



**Support to the HISC
State Ant Specialist –
Summary of main achievements in 2009-2010**

Objective: prevent the entry and spread of invasive ants in Hawaii.

Highlights

Development and launching of www.littlefireants.com

A web page dedicated to invasive ant species in Hawaii has been developed and launched. The website contains a wealth of information ranging from invasive ant biology/ecology, impacts, management options, mitigation activities in Hawaii, extensive bibliography, and downloadable info sheets on all aspects of ant control and detection. The website has received well over 1000 hits since the launch.

Little Fire Ants in Maui

The State Ant Specialist has worked to develop and implement an eradication plan for Little Fire Ants in Maui. Working closely with MISC, Maui County, HDOA and others; the eradication plan includes outreach, survey and eradication activities. Later in September 2010, the treatment component will be complete. With no LFA found on-site since February, prospects for a successful eradication are very good. Outreach, survey and monitoring activities continue – coordinated by MISC.

Detection of Little Fire Ants in Kona

LFA were detected by the State Ant Specialist in the Kailua-Kona area in January 2010. Since that time additional infested sites have been discovered, and these are all being treated. A Kona LFA Taskforce has been established to oversee survey and eradication activities.

Successful development of new ant baits and application equipment

A paste bait and associated application equipment have been developed by the State Ant Specialist, and is currently being investigated for commercialization by a major multi-national chemical company. The new bait is more effective than existing products, can be applied to trees and vegetation where LFA nest, and is much more rain-fast (therefore much more suitable for tropical conditions)¹

Successful acquisition of additional funding sources

The original HISC budget allocation for the State Ant Specialist has been used to lever substantial additional funding:

- **County of Hawaii Research and Development grant** (used to support the HISC R&T grant

¹ These activities were funded through a HISC R&T grant

- for bait research)
- **US Senate Farm Bill grant** \$67,000 (development of nursery pest ant management programs)
- **USFS western division competitive forestry grant** \$200,000 (a multi-nation grant that takes a regional approach to invasive ant prevention and moves some ant risks to Hawaii off-shore)
- **TSTAR research grant** \$117,000 – economic impact analysis of LFA in Hawaii. (co-PI, travel only)

Activities contributing to prevention of entry and spread of invasive ants

The salary and associated costs of the State Ant Specialist were funded through the HISC Prevention Working Group. As such, all activities fall under the “prevention” category. Preventing the entry and spread of invasive species is the most cost effective approach to invasive species management. Prevention activities include those that might also be associated with outreach, detection, pest management and eradication.

Preventing entry of invasive ants

1. Off-shore risk management

Traditional biosecurity models begin at the quarantine barrier and focus on preventing the entry of new pests and diseases through inspection of commodities prioritized by risk. These models rely heavily on rapid response to incursions, post-border detection but must take account of “slippage” which is the rate of contaminated commodities not detected at points of entry. Recent attention has shifted to off-shore risk reduction – reducing the rates of contamination of commodities at source points. This new approach has had dramatic positive results for some countries and is rapidly being adopted as the gold standard in biosecurity.

The funding provided by HISC to the ant project has been used to lever a major grant from USFS (\$200,000). This grant will be used in part to reduce the threat of invasive ants for US affiliates in the Pacific, which in turn reduces Hawaii’s exposure to incursions arising from some of our biggest trading partners. This regional approach has previously been embodied in the Hawaii Ant Plan and the Pacific Ant Prevention Plan.

2. Standardizing ant surveys at points of entry

Standard Operating Procedures have been developed for points of entry and are now used by the CAPS survey program. These new operating procedures offer improved survey quality as well as being more efficient. They include the collection of spatial data suitable for entry to the CAPS database and GIS systems.

3. Development of a response plan for invasive ant incursions

A rapid response plan has been developed for use when an incursion of new invasive ant species is detected in Hawaii. The plan details response procedures and all components of an operational plan

- Pre-incursion planning
- Initial detection and response

- The Emergency Response Management Committee
- Delimiting survey
- Draft management plan
- Response components
 - Surveillance
 - Treatment
 - Communications
 - Movement controls
 - Research priorities
 - Organizational structure.
- Protocols
 - Collection and identification of ant specimens
 - Standardized surveillance and monitoring methods
 - Data capture and management procedures
 - Guidelines for preparation of a management plan
 - Area Freedom/Pest Freedom
- Treatment options
 - Red Imported Fire Ants
 - Little Fire Ants
- SOP: Containment of an exotic ant infestation
- SOP: Distribution of granular ant baits
- SOP: distribution of paste baits

4. Maintain international networks within the invasive species and biosecurity community

The State Ant Specialist presented papers at the 2009 Biosecurity Conference in Queenstown New Zealand and the 2010 International Invasive Ant Management Workshop in Darwin Australia. He maintains an extensive network of colleagues in the Pacific region and mainland USA to keep abreast of latest threats from invasive ants, new chemicals and treatment methods as well as developments in survey techniques.

Case study – Little Fire Ants on Maui

Late in 2009, LFA were discovered on a single property on Maui. The State Ant Specialist developed and implemented a treatment plan for the site using new formulations and application methods developed under a HISC Research and Technology grant. Treatment was conducted through an experimental use permit issued by the HDOA. To date, the treatments appear to have been very successful with no LFA detected since February 2010. Treatment is not yet complete but at this time, the project is on-track for successful eradication.

A short video of the new technique is available at:

http://docs.google.com/leaf?id=0B61oU9xUD-DMODUwZDQxMjktMzAxOS00MDY2LWIxNjUtMzBIYzU5NjNiOTk2&hl=en_GB&authkey=CPHgiNQP

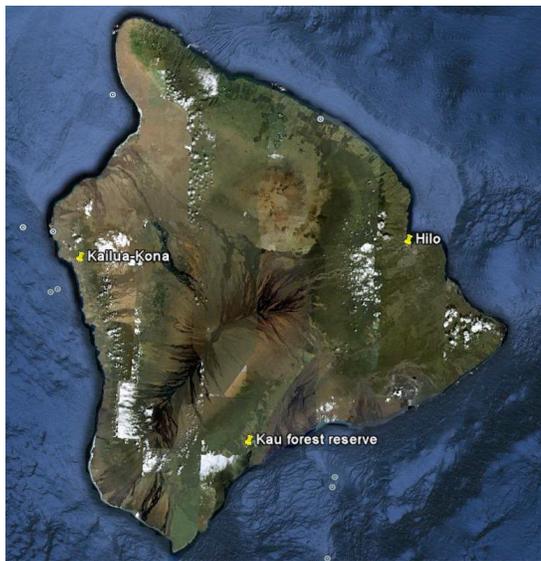
Preventing inter-island spread of invasive ants

The most serious invasive ant present in Hawaii is the Little Fire Ant. It is devastating natural ecosystems, agricultural enterprises and the lifestyles of residents along the east coast of the Big Island. Preventing the spread of LFA to other islands in the Hawaiian archipelago and the west coast of the Big Island is a high priority. Activities that contributed to preventing this are listed below:

1. Development of computerized tools for quarantine treatments of nursery stock

The HDOA approved quarantine treatment for nursery plants infested with LFA are taken from the USDA APHIS Red Imported Fire Ant treatment standards. However the label for the approved product (Talstar) is very difficult to interpret. A computerized “ready reckoner” has been developed for use by HDOA staff in recommending the correct rate of product to use. Previously, no concrete recommendation could be made. While most contaminated plants are simply not exported, large shipments or high-value shipments still are. This reckoner allows appropriate recommendations to be made for quarantine treatments for those commodities.

Detection case study – Pahala LFA



In June 2010, a resident of Pahala called the State Ant Specialist to report she had purchased some potted plants while on a recent trip to Hilo, and they were covered in small yellow ants. She had read in the local media about LFA and thought the

ants in her plants fitted the description. Pahala is 60 miles south-west of Hilo and 60 miles south-east of Kailua-Kona and an LFA infestation there would represent a significant range expansion.

The State Ant Specialist immediately drove to the site which bordered Kau State Forest, treated all the plants and took the most severely infested ones back to Hilo for destruction. This activity has prevented the establishment of a significant outlying LFA infestation within 100 feet of Kau forest reserve.

This case study demonstrates how appropriate outreach can raise community awareness of invasive species issues and rapid technical response contributes to the prevention of new outbreaks of invasive species.

2. Development of an LFA management and detection plan for Maui

Little Fire Ants were detected on a single property on Maui in September 2009. The State Ant Specialist worked with MISC, HDOA, the Maui County and USGS to develop an operational plan to eradicate this incursion. The plan included delimiting (local and island-wide), trace-forward/back, public outreach, site-eradication and follow-up monitoring. The eradication component was undertaken as a joint HDOA-PCSU activity and to date appears to be successful. The plan can be downloaded here - http://docs.google.com/fileview?id=0B61oU9xUD-DMZmZiM2M4ZjAtYTQ0ZS00MDUwLTlmZGZEtYjNkYjIhYTM5ZmNm&hl=en_GB&authkey=COnw0ZgE

3. Trained MISC bunchy top survey team on LFA detection and survey

Banana plants are one of the favored LFA habitats in Hawaii. Virtually any property that has bananas and is infested with LFA, will have LFA in the bananas. Therefore, a check of banana plants on any property will provide a high-confidence of LFA presence or absence. As part of the wider delimiting survey for LFA on Maui, the State Ant Specialist trained the MISC Bunchy Top Survey team in basic detection techniques. The team flew to Hilo and had an opportunity to see LFA infestations in Bananas. This allowed the survey team to simultaneously survey for bunchy top and LFA without adding to survey costs.

Case study – training Maui Invasive Species Committee Bunchy Top survey team

Little Fire Ants were discovered on Maui late in 2009. In collaboration with the Maui ISC, a broader delimiting survey had been designed. LFA are especially fond of nesting in bananas and generally, if LFA are present on a site, some will be nesting in any bananas present. MISC has a survey team actively looking for banana bunchy top virus throughout Maui. The State Ant Specialist developed a training class for these surveyors so they could detect the presence of LFA as part of the bunchy top survey. The team traveled to Hilo where they learned how to identify LFA in the field, and specifically, how to visually survey bananas for this pest.



4. Eradication of Little Fire Ants from Kauai

A small infestation of LFA has existed on Kauai since 2000. It has been kept from spreading by

constant (but *ad hoc*) efforts of HDOA staff on the island. Past efforts have not succeeded in eradicating the infestation, mainly due to access, terrain and non-availability of arboreal control methods. New treatment methods and a break-through in access issues has allowed the formulation of an eradication strategy.

In July 2010, and following on from the apparently successful treatment program on Maui, a plan to eradicate LFA has been initiated. Currently this is awaiting regulatory approval for the treatment method.

Preventing intra-island spread of invasive ants

There are three main forms LFA spread within the Big Island:

1. spread from east (Hilo) to west (Kailua-Kona)
2. jump dispersal
3. local spread
- 4.

1. Preventing spread of LFA from Hilo to Kailua-Kona

The climate and terrain of the Big Island present a natural barrier for spread of LFA between the east (rainy) and west (dry) sides of the island. This is further accentuated by the location of the two major urban centers of Hilo and Kailua-Kona. HDOA and HISC strategies have recognized this and past efforts have focused on preventing the westward spread of this species.

Unfortunately, after 10 years, LFA were detected in Kona (January 2010). Since their discovery, efforts have been made to eradicate local infestations and limit spread as much as possible.

- a. where infestations exist, joint HDOA-PCSU treatments are occurring
- b. 2 plant sellers are infested – the State Ant Specialist is working with these nurseries to implement quarantine treatments and eradicate the pest from the sites
- c. Established and participated in community-driven detection plan for Kona including establishment of Kona LFA Taskforce. This taskforce is led by the Kona County Farm Bureau.
- d. Currently, developing a cooperative nursery participation project that helps nurseries guard against LFA and provide consumers with buying choices.
- e. For an estate infested with LFA, provided training to home owners for conduct of community driven eradication program.
- f. Prepared a community-driven LFA detection plan for Kailua Kona and grant application to fund it (app pending)
- g. Provided formal survey training to members of the Kona LFA taskforce.

2. Preventing jump-dispersal

The most common way that LFA spread from property to property is through “jump-dispersal” a situation where items infested with LFA are carried onto a new site by people. The highest risk materials are plants and organic materials such as soil and mulch. Activities that limit this form of spread included:

- a. Detection of LFA at the Hilo County green-waste site. LFA were detected at the green-waste center in Hilo. The waste is mulched, then taken by residents to add to their

gardens as a soil improver. Infested material would therefore result in many new locations becoming infested. The State Ant Specialist worked with Hawaii County and the contractor to develop a plan and treatment schedule that controlled LFA at this site.

- b. Assisted four major export nurseries by developing nursery eradication programs for LFA. These nurseries together produce around a million plants per year for export and domestic sale.

Prevention case stud – discovery of LFA at Hilo greenwaste center

The Hilo green-waste center recycles green-waste disposed by residents from around Hilo. The waste is chipped into a fine mulch-like material which is then given away to any residents who require it. This material is a popular mulch and soil additive with many tons of the material processed each month. Due to the nature of the material, it is a high-risk vector for the movement of LFA through the island. The State Ant Specialist surveyed the site and found LFA which threatened the continued operation of the facility. Hawaii County considered closing the facility and redirecting the material to the main landfill area even though this would significantly shorten the life-span of the landfill. The State Ant Specialist worked with the County and the contractors to develop a risk management plan which included site treatment, risk reduction through changed hygiene practices and outreach materials to residents who collected the material. As a result, the green-waste center was able to continue operations.

Selected websites featuring this story:

<http://www.hawaiizerowaste.org/recycle/greenwaste>

<http://kohalacenter.org/schoolgardensblog/>

<http://www.hawconews.com/hawaii-county-news/2009/4/10/little-fire-ants-found-near-mulching-facility.html>

<http://www.kohalacenter.org/pdf/LFAInfo/HILO%20LFA%20flyer%202009-04-06%20-%20web.pdf>



map showing positive LFA detections at Hilo green waste center.

- c. Developed and implemented a training package for plant vendors at Makuu farmers market. This package included training on detection of LFA in potted plants as well as appropriate quarantine treatments. It is hoped to expand this program to include all farmers markets.

3. Preventing local spread

The final type of LFA range expansion occurs at the local level – natural spread as colonies

become larger and occupy more space. The spread of LFA from one home to a neighbor is becoming more common. Examples of activities in this category included:

- a. Provided ongoing ant identification services to the public and industry on ad-hoc basis
- b. Produced fact sheets with detailed instructions on detecting LFA around homes and instructions on how to control infestations (see www.littlefireants.com)
- c. Training sessions on ant control methods to Hilo licensed pest controllers
- d. Trained Panaewa Zoo staff on LFA control for the zoo.
- e. Outreach activities have focused on engaging the public and the green industry and increasing awareness of invasive ants and the key risk pathways. This information has been imparted through presentations to industry groups and direct engagement of individuals who made direct contact with the State Ant Specialist. Over 20 presentations have been delivered to various bodies with an estimated total participation of 1200 people.
 - i. Plant growing interest groups:
Hilo Master Gardeners, Hawaii Vireya Society annual conference, Senior Lectures program, Hilo, Hawaii Bamboo Society annual conference, UH Cooperative Extension Service
 - ii. Community groups
Keaehou Resort Homeowners Association, Kona, Kona Outdoor Circle, Kona, Waihe'e Community Association, Maui, Kona Town Hall meeting, Community meeting Yano Hall, Captain Cook
 - iii. The green industry
Big Island Association of Nurserymen, Hawaii Export Nursery Association, Big Island Golf Course Superintendent Association, County of Hawaii Greenwaste and Environmental staff
 - iv. The Pest Control Industry
BEI ant control workshop, Hilo; Crop Production Services annual seminar, Honolulu
 - v. Government and NGOs
Kona Farm Bureau, US Customs and Border Protection, Testimony to the Hawaii County Environmental management Committee
 - vi. Media coverage
Community Television talk show – Lance Holter's Crossroads, Maui; Extensive participation and collaboration in the filming of a documentary on LFA impacts in Hawaii; A total of 66 web pages with stories and information on LFA containing the search words "cas vanderwoude" + "fire ants" + Hawaii; >6 newspaper articles in local newspapers

Emerging pest ant threats

Rover Ants (*Brachymyrmex obscuria*)

This species has been present in Hawaii for many years, reportedly not common. In the past 2 years, golf course managers and people living near large areas of turf have noticed large alate swarms of flying ants. These have been severe enough to drive golfers at Hualalai Golf Course

Resort off the course. On closer examination, it appears this ant species readily forms mutualistic associations with root homoptera of grasses which enables it to form large, continuous super-colonies below the ground. Aside from the implications for plant health, the ant becomes a pest due to the alate flights experienced in mid-late summer. This phenomenon was examined by the State Ant Specialist at Hualalai Golf Course, and preliminary recommendations for control have been formulated.

Case study – Brachymyrmex obscuria, a new pest ant species

Over the past 2 years, golf courses on Oahu and the Big Island have experienced large numbers of nuptial flights by Rover Ants (Brachymyrmex obscuria). These flights are sufficiently large to drive golfers from the course and demand a refund of their green fees. Once rarely found in ant surveys around Hawaii, they now appear to have exploded in numbers. The problem had become so bad, at least one golf course was spraying entire holes with pesticides (to no avail). The State Ant Specialist and Dr Arnold Hara investigated this phenomenon and the State Ant Specialist has begun research trials to develop solutions.



Image: Mr Earl Sanders, head green keeper at Hualalai Resort inspecting Rover Ant nests with Dr Hara and others looking on.

Tapinoma sessile (Maui)

A small infestation of *Tapinoma sessile* has been discovered by Dr Paul Krushelnycki (UH). This species has the potential to become a major pest species with impacts similar to Argentine Ants.

Research

- Conducted experiments that resulted in development of a new bait specifically for LFA in arboreal situations and ground application in high rainfall locations.
- Developed a broad variety of new application tools that allow bait to be applied to trees

without the need for climbing.

- A reprint of a paper published in the Proceedings of the Hawaiian Entomological Society is available here: <http://scholarspace.manoa.hawaii.edu/handle/10125/14460>
- In progress:
 - Determine the most attractive commercial ant bait available in Hawaii
 - New passive monitoring/detection systems
 - Co-PI on a study to measure the economic impacts of LFA in Hawaii (T-Star grant, no salary)
 - Developing and testing new dis-infestation systems for potted plants