Hawai`i Ant Lab:
Summary of activities funded by Hawai`i Invasive Species Council, calendar year 2015

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Background

The Hawai`i Invasive Species Council provided Hawai`i Ant Lab $289,268.00 for invasive ant activities in 2015 calendar year. This report summarizes outcomes for the reporting period 1 January to 31 December 2015. Some activities were partially funded by levering funds from other agencies and it is not possible to dis-entangle these activities.

DELIVERABLES AND MEASURES OF EFFECTIVENESS

General measures of effectiveness (metrics)

- Number lures deployed and identified in surveys
- Number of public enquiries received
- Number of ant samples identified
- Website use – analytics and visitor statistics

A total of 901 enquiries were received by telephone, email and physical office visits for the reporting period, and 704 publically submitted ant samples identified. A total of 43,070 lures were deployed (see table below) and 43,774 samples identified.

Sample source	site	Number of vials

Public submissions	Hilo lab	704
Point of entry surveys	8 surveys total	2,843
Oahu	Nursery survey	25,340
	Mililani Mauka	3,100
	Waimanalo	4,175
Maui	Huelo, Nahiku and Haiku	235[1]
Kauai	Kalihiwai	7,004[2]
Big Island	Waipio	1373
	Naalehu	97
total		43,774

The littlefireants.com website had 8,781 site visits. However, many web "hits" last a short period and the visitor does not interact with the site by viewing other pages or downloading files. This is known as a "bounce". After removing these visits, 7,874 site visits were recorded. Visitors located in the state of Hawai`i comprised 71% of all visits (5,315) with the majority of these from Hilo (2,579) and Honolulu (1,283).

Website statistics have been recorded by HAL since April 2011. Since that time, the www.littlefireants.com website has experienced over 40,000 visits; 26,410 from all Hawai`i and 12,215 from Hilo. After adjusting for the bounce rate and repeat visits, there have been 5,095 unique visitors from the Hilo urban area. Assuming the average household has a single IP address (with possibly multiple computers in a single household), 33% of occupied dwellings in Hilo have visited the website since 2011.

Summary of speaking engagements, displays, etc

During 2015, a total of 34 presentations were given which educated approximately 766 people about Little Fire Ant prevention and control. Presentations were held for residential groups throughout the Big Island. The agricultural sector was also targeted with presentations given to groups, such as: Banana Growers Association, Hawai'i Farmers Union United, and at the Papaya Growers Annual Meeting. Other targeted groups included: school children and their parents, small plant vendors, and the Department of Education maintenance staff.

During 2015, a total of 16 booths were set-up which reached out to approximately 850 people about Little Fire Ant prevention and control. Booths were set up at events targeting residents and industry, such as: Kona Coffee Growers Association Expo, Avocado Festival, Big Island Association of Nurserymen

[1] An additional 12,000 samples were collected and identified by MISC.
[2] Joint survey with KISC.

Plant Shows, University of Hawai'i Hilo Earth Day, Kau Coffee Festival, Kona Horticultural Conference, Hawai'i Farmers Union United Convention, and at farmers markets throughout the Big Island.

Training

HAL conducts an ant management clinic on the last Friday of every month. This is a full day class that covers ant biology, pesticide safety, bait application and the use of other barrier pesticides. The classes are limited to 20 people. Eleven clinics were conducted during 2015 with a total of 249 participants attending.

Preventing intra- and inter-island spread

LFA have been recorded at every point of departure from Hawai`i Island. These infestations increase the risk of transporting LFA to neighbor islands, the US mainland and uninfested locations within Hawai`i island. During 2015, HAL responded to these detections by increasing survey frequency and implementing mitigation procedures when LFA were detected.

The most severely infested site is the Hilo domestic air terminal. Here the entire car park and front check-in area is infested. There are several smaller infestations at Hilo sea port. Additionally, very small loci have been identified at Kona airport and Kawaihae sea port.

The Hilo points of departure were surveyed three times during 2015 and the west Hawai`i sites on two occasions each. Regular treatment operations are now conducted at Hilo sea port and airport as well as Kona airport.

LFA West Hawai'i

HAL has worked in partnership with County of Hawai'i to increase awareness levels in west Hawai'i. The activities reported in this section were implemented using funds from HISC and the county of Hawai`i.

This project commenced in 2014 and ended June 2015. During 2014, Awareness activities included nine booths and presentations targeted to residents and industry in west Hawai`i (see table below). Website visitation from Kona, as a percentage of visitation from Hilo increased from 7% in 2013 to 15% in 2014. This increase was maintained at 13% in 2015.

Date	Group	Type of outreach	# people
1/29/2015	KS Land Managers	Presentation	30
1/30/2015	Kona Coffee Growers Association Expo	Booth	50
2/5/2015	West Hawai'i Master Gardeners	Presentation	20
2/21/2015	Avocado Festival	Booth	50
2/24/2015	Kona Innovations Charter School/Public	Presentation	10
4/14/2015	Hawai'i Farmers Union – Hawi Chapter	Presentation	30
4/23/2015	Kealakehe Science Day	Booth	100
5/2/2015	Kau Coffee Festival	Booth	50
5/18/2015	Kona Lions Club	Presentation	30

LFA Oahu

The operational response to the discovery of LFA on Oahu began in May 2014. During FY15 the following outcomes have been achieved[3]:

- 96 site surveys (nurseries and garden centers) (25,340 samples)
- 4 post treatment monitoring surveys (7,875 samples)
- 24 acres treated (cumulative)

LFA Maui

Two new infested sites were discovered on Maui after the funding proposal was written. The sites span approximately 26 acres in total. During the 2015 calendar year, the following outcomes were achieved on Maui:

- Seven treatments applied to Huelo and Nahiku sites (Feb 10, Mar 24, Apr 28, June 16, Sept 8, Oct 20 and Dec 1).
- Two treatments applied to the Haiku site.
- 235 survey points (Nahiku, Haiku and Huelo)[4].

LFA Kauai

Between January and December, 2015 total of 4.7 acres of the Phase I Little Fire Ant treatment area at Kalihiwai was treated 6 times using a combination of granular bait, HAL Gel bait with Provaunt, and Talstar where appropriate. Total treatment area per treatment varied based on LFA hot spots detected during post treatment monitoring surveys and whether or not the hotspots were near a potential LFA "haven" such as a mulch pile or tall palm trees. The entire Phase II treatment area consisting of approximately 2 acres was treated using the HAL Gel bait with either Tango or Provaunt 5 times between January and June 2015, and 0.16 ac was treated in September 2015 during a single spot treatment following the first post treatment monitoring event. A total of 6033 ground samples and 175 tree samples were collected throughout the Phase I treatment area and 796 ground samples from the Phase II treatment area in 2015.

HAL staffer treating for LFA on Kauai

[3] Jointly funded by HISC and the US Forest Service
[4] Additional survey efforts provided by MISC

Table: survey effort for Kauai LFA.

	Phase I	Tree Samples	Phase II
Jan	1781	53	
Feb	705	48	317
Apr	957	13	
May	627	31	
Jun	1042	30	
Sep	921		479
Total	**6033**	**175**	**796**

Table: treatment details for Kauai eradication

	Phase I		Phase II	
	acreage treated	product	acreage treated	product
Jan	4	Talstar/Probait	2ac	Tango
Feb	2.89	Talstar/Probait	2ac	Provaunt
Apr	3.23	Amdro	2ac	Provaunt
May	2.98	Provaunt/Amdro	2ac	Provaunt
Jun	2.24	Amdro	2ac	Provaunt
Sep	4.7	Provaunt	0.167	Provaunt

Ant management on public lands

HAL worked with their partner (County of Hawai'i) to develop and implement a management plan for beach parks and other public land in east Hawai'i. As a result of the pilot program, the county of Hawai`i established an LFA treatment team which now maintains all infested beach parks and public lands in the county[5].

Community eradications (Naalehu and Waipio)

Naalehu:

The approximate treatment area in Naalehu is 7 acres. A total of 8 treatments have been completed; 2/28/2015, 3/12/2015, 5/23/2015, 7/11/2015, 8/15/2015, 9/19/2015, 11/7/2015, and 12/19/2015 with assistance from the local community, Big Island Invasive Species Committee and the Nature Conservancy. Spot treatments may be recommended based on the results from the post treatment survey scheduled for February 2016. The only survey conducted in 2015 was of a nearby canal where 97

[5] Additional funding provided by Hawai`i Tourism Authority

ant samples were collected and analyzed. LFA were detected in these samples, and project area was expanded to encompass this area.

Waipio:

The approximate treatment area in Waipio is 6 acres. A total of 4 treatments have been completed; 7/18/2015, 8/29/2015, 10/10/2015 and 11/21/2015 with assistance from the Waipio community and Hawai`i Department of Agriculture. A delimiting survey was conducted on 5/18 and 5/19/2015. Subsequent surveys were conducted prior to treatment on the above mentioned dates. A total of approximately 1,335 ant samples were collected and analyzed during these surveys. Still detecting positive LFA samples.

Ant management clinics and workshops

Demand for attendance at the one day workshops continues to increase. HAL conducts an ant management clinic on the last Friday of every month. This is a full day class that covers ant biology, pesticide safety, bait application and the use of other barrier pesticides. The classes are limited to 20 people. Eleven clinics were conducted during 2015 with a total of 249 participants attending. Demand for attendance at the one day workshops continues to increase.

Left: HAL staffer Matt Kema demonstrates the use of gel baits for LFA control. Right: HDOA pesticide education specialist Derek Shigematsu explains safe pesticide use to participants.

Research program

Research efforts for 2015 focused on revising and finalizing a journal paper for publication, conducting laboratory and field bioassays and compiling the results into a second publication. "Palatability of baits containing (S)-methoprene to *Wasmannia auropunctata* (Hymenoptera: Formicidae)" was published in July 2015. The paper discussed observed repellent properties of (s)-methoprene to Little Fire Ants and described an attractive homemade bait recipe formulated to mask the presence of (s)-methoprene.

New research focused on examining the effects of laboratory rearing diet on the response of laboratory reared ants to non-toxic food baits in palatability taste test experiments. Experimental ant colonies were fed a standard diet of pureed crickets, beef hash, whole eggs, and vitamins in agar and recruitment to non-toxic protein, lipid and carbohydrate baits was measured. Colonies were then randomly assigned one of 4 diets which they remained on for 4-5 weeks. Recruitment to the same non-toxic baits was measured weekly and compared. The same non-toxic baits were placed in the field where ant recruitment was measured under natural conditions and the results from which were used for comparison against results from laboratory trials. The aim of this research is to identify factors influencing bait taste tests in the lab and develop standard operating procedures for ant rearing which minimize variation in foraging behavior between laboratory reared and wild ants. This study consisted of 2 laboratory and 2 field experiments. The data for these experiments are currently in the process of being analyzed and a journal paper reporting on the findings is in progress.

Alternative methods for dis-infesting potted plants were also tested[6]. Current methods approved by HDOA require restricted-use pesticides not available to many nurseries. HAL tested several non-restricted pesticides as well as an organic alternative. Further testing will be conducted in 2016 to refine this methodology.

[6] Additional funding provided by HDOA