical help immediately.

Biological Control. Exploration for natural enemies to control the nettle caterpillar is being undertaken by a joint project between the UH College of Tropical Agriculture and Human Resources (CTAHR) and the HDOA. In October 2004, a beneficial parasitic wasp which attacks the caterpillar stage of the nettle caterpillar was collected in Taiwan by former HDOA Plant Pest Control Branch Chief L. Nakahara. This wasp species is being tested in the HDOA Quarantine Facility for host specificity.

Acknowledgements. We gratefully acknowledge L. Nakahara, B. Bushe, C. Jacobsen, and C. Hirayama for conducting surveys and providing other support for this Advisory. Surveys were supported and funded in part by the USDA-APHIS Cooperative Agricultural Pest Survey (CAPS) Program.

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State of Hawaii
DEPARTMENT OF AGRICULTURE

Attachment #8
New Pest Advisory
No. 99-02 Updated July 2005

Figure 1. Little fire ant worker

Little Fire Ant
Wasmannia auropunctata (Roger)

(Hymenoptera: Formicidae)

Patrick Conant, Ronald A. Heu
Larry Nakahara, Bernarr Kumashiro and
Neil Reimer

Introduction. Specimens of a tiny ant (Figure 1) were first collected by a resident of Hawaiian Paradise Park, located in the Puna District of the Big Island, in March 1999 and submitted to the Hawaii Department of Agriculture (HDOA). They were identified as the little fire ant (LFA), *Wasmannia auropunctata* (Roger), by HDOA Plant Quarantine Insect Specialist Dr. N. Reimer. According to Wheeler (1929), *W. auropunctata* is Neotropical in origin and is known throughout central and northern South America, the West Indies, and the warmer portions of Mexico. Nickerson (1983) reported that it is common in south Florida, and Hayashi (1999) mentioned its presence in West Africa, Galapagos Islands, New Caledonia, and the Solomon Islands. Although Nickerson stated that LFA occurs in California, inquiries to the California Department of Food and Agriculture revealed that there is no record of it being established in the state. However, there have been numerous interceptions of LFA in California (E. Fisher 1999, pers. comm.)

Description. Little fire ants are tiny, measuring 1/16 inch long. They are pale orange and characteristically move very slowly. They produce painful stings and large red welts. Ants on the ground rarely sting, but will readily sting when they get under clothing as they drop off shrubbery. Creighton (1950) mentions that the severity of the sting of LFA is out of proportion to its small size. Spencer (1941) adds that, for some people, "the sting lasts for three days, aching painfully at first and later itching intensely by spells."

Figure 2. Little fire ant infestation on ground

Distribution. In April 1999, three separate infestations of the little fire ant were found at Hawaiian Paradise Park and another infestation was uncovered in a nursery at Kapoho in the Puna District of the Big Island. In late August 1999, the ant was found in 20 acres of a much larger fruit orchard in Papaikou, about 4 miles north of Hilo. Apparently, infested palm trees were planted as windbreaks around the fruit orchard in 1995, so LFA was probably established in some commercial nursery plants at least four years prior to its being first discovered (Conant and Hirayama 2000). As of July 2005, LFA is widely distributed in East Hawaii, but has not yet been observed in West Hawaii. A survey

of West Hawaii funded by Natural Resources Conservation Service will be undertaken in the future. In East Hawaii, separate infestations range from Laupahoehoe in Hamakua District, South to Kalapana in Puna District. The highest elevation infestation is in Mountain View (1500' elevation). Infestations are also known in Waiakea Uka and Kaumana in South Hilo. Over 50 infestation sites are known in East Hawaii. Of these, over a dozen nurseries and landscaper baseyards are infested and are potential sources of infested potted plants. HDOA is working with the owners to suppress the ants. All other known infestations are in Puna or South Hilo districts. Surveys to determine the extent of the infestations in Puna and other areas on the Big Island are continuing. In 1999, an infestation of LFA was found at Kalihiwai on Kauai which continues to be suppressed through the use of Amdro fire ant bait.

Habitat. The ants are easily found outdoors crawling on the ground (Figure 2), in and under potted plants, and on ornamental foliage and flowers. Worker ants feed on dead insects, other arthropods, small animals, and are predaceous on many insects (Smith 1965). According to Spencer (1941), the ant feeds preferably on honeydew from sucking insects. Ulloa-Chacon and Cherix (1990) mention that interspecific competition by this ant gradually eliminates other ant species and terrestrial invertebrates in newly colonized areas. So far, there have been at least 5 reports of people being stung inside their homes on the Big Island. According to Smith (1965), *W. auropunctata* can be a household pest which infests clothing, beds, furniture, or food. Fernald (1947) reports that *W. auropunctata* do not form definite nests, but clusters of them may sometimes be found in cracks and crevices or under leaf litter, stones, or other material on the ground. According to Nickerson (1983), these "nests", which contain several queens, numerous workers, pupae, larvae and eggs, are connected with each other by movement of the workers. Spencer (1941) mentions that new nests are apparently formed by budding as nuptial flights have never been observed.

Control. Amdro fire ant bait is being applied by the infested nurseries who have voluntarily refrained from moving plant material off of their properties unless first treated with insecticides. For growers of tropical fruit and nut orchard crops Amdro can be applied in bait stations; however a copy of the Special Local Need label is required. This label is available from the HDOA Hilo office.

Acknowledgements. We gratefully acknowledge C. Hirayama and K. Onuma for conducting field surveys for this ant. Surveys were supported and funded in part by the USDA-APHIS Cooperative Agricultural Pest Survey (CAPS) Program.

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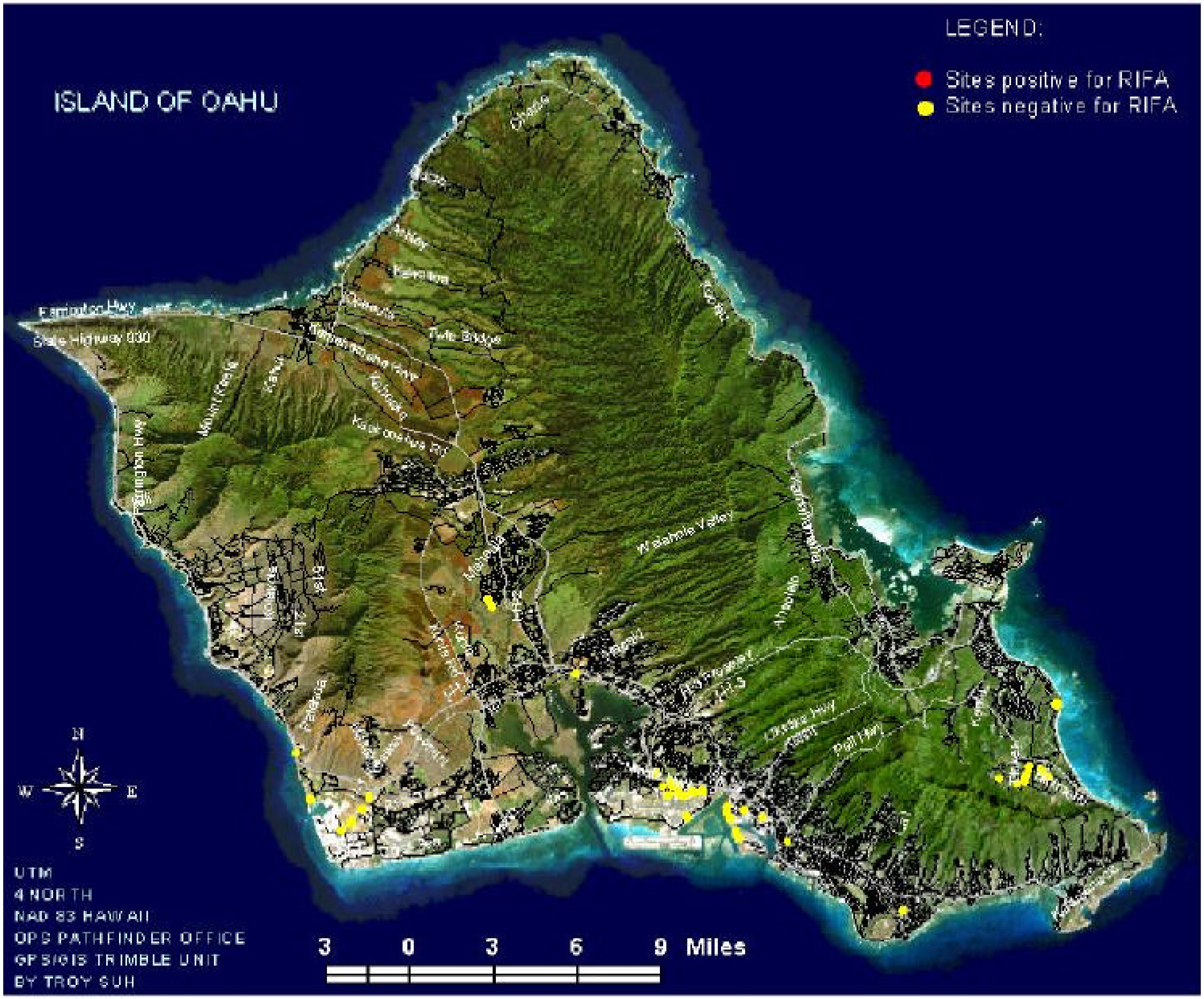
Red Imported Fire Ant Survey
Oahu 2005
(no positive finds)



SURVEY SITES

- Kaulukanu rifa.shp
- Airport lei stand rifa.shp
- Cosco 1 rifa.shp
- Hawaiian air cargo 2 rifa.shp
- Airport 3 rifa.shp
- Campbell industrial park 3 rifa.shp
- Sand island entrance rifa.shp
- Kilauea park rifa.shp
- Aolele st rifa.shp
- Northwest cargo rifa.shp
- Airport terminal rifa.shp
- Campbell 2 rifa.shp
- Nilo nursery rifa.shp
- Campbell industrial rifa.shp
- Horizon co rifa.shp
- Toyota lot rifa.shp
- Pier-51 b rifa.shp
- Koolina resort rifa.shp
- Matson, pier-51 rifa.shp
- Waimanalo nursery rifa.shp
- Kapalama rifa.shp
- Nex pearl harbor rifa.shp
- Mililani ag rifa.shp
- Post office rifa.shp
- Airport road rifa.shp
- Iolani palace rifa.shp
- Waimanalo usda rifa.shp
- United airline cargo rifa.shp
- Delta airline rifa.shp
- Ups postal rifa.shp
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- Warren yee nursery rifa.shp
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- Kahe point rifa.shp
- Uh urban center rifa.shp
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- Hnl gate-12 rifa.shp
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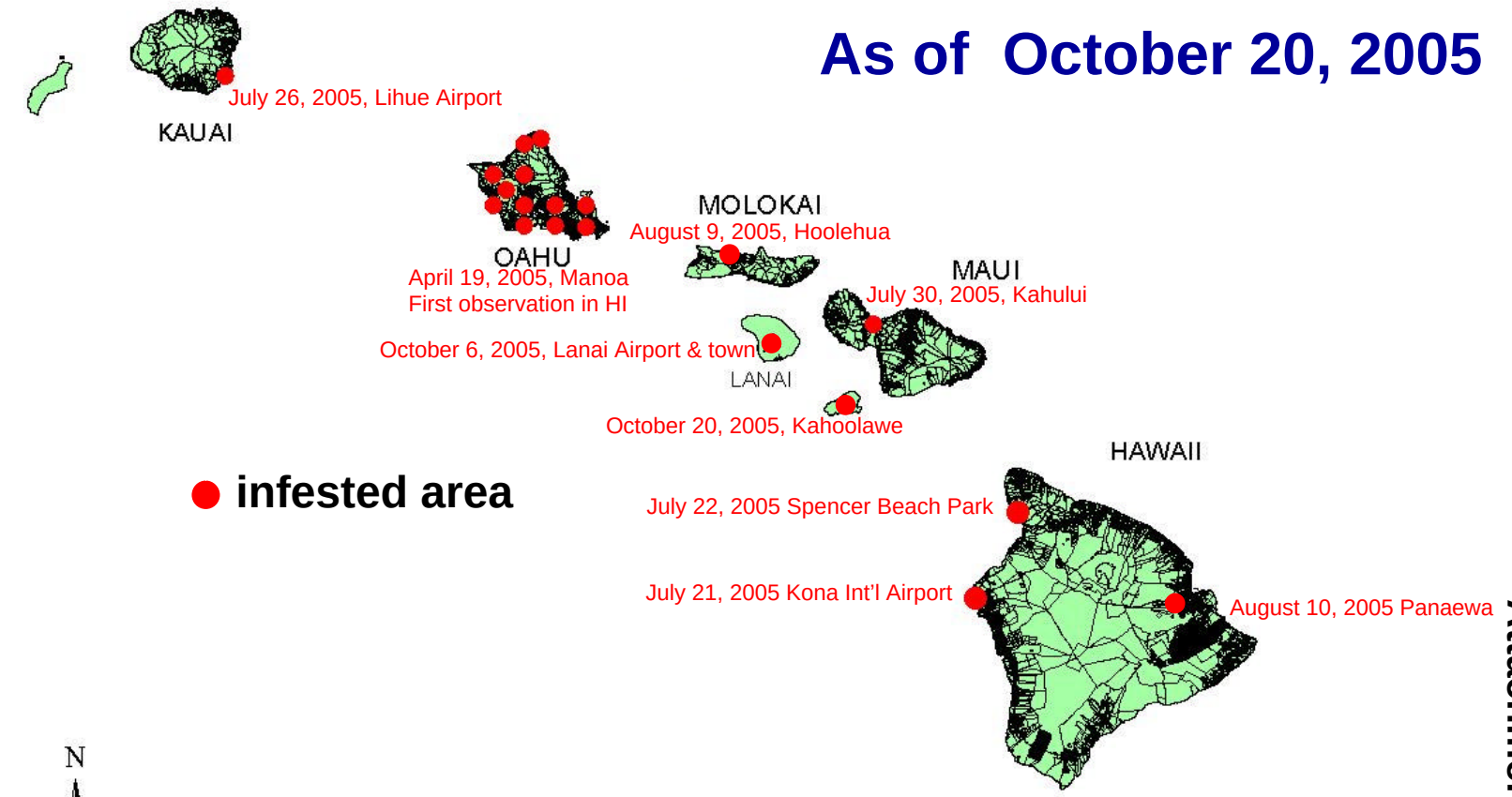
- Pier-39 rifa.shp
- Tgrmjrds
- Tlgroads.shp

Attachment #9

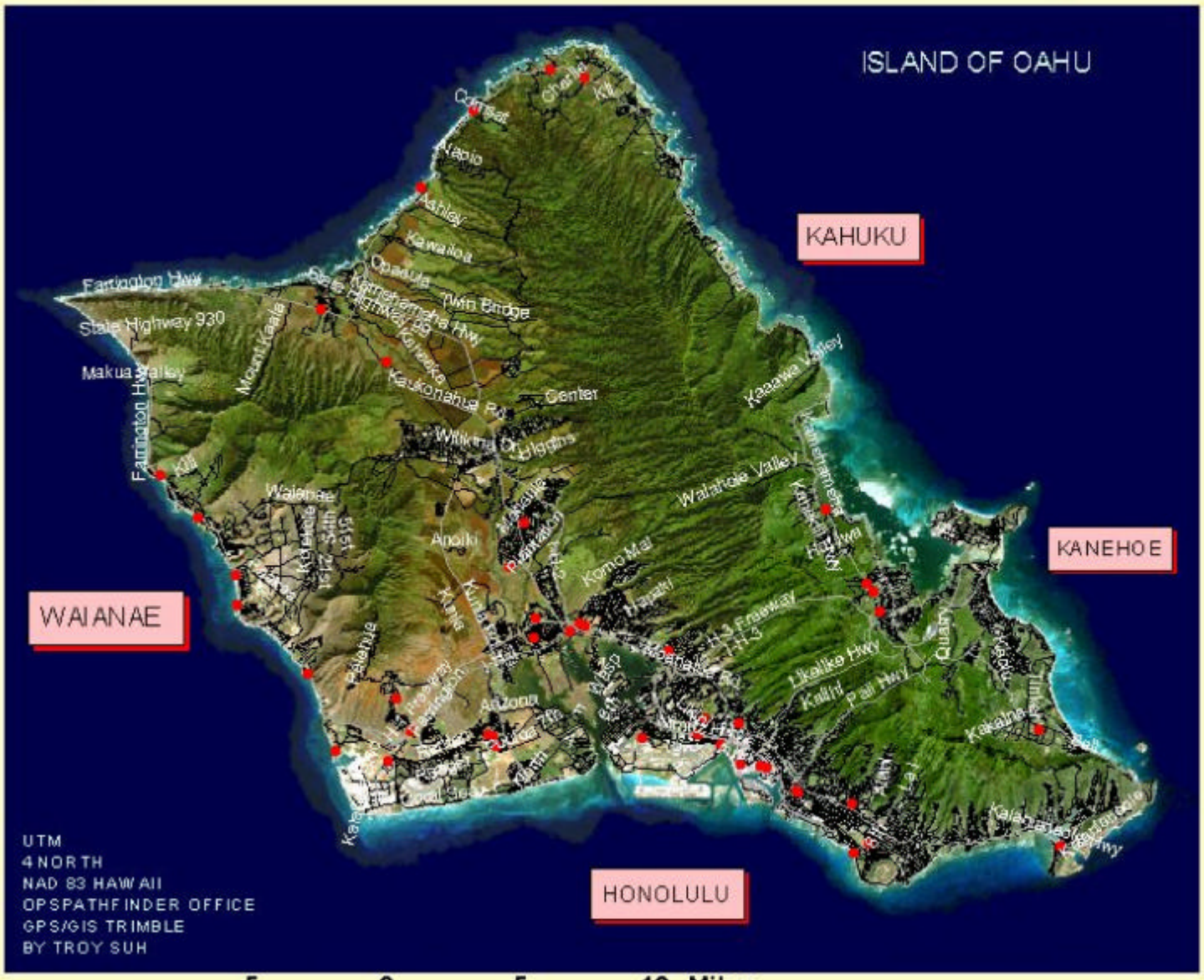
Distribution in Hawaii



Attachment #10a

T. Suh and R. Heu

Erythrina Gall Wasp Survey
Oahu 2005

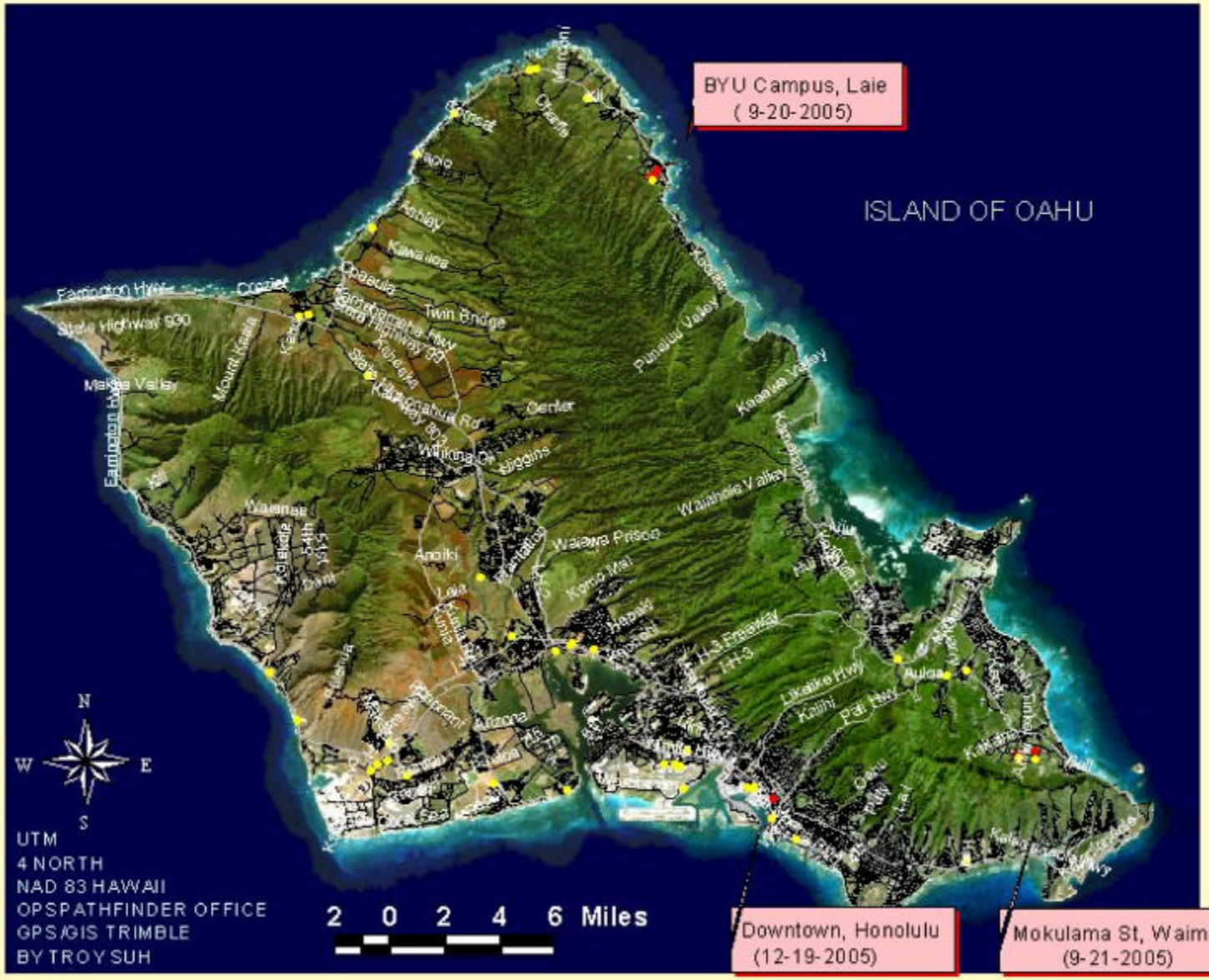


****SURVEYED SITES****

- POSITIVE FOR INFESTATION
  - Kanehoe District Galls, shp
  - Salt Lake's Galls, shp
  - UH's Galls, shp
  - State Capital's Galls, shp
  - PQ Hawaii's Galls, shp
  - Lagoon Drive Park's Galls
  - Nimitz, Young Brothers Galls
  - Cosco Galls, shp
  - Leeward College Galls, shp
  - Aiea Height Galls, shp
  - Fort Shafter Galls, shp
  - Airport Galls, shp
  - Pearl City Galls, shp
  - Waikele Galls, shp
  - Waipahu Galls, shp
  - Ewa beach Galls, shp
  - Makakilo Galls, shp
  - Mililani's Galls, shp
  - Kapolei District Galls, shp
  - Koko Head's Galls, shp
  - Waikiki's Galls, shp
  - Hickam's Galls, shp
  - Kapahulu's Galls, shp

Attachment #10b

Papaya Mealybug Survey
Oahu 2005



SURVEYED SITES

- Young brother pmb.shp
- Waimanalo pmb.shp
- Waimanalo 2 pmb.shp
- Ups postal pmb.shp
- Turtle bay pmb.shp
- Sunset beach park pmb.shp
- Sharon's pmb.shp
- Pearl city hd pmb.shp
- North shore pmb.shp
- Navy ex pmb.shp
- Nanakuli pmb.shp
- Moanalua pmb.shp
- Mililani pmb.shp
- Makakilo nursery pmb.shp
- Lcc pmb.shp
- Kapolei pmb.shp
- Kapolei area pmb.shp
- Kahuku farmers pmb.shp
- Hnl gate-26 pmb.shp
- Foreign trade zone pmb.shp
- Ewa beach pmb.shp
- Cosco pmb.shp
- Airport pmb.shp
- Ala moana pmb.shp
- Waimanalo district pmb.shp
- China town pmb.shp
- Byuh 1 entrance pmb.shp
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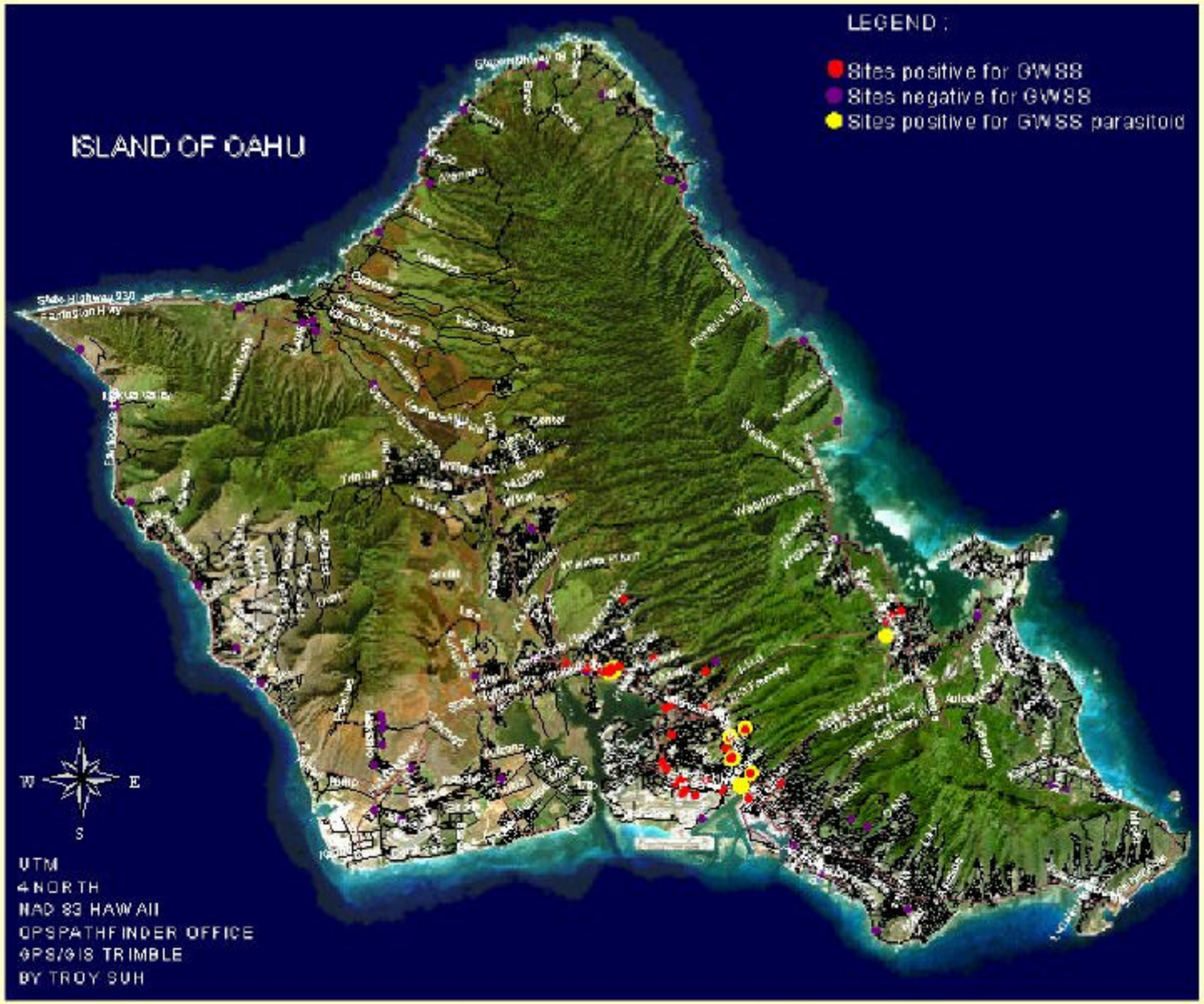
Positive For Infestation
Negative For Infestation

Attachment #11

Glassywinged Sharpshooter Survey
Oahu 2005



SURVEY SITES

- Windward mall gwss.shp
- Urban and garden gwss.shp
- Upper pearl city gwss.shp
- Tripler hospital gwss.shp
- Sears gwss.shp
- Sand island.shp
- saltlake gwss.shp
- Pearl city, sharp_sh.shp
- Pacific palisades gwss.shp
- Nimitz highway gwss.shp
- Moanalua gwss.shp
- Mapunapuna gwss.shp
- Likelike gwss.shp
- Lagoon drive,gwss.shp
- Kaneohe sharp_sh.shp
- Kamehameha freeway.shp
- Home depot(pearl city)gwss.shp
- Hawaiian air gwss.shp
- Halawa sharp_sh.shp
- Fortsmafter gwss.shp
- Aloha stadium sharp_sh.shp
- Airport gate 10.shp
- Ala neight gwss.shp
- Ft h-1 gwss.shp
- Tripler gwss.shp
- Moanalua freeway gwss.shp
- High elevation area gwss.shp
- Wal mart (kunia) gwss.shp
- Waikiki gwss.shp
- Sharon's gwss.shp
- North shore gwss.shp
- Mililani mauka gwss.shp
- Makakilo gwss.shp
- Kme lookout gwss.shp
- Kapolei gwss.shp
- Ewa beach gwss.shp
- Ala moana sharp_sh.shp
- Ala moana 2 gwss.shp
- Kahuku 1 gwss.shp
- Makakilo 1 gwss.shp
- Lale gwss.shp
- Sunset beach park gwss.shp
- Waimea gwss.shp
- Waialua gwss.shp
- Mokuleia gwss.shp
- Leeward gwss.shp
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- Barber's pt gwss.shp
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- Hcc college gwss.shp
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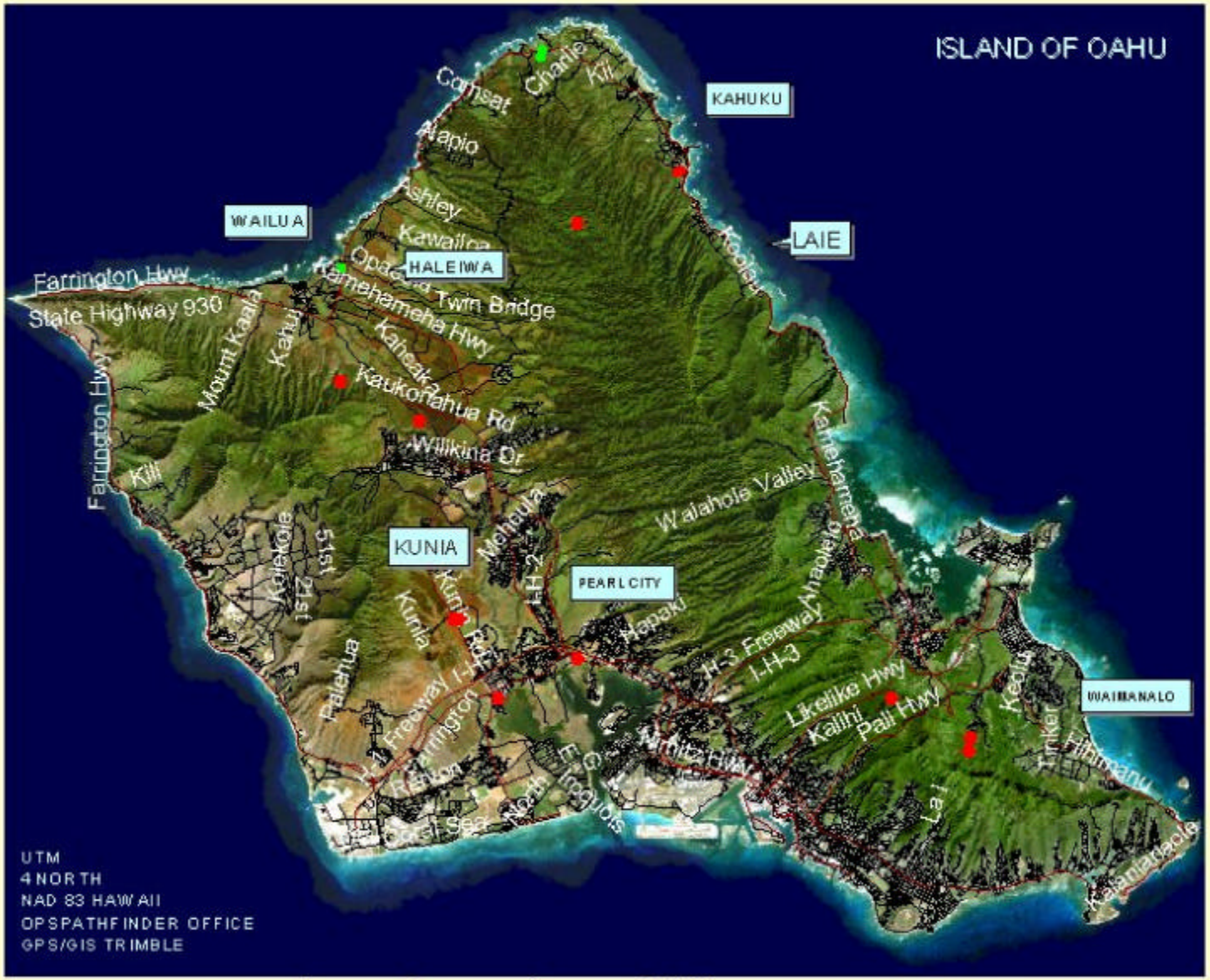
- Sears parasitoids gwss.shp
- Mapunapuna parasitoids gwss.shp
- Lower tripler parasitoids gwss.shp
- Kwnl refuse parasitoids gwss.shp
- Fortshafter parasitoids gwss.shp
- Tgrn_rds
- Tiger_rds.shp

Attachment #12

Pickleworm Survey
Oahu 2005



- NEGATIVE FOR INFESTATION
- POSITIVE FOR INFESTATION

- Aloun farm, shp
- Castle Junction, shp
- Kahuku farm, shp
- Khamphoudt farm, shp
- Kunia farms, shp
- Poamoho station, shp
- Urban garden, shp
- Wailua farms, shp
- Waimanalo, shp
- Haleiwa Farm, shp
- Laie's Farm, shp

Attachment #13

SURVEY BY JUALIANA YALEMAR

Summary of Hawaii and Guam records entered into NAPIS

2005

Date entered	Pest name	Scientific name	Record type	Island	Year rec'd	EPA code	Notes
03/31/05	red imported fire ant	Solenopsis invicta	absent	Oahu	2005	ISASAZA	8 entries, 70 traps, neg. data
03/31/05	red imported fire ant	Solenopsis invicta	absent	Kauai	2005	ISASAZA	2 entries, 57 traps, neg. data
03/31/05	red imported fire ant	Solenopsis invicta	absent	Hawaii	2005	ISASAZA	4 entries, 300 traps, neg. data
03/31/05	little fire ant - Kauai	Wasmannia auropunctata	present	Kauai	2005	ISASBHA	2 positive sites
04/06/05	macadamia felted coccid	Eriococcus ironsidei	State	Hawaii	2005	IRALAPA	new State record
04/06/05	pickleworm	Diaphania nitidalis	Island	Hawaii	2005	ITBMAWA	new island (county) record
04/06/05	pickleworm	Diaphania nitidalis	Island	Maui	2005	ITBMAWA	new island (county) record
04/08/05	oleander scale	Aspidiotus nerii	Island	Hawaii	2005	IRAKAKA	new island (county) record
04/08/05	an armored scale	Morganella conspicua	Island	Hawaii	2005	IRAKQXA	new island (county) record
04/18/05	large orange sulfur	Phoebis argarithe	State	Maui	2005	ITBJAUA	new State record
04/18/05	large orange sulfur	Phoebis argarithe	Island	Oahu	2005	ITBJAUA	new island (county) record
05/25/05	erythrina gall wasp	Quadrastichus erythrinae	State	Oahu	2005	ISAPAVA	new State record
05/25/05	trilobite scale	Pseudaonidia trilobitiformis	State	Hawaii	2005	IRAKEUA	new State record
07/15/05	eucalyptus gall wasp	Epichrysocharis burwelli	State	Oahu	2005	ISAPARA	new State record
07/15/05	hibiscus psyllid	Mesohomotoma hibisci	U.S.	Oahu	2005	IRAXEBA	new U.S. record
07/29/05	erythrina gall wasp	Quadrastichus erythrinae	Island	Hawaii	2005	ISAPAVA	new island (county) record
07/29/05	erythrina gall wasp	Quadrastichus erythrinae	Island	Kauai	2005	ISAPAVA	new island (county) record
08/12/05	erythrina gall wasp	Quadrastichus erythrinae	Island	Maui	2005	ISAPAVA	new island (county) record
11/06/05	papaya mealybug	Paracoccus marginatus	Island	Oahu	2005	IRAWQIA	new island (county) record
11/30/05	tortoise beetle	Cassida circumdata	Island	Maui	2005	INAMQTA	new island (county) record
12/01/05	red imported fire ant	Solenopsis invicta	absent	Oahu	2005	ISASAZA	38 entries, 411 traps, neg. data
12/19/05	SOD	Phytophthora ramorum	absent	Oahu	2005	FGHEPWN	one site, 3 samples
12/19/05	SOD	Phytophthora ramorum	absent	Hawaii	2005	FGHEPWN	one site, 4 samples
12/20/05	SOD	Phytophthora ramorum	absent	Hawaii	2005	FGHEPWN	one site, 4 samples
12/20/05	SOD	Phytophthora ramorum	absent	Kauai	2005	FGHEPWN	one site, 8 samples
12/20/05	SOD	Phytophthora ramorum	absent	Oahu	2005	FGHEPWN	one site, 4 samples
12/20/05	SOD	Phytophthora ramorum	absent	Oahu	2005	FGHEPWN	one site, 1 sample
12/20/05	SOD	Phytophthora ramorum	absent	Oahu	2005	FGHEPWN	one site, 1 sample
12/20/05	SOD	Phytophthora ramorum	absent	Oahu	2005	FGHEPWN	one site, 1 sample
12/20/05	SOD	Phytophthora ramorum	absent	Hawaii	2005	FGHEPWN	one site, 5 samples
12/20/05	SOD	Phytophthora ramorum	absent	Hawaii	2005	FGHEPWN	one site, 2 samples
12/20/05	SOD	Phytophthora ramorum	absent	Hawaii	2005	FGHEPWN	one site, 3 samples
12/20/05	SOD	Phytophthora ramorum	absent	Hawaii	2005	FGHEPWN	one site, 1 sample
12/20/05	SOD	Phytophthora ramorum	absent	Oahu	2005	FGHEPWN	one site, 1 sample
12/28/05	cockerell scale (Guam)	Pseudaulacaspis cockerelli	State	Guam	2005	IRAKQIA	new Guam record
12/28/05	cycad scale (Guam)	Aulacaspis yasumatsui	State	Guam	2005	IRAKQKA	new Guam record
12/27/05	a predaceous scale	Euglandina rosea	present	Oahu	2005	IGDJABA	established on Oahu
12/27/05	giant African snail	Achatina fulica	present	Oahu	2005	IGDBABA	established on Oahu
12/27/05	a snail	Succinea sp.	present	Oahu	2005	IGDPBCA	established on Oahu
12/27/05	a snail	Ovachlamys fulgens	present	Oahu	2005	IGDYABA	established on Oahu
12/27/05	a snail	Paropeas achatinaceum	present	Oahu	2005	IGDOBCA	established on Oahu
12/28/05	greenhouse thrips	Hercinothrips femoralis	present	Guam	2005	IMOCAJA	established on Guam
12/28/05	red banded thrips	Selenothrips rubrocinctus	present	Guam	2005	IMOCAPA	established on Guam
12/28/05	woolly whitefly	Aleurothrixus floccosus	present	Guam	2005	IRABADA	established on Guam
12/28/05	a whitefly	Aleurotrachelus trachoides	present	Guam	2005	IRABBKA	established on Guam
12/28/05	a whitefly	Dialeurodes citrifolii	present	Guam	2005	IRABAHA	established on Guam

12/28/05	mollusk	Subulina octona	present	Maui	2005	IGDOARA	established on Maui
12/28/05	mollusk	Succinea sp.	present	Maui	2005	IGDPBCA	established on Maui
12/28/05	mollusk	Assimineidae	present	Maui	2005	IGDBRAA	established on Maui
12/28/05	mollusk	Achatina fulica	present	Maui	2005	IGDBABA	established on Maui
12/28/05	mollusk	Euglandina rosea	present	Maui	2005	IGDJABA	established on Maui
12/28/05	mollusk	Assimineidae	present	Maui	2005	IGDBRAA	established on Maui
12/28/05	mollusk	Paropeas achatinaceum	present	Maui	2005	IGDOBCA	established on Maui
12/28/05	mollusk	Ovachlamys fulgens	present	Maui	2005	IGDYABA	established on Maui
12/28/05	mollusk	Subulina octona	present	Maui	2005	IGDOARA	established on Maui
12/28/05	mollusk	Euglandina rosea	present	Maui	2005	IGDJABA	established on Maui
12/28/05	mollusk	Achatina fulica	present	Maui	2005	IGDBABA	established on Maui
12/28/05	mollusk	Euglandina rosea	present	Maui	2005	IGDJABA	established on Maui
12/28/05	mollusk	Tornatellides	present	Maui	2005	IGDSABA	established on Maui
12/28/05	mollusk	Paropeas achatinaceum	present	Maui	2005	IGDOBCA	established on Maui
12/28/05	mollusk	Subulina octona	present	Maui	2005	IGDOARA	established on Maui
12/28/05	mollusk	Bradybaena similaris	present	Maui	2005	IGDDAJA	established on Maui
12/28/05	mollusk	Hawaiia minuscula	present	Maui	2005	IGDRAJA	established on Maui
12/28/05	mollusk	Succinea sp.	present	Maui	2005	IGDPBCA	established on Maui

Last updated: January 31, 2006