

Little Fire Ant

Wasmannia auropunctata

Hawaii Status Summary February 2015





This report was compiled by the Hawaii Invasive Species Council (HISC) in partnership with the following agencies:

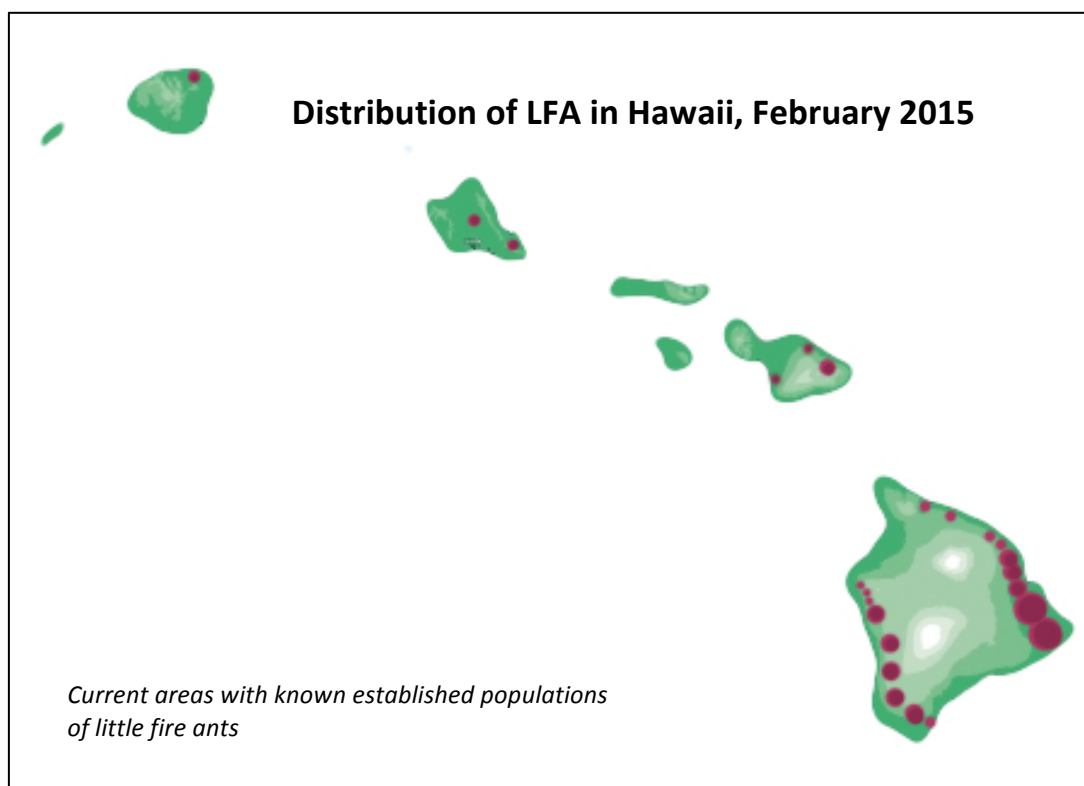
- Hawaii Ant Lab (HAL)
- Hawaii Department of Agriculture (HDOA)
- Hawaii Department of Land and Natural Resources (DLNR)
- Coordinating Group on Alien Pest Species (CGAPS)
- Oahu Invasive Species Committee (OISC)
- Maui Invasive Species Committee (MISC)
- Molokai Invasive Species Committee (MoMISC)
- Big Island Invasive Species Committee (BIISC)
- Kauai Invasive Species Committee (KISC)
- University of Hawaii (UH)
- Oahu Army Natural Resources Program (OANRP)
- US Fish and Wildlife Service (US FWS)

The information provided within this report was primarily collected at a statewide little fire ant planning (LFA) meeting held on December 18, 2014

This document is intended to provide a broad overview of LFA status statewide including prevention, early detection, management, and outlining of current gaps and resources needs. It may not be completely comprehensive of all LFA activities in Hawaii

Executive Summary

Little Fire Ants (LFA) are a devastating and costly invasive species currently moving and established throughout Hawaii. They cause painful stings, are linked to blindness in pets, and significantly threaten local food security by making farmlands less productive and unworkable. It is estimated that the damages from LFA on Hawaii Island alone could be in excess of \$100 million annually over the next 35 years if funding is not sustained for current programs. To deal with this pest will require strong biosecurity, efficient early detection and rapid response programs, and the kokua of business and the general public to stop the ants in their tracks.



This report outlines the current status of LFA on each island as well as the primary resources needed to continue fighting this pest. Each island must maintain its current capacity within the state agencies primarily the Department of Agriculture (HDOA) and the Department of Land and Natural Resources (DLNR) as well as the response and outreach capacity from the Hawaii Ant Lab (HAL) and Island Invasive Species Committees (ISC). There are key positions needed to increase capacity and address critical gaps including a dedicated outreach specialist on Oahu and an LFA coordinator on Maui. Additionally, HDOA is proposing a compliance agreement program (CAP) with industry to significantly increase the overall biosecurity of Hawaii. New pilot projects that have the ability to greatly increase effectiveness include establishment of a HAL survey program on Oahu, training detector dogs, and working with local communities to empower them to eradicate LFA given the right information and resources.

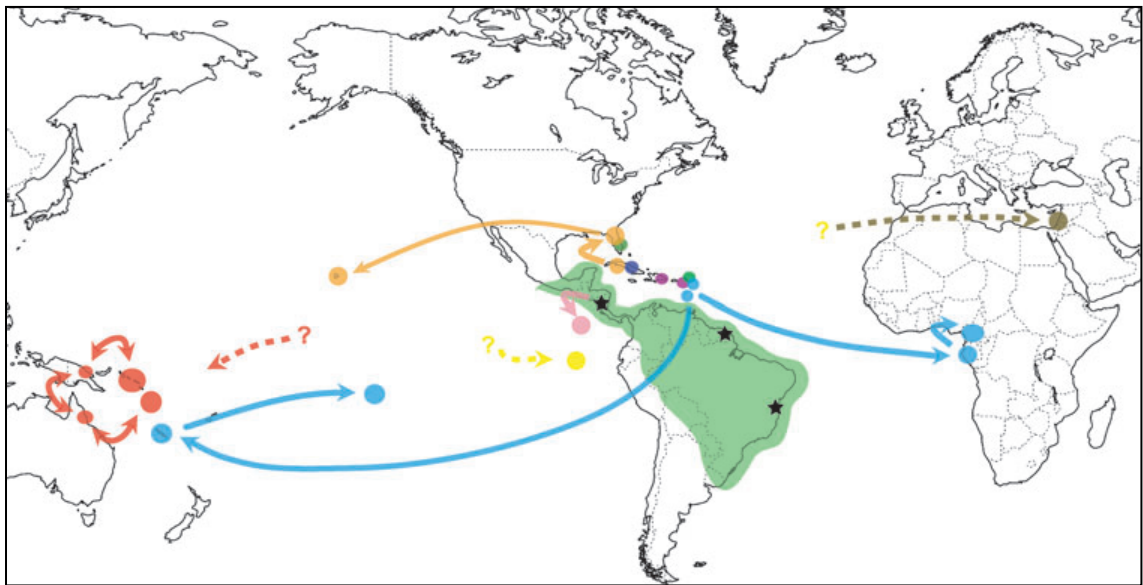
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I. Brief History and Introduction

Wasmannia auropunctata, or as they are commonly known in Hawaii, little fire ants (LFA) are native to Central and South America. They were first documented moving around the globe in the early 1900s, with the first known invasions occurring in Africa in 1914, Florida in 1924, and the Galapagos in 1935. From the early 1970s through present, LFA have been spreading and wreaking havoc throughout the Pacific Islands region. They have significant environmental impacts including threatening native and endangered species and ecosystem altering effects by outcompeting and replacing high percentages of native insect fauna. Additionally, they have devastating impacts on human populations by making lands unlivable and unworkable for agriculture, inflicting painful stings that can lead to more serious infection, and blinding pets.

Because LFA reproduce clonally (daughters of queens are clones of her and sons of queens are clones of the father) researchers have been able to track the movement of clonal lines and discover that LFA dispersal is linked to major shipping and transit routes as well as establish that there have been less than 5 separate introductions into the Pacific Region. This image shows the movement of clonal lineages worldwide:



From: Foucaud, J. Orivel, J. Loiseau, A. Delabie, J.H.C. Jourdan, H. Konghouleux, D. Vonshak, M. Tindo, M. Mercier, J. Fresneau, D. Mikissa, J. McGlynn, T. Mikheyev, A.S. Oettler, J. and Estoup, A. (2010). Worldwide invasion by the little fire ant: routes of introduction and eco-evolutionary pathways. *Evolutionary Applications*. 1-13

LFA were first detected in Hawaii on the Big Island in 1999 at a nursery in lower Puna. Initial delimiting work revealed that upon discovery the ants were already widespread throughout the Puna and Hilo Districts. At this time very little was known about the impacts of the species and even less about its biology and control. Also in 1999, HDOA trace-forwards located an infested shipment of palms on Kauai near Kalihiwai beach. This site was quickly treated with Amdro ant bait and no additional ants were observed

in months of follow-up surveys. Throughout the early to mid 2000s, LFA continued to spread through windward Hawaii Island. The Hawaii Department of Agriculture (HDOA) worked to contain the spread as resources (funds and staff) allowed. Staff were hired to develop a Hawaii Ant Plan, and additional staff began working on applied research resulting in clearly demonstrating that conventional treatments were not effective on LFA as well as the development of new treatments for tropical agriculture. In 2007 the Invasive Ant Management Conference was held in Kailua-Kona. In 2008-9, HDOA and HISC funded a new ant specialist position based in Hilo and appointed Dr. Cas Vanderwoude to conduct applied research and assist the public and industry. This position led to the development of the Hawaii Ant Lab (HAL) which today provides monthly workshops to help the public living in infested areas, leads control work statewide, and continues to develop cutting edge control methods. In 2010, LFA was detected at multiple sites in west Hawaii Island.

In 2004, it was discovered that the initial infestation thought to have been eradicated in 1999 on Kauai had only been controlled to undetectable levels and over the past 5 years had spread to cover up to 10 acres. Despite not having effective treatment methods available at the time, HDOA and KISC managed to contain the infestation and at present it is still being monitored and treated with the goal of eradicating the ants from Kauai.

In 2009, HDOA discovered LFA on an organic mixed crop farm on Maui. MISC immediately formed a multi-agency task force including HDOA, County of Maui, USGS, Starr Environmental, and HAL and led outreach and delimiting efforts. Over the course of the next few years and with cooperation from the landowner the task force succeeded in eradicating LFA from this site.

In December of 2013, LFA was again discovered on Maui, this time in infested hapuu logs shipped from the Big Island. HDOA immediately conducted trace backs, which revealed that infested material was sent to Oahu, Maui, and Lanai. Through trace forwards, HDOA attempted to survey and treat any infested suppliers and material. Throughout 2014, MISC continued surveys to locate possible incipient colonies and treat the areas of initial discovery. In September 2014, a MISC Miconia field team found a large infestation of LFA in Nahiku. This is the largest infestation on Maui to date and is in very challenging terrain. MISC, HDOA, and HAL along with other partners are currently in the planning and early implementation stages of control for this site.

Through the trace backs conducted in December 2013, LFA infested material was also found on Oahu. HDOA organized a multi-agency incident command to address the issue. Partners in the effort include OISC, HISC, DLNR, TNC, US FWS, UH, OANRP and others. The IC team surveyed and treated all known material and increased island wide survey efforts in priority areas. In January 2014, surveyors located an established infestation in Waimanalo and in June of the same year a report from a concerned citizen led the team to an additional infestation in Mililani-Mauka. Immediately upon finding these sites, the IC team created treatment plans led by HAL, which are in process now.

II. Prevention

A comprehensive biosecurity program preventing invasive species from moving is the most cost effective method to protect people and the environment from their devastating impacts. The HDOA Plant Quarantine (PQ) Branch has the primary kuleana within the state for preventing the movement of invasive species. Chapters 150A and 4-72 of the Hawaii Administrative Rules (HAR) provide authority and the regulations to HDOA PQ for inspection of commodities going between islands and specifies inspection requirements for plants and propagated plant parts. There are currently a total of 73 inspectors statewide and an additional 20 vacant positions. Due to the limited number of staff there are many gaps in state biosecurity, including no night shifts in Honolulu or Maui, no inspections of private yachts, limited monitoring of air passengers, and limited inspections of intrastate commodities.

Following the discovery of LFA infested hapuu moving throughout the state, HDOA PQ completed an increased inspections project to determine the highest risk pathways and commodities on which LFA are moving. The inspections focused primarily on air cargo with some sea cargo included as well. Initial results showed that LFA are moving on non-propagative materials such as cut flowers and produce. However, plants were largely underrepresented in the survey so a more thorough review of all commodities would result in a more complete picture of risk. This initial project was dependent on very limited manpower availability with inspectors often working overtime to complete increased inspections

In order to have effective biosecurity, all those involved in moving commodities must kokua and be a part of the solution. HDOA PQ is proposing a compliance agreement program (CAP) to work with industries to ensure that only clean goods are moving within and out of the islands. The program would work with industry to help them follow best management practices and provide approved treatments prior to the shipment of commodities, making the process more efficient and beneficial to business while increasing the biosecurity of the state. The first step is to have the program passed into law by the state legislature, after which, HDOA would go through a public rule making process to set up the details of the program. To implement the CAP, HDOA would request an additional seven inspector positions to ensure the infrastructure is in place to support it.

In addition to approval and implementation of the proposed CAP the greatest need for statewide biosecurity is more staff. One significant hurdle is the slow state hiring process, which creates a backlog of unfilled positions. This process needs to be reviewed and streamlined to allow agencies to bring on staff in a more efficient manner. The agency also needs support to increase the number of positions overall so that there are enough staff to complete the critical task of safeguarding our points of entry and exit.

III. LFA Status by Island

Kauai

a. Status of LFA and Current Management Activities

There is only one known infestation near Kalihiwai beach. This site was first detected in 1999, and after initial treatments thought to have been eradicated. However, LFA were again detected at the same site in 2004 and discovered to have spread over up to 10 acres. HAL, HDOA, and KISC are currently partnering to monitor and treat this area. One of the main challenges is the terrain of this site which includes a steep cliff face on which LFA occur. All 3 agencies provide staff support for the treatment and monitoring program. Additionally, HAL provides identification services for ant samples from Kauai. KISC is the primary provider of LFA outreach.

b. Management Objectives

- Island-wide eradication. With current level of control, this may be possible within 3 years
- Continue early detection through sustained surveys at high priority areas
- Increased public outreach

c. New Management Activities/Projects in Development

None at this time, primary focus is sustaining current program.

d. Ongoing and Anticipated Resources Needs

To achieve the management objectives, the current core capacity must be sustained. This includes the HAL program and staff support, KISC field crew and outreach staff, and HDOA assistance.

Oahu

a. Status of LFA and Current Management Activities

There are currently two known established populations of LFA on Oahu: (1) roughly six acres in Waimanalo on primarily agricultural and natural areas and (2) four acres in a residential neighborhood in Mililani-Mauka. Property owners at both sites have been extremely cooperative in allowing access and providing needed habitat modifications to support control activities. Upon discovery of each site, HAL immediately developed a treatment schedule and HDOA coordinated with property owners so that activities could begin quickly. IC partners assisted with delimiting surveys and continue to provide support for the ongoing treatments. The control work is primarily being conducted by HAL, HDOA, and OISC. Additionally, the IC has established a multi agency outreach group that has coordinated outreach to schools, the general public and targeted stakeholders such as plant industry and enthusiasts. To date, the outreach group has participated in over 80 programs reaching over 5,000 people since February 2014. The IC has also initiated a priority survey program to search for LFA at high-risk sites and has completed over 140 surveys since March 2014. Ant identification on Oahu is provided by HDOA, and can be supported by UH and HAL if samples submitted outpace capacity.

b. Management Objectives

At this time it is considered highly likely that LFA will continue to arrive on Oahu and that there are other established populations on the island that have not yet been detected. Based on this reality there are 3 primary objectives:

- Eradication of two currently known infestations
- Establish and maintain sustained survey program for early detection and rapid response
- Increased public outreach

c. New Management Activities/Projects in Development

US Forest Service funds are being used to establish two new HAL staff positions to be based on Oahu with the primary objective of developing a management strategy for the island with a focus on early detection surveys at high risk sites

CGAPS has secured funding from the Hauoli Mau Loa Foundation and will partner with MISC for an LFA dog detection pilot project for both Oahu and Maui (*described further in Maui Nui section c*)

d. Ongoing and Anticipated Resources Needs

Sustained support for HAL, HDOA, and OISC core functions related to LFA are required to meet the management objectives. For effective long-term management the new Oahu-based HAL program will require sustained funding.

The primary gap for Oahu-based LFA management is dedicated outreach support. The IC has determined that at least 1 full time staff person is needed to coordinate and sustain outreach to Oahu's over 900,000 residents.

Maui Nui

a. Status of LFA and Current Management Activities

MISC in partnership with HDOA continues to survey and control the very small infestations located following the discovery of LFA movement from Big Island on hapuu logs in December 2013. These include several retail stores, the Andaz Maui at Wailea and nearby South Maui Condominium. Additionally, HAL is working to develop a control plan for the largest known infestation in Nahiku, which will be implemented by HAL, MISC, and HDOA; the first round of treatments began in January 2015. Initial treatments will focus on reducing the risk of spread and alleviating property owner impacts while the team continues to plan for how they will address the rugged terrain in the invaded natural areas. In January 2015, a resident reported a stinging ant in Huelo and it was confirmed as LFA. Delimitation has determined the infestation spans five to seven properties, an estimated three acres. There was also a recent find at single property in Haiku. MISC will work with HAL to develop control plans for these new sites. On Maui, the MISC Early Detection Team and HDOA provide ant identification services. Maui County is also actively engaged and provides resources towards these efforts.

b. Management Objectives

- Eradication of the very small, isolated populations and new finds at Huelo and Haiku
- Long term control to eradicate the infestation at Nahiku
- Continue surveys at high risk sites, prioritizing East Maui
- Continued public outreach
- Implement dog detection pilot

c. New Management Activities/Projects in Development

MISC received HISC funding in FY15 to implement a dog detector pilot program. They will partner with CGAPS to combine efforts and resources and are working with an Australian team with proven success. The rough timeline is for the dogs to be in place by mid-year, they will have a training period and then begin working in real world scenarios by the end of 2015 on both Maui and Oahu. This project is a pilot for proof of concept to support additional resource requests if successful.

Continuation of control plan development for Nahiku, Huelo, and Haiku

d. Ongoing and Anticipated Resources Needs

Sustained support of MISC, HAL, and HDOA are critical to continue efforts to locate, control and eradicate LFA from Maui.

As the story of LFA on Maui rapidly evolves, more resources are required. An LFA coordinator position is needed to facilitate effective partnerships, and manage the detection and control programs

e. Molokai and Lanai

LFA has not been detected on Molokai. Molokai, primarily through MoMISC, is actively surveying priority sites. There is also an intermittent hire working with school groups to implement student home surveys. One pathway of high concern for Molokai is private boats that move between the islands. More support is needed for inspection to ensure that LFA is not spread to this island.

During the trace forwards on hapuu shipments in December 2013 and January 2014, USDA APHIS staff detected LFA on Lanai in a location where infested hapuu had been planted. Pulama Lanai took on the responsibility to treat and monitor this limited area. Additionally, they have been provided with survey, treatment, and prevention information about LFA, but little is known regarding ongoing prevention/detection activities that may occur. HDOA staff are working to increase communications with this organization.

Hawaii Island

a. Status of LFA and Current Management Activities

At the time of its discovery near Hilo in 1999, LFA were already widespread and very little was known about the potential impacts, its biology, and how to manage them effectively. LFA have continued to spread throughout Hilo district,

there is a small-isolated population in Waipio Valley and they are being detected more and more on the Kona coast. HAL provides critical support to homeowners through monthly control workshops as well as guiding the county on efforts to reduce LFA in public areas. HAL provides many additional resources, as does UH extension, for both homeowners and business.

b. Management Objectives

- Slowing the spread of LFA across the island
- Continued assistance to manage LFA to tolerable levels
- Work with affected industry to minimize impacts and interisland spread
- Continued outreach

c. New Management Activities/Projects in Development

In FY15 Hawaii County received HISC funds to implement targeted LFA control at public parks. Additionally, the County has a grant to increase outreach by producing PSAs to be shown island wide

HAL received FY15 HISC funds to implement two community-based management pilot projects. These projects will focus on small isolated LFA infestations in communities to demonstrate that local community led eradications are possible if the resources and support are available. They also have Farm Bill funds for outreach and work with farmers markets

HAL is working in partnership with HDOT to survey points of exit extensively

d. Ongoing and Anticipated Resources Needs

A recently released study from UH in collaboration with HAL estimated that an expenditure of \$8 million over the next 3-5 years followed by sustained programmatic support for prevention, monitoring, and treatment would yield \$1.210 billion in reduced control costs and \$129 million in lowered economic damages over 10 years. Sustained support for the HAL and the County projects is critical to continued progress on the management objectives.

IV. Summary of Resource Needs

In order to effectively protect Hawaii from continued and increased spread of little fire ants, HDOA needs the ability to quickly and efficiently fill vacant positions as well as support for additional position requests to increase the number of inspectors statewide. Prevention is the most cost effective measure against invasive species and effective biosecurity will save millions in control and management costs. Support for the newly proposed Cooperative Agreements Program is critical to establish a framework for public/private partnerships to be more effective in this fight.

The next most cost effective line of defense is early detection and rapid response. It is imperative to quickly address the small, established LFA infestations on Kauai, Maui, and Oahu. Early eradication will prevent the enormous economic, environmental, and public health costs that will result if they become widespread. Sustained funding for

HDOA and HISC, which supports HAL and the Island ISCs, is crucial to this success. They must be able to maintain the level of work being done at this time. Additionally, there are critical gaps to be addressed. New positions needed include an LFA outreach specialist on Oahu, and an LFA coordinator on Maui. There are also new programs that have temporary funding but will require consistent funding to be effective in the long term, this includes two new HAL staff to initiate full scale LFA surveys on Oahu and a pilot dog detection program which if successful could dramatically increase effectiveness in finding LFA while significantly reducing the costs.

The widespread infestations on Hawaii Island require that funding for ongoing maintenance control be maintained long term. This includes support for the HAL and the new County management programs at public parks.

V. References

- Lee, D.J., Motoki, M., Vanderwoude, C., Nakamoto, S.T., Leung, P., 2015. Taking the sting out of Little Fire Ant in Hawaii. *Ecological Economics* 111, 100-110.
- Motoki, M., Lee, D.J., Vanderwoude, C., Nakamoto, S.T., Leung, P., 2013. A bioeconomic model of Little Fire Ant *Wasmannia auropunctata* in Hawaii. Pacific Cooperative Studies Unit Technical Report #189 (accessible at <http://manoa.hawaii.edu/hpicesu/techr/186/default.htm>)