

– NO ANTS HERE! –
Plant Vendor Training
Disinfesting potted plants before sale



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Why am I doing this?

This all seems like a waste of time doesn't it? Maybe there are ants in my plants and maybe not – who really cares! They don't seem to harm my plants anyway. All of a sudden, the market organizers want me to make sure there are no Little Fire Ants in the plants I sell.

Well, there are some really good reasons for you to be selling “clean” plants. Little Fire Ants (*Wasmannia auropunctata*) do not belong here. Once they become established at a new site, they rapidly spread causing huge problems for people, pets and the environment. They live in trees and other vegetation – and when disturbed, they fall onto whoever happens to be underneath. They will become entangled in people's clothes and the fur of domestic pets where they become alarmed and start to sting people. Once they spread throughout a property, they start coming into homes, stinging people even while they sleep! Little Fire Ants especially love to live on fruit trees, bananas, coffee and palms. If a home owner or farmer tries to harvest their fruit, they get stung repeatedly, causing gardening and being outdoors to become a misery. Do you want that for your customers? Do you want to be responsible for them getting Little Fire Ants?

I want to do the right thing for Hawaii

Hawaii is a beautiful place – no poisonous spiders, no snakes, no nasty things biting and stinging us. And we want to keep it that way – don't we? Little Fire Ants are spreading throughout the island and have even made it to Kauai and Maui. Most of this spread is caused by people buying potted plants, landscaping material and mature trees that are infested with LFA.

I want to do the right thing for my customers

My customers buy plants from me because I grow great stock and sell them at a good price. I do not want them to get a nasty surprise when they bring my plants to their home only to find out later that they also brought LFA home as well.

I want customers to buy from me

People are becoming more cautious about buying plants at markets and they are concerned about LFA. By demonstrating I am aware of the problem and by doing something about it I will have a marketing advantage over other plant sellers. People will want to buy my plants in preference to those of other sellers.

Introduction

This training manual is designed to provide you with some basic information about Little Fire Ants (*Wasmannia auropunctata*) and explain some of the methods that can be used to manage them in potted plants. Remember, no control method is perfect and there is always a small chance that LFA could survive treatment. I hope you find this information useful.

The ant management system is comprised of three parts:

- Surveying and/or treating your nursery for LFA,
- Treating any plants you take to the market
- Placing a baited chopstick on the soil surface of each plant so customers can see for themselves whether the plants have LFA or not.

Instructions for doing this and some information on Little Fire Ants are presented in this manual for you. By following these simple measures, not only will you increase your sales, you can be confident you are not giving your customers a nasty surprise when they get home.

Part 1: The ant control cook-book

Controlling LFA at your nursery

Whether you have LFA or even if you do not, applying a granular bait in and around your nursery will either help to reduce the ant problem or prevent LFA from getting established.

Bait ‘em first, then blast em!

A combination of baiting, foliage sprays and barrier treatments will give the best results. However, its VERY important that these are done in the right order! Always bait first, then wait a week before using sprays and barrier granules

Baits

- Ant baits are an attractive food laced with a toxin. Ants harvest this food and take it back to the nest where it shared with the rest of the colony. Once the toxin takes effect most or all of the ants are killed. Baits are the recommended treatment because it is very effective and also minimises use of pesticides.
- Baits are the front-line tool for ant control and should be spread throughout lawns gardens and other open spaces. Some baits can not be used inside orchards or vegetable gardens – read the product labels to be sure you are using the right baits for the right situation.
- Baits become unattractive to ants when they get wet from rain or irrigation. Remember, the baits need to be taken by the ants back to the nest and shared with the rest of the colony. No-one likes a soggy lunch, so be sure to spread baits when the soil is dry and on days when fine weather is expected.

Barrier treatments

- Barrier treatments are insecticides that are sprayed or sprinkled around areas where ants are to be excluded. Some barrier treatments are granular and can be applied to soil and turf. As ants and other insects crawl over the treated areas,

- they come into contact with the toxin and are killed. Barrier treatments usually have a residual activity and can provide protection for many months.
- It is not a good idea to apply a barrier treatment at the same time as a bait because, the ants carrying the baits back to the nest will be killed and the colony might survive. Always apply the barrier treatment at least a week or so AFTER you have applied baits.
 - The chemicals in barrier treatments need to stick to the soil particles for them to work and the best time to apply these products is when the ground is wet. This helps the binding process needed for the chemicals to work. If the soil is dry when you want to apply these products, you can wet the ground with a garden hose or sprinkler first.
 - The more ground you treat, the better the effect of a barrier treatment. However, if you want to limit your use of chemicals, you can just sprinkle or spray those parts of your lot where you want the most protection such as around the home and the lawn areas used by people or pets.

Safety precautions

ALWAYS read the label of the product you buy very carefully to make sure your plant species and situation is listed.

Follow **ALL** safety directions on the label.

ALWAYS make sure to keep other people and pets away from the treated plants until they are completely dry

Some suitable baits for Little Fire Ants

Product name	Active ingredient	EPA registration number
AmdroBlock	Hydramethylnon	73342-2
Amdro Pro	Hydramethylnon	241-322
Amdro Firestrike	Hydramethylnon + S-methoprene	73342-6
Extinguish Plus	Hydramethylnon + S-methoprene	2724-496
Extinguish Pro	S-methoprene	2724-475

Some suitable barrier treatments for Little Fire Ants

Product name	Active ingredient	EPA registration number
Ortho Home Defence Max	Bifenthrin	279-3240-239

granules		
Ortho Home Defence ready to spray	bifenthrin	239-2698
Triazicide Once and Done Insect Killer Granules	Alpha-cyhalothrin	9688-181-8845
Triazicide Once and Done Insect Killer Spray	Alpha-cyhalothrin	9688-195-8845

Treating infested plants

Potted plants make a great habitat for Little Fire Ants. Often you can not see them because they hide in the foliage or in the potting mix but nevertheless, they are there. If you move or sell these plants, there is a good chance the recipient will get a nasty surprise when they bring the plant to their home. Once at their new home, the ants will sneak out of the plants and rapidly spread throughout the new property.

Be a good vendor and treat your plants before you move them to make sure you are not spreading Little Fire Ants at the same time. Follow the simple instructions below to ensure you are only moving ant-free plants!

Potted plants can easily be sprayed and drenched with readily available products available from your local chemical supply store. A list of suitable chemicals is provided at the end of this fact sheet. These contain carbaryl as the active ingredient. They are effective as foliar sprays as well as drenches. Chemical supply stores sell carbaryl in gallon containers and larger. This is the cheapest way to buy chemicals.

Preparing plants to take to the market

The most convenient way to treat your plants is to load them onto your truck or trailer the day before the market. Once the plants are loaded, you have quarantined them from the other plants and ants that might be present in your nursery or surrounds. Now you can treat them in preparation for moving and the chemicals will have a chance to dry before you move them. You will need to spray AND drench the potting medium. If the plants remain unsold and are brought back to your nursery, you will need to treat them again before taking them to the next market.

Drenching plants

Often, Little Fire Ants will make nests in soil or potting medium of potted plants. You may not always be able to see them there, so its best to treat them regardless if you think they have LFA. Mix the indicated rate of Sevin per gallon of water and gently water the soil of your pot plants until all the soil is wet. A small pump-up sprayer works well for this – just take off the nozzle and spray the carbaryl mixture into the pot until it starts to run out the bottom. Do your best to make sure all the potting medium is wetted.

If you prefer to treat the plants before loading, it is safest to stand them on benches so that the soil underneath can absorb any excess mixture. You must treat your plants 12-24 hours before taking them to the market. Always read the product label carefully and follow all safety precautions.

Foliar sprays

Spray the plant foliage until the entire plant has been wetted. It is important to make sure any cracks, crevices and hollows are wetted as this is where Little Fire Ants often make their nests. Once the plant has been sprayed, allow it to dry before moving or permitting other people or pets to go near them. It will help to add a small amount of wetting agent (a wetter-sticker, or detergent) to the mix to ensure good coverage.

Safety precautions

- ALWAYS read the label of the product you buy very carefully to make sure your plant species and situation is listed.
- Follow ALL safety directions on the label.
- ALWAYS make sure to keep other people and pets away from the treated plants until they are completely dry.
- Anything written on the label of the product you choose to use supercedes all recommendations in this document.

The minimum recommended safety equipment you should use are as follows:

- Long sleeved shirt and long pants
- Shoes and socks
- Chemical resistant gloves
- Chemical resistant apron when mixing chemicals, loading or cleaning spills.

Suitable chemicals for spraying and drenching plants against Little Fire Ants

Trade name	contains	Mix rate
BayerSevin 4F	Carbaryl 43%	$\frac{3}{4}$ ounce per gallon
Bayer Sevin RP4	Carbaryl 43%	$\frac{3}{4}$ ounce per gallon
Bayer Sevin 80s	Carbaryl 80%	$\frac{1}{2}$ ounce per gallon

- Other proprietary products containing carbaryl may be available and suitable for this purpose. Please consult the staff at your hardware, chemical supply or farm exchange for advice on these products. Some products may contain different concentrations of the active ingredient and you will need to adjust your mixing rates accordingly.

Go to www.littlefireants.com for more information on Little Fire Ants

Easy and cheap – keeping new stock fire ant free

Another way of keeping your plants free of insect pests is to incorporate a granular long-release chemical into the potting medium before you use it. **Talstar Nursery** is a granular form of bifenthrin which can be mixed in with your potting mix. Depending on the rate you use, it will provide up to 2 years continuous protection against insect pests. The amount used will depend on the length of protection needed and the bulk density of your potting medium. If you do not know the bulk density contact the State Ant Specialist (808 989-9289) and he will test your soil. If you use this method, there is no need to treat your plants each week.

Part 2: Survey methods

There are three main survey types: detection surveys, delimiting surveys and monitoring surveys. Each survey type has a different aim and the type of information that needs to be gathered is also different. In a detection survey, the objective is to determine if a site does, or does not, have LFA. This is the easiest type of survey to conduct because all that is needed to confirm presence of the ant is a single specimen. In delimiting surveys, we are trying to map out exactly the infested area. This type of survey needs to be much more exacting. Monitoring surveys are used to determine the success or failure of treatment. For this type of survey we need to know not only where LFA are but also how dense the population is. For our purposes, detection surveys are most suitable, and they are also the easiest to conduct.

Checking individual plants and presenting them for sale

Once you have arranged your plants at the market, place a baited chopstick on the surface of the potting medium of each plant (on the shady side). This way, buyers can check for themselves if your plants have LFA. Instructions on how to prepare the baited chopsticks are in the next section.

Detection surveys

The main type of survey you will be conducting is a detection survey. The aim is to find out, with a reasonable degree of certainty, whether LFA are present or not. The easiest way to do this is through bait surveys using chopsticks smeared with peanut butter.

Little Fire Ants love to live in shady moist places, especially on trees and other vegetation, under stones and other debris and at the bases of trees. You can survey these places by using the “chopstick method”. Also, whenever bringing new potted plants, soil, mulch or other organic matter to your nursery, these should also be checked.

Step 1. On one side of some chopsticks or popsicle sticks, smear a thin coat of peanut butter. A thick coat is not better and might make it difficult to identify any ants you find.

Step 2. Place these around your property in shady locations as follows:

- The bases of trees,
- Leaf junctions of banana plants and palm trees,
- In the forks or branches of fruit trees,
- In garden beds and potted plants

Leave the baits out for 60-90 minutes then go back and check them.

Step 3. Carefully collect each chopstick and look at the peanut butter. Some of the chopsticks will now have ants on them, but how do you tell if they might be Little Fire Ants? Are they:

- Red-orange?

- Very small (around 1/16th of an inch)?
- Slow moving and do they easily dislodge from the stick?

Step 4. If you answer YES to these questions, the ants might be Little Fire Ants and you should get them identified by the Hawaii Department of Agriculture. Place the chopstick and the ants into a zip-lock bag, freeze them overnight by placing them in your freezer and take them to your nearest HDOA office. Be sure to write your name, address and contact details on the bag with a marking pen, or place a note with this information inside the bag.

Collecting specimens

There are about 50 ant species present in Hawaii. Many of these do not look anything like LFA but several other species are indistinguishable from LFA to the naked eye. A careful surveyor can visually eliminate many ant specimens by following some simple methods. LFA are:

1. very small – as long as a penny is thick
2. a uniform dark yellow-orange color. Ants that have a different head or abdomen color are definitely not LFA
3. slow moving

Three other ant species (see below) can easily be mistaken for LFA: *Plagiolepis allaudi* (A), *Solenopsis* sp. (B), *Tertamorium similimum*, (C). Image D below is the Little Fire Ant.



Go to www.littlefireants.com for more information on Little Fire Ants

Samples collected on chopsticks are easily collected by placing the entire chopstick in a zip-lock bag, sealing it and placing in the freezer overnight. Once the ants have been killed, the zip-lock bag can be sent to an entomologist by mail. Ants observed during visual searches can be collected by using a small artist brush, dipped in rubbing alcohol. The brush can be used to pick up some of the ants and then removed from the brush by placing it in a small vial that has been partially filled with rubbing alcohol. The vial can be mailed to an entomologist for identification. First, decant as much alcohol from the vial as possible.

The address is:

Cas Vanderwoude
Hawaii Department of Agriculture
16 E. Lanikaula St
Hilo Hawaii 96720
Ph 808 989-9289

Part 3: Little Fire Ant Biology and Ecology

Ants are social insects closely related to bees and wasps. As a rule they live in a colony with one or more queens. Workers are sterile females who perform specialised roles including caring for brood (larva), feeding and attending to the needs of the queen(s), foraging for food and defence of the colony. Worker ants are dispensable as the queen produces a regular supply of replacement workers.

Males are notably absent from day to day life and are produced seasonally for breeding purposes. After mating, their purpose is served and they die. Most ant species spread by means of production of winged reproductive casts (male and female) which leave the parent nest in synchronized nuptial flights. Mating takes place in the air and fertilized female queens then return to the soil surface and establish new colonies independent from the parent colony.

Many invasive ant species including Little Fire Ants do not use this dispersal method. Rather, mating occurs within the parent colony (or close nearby) and newly fertilized queens either remain there or disperse on foot taking with them a small number of workers (to care for them and the new brood which the queen will produce). Often, these nests remain connected with the parent colony and the tasks of territory defence and food gathering are shared. This results in a polydomous, unicolonial “supercolony” with no intraspecific aggression between workers and queens. The loss of workers and even queens does not threaten the viability of the colony as production of new workers and queens occurs constantly.

The dispersal strategy and social nature of invasive ant species makes them a formidable enemy to competitors and prey in habitats they have invaded. Indeed the impacts of these invasions are all the greater due to this feature. They are able to monopolise resources and overpower competitors through sheer force of numbers. In the case of Little Fire Ants, assessments of abundance are measured in billions per hectare.

Dispersal over distances greater than a few metres are almost always human-mediated. Small colony fragments “hitch-hike” with personal possessions, freight or produce and establish a colony in a new location. The most common way this happens in hawaii is through the movement of infested potted plants.

Impacts and spread in the Pacific region

Little Fire Ants originated in South America and over the last century have spread to USA, Africa and the Pacific region. Sites currently infested with this species are shown in Figure 1. The populations in Gabon and New Caledonia, and Tahiti (former French colonies) are closely related while Little Fire Ants in PNG, the Solomons, Australia and Vanuatu are phylogenetically more similar to the USA and Carribean populations. The Little Fire Ants in Hawaii appear to have originated in Florida.

Over the last two decades, Little Fire Ants appear to be spreading more rapidly than before, probably facilitated by increased trade within the Pacific region. Since the 1990s, new infestations have been discovered in Vanuatu, Cairns, Tuvalu, and more recently,

Papua New Guinea.

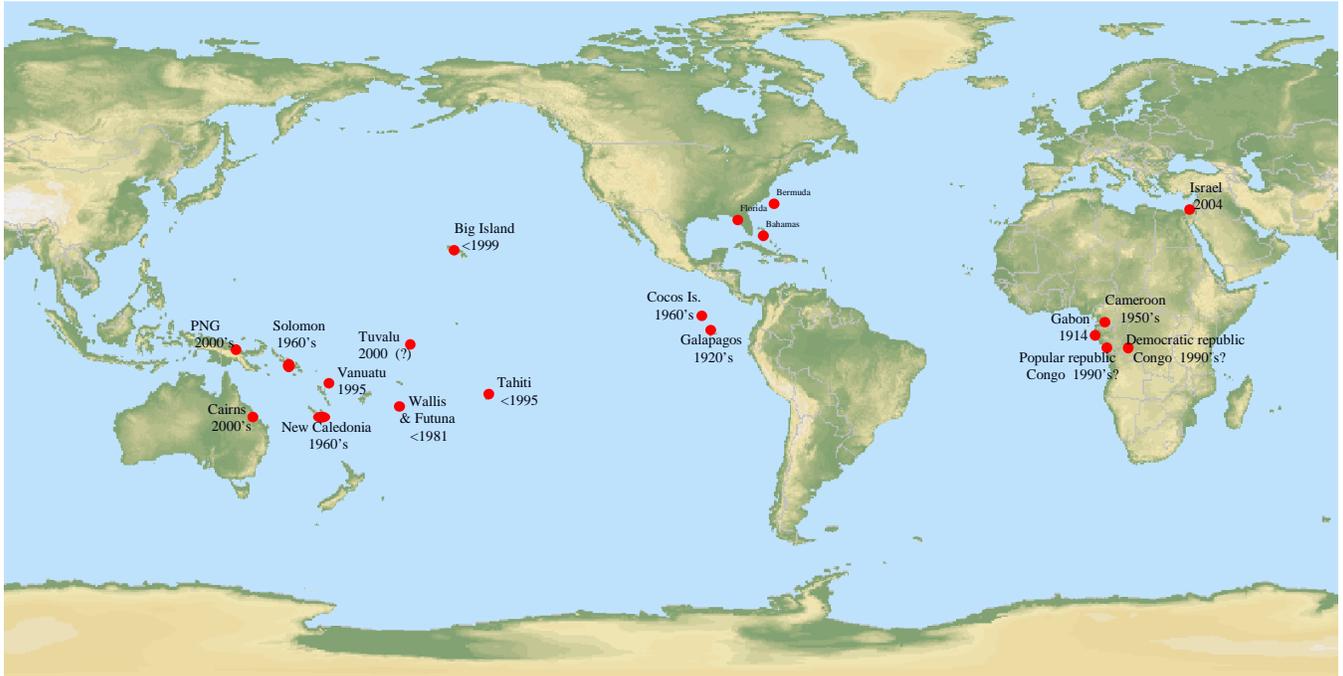


Figure 1. Sites with introduced Little Fire Ant populations

Economic impacts

Wasmannia auropunctata is a shade-loving species that nest in vegetation and on the ground. Little Fire Ants interfere with production in agricultural systems such as coffee and citrus where they promote scale insects and interfere with biological control organisms. Workers have refused to harvest or tend orchards infested with this species in Hawaii¹.

Another serious impact of LFA is their affects on subsistence gardens - often a mixture of tree (coconut, banana, paw paw, mango, breadfruit etc) and ground crops (maize, taro, yams, aibika, kangkong, pitpit etc). These food gardens are a haven for Little Fire Ants who will inhabit both the ground layer and tree trunks and canopies. Here they promote crop pests especially homoptera and sting people tending their crops and harvesting food. As workers move through their gardens, they disturb the foliage dislodging ants which then become entangled in the workers' clothes, stinging them. Little Fire Ants have been found in the crowns of mature coconut trees, making harvesting of even this commodity difficult and painful.

Environmental impacts

One immediately noticeable impact on natural ecosystems invaded by this ant is the

¹ See <http://hawaiihealthguide.com/healthtalk/display.htm?id=613&hhsid=0c022d71674bd3e3df465f733b25ddb1>

virtual absence of other ant species. Indeed, the boundary between invaded areas and uninvaded areas are most easily delineated by the presence of other ant species in uninvaded areas. There is also considerable anecdotal evidence that Little Fire Ants sting domestic and wild animals especially on the eyes, causing blindness.

Social impacts

Little Fire Ants forage and nest in houses and outbuildings and this puts them into direct contact with people. Once they have infested houses, it is common for children and adults to be stung regularly and for the ants to spoil prepared food items in kitchens and pantries. While stings are only moderately painful to adults, children appear to be much more sensitive and often are stung multiple times in their sleep. The high cost and non-availability of medical facilities can make this a difficult issue for families to manage.

Typical LFA habitats

Most invasive ants are sun-loving animals. They prefer to nest and forage in open, dry places. Most often their nests are built in the soil. Little Fire Ants are very different. They are native to the rainforests of south America where it is warm, wet and shady. While they will nest in the ground, they will also nest in trees and other vegetation. This means when surveying for LFA, search efforts should be concentrated on those areas where LFA are most likely to be found.

Potted plants

We know that the movement of potted plants is one way that LFA are moved from place to place. It stands to reason then, that this is a good place to search for them. Potting media is usually soft and easily penetrated, shaded by the plant, and kept at an ideal moisture level for both the plant and LFA. Often removing the plant from the pot will reveal LFA present between the wall of the pot and the root ball. Just lift the plant out and wait for a few seconds. Another good location is under the pot or the drip tray. Again these are dark cool spots that LFA seek out.

Favorite trees

Here in Hawaii, almost every home has banana plants or palms somewhere in the garden. These are without question the favorite plants for LFA. The reason for this is that these plants give them the two things they need most: food and shelter. The base of older leaves make a ready-made nest site. Peeling back a few of these leaves in a banana clump often reveals the tell-tale signs of an LFA nest – a bunch of small slow-moving ants and the white eggs and larva. Sometimes you will see ants with wings – these are the new unmated queens.



Typical LFA nest in a banana leaf crown



ideal location for LFA nest in a palm

Near homes and other structures

When visually surveying or baiting for LFA around houses and other structures, focus on the shady side of the building (usually on the north side). LFA rarely nest inside houses, preferring to build their nests outside and forage inside the house. Many people mistakenly spray or otherwise treat ants inside their homes when the ants are actually nesting outside.

Nests and foraging trails are most commonly found at the base of exterior walls, where the walls meet the ground. If the homeowner has been trying to control them, “drifts” of dead ants are often obvious around entrances such as doors and windows,



The bottom track of a sliding door showing dead LFA that have been killed by sprays or other treatments

applied by the homeowner.

In the garden

Gardens provide ideal nesting and foraging places for LFA. The places to concentrate on for survey are:

- At the base of trees and other plants (on the shady side of the stem)
- Near sources of moisture
- Shaded areas
- Under rocks, stones and other objects on the ground
- In rock walls (especially north-facing ones)
- In and behind moss growing on trees and rocks
- In deep litter/mulch

Other locations

People with pets often have the food and water bowls in a specific location. This invariably attracts ants including LFA. Always place a bait or two near these locations. Lift the bowls and check carefully underneath – often a nest will establish at these locations.

Trash bins, compost piles and piles of garden waste also provide ideal nesting locations for LFA so these are also worth checking out.