



**General Emergency Response Plan
for Invasive Ant Incursions**

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Definitions

Area	An officially defined country, part of a country or all or parts of several countries
Containment	The application of phytosanitary measures in and around an infested area to prevent the spread of an ant.
Delimiting survey	Survey conducted to establish the boundaries of an area. In this case to establish the boundaries of an area infested by the ant.
Endangered area	An area where an ant can become established and cause an important loss.
Entry (of an ant)	Movement of an ant into an area where it is not yet present, or present but not widely distributed and being officially controlled
Eradication	Application of phytosanitary measures to eliminate an ant from an area. (see IPSM 5)
ERMC	Emergency Response Management Committee
ERP	Emergency Response Plan
Establishment	An ant will remain for the foreseeable future within an area after entry.
monitoring	A survey designed with the purpose of determining the effect of treatment on the ant population
NGO	Non government organisation
Occurrence	The presence in an area of an ant officially reported to be indigenous or introduced and/or not officially reported to have been eradicated.
Outbreak	An isolated ant population recently detected and expected to survive for the immediate future.
Pacific Island Countries and Territories (PICTs)	The Pacific island nations and Territories that are member countries of the Secretariat of the Pacific Community.
Pest free area	An area in which a specific ant does not occur as demonstrated by scientific evidence and in which, where appropriate, this condition is being officially maintained.
Phytosanitary measure	Any legislation, regulation or official procedure having the

purpose to prevent the introduction and/or spread of ants.

PICT	The Pacific island nations and Territories that are member countries of the Secretariat of the Pacific Community.
PPS	(National) Plant Protection Service
Regulated article	Any plant, plant product, storage place, packaging, conveyance, container, soil and any other organism, object or material capable of harbouring or spreading ants, deemed to require phytosanitary measures, particularly where international transportation is involved.
Risk items	Any item or commodity capable of being a vector for the spread or movement of exotic ant species including Red Imported Fire Ant or Little Fire Ant
SPC	Secretariat of the Pacific Community
Spread	Expansion of the geographical distribution of an ant within an area.
Suppression	The application of phytosanitary measures in an infested area to reduce ant populations and thereby limit spread.
Surveillance	An official process which collects and records data on ant occurrence or absence by survey, monitoring or other procedures.
Survey	An official procedure conducted over a defined period of time to determine the characteristics of an ant population or to determine which species occur in an area.
Treatment	Officially authorised procedure for the killing, removal or rendering infertile of ants.

Outline

This manual contains a detailed emergency response plan (ERP) for ant incursions that can be used by Pacific Island Countries and Territories (PICTs) as a basis for ant-specific ERPs. The plan was developed at a workshop conducted by SPC in Suva, Fiji between 6th and 8th October 2008 and draws heavily on an existing generic emergency response plan developed by Dr Geunther Rapp in 2001 for the Secretariat of the Pacific Community.

The document is in several sections. This section outlines a generic management structure including the functions and responsibilities of key players. Since every PICT has a different administrative structure, this section needs to be adapted to suit each PICT's unique circumstances.

Additional sections include:

Standard operating procedures

A resource section

Contact details for taxonomists, chemicals and equipment that may be necessary

Both countries and SPC need to up-date this document or relevant sections and any other related plan as required. The document should also be reviewed during and after an incursion. In its function as Secretariat to the Pacific Plant Protection Organisation, SPC also has the duty to inform other countries about incursions in the form of Pest Alerts.

Pre-incursion planning

Each PICT should ensure that any exotic ants not already present in the country or jurisdiction have been, or can easily be, declared under relevant legislation so that action can be taken should an incursion be reported. This should apply especially to Red Imported Fire Ants (*Solenopsis invicta*) and Little Fire Ant (*Wasmannia auropunctata*) both of which are known to be extremely destructive.

Additionally, it is important that a mechanism exists to allow the fast allocation of emergency funds from other budgets. This should be part of a wider preparedness for incursions of exotic pests and diseases.

Initial detection and response

When a suspected exotic ant incursion is reported, the generic response to this detection is outlined in Figure 1. During this part of the response, the Chief Quarantine Officer seeks to confirm the identity of the ant and obtain an initial report of the extent of the infestation. With this information, the Chief Quarantine officer will decide whether to involve the Emergency Response Management Committee (ERMC). This committee is usually a standing committee that co-ordinates all emergency responses for the country.

Before the ERMC meets to discuss the incursion the Chief Quarantine Officer should begin a delimiting survey and impose movement controls for risk items leaving the infested area. These risk items include, pot plants, soil and aggregates, items that have been in contact with the

ground, produce, hay, mulch and building supplies, earthmoving equipment and other vehicles. The risk items list may need to be revised depending the ant species that has been detected and/or other site-related factors such as industries or activities being conducted in the infested area.

The Emergency Response Management Committee

The ERMC is a standing committee that deals with all emergencies for that country including natural disasters etc. The committee advises and informs government, makes resources available for response activities and makes decisions on how to proceed. A flowchart showing options that the ERMC will consider is shown in Figure 2. The ERMC is usually made up of the following people:

- Chairperson
- Head of Quarantine (Deputy Chairperson)
- Director, National Disaster Programme
- Director, Research
- Director, Environment
- Director, Extension
- Chief Quarantine Officer
- Representative of affected province or island
- Representative of private sector and/or government body dealing with the affected commodity
- Ant Specialist
- Any other representative (s) of one or several body(ies) that needs to be involved

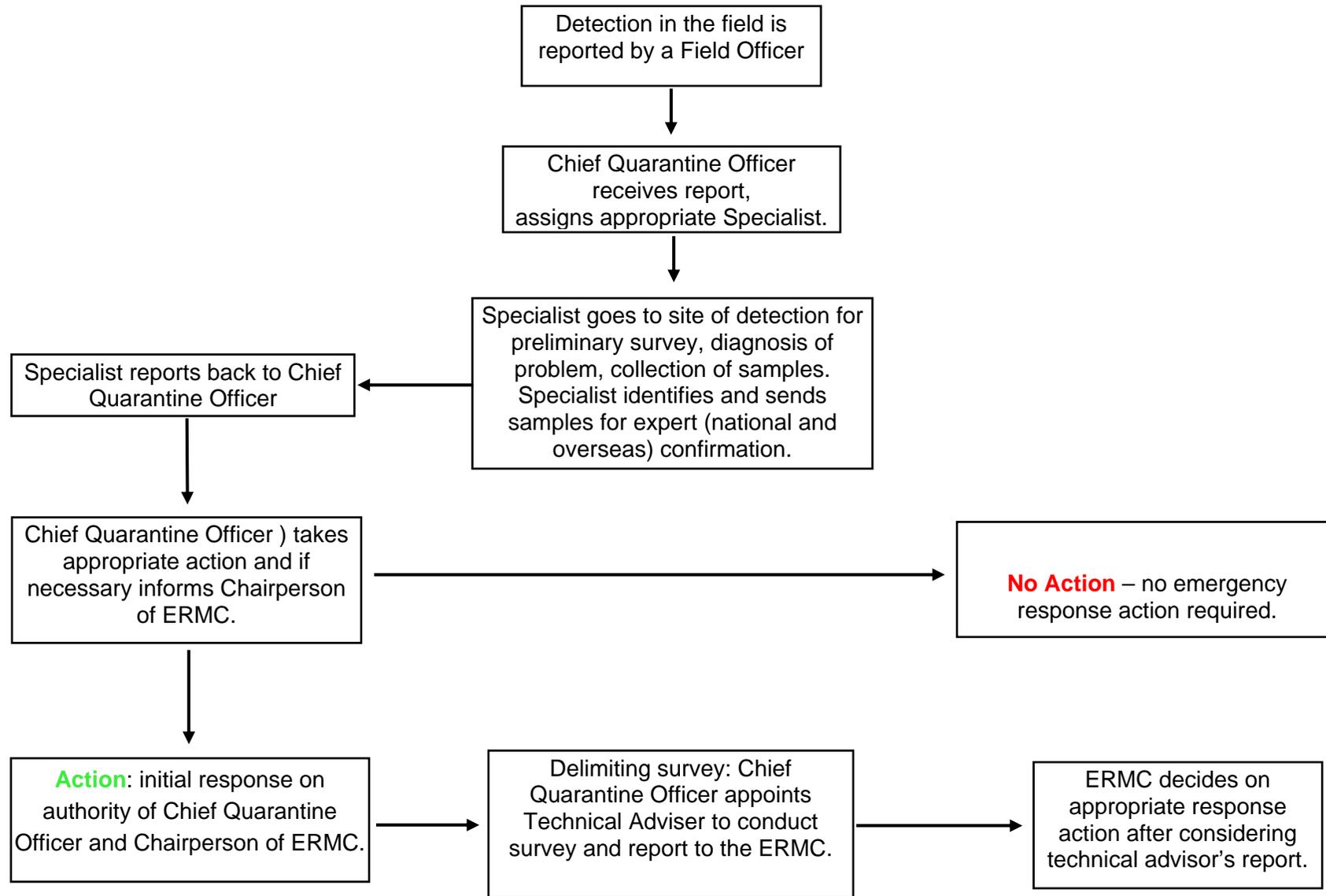


Figure 1. Generic response to a suspected exotic ant incursion

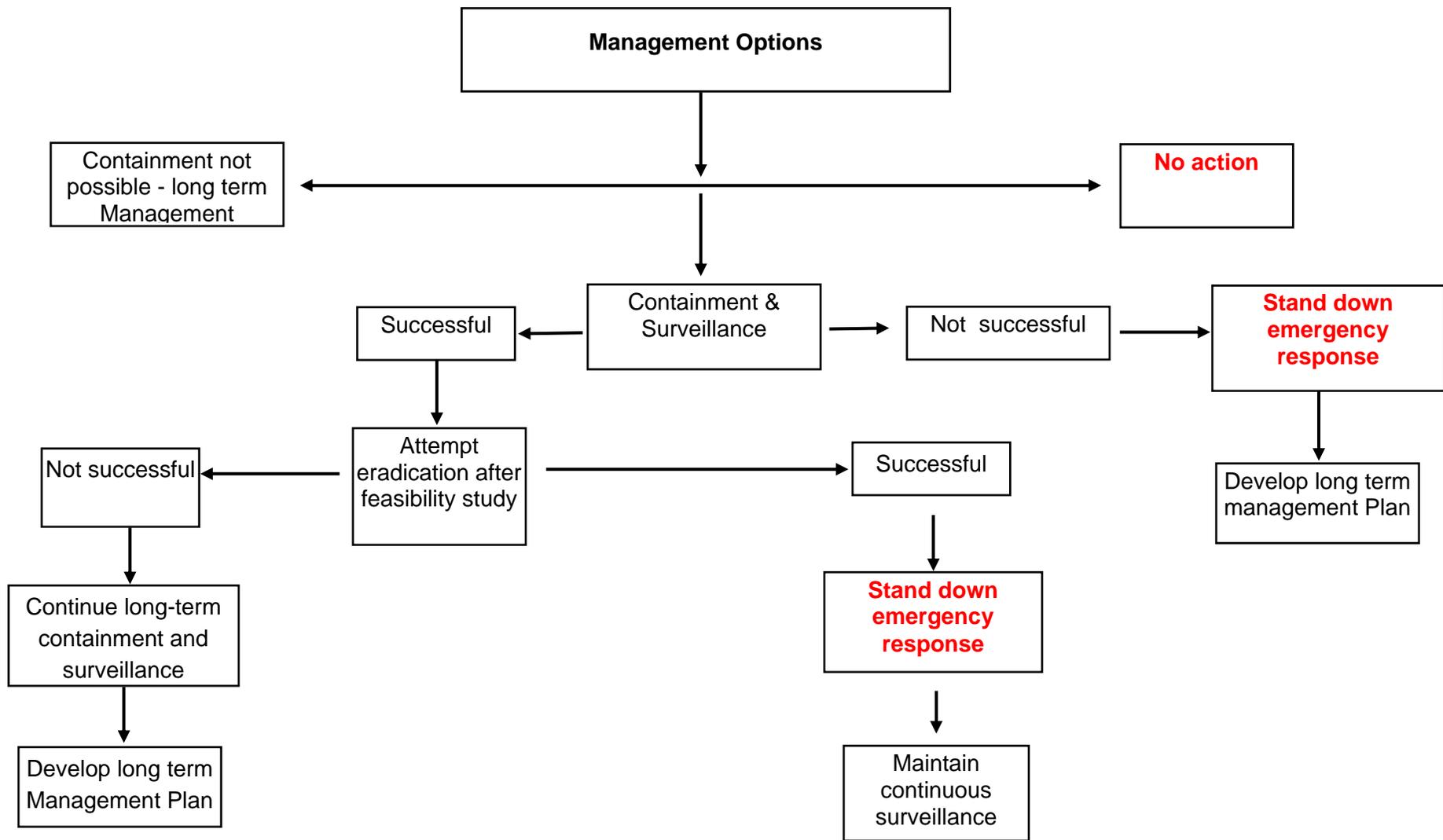


Figure 2. Decision flowchart used by ERMC to decide appropriate course of action

Roles and responsibilities

A brief outline of the functions and responsibilities of persons involved in the emergency response is listed in the table below.

Table 1. Roles and responsibilities of persons involved in the emergency response

POSITION	ROLES AND RESPONSIBILITIES
Chairperson, ERMC.	<ul style="list-style-type: none"> • Puts the Emergency Response Plan into action; • Overall management of the programme.
Emergency Response Management Committee (ERMC).	<ul style="list-style-type: none"> • Discusses recommendations from the Technical Adviser (TA) after delimiting survey and decides on further action; • Appoints Operations Manager and Field Controller; • Quorum (5): Chairperson or Deputy, Chief Quarantine Officer , representative of affected province or island, representative of private sector and/or government body dealing with the affected commodity, TA.
Head of Quarantine (Deputy Chairperson).	<ul style="list-style-type: none"> • Acts in the absence of the Chairperson; • Commits the resources of the Quarantine Department to the problem.
Director, National Disaster Programme.	Commits the resources of the organisation to the problem.
Chief Quarantine Officer .	<ul style="list-style-type: none"> • Alerts Chairperson to a suspected ant incursion; • Reports to ERMC during operational phase; • Supervises the Director of operations; • Ensures that all management plans conform to relevant legislation; • Notifies SPC of suspected new ant.
Specialist: • appointed by and reporting to Chief Quarantine Officer .	<ul style="list-style-type: none"> • Collects samples and organises identification of samples; • Collects information.

POSITION	ROLES AND RESPONSIBILITIES
<p>Operations Manager:</p> <ul style="list-style-type: none"> • appointed by ERMC; • located in the area where the new ant is present; • should be in a position of local authority and possess management skills and administrative experience. 	<ul style="list-style-type: none"> • Reports to Chief Quarantine Officer ; • Manages day-to-day finances; • Oversees field operations; • Checks resource requirements; • Liaises with provincial authorities; • Selects and appoints the response team(s); • Briefs and trains response team(s) and Field Controller together with Technical Adviser.
<p>Technical Adviser:</p> <ul style="list-style-type: none"> • appointed by Chairperson; • reports to nobody to make sure that advice remains objective; • located as required; • has to be a recognised expert on the particular ant causing the incursion. 	<ul style="list-style-type: none"> • Conducts delimiting survey; • Submits report including response options, recommendations and tentative budgets to ERMC; • Briefs and trains response team(s) and Field Controller together with Operations Manager; • Provides technical advice to Chairperson, Chief Quarantine Officer , ERMC, Operations Manager, Field Controller, operational teams; • Periodically monitors operations.
<p>Financial Controller:</p> <ul style="list-style-type: none"> • nominated by Head of Quarantine; • reports to Operations Manager. 	<ul style="list-style-type: none"> • Responsible for administration and finance.
<p>Field Controller:</p> <ul style="list-style-type: none"> • appointed by ERMC; • located on site full time; • reports to Operations Manager; • should possess agricultural background and management skills. 	<p>Logistics;</p> <p>Day-to-day control of field operations;</p> <ul style="list-style-type: none"> • Liaises with district staff and stakeholders.
<p>Field Teams:</p> <p>appointed by Operations Manager; report to Field Controller.</p>	<p>Field activities such as surveys.</p>

The Specialist

The Specialist is usually the first person to investigate the possible incursion after it is reported. It is the role of the specialist to collect specimens for identification, dispatch them to a recognised expert and gather information on the incursion and the ant species detected for the Chief Quarantine Officer.

Each country will have its own unique laws and regulations and the official powers of the Specialist will therefore be different for each country. Before leaving to investigate the suspect incursion, the Specialist should seek confirmation of the powers available to him or her, specifically when it pertains to site entry, quarantine directions and preventing the movement of risk items. The Specialist should also ensure he or she is able to take specimens away from the site to a new location.

Collecting specimens

The first step in managing a possible exotic ant incursion is to know exactly which species has been detected. This means obtaining specimens and having them identified by a local or regional taxonomist and confirmed by a reliable institution. A guide to collecting ant specimens and a contact list of external taxonomists is attached in Appendix 1.

Secure the scene/containment

Invasive ants can spread quickly from one site to another by human-mediated means. Colonies or colony fragments can be concealed in produce and other risk items which are transported by people to a new location. Preventing further spread at this stage of an incursion is very important. If it can be established that only a small area is infested, preventing public access to the entire site is a very good solution. If the infested site is larger, the Specialist should ensure that people living within the infested area do not move risk items to other locations. Risk items should include the following:

Soil, gravel, aggregates or other landscaping material,

Any item that has been in contact with soil for more than 24 hours

Pot plants, Mulch, hay, firewood, thatching and other building materials

Earthmoving machinery

The risk items list may need to be revised depending the ant species that has been detected and/or other site-related factors such as industries or activities being conducted in the infested area.

Ant colonies will also disperse if the colony is disturbed. The Specialist should ensure that people living in or near the infested area do not poke, disturb, interfere or attempt to treat the suspect ants.

Gather information

After returning from the initial investigation, the Specialist should prepare a short situation report for the Chief Quarantine Officer which should include the following information as a minimum:

the result of the identification,
picture(s) of ant and its damage,
date and details of first report,
size of the infested area,
affected crop(s),
if possible, an indication as to how the ant may have reached the area,
if possible, an indication as to its origin,

Additionally, the Specialist should compile available information (reports, journal articles, etc) about the ant species including:

- potential impacts in terms of:
 - economic impacts,
 - social (including human health) impacts,
 - cultural impacts;
 - environmental impacts and biodiversity.
- expected cost of export treatments,
- known control measures

The resource section of this manual contains electronic copies of key reports, journal articles, recommended control and survey methods as well as images of the ant and examples of damage. The Specialist should also search the internet and contact overseas experts for additional information. The Global Invasive Species Database (www.issq.org/gisd) is a useful resource for up-to-date information. Much of this can be completed while waiting for confirmation of the species identity.

Once the ant species identity has been verified, a decision needs to be made on how to progress. The final decision on further action lies with the ERM. If the ant is likely to cause unacceptable impacts, the Chairperson appoints a Technical Adviser to conduct a delimiting survey and mobilises the necessary funds. (please note that the Specialist could fulfil this function if sufficiently qualified).

The Chief Quarantine Officer establishes quarantine restrictions as required, and in close collaboration with the ERM should brief government on the incursion. Once government has been briefed, the ERM should notify the public (through the media) of the occurrence of the new invasive ant species and what to look for and how, who and where to report to. The ERM should also appoint a communication specialist to develop a communication strategy.

The Technical Advisor

The Chief Quarantine Officer, in consultation with the ERM, may proceed with an emergency response or decide to take no further action. If proceeding with a response, a Technical Advisor will be appointed by the Chief Quarantine officer. The Technical Advisor's role is to delimit the infestation, advise the Chief Quarantine Officer on trace-forward and trace-back activities, and prepare a draft management plan. The Technical Advisor does not recommend a course of action as this decision is made by the ERM. Rather he or she advises on the technical merits of proposed courses of action.

Delimiting survey

The immediate task of the Technical Advisor is to plan and implement a delimiting survey. Standardised surveillance methods have been developed and can be found in Appendix 2. The delimiting survey is carried out by a survey team composed of the Technical Adviser, the Specialist, available field officers from agencies with responsibility for incursions, local NGOs, a capable extension officer who knows the affected area and the Field Officer who reported the incident in the first place. The size of the survey teams will depend on the expected area to be surveyed. Additionally, one or more staff from the appropriate quarantine agency should be on hand specifically to co-ordinate and implement trace-forward and trace-back activities. The communication specialist should be involved in the delimiting survey and oversee media and public communication.

The objectives of the delimiting survey are:

- Establish the borders of the area that is infested with the ant,
- Gather information for deciding what actions should follow.
- To advise quarantine staff on trace-forward and trace-back activities in order to determine if there are more infested areas, and
- To determine resources needed
- The Technical Adviser ensures that all items required for the survey are available, such as:
 - emergency response plan, including current quarantine law;
 - a map of the area (unless already provided by local extension service);
 - notebooks, pens, pencils, markers;
 - digital camera, GPS units with enough batteries;
 - field record sheets
 - sufficient baits (See Appendix 2) and bait vials
 - equipment: brush, pocket knife, spade, hand lens, specimen bottles, plastic bags in various sizes, 70% alcohol solution, torch, gloves;
 - first aid kit;

The survey starts from the area where the incursion was reported. Actions included are to:

- identify the land or property owners or residents and inform them and discuss actions to take and seek their cooperation;
- establish exactly how and when the ant reached the area;
- monitor the speed of the ant's dispersal;
- map boundaries and estimate size of both the infested area and of the endangered area to which where the ant could spread;
- identify soil, aggregates, machinery, plants, plant products, or other articles whose movement out of the infested area would need to be regulated in the containment of the ant;
- identify the owners of these materials, machinery, plant products, or other articles;
- assess the possibility of stopping the ant from spreading further;
- identify how and where infested plants and/or products could be treated or disposed of;
- take pictures of ant, symptoms, affected plants and areas;
- through the communications specialist, inform local authorities, extension officers and producers of host crops about the ant;
- recommend local staff who would need to be part of further actions.
- assess the feasibility, costs and possible problems of containing, eradicating and managing the ant;

As soon as practical, and in consultation with the other team members, the Technical Adviser completes a survey report with the addresses of all stakeholders as an annex and distributes (through the Chief Quarantine Officer) it to both the survey team and the ERMC members. The survey report should include: names of areas surveyed, area affected (extent of infestation), description of land use type, accessibility, include maps, photographs, density of infestations, confirmed ant species present, land ownership, tenure.

The survey report also includes response options, recommendations and tentative budgets. The Report should not recommend a particular course of action but outline options available. The ERMC should make a decision on what options to take.

The ERMC will, based on the Report decide the response actions:

1. If the ant cannot be eradicated in the infested area: containment within the infested area and surveillance in endangered areas;
2. If the ant could be eradicated in the infested area: containment in the infested area and surveillance in endangered areas, followed by eradication in the infested area if the first step was successful.

Draft management plan

The Technical Adviser will develop a draft management plan and budget for the response decided by the ERM. The Chairperson convenes a meeting of the ERM to discuss the Technical Adviser's report within a week of report submission when the committee decides on a course of action. After approval by ERM, the Technical Adviser finalises the management plan and budget for approval by the Chairperson and, in consultation with the Financial Controller, Chief Quarantine Officer, Nominee for surveillance and Operations Manager (in case of eradication).

The management plan should include the following components:

- A surveillance plan,
- A plan for treatment and eradication including anticipated timeframe to eradication (if needed),
- A communications strategy,
- Specifications for movement controls of risk items out of the infested area.
- The methods to be used for monitoring progress and declaration of area freedom
- A budget,
- Recommendations for operational research (if needed); and
- An organisational plan

Surveillance

The Surveillance Plan should include the following

- specification of plants, plant products, and other risk items that could be hosts or carry the ant,
- list of surveillance sites selected on the advice of the Technical Adviser,

measures that achieve co-operation from owners of possibly infested plants, plant products or other articles in the infested area, growers' associations, traders, local extension officers and authorities,

- instructions on how to:
 - survey an area using attractive baits
 - record data,
- state who would do the actual surveillance,
- list of required surveillance equipment (preferably locally available),
- state that suspected specimens have to be collected and preserved as in Appendix 1 for identification by a local specialist,
- define further action if suspicious specimens are found,
- establish a surveillance schedule,

- a list of local traders (i.e. those dealing with risk items) who may observe the presence of ants in commodities being exported or processed; and
- starting date for monthly reviews of the operation.

The surveillance plan should have the file on the ant and the relevant part of any legal provisions attached.

Treatment

The treatment plan should contain the following:

- definition of the infested area: which plants, plant products, or other articles need to be treated, destroyed or disinfested,
- measures that achieve co-operation from owners of possibly infested plants, plant products or other articles in the infested area, growers associations, traders, local extension officers and authorities,
- list of required equipment (preferably locally available). Stockpiles of anticides for treatments that can be used and replaced may be available with SPC or other organisations. Consideration should be given at an early stage to the registration of any anticides that are not already registered,
- contain instructions on how to treat, disinfest or destroy risk items,
- maintenance and processing of work sheets and assignment of responsibility for this task because trading partners will request information to support claims of area freedom;
- action if suspicious specimen are found,
- specify under what conditions restitution needs to be paid to affected farmers when plants or risk items need to be destroyed. Also specify how much restitution is to be paid in accordance with current regulations,
- establish work schedules,
- indicate how long the exercise should go on, which will depend on the size of the infested area and the life cycle of the ant,
- specify the period of time without finds of the ant that has to elapse before the ant can be declared eradicated. Usually this is two years,
- Establishment of an operational control centre or use an already established facility; and
- starting date for monthly reviews of the operation.

The eradication plan has the file on the ant and the relevant part of the legal provisions attached.

Communications

A communications strategy will need to be developed by a communications specialist and should address the following issues:

- Lines of communication through the control centre and to heads of department, ministers etc including the order that key people are informed of developments
- Reporting to appropriate agencies
- A plan to engage the community living on or near infested land taking special note to address access issues, identify any village disputes that may impact on operations and encourage co-operation
- Dissemination of movement controls as they apply to risk items
- Engaging with affected industries
- A public awareness programme for the rest of the country

Movement controls

The movement control plan should specify which items can or can not be moved from the infested area(s) as well as prescribed approved treatment for disinfestations where this is possible. The costs of disinfestations and responsibility for meeting these costs also needs to be established.

Budget

Points to consider in the budget are, broadly speaking, expenses for human resources, transport, material and awareness measures or, in more detail:

Human resources	salaries and wages, overtime payments, lunch allowances, costs of accommodation and per diems
Transport	Air or boat fares, hire of transport, fuel, spare parts
Material	Inspection equipment, treatment equipment, first aid kit, identification badges, stationery
Public Awareness	Radio programme, leaflets - design costs, number of leaflets
Restitution	Appropriate restitution for destruction of risk items and possible loss of trade.

Research priorities

The plan should address any gaps in knowledge that might impact on the success of surveillance or eradication. It is possible each country will have unique issues that may need to be dealt with. Where knowledge gaps, or the need for more research or trial work exists, these should be identified in the plan.

Organisational structure.

The control centre should report to the Chief Quarantine Officer. The complexity of the organisational structure should be consistent with the size of the response

The duties and responsibilities of key staff are as follows:

The Chief Quarantine Officer :

- provides weekly reports to the ERM and answers queries;
- supplies the Containment Team with proof of their appointment and identification badges;

The Operations Manager

- reports to the Chief Quarantine Officer ;
- is responsible for the overall implementation of the surveillance and eradication plans
- provides weekly reports to the Chief Quarantine Officer and Technical Adviser;
- contacts the Chief Quarantine Officer and/or Technical Adviser at any time to seek advice;
- is responsible for the purchase of all the required equipment;
- ensures that equipment is available when and where needed;
- maintains an inventory of issued equipment;
- organises transport and accommodation;
- selects and appoints a surveillance team and eradication team of qualified officers. Names of team members must be provided to the Chief Quarantine Officer, who will gazette them as Plant Inspectors or other *ex officio* designations for the duration of the operation.
- together with the Technical Adviser, briefs and trains the surveillance team for their tasks and targets with clear instructions. The trainers need to make sure that everybody knows their positions and understands their responsibilities;
- supplies the surveillance team with:
 - surveillance plan and attachments,
 - surveillance equipment,
 - inspection, treatment and restitution forms (model in Annex 9),
 - limited material to treat and/or destroy infested plants or plant material,
 - safety equipment and first aid kit,
 - datasheets, notebooks, pens, markers.
- decides on improvements to the operation that are suggested by the Technical Adviser or Field Controller;
- manages operational funds on a day-to-day basis;
- reports expenses to the Financial Controller every week;
- requests new funds from the Financial Controller every week,

- decides on restitution payments according to regulations;
- issues restitution payments;
- once a month, contacts local traders (i.e. those dealing with the affected commodity) who may observe unusual damage by the ant.

The Field Controller:

In large organisations, this could become two positions: one managing surveillance and one managing treatment).

- organises surveillance and treatment schedules;
- is responsible for day to day implementation of the operation;
- ensures that:
 - appropriate procedures are followed,
 - infested products are disposed off or treated in the most appropriate way,
 - treatments are applied correctly.
- decides on improvements to the operation suggested by the surveillance team.
- suggests improvements to the Operations Manager and Technical Adviser.

the Nominee would report to the Chief Quarantine Officer . The Field Controller would report to the Operations Manager;

the Field Controller would forward resource requirements to the Operations Manager. The Nominee would deal with resource requirements himself/herself;

the Field Controller would provide weekly summary reports to the Operations Manager with the record sheets attached. The Nominee would compile these reports for himself/herself.

The Financial Controller:

- reports to the Operations Manager;
- is in charge of administration and finance;
- establishes procedures that allow fast processing of payments;
- compiles weekly expenses reported by Nominee/Operations Manager;
- mobilises new funds requested by Nominee/Operations Manager every week.

The communications specialist

- reports to the Operations Manager
- Manages the flow of information beyond the control centre
- Prepares briefing notes to ministers and other political entities, and ensures appropriate persons are informed of developments. This includes communication with village councils, chiefs and other local level agencies.
- Prepares briefing notes and reports to ERM for the Operations Manager
- Designs and implements public outreach strategy including contact with the media

- Designs and implements outreach and engagement strategy to persons and businesses within the areas being treated and surveyed.
- Is the first point of contact for external agencies regarding progress and developments.

The Technical Adviser:

briefs and trains the surveillance team and, in the case of an eradication, also the Field Controller, on their tasks and targets. The briefing is conducted together with the Operations Manager in the case of an eradication, or together with the Nominee in the case of a containment. The trainers need to make sure that everybody knows their positions and understands their responsibilities;

- periodically monitors the operation to assess progress;
- suggests improvements to the Nominee/Operations Manager;
- sources additional technical information for the Nominee/Field Controller if required.
- Suggests research priorities if required.

The surveillance and treatment teams:

- reports to the Nominee / Field Controller;
- follows the procedures outlined in the surveillance and treatment plans;
- treats and if necessary destroys host materials;
- issues inspection, treatment and restitution forms;
- keeps records of trapped ants or collected risk items;
- keeps records of inspected, treated, destroyed or released risk items;
- keeps suspected samples and forwards them for identification;
- provides weekly summary reports to the Nominee/Field Controller with the record sheets and restitution claims attached;
- forwards resource requirements to the Nominee/Field Controller;
- suggests improvements to the Nominee/Field Controller and Technical Adviser.

The Chief Quarantine Officer, Financial Controller, Technical Adviser, Operations Manager/Nominee and Field Controller meet at least monthly to discuss progress and further action and set a date for the next review. At a minimum, monthly progress reports are to be forwarded to the ERM for consideration.

Area Freedom/Pest Freedom

The accepted standard for declaring area freedom in an ant eradication is the absence of the ant for two years using accepted surveillance methods. The frequency and extent of surveillance needs to be sufficiently rigorous to ensure the ant is truly eradicated.

The suggested frequency for post-eradication surveillance is twice per year over the two year period; i.e. four rounds of negative surveillance after the last ant detection. The surveillance needs to cover all previously infested areas and the survey should be designed following the methods outlined in Appendix 2.

Additional useful links

General information on Little Fire Ants

http://www.hear.org/species/wasmannia_auropunctata/

<http://www.issg.org/database/species/ecology.asp?si=58&fr=1&sts=tss&lang=EN>

General information on Red Imported Fire Ants

http://www.hear.org/species/solenopsis_invicta/

<http://www.issg.org/database/species/ecology.asp?si=77&fr=1&sts=tss&lang=EN>

<http://fireant.tamu.edu/>

Conversion of GPS files to text files and import into Google earth

http://www.gpsvisualizer.com/convert_input

Information on chemicals

<http://extoxnet.orst.edu/ghindex.html>

A key to invasive ants in the Pacific

http://fijiant.org/PIAkey_page.htm

Appendix 1. Collection and identification of ant specimens

Purpose

The purpose of this document is to outline the procedures for collecting ant specimens in the field, identifying the specimens and sending samples to an international taxonomist for confirmation.

Scope

This standard operating procedure provides:

- collection procedures for ant specimens in the field suspected as being a new exotic incursion,
- A key to invasive ant species in the Pacific region,
- Instructions for curation and preparation of specimens for dispatch to an overseas taxonomist for identification or confirmation, and
- A contact list of taxonomists available to identify ant specimens.

Work instructions

Collection procedures

You will need the following equipment:

- Specimen vials
- 70% and-90% ethanol
- Fine forceps
- A small paint brush
- A notebook, a pencil, a pen
- A small amount of peanut butter, luncheon meat and jam
- A GPS if available
- A digital camera if available

When arriving at the infested site, park your vehicle well away from the suspect nest in order to minimise the chances of live ants climbing on board the vehicle and being transported elsewhere when you leave. Look for obvious mounds or nests. Ask local people or the officer who reported the ants where they were seen. **DO NOT** disturb, poke or interfere with the nest. Many invasive ant species will disperse quickly when disturbed and this will make future treatment more difficult. Also be

aware that several invasive ant species have unpleasant stings, so handle live ants carefully and make sure not to get any lodged in clothing. If you are worried about ant stings, dust your hands with talcum powder and/or wear latex gloves when collecting samples.

It is best to collect ants a small distance away from the nest to avoid disturbing it. Place small amounts of the peanut butter, luncheon meat and jam directly on the ground in 4-8 different locations around the site. Try to place these baits in shaded locations. If the ant was found foraging on trees and vegetation, place baits there as well. Wait patiently for around 30 minutes and any ants present on the site will find the bait and begin to recruit to it. Once ants are visible around each bait, collect specimens into a vial partially filled with 70% ethanol by brushing them with a wet brush. At the same time collect 5-10 specimens in to 90% ethanol vial for molecular testing if required. The ants will stick to the wet brush and can then be transferred to the vial. Note which bait type(s) they recruit to.

Often, more than one ant species can be present at a site and many species look very similar. For this reason collect ants at each bait and keep them in separate vials. Some ant species have different castes and it is useful to collect some of each form that you might observe (small, medium and large ones, ones with large heads or wings etc).

Make a note of the following on each collection vial:

- A sample number (make a small sketch of the site in your notebook and record where you collected each specimen).
- Your name,
- Date,
- Location
- Which bait type the ants were recruiting to
- GPS co-ordinates or waypoint number if you have a GPS

Record this information on the vial label with a biro, not a marking pen (ethanol can wash away marking pen). Also, write the same information in pencil on a small piece of paper and put this inside each specimen vial. If you have a digital camera, try to take images of the nest or mound as well as foraging ants using the macro option on the camera. It is also useful to take general site images as this will assist the Technical Advisor with planning later on.

Before leaving the site, check your vehicle, clothing and equipment very carefully to ensure no live ants are being transported from the site. Instruct residents not to interfere with the nests or mounds and not to move any risk items (soil, produce, firewood, mulch, pot plants, thatch etc) from the site. Also caution residents on the

possibility that the ants could sting people or livestock. Be sure to give nearby residents your contact details or the Agency's contact details.

Ant identification

The specimens should be examined by a taxonomist in your country experienced with ants. There will be times when such a person might not be available. Without specific training in ant taxonomy, identifying the species can be difficult. It is also possible to mis-identify a specimen. However, some keys are available to help you or the entomologist. One such key has been included in the resource section of this plan. Another good key is available on-line at http://fijiants.org/PIAkey_page.htm (search for PIAKEY). Unfortunately, this page takes a long time to load even with a fast internet connection.

Regardless of the outcome of the in-country identification, it is important to get another taxonomist to confirm your identification. The contact details of taxonomists willing to examine specimens and identify them (usually free of charge) are listed below.

Table 5.1. Contact details of entomologists who can identify specimens.

Country	Name	Contact details
French Polynesia	Rudolph Putoa rudolph.putoa@rural.gov.pf	Service du développement rural Département de la protection des végétaux BP 100 - 98713 Papeete Tahiti - French Polynesia Ph (689) 575 933 Fax (689) 410 530 an import permit is needed – Rudolph can arrange this
New Zealand	Disna Gunawardana Disna.Gunawardana@maf.govt.nz	Investigation and Diagnostic Centre MAF Biosecurity New Zealand 231 Morrin Road, St. Johns, P.O. Box 2095, Auckland 1140 New Zealand 64-9-909 5718
New Zealand	Cas Vanderwoude Cas@Vanderwoudeconsulting.com	VCL New Zealand 28A Gazelle Ave Beach Haven Auckland, New Zealand 0626 ph/fax +64 9 4820543
Fiji	Ana Turaganitabua - ana.turaganitabua@govnet.gov.fj Viliame Ratoto - viliame.ratoto@govnet.gov.fj Ilaisa Dakaica - ilaisa.dakaica@govnet.gov.fj	Fiji Quarantine and Inspection Division P.O. Box 18360, SUVA Rep. of the Fiji Islands. Ph: 679 331 2512 Fax:679 330 5043

New Caledonia	Hervé Jourdan, PhD Herve.Jourdan@noumea.ird.nc	Applied Zoology Laboratory UR 022 / CBGP IRD - Institut de Recherche pour le Développement BP A5 / 98848 Nouméa Cedex Nouvelle-Calédonie / New Caledonia Tel : +687 26 07 84 Fax : +687 26 43 26

Preparing specimens for dispatch to overseas taxonomists

Use a small screw-top vial designed to be used with ethanol (plastic preferred). Take several (6-10 specimens) from the samples you collected, being sure to include the different castes if these were collected. Place these in the vial and fill the extra space in the vial with cotton wool that has been soaked in ethanol. Squeeze out excess ethanol so that there is no free liquid in the vial. Include all the collection details you previously recorded written in pencil on paper and place this inside the vial. Place the vial in a small cardboard box cushioned with bubble wrap or other filler.

Before sending important or urgent specimens to the taxonomist you have chosen, contact them directly to ensure they are able to do the identification. Sometimes people go on leave for a few weeks and their mail remains unopened on their desk. Once you have confirmed the taxonomist can identify the sample for you, send it to them by the fastest possible means. Always use the “track and trace” option if it is available and send the taxonomist a fax or email with the tracking number and details for tracking the parcel. Always make sure the taxonomist has the contact details of someone else in your office in case you are away when the taxonomist calls you. Also CC this person on any emails you send regarding the sample.

Usually the cost of mailing the sample is met by the country but where this is a problem, SPC will reimburse the mailing costs.

Appendix 2. Standardised surveillance and monitoring methods for exotic ants

Purpose

The purpose of this document is to outline the procedures for conducting surveillance and monitoring for exotic ants

Scope

This standard operating procedure provides:

- Delimiting surveillance procedures for Red Imported Fire Ants (*Solenopsis invicta*) and Little Fire Ants (*Wasmannia auropunctata*)
- Monitoring procedures for Red Imported Fire Ants (*Solenopsis invicta*) and Little Fire Ants (*Wasmannia auropunctata*); and
- General surveillance procedures for Red Imported Fire Ants (*Solenopsis invicta*) and Little Fire Ants (*Wasmannia auropunctata*)

Work instructions

Overview

Surveillance for ants is accomplished by placing vials baited with attractive food items in a grid pattern over the entire area to be surveyed, and collecting the vials after 30-60 minutes exposure. While the baits are in the field, any ants foraging nearby will be attracted to the baits and these can be sealed inside the vials and identified in the laboratory. The procedures for Little Fire Ants and Red Imported Fire ants are slightly different and the procedures for delimiting, monitoring and general surveillance are also slightly different. The instructions below are for the generic survey method and differences for survey types are listed in Table 1 for Red Imported Fire Ant and Table 2 for Little Fire Ant.

Equipment and supplies needed

Bait materials

- A sufficient number of “Biolab” 50cc bait vials ($\frac{1}{2}$ with blue lids and $\frac{1}{2}$ with yellow lids)
- 1 jar of smooth peanut butter per 500 baits; and a small amount of vegetable oil
- 1 tin luncheon meat per 500 baits
- 1 jar of jam (clear, without lumps or seeds)
- Toothpicks (1 per bait)

Bait preparation

- Paper or plastic plates
- 2 dessert spoons for mixing
- A sharp knife

Survey equipment and supplies

- Map of survey area
- Data sheets
- Clip board
- GPS if available
- Hi-Viz vests
- Supermarket bags or other bags
- Plastic bags for specimens
- Large white, yellow, blue crayons to mark pottles locations or spray paint
- First aid kit
- stapler
- pens
- highlighter pens (3 colours)
- Permanent marker vivid pens
- Paint brush
- surveillance forms

Planning the survey

When planning the survey, work out the area you want to cover and obtain a map or aerial image of the site. Google Earth¹ is a good source of maps but most ports have port plans which can also be used. If these are not available, make a sketch of the area showing approximate distances. Contact site management at least a day before the survey to make sure you have permission to enter and arrange any port passes etc that might be needed. In the case of an airport or sea port, try to pick a time when no planes are expected or ships are being loaded/unloaded. Also, plan to do the survey during clear weather when rain is not expected.

Each team needs to be made up of three people and one team should be able to place and collect around 200 pottles in a day. When planning the survey organise staff in lots of three (3, 6, or 9 people) one person to record complete sample sheet and/or mark waypoints, one person to deploy sugar baits and one person to deploy protein baits. When preparing baits, make up around 70 per person working in the survey. If you know the size of the area you have to cover and the survey type (see

¹ A copy of the software you need is on the resource disk

Tables 1 and 2), you can also use these rates to work out how many days you will need to complete the survey.

Bait preparation

Different ants are attracted to different food types so a mixture of bait types is used. Its best to make only enough baits for a days work. This way the baits will be fresh and attractive to ants (ants are not as interested in old baits). If possible, make them up the day before and store them in a refrigerator overnight. This way you can make an early start before temperatures get too hot.

You will make two types of bait: a protein bait and a sugar bait. When you lay them out in the field, these will be placed alternately – a protein bait, then a sugar bait, then a protein bait etc. Use the vials with blue lids for the sugar baits and the vials with yellow lids for the protein baits. That way you will know which is which. Keep these in separate bags.

Protein baits contain a smear of peanut butter and a small cube of luncheon meat. The convention is to use vials with yellow lids for these baits. Protein based bait should be prepared by smearing a line of peanut butter (half the size of a pea) on the inner side of each bait container on the side corresponding with the back of the label². In addition, a small cube of luncheon meat is to be placed inside each pot. If the samples need to be sent overseas for identification, the meat will have to be removed so in this case, spear the meat with a toothpick so that it will be easier to remove after the survey.

Use a vial with a different colour lid for sugar baits. The sugar baits contain a smear of light coloured jam on the inner side of each bait container on the side corresponding with the back of the label. The jam should be light coloured and not contain seeds, lumps or rinds. A little water can be mixed with the jam to make it more runny and easier to spread

Conducting the survey

The aim of the survey is to thoroughly sample the ants at the site. This is done by placing baits in a grid pattern over the entire area, placing protein baits and sugar baits alternately. The spacing between baits is different for each survey type and these are listed in Table 1 and 2. It is not important to have the grids at **exactly** these spacings as long as the spacings are approximately correct. Sections that are all concrete or bitumen do not need to be sampled because few ants nest in these locations. Common ant habitats are listed in Table 3 and it is important that these are all sampled.

Bait vials should be collected 30-90 minutes after placement depending on the ant species. It takes much less time to retrieve vials than it does to deploy them. As a guide, teams should place vials for one hour for Red Imported Fire Ants and 90 minutes for Little Fire Ants, then stop and retrieve the vials they have deployed in the order they were deployed. This way, the vials placed at the beginning will have been

² This makes it easier for the entomologist to identify specimens.

out for 60-90 minutes and the ones deployed last will have been exposed for about 30-45 minutes depending on ant species.

Surveillance should not occur during or after rain when the ground surface is still wet and also on windy days. Also no rain is to occur between placement of bait traps and their retrieval. If rain is imminent, it is a good idea to stop deploying baits and retrieve the ones already out. If this is not possible, collect the baits one hour after the rain has stopped. If not many ants are at the baits, it might be necessary to re-survey the rain-affected section.

Bait pottles shall be placed in the shade where possible. As a hint place your vials away from prevailing wind and angle the entrance slightly to the ground. This helps prevent vials filling with water if you encounter a sudden down pour.

All bait vial locations should be marked on the ground using crayon, spray paint or a durable water-proof alternative to record the specimen number.

Any unusual ants (that look different to common established species) sighted while conducting surveillance should be collected as a visual sample and the location recorded on the ground, map and survey form that indicates the area where they were found so that the site could be re-visited for further investigation.

Keeping records

Good record keeping is essential because once the ants are identified by the entomologist, you will need to know where each sample was placed in the field. The vials have a label on which this information can be written. At a minimum, the date, location and a sample number are needed. These should also be entered on a data sheet (a sample data sheet is appended). Number each sample consecutively 1, 2, 3, etc and if there is more than one team working at the location, make sure each team uses their own unique numbers. For example, you might allocate numbers 1-500 to team 1 and 501-999 to team 2, etc. You will need to record the sample number on the ground with a crayon or paint marker so that you can find the location again if the sample is positive.

Alternative documentation system

If you have access to a global positioning system (GPS) the documentation method can be streamlined considerably. You can mark waypoints for each bait and record the waypoint number on the vial. After the day's survey, download the waypoints onto a computer and print them out and email the data to the entomologist. Send the samples to the entomologist with the print-out and a summary sheet containing other collection details (date, location team members etc) You can then plot the waypoints onto a map using Google Earth (Plus) or have the GIS section of your department do this for you. The resource section has detailed instructions on how to do this.

Table 5.2. Detailed specifications for Red Imported Fire Ants and other exotic ants

Red Imported Fire Ants and other invasive ants	Delimiting Surveys	Post Treatment Monitoring	General (outside known infested zone)
Methods	Bait vials	pitfall traps or bait vials	Bait vials
Baits/ Food lures	sugar and protein alternated	sugar and protein alternated	sugar and protein alternated
Vial spacing	200/ha, 1 vial every 7m	400/ha, 1 vial every 5m	100/ha, 1 vial every 10m
Pitfall spacing		1 pitfall trap every 10m (Pitfall traps contain 70% ethanol, some glycerine)	
Time in field	30 -60 minutes	30 -60 minutes (Pitfall traps 5-7 days)	30 -60 minutes
Frequency/ length of programme	Immediately, if results negative follow up every six months for 2 years If results positive, treat and monitor out to delimiting boundary	Six months for 2 years beyond last detection	Six monthly annually (2 rounds per year)
Buffer zone	2 km	200m	50m
Visual Surveillance	If field identification possible, can use visual surveillance in high density areas but still use baits in buffer zones and around edges. Note that <i>S.invicta</i> and Tropical Fire Ants (<i>S. geminate</i>) are difficult to differentiate in the field.		

Table 5.3. Detailed specifications for Little Fire Ants

Little Fire Ants	Delimiting Surveys	Post Treatment Monitoring	General (outside known infested zone)
Methods	vials	pitfall traps and vials	vials
Baits/ Food lures	Peanut butter only	Peanut butter only	Peanut butter only
Vial spacing	100/ha, 1 vial every 10m. Once no ants detected, switch to 1 vial every 5 m at least 20m beyond the limits of detection	400/ha, 1 vial every 5m	200-400/ha, 1 vial every 5-7m depending on available resources
Pitfall spacing		1 pitfall trap every 10m (Pitfall traps contain 70% ethanol, some glycerine)	
Time in field	45 min, maximum up to 1.5 hours	45 min, maximum up to 1.5 hours (Pitfall traps 5-7 days)	45 min, maximum up to 1.5 hours
Frequency/ length of programme	Immediately, if results negative follow up every six months for 2 years If results positive, treat and monitor out to delimiting boundary	Six months for 2 years beyond last detection	Six monthly annually (2 rounds per year)
Buffer zone	20m	20m	50m
Visual Surveillance	Very efficient in high density areas especially if surveyors are familiar with the ant. Habitat is 3 dimensional- in soil, intermediate canopy, vegetation, target bananas and coconut trees first. A good visual method is to use a smear of peanut butter on a plastic card as a bait.		

Table 5.4. A list of common ant habitats

1.	Tree trunks (visual inspection and bait at base if appropriate).
2.	Flowers and trunks of trees.
3.	Shrubs and poles.
4.	Building edges and foundations.
5.	Concrete slab edges.
6.	Cracked concrete.
7.	Disturbed sites.
8.	Drains and culverts.
9.	Electrical generators and fittings.
10.	Exposed rocks.
11.	Fence palings.
12.	Grass areas.
13.	Verges.
14.	Hot water pipes and heaters.
15.	Isolated weeds.
16.	Logs.
17.	Loose gravel.
18.	Low vegetation (including grass).
19.	Plant pot bases.
20.	Road margins.
21.	Rubbish piles.
22.	Shiny surfaces.
23.	Soil.
24.	Tree crotches and hollows.
25.	Vertical surfaces.
26.	Weed and plant re-growth.
27.	Wooden structures.
28.	Underneath stones or concrete rubble.

Appendix 3. Guidelines for preparation of the management plan

The Management Plan should contain a surveillance/monitoring strategy, a treatment strategy, detailed movement controls and a communication strategy. These in totality should address the following points:

- Specification of articles that could be hosts or carry the ant.
- Definition of the infested area.
- Measures that achieve co-operation from owners of infested areas, growers associations, traders, local extension officers, conservation groups and other authorities.
- Specific awareness measures (radio broadcasts, posters, signboards, leaflets, public meetings) to inform the public about the ant and the operation.
- Procedures to trace, check and if necessary treat or destroy host materials that may have been removed from the infested area.
- Measures to stop all operations that are likely to assist the ant in reaching an endangered area.
- Establishment of inspection points (e.g. harbour, airport, crossroads) to prevent the uncontrolled movement of risk items out of the infested area.
- Type of inspections to be done.
- List of required inspection and treatment equipment (preferably locally available).
- A list of chemicals needed for control and registration/permit requirements for their use (a list of suitable products and contact details of suppliers are listed in appendix 4)
- Procedures for the release of plants, plant products, soil, machinery, or other risk items from the quarantine area after clearance by appointed officers.
- Action if suspicious specimen are found.
- Establishment of an operational control centre.
- Maintenance and processing of work sheets and assignment of responsibility for this task because trading partners will request information to support claims of area freedom.
- Starting date for monthly reviews of the operation.
- Documentation systems for survey and treatment

The Containment Plan should have the dossier on the ant, the delimiting survey report and the relevant part of a legal provision attached.

Budget

Points to consider in the budget are, broadly speaking, expenses for human resources, transport, material and awareness measures; in more detail, these are:

Human resources Salaries and wages
 Overtime payments
 Lunch allowances
 Costs of accommodation and per diems
 Hiring of labour

Transport Air or boat fares
Hire of transport to move staff, plants and plant material
 Fuel, spare parts

Material Posts, paint, quarantine tape to mark borders of infested area
 Inspection equipment
 Equipment and material like anticides or kerosene that are needed to treat, remove or destroy infested plants or plant material
 Safety equipment (helmets, raincoats, gloves...) and first aid kit

Identification badges

Stationery

Public Awareness

Signboards: design costs, number of boards

Radio programme

Posters: design costs, number of posters, with or without lamination

Leaflets: design costs, number of leaflets

Cost of meetings in affected areas

Restitution Appropriate restitution payments for destroyed crops or crop products

Appendix 4. Supplier details for chemicals suitable for exotic ant control

Active ingredient	product	Manufacturer
Hydramethylnon	Amdro	BASF
	Maxforce Fire Ant Killer granular bait	Bayer
	Campaign	Sumitomo Australia
Indoxacarb	Advion	Dupont
Fipronil	Ceasefire	BASF
	Xstinguish	Environmental Health Products

Suppliers of pest control chemicals

This list is not exhaustive but would be a good starting point.

New Zealand

Environmental Health Products
 42B Elice Rd Glenfield New Zealand
 ph +64 9 440 9994
 fax +64 9 443 5083
 email John@flybusters.co.nz

VCL New Zealand
 28A Gazelle Ave Beach Haven
 Auckland, New Zealand 0626
 ph/fax +64 9 482 0543
 email cas@vanderwoudeconsulting.com

Australia

Garrards Pty Ltd.
 P.O. Box 5477
 Brendale MDC
 Queensland 4500
 Ph +61 7 3881 1693
 Fax +61 7 3881 1781
 email craig@garrards.com.au

Globe Australia
 2/21 Alton St, Coopers Plains,
 QLD 4108, Australia
 ph +61 7 3277 3999
 fax +61 7 3277 5644
 email sales@globeaustralia.com.au

Appendix 5. Treatment options for ant control

Overview

Baits (an attractive food matrix laced with a toxin) are regarded as best practice for control of ants. Most commercial ant baits are manufactured in granular form and designed for easy distribution over the soil surface. These baits have usually been developed specifically for Red Imported Fire Ants as this is the largest market for chemical companies. They all take a similar form: comprised of pre-gel defatted corn grit mixed with ~20% (by weight), vegetable oil that has been pre-mixed with a toxin. A thorough review of bait types available worldwide has been prepared by Stanley (2004) and a copy is included in the resource section.

Baits work by exploiting the ants' social structure. Foraging ants find food and bring this back to the nest to share with their sisters, the larvae and the queen. By spreading these baits on the ground, the ants find the bait instead of the operator having to find the nest. Unfortunately, not many active ingredients are effective in ant baits, so the choice of products is limited. The choice of product will also be limited by availability. Not all products will be available for all countries and some products may take too long to ship. Currently five active ingredients are available in a number of formulations and these are discussed in the following section. All or any of these active ingredients are suitable, and Appendix 4 lists some of the product names and suppliers.

Chemicals

Hydramethylnon

This active is one of the older ones in use today. It is also used for cockroach control and has a safe toxicological profile (its safe to use and has very few non-target impacts). Also it is available from a number of manufacturers which means there is some price competition and will be less expensive to buy. The effects of hydramethylnon baiting might take 2-4 weeks to become apparent in the field.

Fipronil

This is a relatively new active ingredient and still under patent. Besides ant control it is also used in vegetable crops, flea control for dogs and cats and termite control. Fire Ant baits incorporating fipronil are very fast acting (1-2 days) as the chemical is extremely effective. However, it will have greater non-target impacts especially if not used carefully. Fipronil is very toxic to aquatic life and crustaceans (crabs, shrimps etc), so use near water is not advised. Coconut crabs appear to be very susceptible to this toxin.

Indoxacarb

Indoxacarb is a new compound and so far has proven extremely effective in ant control. It has a very good toxicological profile. Results are very quick, 1-2 days. Because it is still under patent, it is more expensive than the other actives and supply could be more difficult.

Insect Growth Regulators

Insect Growth regulators (IGRs) are not a toxin. They work by preventing the queen from laying eggs and also stop insect from pupating. When used for ant control, the results can be very slow because the worker ants are unaffected and can live for many months. They are, however, very effective and their use should be considered if available.

An ideal regime would be to apply bait with an insect growth regulator first and follow this with another bait type 2-3 months later. There are a number of IGRs available on the market today. The ones with the best record in ant control are s-methoprene and pyriproxyfen. Both of these are used extensively for mosquito control, whitefly control as well as flea treatments for cats and dogs.

Treatment programme

It is not possible to get 100% control from a single ant bait treatment. The chemicals listed above typically provide 70-85% control, leaving a small residual population. A total of 8-12 treatments over 2-5 years might be necessary for complete removal of the ant from the site.

Developing a treatment regime should take local climatic conditions into account. Treatment during a wet or monsoon season will not be very effective because the baits are affected by rain. For places with distinct wet and dry seasons, it is recommended to treat 2-3 times per year during drier months. If the climate is the same all year round, then regular treatments need to be scheduled using weather forecasts to select dry days for bait application. The baits need to be applied to dry soil followed by 12-24 hours without rain. In some locations this could be the most difficult aspect of the entire treatment programme.

Application methods

Granular baits can be spread by hand in a manner similar to feeding chickens. However, calibration using this method is difficult and normally results in too much product being used. Small inexpensive spreaders are available from a number of sources, and most pesticide suppliers will be able to supply them. These spreaders have a small hopper where the granules are stored and they work by turning a spinner handle. The units are calibrated by a variable opening in the hopper. Swath width is 3-4 metres.

Sometimes motor driven blowers are used to treat areas not accessible by foot. These blowers are heavy and cumbersome not to mention expensive. An option for treating large areas is the use of an agricultural helicopter. These can be equipped with a pair of spreaders or a sling bucket. The cost is high, typically >\$US 1000 per hour but large areas can be covered very quickly.

Red Imported Fire Ants

This species nests almost exclusively in soil. Often the mounds are easy to spot. However, there are usually other nests that can not be easily seen. Treatment for this species consists of spreading granular baits over all ground within the designated treatment area. It is not necessary to apply treatments to vegetation or inside dwellings and other buildings. The Standard Operating Procedure titled "Distribution of Bait Granules" should be followed when treating for Red Imported Fire Ants.

Red Imported Fire Ants are able to spread by nuptial flights – new queens flying away from the nest to start new colonies. The generally accepted distance that these new queens can fly is around 1.6km. This means that any treatment programme should include a buffer area of at least 2km out from known infested areas.

Little Fire Ants

Treating Little Fire Ants is very different from treating Red Imported Fire Ants. Red Imported Fire Ants nest in soil and are rarely found foraging more than a metre above the ground. Certainly, the main nest is always in soil. Little Fire Ants do not build elaborate nests and nest predominantly in and on vegetation (as well as under stones, logs etc). Here, they gain much of the energy needed for rapid colony growth and dispersal by tending hemiptera (scale insects, mealybugs etc) which provide them with an abundant supply of carbohydrates.

It is not uncommon to find Little Fire Ant nests in the crowns of mature coconuts as much as 30 metres above the ground. We know that Little Fire Ants do not forage a great distance away from their nests so it is vitally important that the ground as well as vegetation is treated. Ground treatment should follow the "Distribution of Bait Granules" SOP. The Standard Operating Procedure titled "Treatment with Xstinguish Bait" should be followed for treating vegetation.

Little Fire Ants are not thought to fly when they disperse so a large treatment buffer is not needed. Treatment should extend 20 metres beyond the limits of detection. If treatment can not be accomplished immediately after detection, a containment treatment can be applied around the infested area to prevent further spread. The Standard Operating Procedure "Containment" should be followed for this activity.

STANDARD OPERATING PROCEDURE: CONTAINMENT OF LITTLE FIRE ANTS

Purpose and scope

This standard operating procedure describes recommended methods for containing a newly discovered outbreak of Little Fire Ant (*Wasmannia auropunctata*) and for ongoing prophylactic containment of existing outbreaks.

Background

Little Fire Ants are spreading rapidly through the Pacific region. It is an invasive species with substantial economic, social and environmental impacts. Eradication of this pest requires that ants are contained within infested areas and do not spread beyond treatment boundaries

Materials

- Maxforce Fire Ant Granules, Amdro or similar product
- “Scott” brand bait spreader

Method

The intent of treatment of a containment line is to create a treated buffer between areas known to be infested and areas believed to be free of Little Fire Ants. It may be thought of as a prophylactic treatment that provides an extra level of security. Maxforce™ Fire Ant Granules, Amdro™ or similar products are easily distributed using a “Scott” brand bait spreader. The aperture is set at “1” (Figure 1) and the operator winds the spreader handle at approximately 60 rpm while walking at 3 km/h (Figure 2). The swath width thus created is approximately 4 metres. Therefore three passes along the containment line should be sufficient to deliver a 10-15 metre treated zone.

It is important that the same zone is treated on successive operations as this provides a continuous barrier to spread by Little Fire Ant colonies. The path taken by the operator should be carefully selected and wherever possible, a track or open area should be chosen. The centre of the containment path should be as close as practically possible to the edge of the treatment area.

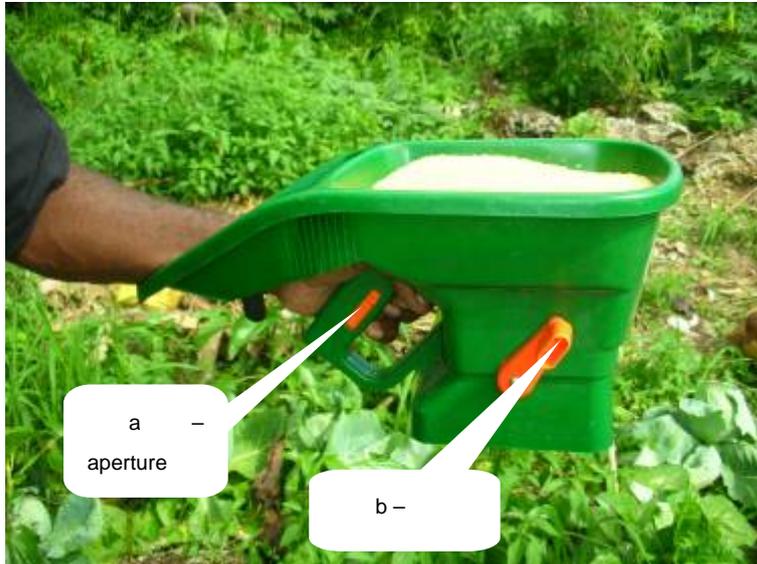


Figure 5.1. Image of a “Scott” bait spreader showing the winding handle (a), the aperture adjustment (b) and correct grip. Set the aperture at “1”.



Figure 5.2. Using Scott bait spreader.

STANDARD OPERATING PROCEDURE: DISTRIBUTION OF ANT BAIT GRANULES

Purpose and scope

This standard operating procedure describes recommended methods for treating the ground within a designated outbreak of Little Fire Ant (*Wasmannia auropunctata*) or Red Imported Fire Ants (*Solenopsis invicta*).

Background

Little Fire Ants are spreading rapidly through the Pacific region and Red Imported Fire Ants are a known invasive threat to the region. They are both invasive species with substantial economic, social and environmental impacts. Eradication of these pests requires that ants are contained within infested areas and treated with products that will eradicate them.

Materials

- Maxforce™ Fire Ant Granules, Amdro™ or similar product
- “Scott” brand bait spreader

Method

The intent of treatment with granular baits is to deliver an even distribution of the bait over the soil surface at an approximate rate of 2kg product per hectare. Maxforce Fire Ant Granules, Amdro and similar products are easily distributed using a “Scott” brand bait spreader. The aperture is set at “1” and the operator winds the spreader handle at approximately 60 rpm while walking at 3 km/h (see standard operating procedure for containment). The swath width thus created is approximately 4 metres. An overlapping series of parallel swathes is recommended. This is accomplished by starting on one boundary of an infested site and proceeding 1 metre inside the boundary. Once the operator reaches the end of the treatment area, he or she takes 2-3 paces towards the untreated area and returns parallel to the original path (see Figure 3). Continuing this process, the designated area can be systematically covered. It is important that all ground is treated including spaces between buildings and corners of gardens. An additional sweep around buildings, garden edges and other structures is recommended. Rainfall within 12 hours of treatment will reduce effectiveness so plan to conduct treatment when rain is not expected for 12 hours.

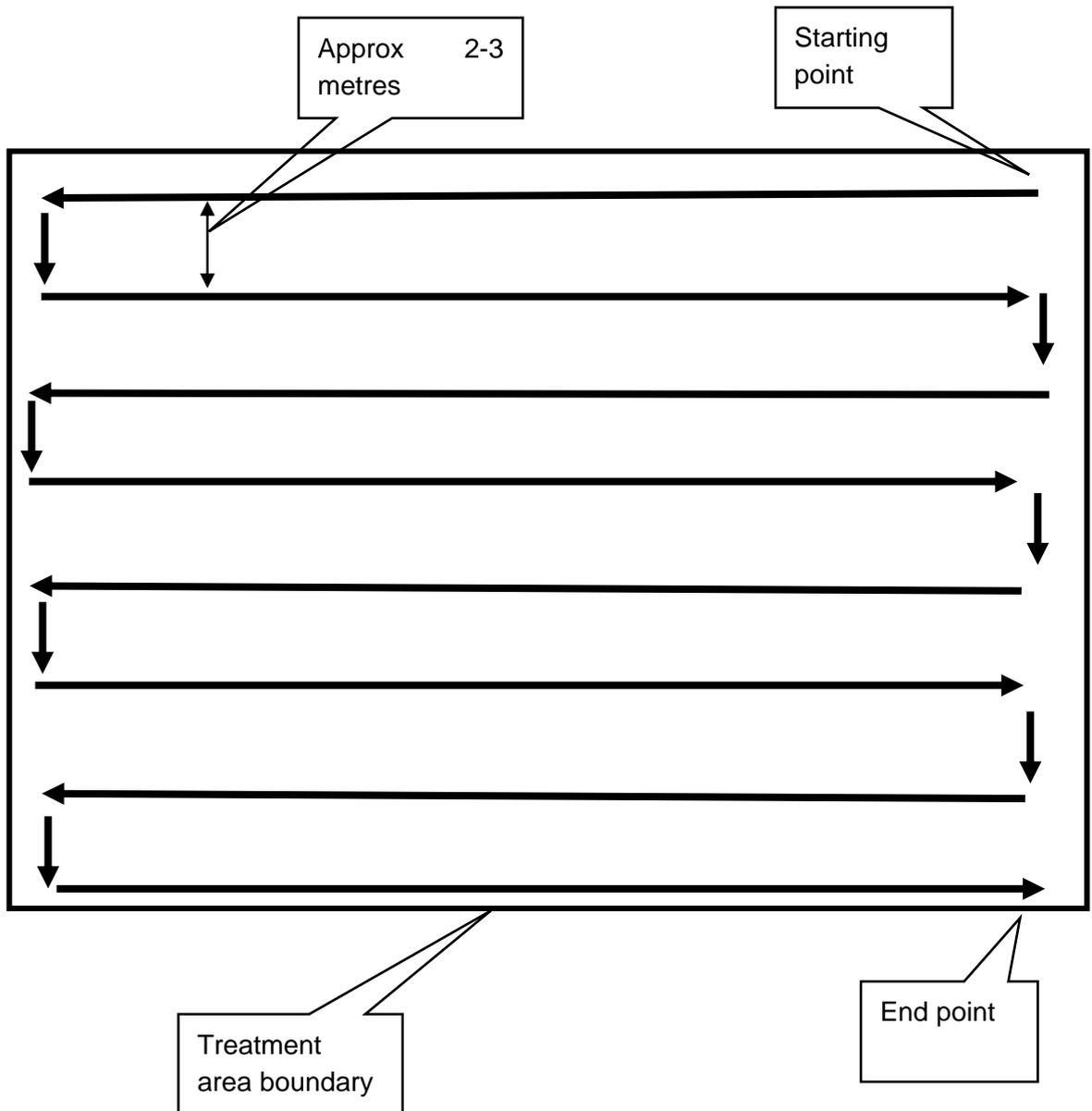


Figure 5.3. recommended method for distribution of ant bait granules

STANDARD OPERATING PROCEDURE: TREATMENT WITH XSTINGUISH BAIT FOR LITTLE FIRE ANTS

Purpose and scope

This standard operating procedure describes recommended methods for treating vegetation and structures within a designated outbreak of Little Fire Ant (*Wasmannia auropunctata*).

Background

Little Fire Ants are spreading rapidly through the Pacific. It is an invasive species with substantial economic, social and environmental impacts. Eradication of this pest requires that ants are contained within infested areas and treated with products that will eradicate them.

Materials

- Xstinguish™ Ant Bait
- 250mm caulking gun
- sharp knife or blade for opening bait.

Method

The intent of treatment with Xstinguish™ bait is to ensure areas not adequately covered by granular baits are also treated. Little Fire Ants are predominantly arboreal and most trees, shrubs, structures and buildings will harbor small ant colonies. Many such colonies do not forage great distances and therefore they may not always reach the ground-applied bait granules.

Xstinguish™ is a paste bait with fipronil as the active ingredient. It is supplied in 325 gram tubes and applied using caulking guns available at most hardware stores (Figure 4). The bait is easily applied to cracks, crevices, branches, vertical surfaces etc and it is therefore very suitable for use on trees, shrubs and buildings. The correct application rate is 3kg per hectare (approximately 9-10 tubes). Rainfall within 12 hours of treatment will reduce effectiveness so plan to conduct treatment when rain is not expected for 12 hours.

Every tree, shrub, structure building is to be treated as follows:

Trees

Large trees need to be climbed. Go as high as it is safe to do so and apply a small amount of bait (enough to cover your small fingernail) to suitable locations such as branch junctions, hollows, areas with dead wood, areas where debris has collected and along branches. If Little Fire Ants are seen, place additional amounts of bait along foraging trails. The bait should be placed at approximately 1 metre intervals. Always start from the top of the tree and work down. Stepping on bait may cause the operator to slip and fall. On palms and coconuts, several spots need to be placed in the crown, near dead or dying fronds, and in foot holds and hollows of the trunk.

Bananas

Banana clumps are regarded as perfect habitat for Little Fire Ants. In infested areas, almost all the spaces between leaf axils and the stem will house a small colony. It is important to place an amount of bait in each of these leaf axils. Also examine the trash around the banana clump and place some bait along fallen or cut trunks.

Shrubs and small trees

Flowering plants, fruit bearing trees and small shrubs are often used by Little Fire Ants for food gathering. These are generally too fragile to climb but place spots of bait in branch junctions, hollows, cracks and crevices. If a foraging trail is seen, follow it to the ground and/or to the nest and place some bait there also.

Buildings and structures

The bases of buildings and other structures are places where Little Fire Ants will be found. Work around each building, placing spots of bait at 1-2 metre intervals. The best spots to place baits are cracks crevices, hollows and places where foraging trails can be seen. If ants are seen foraging up walls or posts, place additional bait as high as can be safely reached. Always choose the shady side of posts to place bait as Little Fire Ants prefer to forage in shady locations.



Figure 5.4. A tube of Xstinguish™ housed in a caulking run and ready for use. The small amount of bait (coloured green) next to the nozzle is approximately the correct amount to apply in each spot.