SUPPORT TO THE HISC: HAWAI`I ANT LAB, SUMMARY OF MAIN ACHIEVEMENTS 2010-2011

OBJECTIVE: PREVENT THE ENTRY AND SPREAD OF INVASIVE ANTS IN HAWAII.

HIGHLIGHTS

This past year has seen the appointment of two key staff in the Hawai`i Ant Lab (HAL). This has been necessary in order to meet the growing workload of invasive ant management. Together, Ms Michelle Montgomery (research technician) and Mr Brent Sheehan (research assistant) bring substantial skills, expertise and capacity to the HAL.

NEW WWW.LITTLEFIREANTS.COM WEB PAGE

The little fire ant website has been very well patronized and by April 2011, it became apparent that the site had become too complex for the basic software used to create it. As a result, the entire code was re-written using more sophisticated software and migrated to a dedicated hosting service. Between September 2010 and August 2011, a total of 2,307 people visited the site with 4,014 page views (Table 1). Most visits were from the United States (1,828) and within Hawai`i, Oahu (824) and the Big Island (569) accounted for most visits. Monthly visit numbers increased through the year from 142 in September 2010, to 251 in August 2011 (Figure 1).

Table 1. break-down of visitors to the www.littlefireants.com website (September 2010-August 2011)

category	# visits
total visits	2307
total page views	4014
-visits by country	
United States	1828
French Polynesia	158
Pacific region	68
Australia	55
-within-Hawai`i visits	
Oahu	824
Big Island	569
Mauai	80
Kauai	17

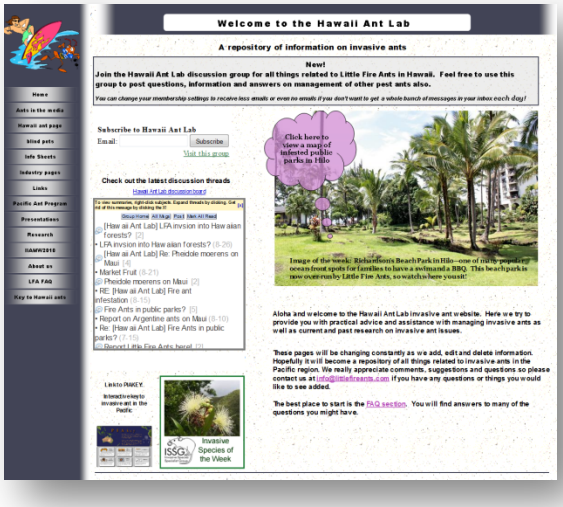
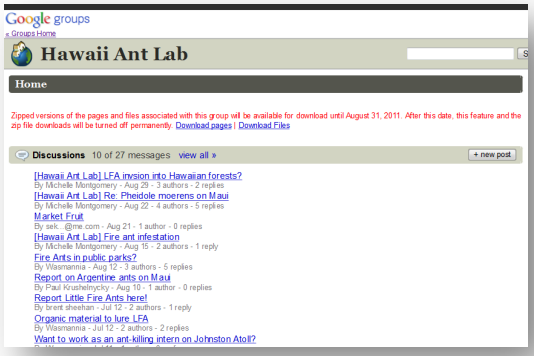


Figure 1. monthly number of visits to www.littlefireants.com (September 2010-August 2011)

Screen shot of the Hawai`i Ant Lab home page

THE HAWAI`I ANT LAB DISCUSSION GROUP



Screen-shot of Hawai`i Ant Lab discussion group and blog

An internet discussion group and blog was started in July 2011. The Hawai`i Ant Lab discussion group http://groups.google.com/group/littlefireants?hl=en allows residents, industry, outreach, research and extension to interact with each other, as well as proving a point of contact to announce various new initiatives and for people to ask specific questions about invasive ants.

MAUI FIRE ANTS PAU?

The Hawai`i Ant Lab 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. To date the infested site has been treated 11 times (October 2009-September 1020). Three post treatment surveys have been conducted since that time and no Little Fire Ants have been detected since February 2010. The results of this work have been published in the Proceedings of the Hawai`i Entomological Society.

Mr Kyle Onuma of HDOA Plant Pesticide Branch Hilo treating Little Fire Ants at Maui

LITTLE FIRE ANTS IN KONA

LFA were detected in the Kailua-Kona area in January 2010. Since September 2010, one additional site has been discovered. A Kona LFA Taskforce has been established to oversee survey and eradication activities. At this time, each site is being visited regularly and treated if Little Fire Ants are detected.

A grant from USDA will be used to develop and implement a cooperative nursery scheme for retail and landscape nurseries in the Kailua-Kona area. The purpose of the scheme is to encourage nurseries to voluntarily implement best practice management systems that prevent further spread of invasive species.

ACQUISITION OF ADDITIONAL FUNDING SOURCES

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

- US Senate Farm Bill grant $28,000 (development of nursery pest ant management programs). This award extends the previous farm bill grant of 2010-2011.
- 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)
- T-STAR research grant $117,000 – economic impact analysis of LFA in Hawaii. (co-PI, travel only)
- DOFAW non-competitive grant $25,000 to conduct a planning workshop for response and management of new ant incursions in the Pacific.

ACTIVITIES CONTRIBUTING TO PREVENTING ENTRY AND SPREAD OF INVASIVE ANTS

The salary and associated costs of the State Ant Specialist in 2011 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.

1. Preventing entry of invasive ants

Off-shore risk management

Shipping and human movements have long been recognized as the main vector for introduction and spread of invasive ants (and many other organisms). "Off-shore" risk management is now considered the starting-point for biosecurity management by New Zealand and Australia who are recognized world leaders in biosecurity systems. Reducing the risk that a vector presents prior to commodities arriving at the border directly influences rates of new introductions. HAL has actively engaged US Affiliate nations in the Pacific to develop a regional response to the threat of invasive ants by developing and implementing detection surveys, response plans for target invasive ant species and strengthening the biosecurity capacity of Pacific jurisdictions. The funding provided by HISC to the Hawai`i Ant Lab has been used to lever a major grant from USFS ($200,000) for this purpose. 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. In the past year, 102 quarantine officers, conservation staff and forestry employees were trained at 5 locations in Micronesia.

Participants for the invasive ant survey training package in Palau

Standardizing ant surveys at points of entry

Standard Operating Procedures have been developed for points of entry and are now used by the Cooperative Agricultural Pest Survey (CAPS) program. These new operating procedures offer improved survey quality as well as being more efficient. All data are now collected with sample-level GPS co-ordinates for direct entry into the CAPS database and to implement rapid responses to new incursions. For the Island of Hawai`i, HAL staff survey each point of entry twice per year to ensure rapid detection of any new threats.

Maintain international networks within the invasive species and biosecurity community

The State Ant Specialist presented a paper at the 2011 Pacific Branch of the Entomological Society of America at their annual conference held in Kona. An extensive network of colleagues in the Pacific region and mainland USA help Hawai`i to keep abreast of latest threats from invasive ants, new chemicals and treatment methods as well as developments in survey techniques.

2. Preventing inter-island spread of invasive ants

The most serious invasive ant present in Hawaii is the Little Fire Ant (LFA). 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:

Development of ant management systems for fruit, foliage and cut flowers

Recently, the Hawai`i Department of Agriculture Pest Quarantine branch conducted a "blitz" inspection of agricultural products being shipped from the Big Island to neighbor islands. The outcome of this intensive inspection exercise was that many produce items (fruit, flowers and foliage) were found infested with Little Fire Ants. In response, the Hawai`i Ant lab has commenced a large-scale ant management demonstration on a commercial fruit farm near Hilo. New pest management strategies are being developed and tested. The outcome of this research will help develop best-practice guidelines for management of Little Fire Ants on large-scale farming ventures.

Training of Molokai Invasive Species Committee staff.

Following concerns about the potential for spread of Little Fire Ants from the Big Island to Molokai, staff from the Molokai Invasive Species Committee traveled to Hilo where a training package on invasive ant awareness was delivered.

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 have allowed the formulation of an eradication strategy.

Planning for the eradication of this pest from Kauai is in its final stages. Difficulties encountered to date include steep terrain

Image showing part of the area on Kauai infested with Little Fire Ants

over a portion of the site, selection of optimum treatment products, registrant concerns and the proximity of the treatment area to water.

3. Preventing intra-island spread of invasive ants

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, the Hawai`i Ant Lab visits each infested site on a regular basis, monitors, and treats if ants are still present.

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:

- 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.

- Assisted major export nurseries by developing nursery eradication programs for LFA. These nurseries together produce millions of plants per year for export and domestic sale.

- 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.

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:

"Jasmin" from Keaeu, showing the effects of multiple fire ant stings on her eyes

- Provided ongoing ant identification services to the public and industry on ad-hoc basis
- Produced fact sheets with detailed instructions on detecting LFA around homes and instructions on how to control infestations (see www.littlefireants.com)
- Training sessions on ant control methods to Hilo licensed pest controllers.

- 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 Hawai`i Ant Lab. 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
  Keauhou Resort Homeowners Association, Kona, Kona Outdoor Circle, Kona,

  III. The green industry
  Big Island Association of Nurserymen, Hawaii Export Nursery Association, Big Island Golf Course Superintendent Association, Hawai`i Environmental Health Association, Landscape Industry Council of Hawai`i, Hawai`i Island Landscape Association

  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
  Extensive participation and collaboration in the filming of a documentary on LFA impacts in Hawai`i and Tahiti; In 2010, a total of 34 web pages with stories and information on LFA containing the search words "cas vanderwoude" + "fire ants" + Hawai`i.[i]

EMERGING PEST ANT THREATS

*Brachymyrmex obscuria (*Rover Ants)

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 enable 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. No research activities were conducted for this species in 2011

Tapinoma sessile (Maui)

[i] A total of 329 web pages regardless of publication year

A small infestation of *Tapinoma sessile* has been discovered by Dr Paul Krushelnycki (UH) on Maui. This species has the potential to become a major pest species with impacts similar to Argentine Ants. No further activities have been conducted for this species in 2010.

RESEARCH

Improved and extended the range of chemicals suitable for control of arboreal ants and ground treatment in high rainfall locations.

Improved and simplified the adjuvants used in arboreal treatment projects.

Developed additional application tools that allow bait to be applied to trees without the need for climbing.

Published in the Proceedings of the Hawaiian Entomological Society describing and documenting the eradication of Little Fire Ants in Maui. http://scholarspace.manoa.hawaii.edu/bitstream/handle/10125/19914/PHES-Vanderwoude-42_23-31.pdf?sequence=1

Currently evaluating the palatability of commercially available ant baits in Hawai`i.

In progress:

- Co-PI on a study to measure the economic impacts of LFA in Hawaii (TStar grant, no salary)
- Developing and testing new dis-infestation systems for potted plants
- Studying the impacts of Little Fire Ants on Hawaiian forest ecosystems
- Large scale demonstration project on controlling Little Fire Ants in orchards.