

# Management Plan for Kiribati

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## 1 Purpose and approach

The purpose of the Management Plan for Kiribati is to provide resources for all the activities required to manage an early incursion of yellow crazy ant (*Anoplolepis gracilipes*) on a small scale (1 hectare) in an inhabited environment. The Management Plan is based on best practice, but has been tailored to reflect the limited resources available in Kiribati.

The goal of management is to eradicate the yellow crazy ant on Kiritimati within two years, followed by three years of monitoring. The Management Plan also provides a way to record the results of management activities, and will be revised as needed based on progress (adaptive management).

The plan incorporates the SPC General Emergency Response Plan for Invasive Ant Incursions 2008, and ESIA. Documents referenced in the development of this plan can be found in the Acknowledgements.

## 2 Scope and adaptive management

### 2.1 Scope

The *spatial scope* of management on Kiribati includes the single yellow crazy ant infestation in Ronton Kiritimati, outlined in Figure 1. The first management treatment in April 2015 will be preceded by a delimiting survey. If the yellow crazy ant incursion is found to have significantly increased or decreased in size, the management plan will be revised accordingly.

The *temporal scope* of management (timeline) is from April 2015 to December 2019.

Further detail on the spatial and temporal boundaries of management can be found in the ESIA.

The Management Plan will be executed over a five year period. Depending on the results of the first Monitoring exercise, these plans may be modified.



**Figure 1:** Map of Kiritimati showing the distribution of the yellow crazy ant infestation (yellow circles) as found in February 2015. The infestation does not appear to have expanded significantly since 2013. The red spot represents the start point for the delimiting survey to be conducted on 5<sup>th</sup> of August 2015.

## 2.2 Progress recording and adaptive management

As the management activities progress, their outcomes will be recorded here, and changes incorporated into the Management Plan.

**Table 1:** Timeline of management activity on Kiritimati. It will be used to plot the progress of treatment and to record changes after re-evaluation of each step. Appendices 7 and 8 contains detail of each treatment and monitoring event, which is summarised here.

<b>Date</b>	<b>Activity</b>	<b>Results</b>	<b>Outcomes</b>
April 2015	Treatment	Rain prevented broadcast baiting and recruitment to bait stations was very low.	A return visit in July 2015 is necessary. Research will be undertaken prior to decide which parameters (matrix composition, use of stations vs broadcast etc.) need to be revised.
August 2015	Treatment	Following delimiting and pre-treatment monitoring AntOff bait was broadcast using manual operated bait spreaders throughout the infested area. Building interiors and sheltered exterior areas were treated with ATTRATHOR and/ or Vanquish Pro. Initial treatment was followed up with spot treatment after two days. This treatment was followed by post treatment monitoring	<p>Broadcast bait was rapidly picked up by YCA foragers. Recruitment to Vanquish Pro was also rapid – particularly around the fisheries Buildings. However several bursts of rain following distribution of the AntOff bait softened the Antoff granules and may have compromised its attractiveness to ants. For this reason, follow up baiting was undertaken four days later in areas where ants remained active. This follow up baiting was supplemented with a combination of ATTRATHOR and Vanquish Pro in sheltered areas.</p> <p>Yellow crazy ant activity was noticeably reduced five days after baiting was completed, however we are still awaiting final monitoring results from our Kiritimati partners. A large number of poisoned millipedes and woodlice was observed around the Fisheries building. This was not perceived as a problem by WCU or ALD staff and no other non-target poisoning was observed. Depending on the results of final Monitoring by WCU/ALD staff, a follow up treatment may be required in October/November</p>
October 2015	Monitoring OR Delimiting and Treatment	Preliminary monitoring indicated that YCA are still present in the treatment area, however they appear to be at much lower abundance and patchily distributed through the treatment area.	The YCA are now patchily distributed and appear to be at lower abundance. This reduction in worker numbers may make it difficult to get sufficient poison into nests in order to kill them. Heavy rain and staff absences due to public holidays and other commitments hampered treatment. Monitoring is required in December/January likely followed by spot treatments.

		Spot treatments of ATTRATHOR, Vanquish-Pro and AntOff were applied resulting in further reductions in ant numbers, but not eradication.	
March 2016 (originally scheduled for November then January 2016)	Monitoring	Katareti Taabu performed a visual survey of the 2015 treatment area. No evidence found of YCA South of CCH's boat yard. However, YCA were still present at the northernmost tip of the infested area and were seen foraging near the live fish export building and in the grounds of the gentleman that makes toddy (see October 14 <sup>th</sup> entry). Katareti expressed concern about a pile of rubbish outside the gentleman's house.	A further reduction in YCA abundance and distribution is evident. However, the YCA persist at the northern end of the initial infested area. Movement controls need to be put in place to prevent any YCA nesting in the observed pile of rubbish from being distributed elsewhere on the atoll. The remaining infestation needs to be treated before the end of April 2016 to minimise the chances of bait shyness if treatment is undertaken in August, 2016.
September 2016	Monitoring OR Delimiting and Treatment		
2017	Monitoring (3 events)		
2018	Monitoring (3 events)		
2019	Monitoring (3 events)		

## 3 Communication Plan

### 3.1 Stakeholders

The primary Stakeholders have been identified as:

- Employees of the MLPID building yard
- MLPID water supply and sanitation project workers
- Government Fisheries Office workers
- Captain Cook Hotel boatyard workers
- Central Pacific Producers Limited (CPPL) workers
- Kiribati Shipping Service Limited workers
- Ministry of Commerce Industry Co-operatives workers
- Wildlife Conservation Unit workers
- MLPID generator housing workers.

#### 3.1.1 Roles and responsibilities of parties

<b>Organisation and Role</b>	<b>Responsibilities</b>
Pacific Biosecurity Activity Leader	<ul style="list-style-type: none"> <li>• Undertake treatment and monitoring on Kiritimati</li> <li>• Ensure appropriate parties (business owners on Kiritimati) are fully informed</li> <li>• Ensure all safety and mitigation measures are followed</li> <li>• Maintain professional practice</li> <li>• Report outcomes of monitoring as described</li> <li>• Comply with local law and cultural expectations</li> <li>• Ensure effective communication</li> <li>• Ensure that logistic requirements are met</li> </ul>
MELAD Support Activity on Kiritimati In-country logistics and liaison	<ul style="list-style-type: none"> <li>• Ensure staff participate in treatment and monitoring</li> <li>• Ensure staff receive training</li> <li>• Undertake monitoring independently (Years 3 – 5)</li> <li>• Ensure business owners informed</li> <li>• Comply with the safety guidelines</li> <li>• Adhere to the instructions given by Pacific Biosecurity</li> <li>• Participate in treatment</li> <li>• Raise concerns with appropriate parties</li> <li>• Report concerns to Pacific Biosecurity</li> <li>• Ensure effective communication</li> <li>• Ensure that logistic requirements are met</li> </ul>
Business owners on Kiritimati	<ul style="list-style-type: none"> <li>• Support the Activity</li> <li>• Comply with the safety guidelines</li> <li>• Raise concerns with appropriate parties</li> <li>• Report concerns to Pacific Biosecurity, ECD WCU, ALD</li> </ul>



### 3.1.2 Key messages

To ensure minimal disruption to daily life and maximum reduction of risks associated with insecticide treatment, affected stakeholders will be briefed prior to beginning of treatment. These risks include:

- Human exposure to toxins in Antoff bait (0.01ppm/10mg/kg) – no effects have previously been reported in association with the Antoff granular bait being used in the current Activity. However, exposure to large quantities of the active ingredient Fipronil, have been associated with the following symptoms: excessive sweating, nausea, vomiting, head ache, stomach pain, dizziness, weakness, seizures. There is one known case of a fifty year old man who sprayed fields with Fipronil for about five hours and complained of headache, nausea, weakness and dizziness. The symptoms emerged after about two hours and went away by themselves. Post treatment monitoring of participants and stakeholders will be put in place for early detection of any symptoms.
- Human exposure to toxins in Vanquish-Pro/Xstinguish bait paste – no effects have previously been reported in association with Vanquish Pro/Xstinguish bait paste. The active ingredient is the same as that in Antoff granular bait above (Fipronil) and the same symptoms would be expected if a person was to consume a large amount. This bait is covered by the same post treatment monitoring as described above.
- Human exposure to toxins in ATTRATHOR bait - no effects have previously been reported in association with ATTRATHOR targeted insecticide. The active ingredient is the same as that in Antoff granular bait above (Fipronil) and the same symptoms would be expected if a person was to consume a large amount. This bait is covered by the same post treatment monitoring as described above.
- Disruption of business activities- a team of up to ten people will be distributing Antoff, Vanquish-Pro/Xstinguish and ATTRATHOR around the Ronton commercial district. It is unlikely there will be significant disruption to business activities
- Non target poisoning (domestic animals and wildlife) – Fipronil is toxic to a wide variety of beneficial invertebrates including crabs and spiders. Animals and birds are unlikely to be affected as the baits contain extremely low concentrations of poison (0.01-0.26g/kg). However, caution should be exercised in allowing domestic animals (such as chickens and cats) to roam freely in the treatment area
- Contamination of water or lagoon - Fipronil is highly toxic to fish and marine invertebrates such as crabs. However, the Fipronil will not be applied near open water or when rain is expected in order to minimise any chance of run-off.



The briefing outlines ways to reduce risk from the treatment of ant infestations with Antoff, Vanquish Pro/Xstinguish and ATTRATHOR baits. This includes:

- Appropriate personal protective equipment (PPE) will be distributed to all participants. Because the granular bait is being distributed using mechanical spreaders filled using scoops, nitrile gloves are the only PPE deemed necessary for this operation. Similarly, Vanquish Pro/Xstinguish is distributed from the nozzle of a sealed cartridge and nitrile gloves are the only PPE required for this operation. ATTRATHOR is diluted with water and applied using a hand held garden squirt gun. Nitrile gloves will be supplied for dilution and a paper mask plus nitrile gloves will be supplied for application.
- In addition to briefing all stakeholders, warning posters in both English and Kiribati will be distributed around the treatment area.
- Timeline of management activity- it is anticipated that each application of bait will take a maximum of two days. The baiting teams will be moving constantly, so it is unlikely their presence will cause any disruption to local business activities. Similarly, it is estimated that Delimiting and Monitoring will take no more than one day each.
- Use of granular, paste and contact baits – because of the low concentration of Fipronil in these baits, it is unlikely that any domestic animal, native bird or reptile would be able to consume sufficient bait for the toxin to have an effect on them. Such animals would need to consume approximately their own body weight of Antoff to have a noticeable effect. Similarly the paste and contact bait will be distributed in such small quantities at widely spaced intervals and at a height greater than 1.5m that it is unlikely that such animals would consume enough to do them harm.
- Buffer zone near water and application during dry season – a buffer of 5 metres is being observed around the edge of all open water where no bait will be applied on the ground). In addition, the bait will be applied during the dry season to mitigate against the possible effects of rain washing the toxin into the lagoon.

In addition to briefings, signage (Appendix 1. Warning poster for Antoff Fipronil treatment) in Kiribati and English will be distributed around the treatment area.

## 3.2 Community awareness

To limit the spread of yellow crazy ant, in accordance with the Surveillance and containment plans, awareness materials will be distributed to community members.

### 3.2.1 Key messages

The key messages that need to be conveyed to the community are:

- What the pest is - a clear description of the yellow crazy ant accompanied by photographs. Give some information about the ants' biology particularly the need to kill queens rather than workers in order to destroy nests
- Why it is a problem – detailing the environmental (death or displacement of native birds, lizards, crabs and as well as other invertebrates), Economic (the ants "farm" mealybugs, whitefly, aphids and other pest insects, which reduce crop quality and yield and the ants' disruption of roots leading to plant death) and social (the ants are a nuisance in large numbers, disrupting everyday activities, biting, spraying acid and its association with secondary infections).

- How the ant spreads – an outline of the high risk pathways for the ant to spread: Copra, rubbish, fresh produce, passengers and their belongings, pipes, timber, machinery and vehicles that have been parked for a long time in high risk areas.
- Who to contact if an ant is discovered. Appoint a central officer or group that community members can contact if they detect something suspicious
- Prevention is better than cure! Stress that anything being moved from a high risk area must be checked or treated before departure.

### 3.3 Delimiting and baseline data gathering

In order to contain or eradicate an incursion of yellow crazy ant it is essential to first determine the limits of its distribution. The limit of the current yellow crazy ant incursion was initially determined in February, 2013, was revisited in February 2014 and February and April 2015 (Figure 1). The Management Plan is based on the results of these delimiting surveys. However, it is possible that the area infested by the ant may have significantly increased or decreased and follow up delimiting surveys will be conducted prior to commencement of each treatment round. Depending on the results of these surveys, management may need to be revised.

### 3.4 Delimiting surveys

Surveys are to be conducted by visual inspection. In addition, card counts (See section 5.2.2.2) are to be conducted to establish a baseline of ant density. As ants tend to forage most when temperatures are coolest during the morning the surveys will be conducted between 8:00 and 11:00am.

The infested area is surveyed, paying close attention to noni trees and any other flowering plants as well as suitable ground habitats such as clumps of grass, under stones and any debris that is easily lifted.

Searches will cover the area where the ants are known to occur (marked in yellow in Figure 1) and will spread out from there until no further ants are found for at least 100 metres.

There will be fewer ants farther from the main infestation, so they will be harder to detect. To avoid overlooking ants take a little longer looking - stand still for about a minute every five metres and watch for any ants during that time.

Even if ants are not seen, this can be because there are few of them. Sugar lures are used to increase chances of detection. Place a cotton wool ball or screwed up tissue soaked in sugar water every ten metres once no ants are found visually. Leave the sugar lures for 15 minutes and return to them. If there are yellow crazy ants present at the lures, mark the location and count and record the number present. Continue until no ants are found using the lures. A buffer of 100 metres should be added to this point. This is called the infestation boundary

### 3.5 Baseline data gathering

Card counts are a quick way of establishing yellow crazy ant density. The full methods for this technique are presented in the Monitoring plan (5.2.2.2.) below, but basically this involves counting the number of ants crossing a square of white card in a 30 second period.

### 3.6 Environmental impact measurement

In order to check for non-target impacts, any crabs, birds, lizards, fish, spiders or insects on the ground other than yellow crazy ants encountered during the visual survey will be recorded. It is not important to identify what is encountered beyond these six categories. Just make a tally of the number of each encountered on the sheet provided (Appendix 2).

## 4 Surveillance and containment plan

### 4.1 Surveillance

Ongoing surveillance is essential to catch incursions early before they become a bigger and harder problem to manage. However, surveillance can require a lot of resources, particularly in terms of peoples' time. Below are some simple low-cost actions that can identify incursions in their early stages. Other Monitoring protocols are presented in Appendix 5.

#### 4.1.1 Passive surveillance of ants

Surveillance capability can be increased by engaging the community. Posters, public talks and word of mouth can be used to raise general awareness of potential threat species. An example poster is included in Appendix 3. The poster should:

- State what the threat is
- Have a clear photograph of the threat species
- State why it is a pest
- State the possible consequences of establishment
- Give clear instructions who to report any sightings to

Posters should be placed in high risk and high value areas (See Table 2 below), as well as community gathering places (shops, post office, community halls etc.). It is important to have a centralised group or individual that people can report their sightings to and for these reports to be investigated promptly and for feedback to be given to the reporter.

**Table 2:** A list of areas in Kiritimati which represent either potential sites of infestation and spread of yellow crazy ants or sites where the establishment of yellow crazy ant would cause significant environmental or social problems

High Risk Areas	High Value areas
Ports and airports	Motu tabu conservation Island
Warehouse and holding area (Ronton)	Cook Island Conservation area
Boat departure area	Food storage areas
Hotels	

#### 4.1.2 Active surveillance of ants

When, undertaken periodically, visual surveillance of high risk and high value areas is the most cost effective means of actively monitoring for yellow crazy ants. The boundaries of the area of interest should be established and it should then be searched in its entirety paying particular attention to:

- Fruit trees, flowering plants or other food sources
- Sheltered or damp areas such as clumps of grass

- Under debris and easily moved stones.

At low densities yellow crazy ants may be difficult to observe. Use of sugar lures (a ball of cotton wool soaked in sugar water every ten metres will aid in discovery of any smaller populations of yellow crazy ant.

Note the location and record the limits of any populations found.

## 4.2 Movement controls

If incursion new population is discovered it must be prevented from spreading. There are two parts to the containment of Yellow crazy ant: restriction of natural spread and reducing the risk of jump dispersal.

Restriction of natural spread may be achieved by the placement of bait stations in high risk areas and at the periphery of the known distribution. Baiting is described in detail in section 5 Treatment and Monitoring below.

### 4.2.1 Reducing the risk of jump dispersal

The greater risk of spreading ants is via jump-dispersal associated with human transport. The first step required for reducing the risk of jump-dispersal is the identification of the high-risk pathways for transporting ants *out* of infested areas. In Kiritimati this is any activity that involves the movement of vehicles, machinery, plant material, rubbish or food from the infested area to other motu or atolls.

Yellow crazy ant was observed in the following areas (Figure 1) in February 2015. These locations should also be considered to be high risk:

- Captain Cook Hotel Store
- Central Pacific Producers Limited (CPPL) area
- Fisheries Office
- Powerhouse
- Copra warehouse

Materials and things that ants can use to be transported include:

- Copra and other plant products
- Stock moved from the Captain Cook Hotel Shop
- Fresh produce
- Passengers and their baggage
- Rubbish from any of the affected areas.
- Pipes
- Old stacked timber
- Potted plants
- Soil and debris
- Compost
- Mulch
- Landscaping bark
- Transport containers
- Uprooted plants

These items should be thoroughly inspected for ants before they are allowed to be removed from the high risk area.

There are two further steps to reduce the risk of jump dispersal:

- Control in high risk areas - this involves the placement of baits in high risk areas (i.e. those areas where an incursion has been identified). Protocols for treatment using baits are detailed in Section 5 below. In domestic structures where Antoff is not permitted for use, products such as Raid Bug Barrier may be used around windows, doors and other potential points of entry.
- Building awareness - poster campaigns and public talks are necessary to spread awareness of the incursion in the community. This is effectively an extension of passive surveillance (Section 4.1.1) with a focus on which items can potentially move ants.

## 5 Treatment and monitoring

The Treatment and Monitoring plan will be executed over a five year period and will be reviewed annually to establish whether baiting protocols need to be modified. Table 1 outlines the treatment plan. Depending on the results of the first Monitoring exercise, these plans may be modified.

**Table 1:** Approximate timetable of treatment and monitoring activities, based on treatment activities occurring in the dry season in Kiritimati. **Red / Bold** text indicates Pacific Biosecurity and in-country staff undertaking treatment / monitoring *Green / Italics* text indicates in-country staff independently undertaking monitoring. Years are from June to May.

Years 1 – 2			Years 3 – 5		
April	September	January	April	September	January
	<b>Monitoring</b>		<b>Monitoring</b>		<b>Monitoring</b>
	<b>OR</b>		<b>OR</b>		<b>OR</b>
<b>Treatment</b>	<b>Delimiting/ Treatment</b>	<i>Monitoring</i>	<b>Delimiting/ Treatment</b>	<i>Monitoring</i>	<b>Delimiting/ Treatment</b>

### 5.1 Treatment Standard Operating Procedures (SOPs)

#### 5.1.1 Schedule for activities during treatment

These are the general activities required during each round of treatment. The actual activities, their outcomes and any issues are recorded in Appendix 7, which are summarised in Section 2.2.

##### Day 1.

ALD and ECD meet to discuss treatment activities for the week Safety briefing and ensure all safety gear etc. is available to staff. Demonstration of safe spreader, ATTRATHOR and Vanquish Pro Use.

##### Day 2.

Morning: Visual delimiting and baseline data gathering of the infestation

Afternoon: Communication with affected stakeholders. Put up warning signs around treatment area.

### **Day 3.**

8:00 -11:00 am Review team safety. Start treatment. Initially, four spreader operators will broadcast AntOff bait over the infested area. These operators will be supported by one person carrying bait and refilling the spreaders plus a supervisor ensuring no bait is spread within 5m of the high tide mark.

11:00-3:00 Break

3:00-6:00 Finish Treatment with spreaders (if necessary), then the group will split into two teams. One team will place Vanquish-Pro bait around the derelict building areas and where appropriate around the fisheries and tourism office. The second team will apply ATTRATHOR inside the fisheries building, the James Cook Hotel Store, the Water Supply Building and the copra warehouse. A supervisor will move between the two groups.

### **Day 4.**

8:00am start. Continue treatment if not finished.

### **Days 5 - 7.**

If treatment is finished these days are more flexible. Undertake:

- Health survey for all people involved in treatment activity including stakeholders
- Monitoring of effects of the treatment, including communication with affected stakeholders.

#### **5.1.2 Health and safety**

The active ingredient being used in this treatment is Fipronil, an insect neurotoxin. The toxin is in low (0.01-0.26g/Kg) concentration in either a fishmeal-based attractant bait called Antoff, a carbohydrate and protein based attractant paste or a micro-encapsulated contact film. Because of this low concentration, no significant health effects are expected from short term exposure to these products. However, as a precaution all participants in this treatment will be issued with the following personal protective equipment (PPE):

- Nitrile gloves
- Paper dust masks will also be supplied for team members using ATTRATHOR.

In addition, all participants are encouraged to wear long sleeved shirts, closed shoes and long trousers to minimise risk of any skin contact with bait.

Key messages related to bait containing Fipronil:

- Fipronil may be harmful if swallowed, inhaled or absorbed through the skin. Fipronil may cause damage to the nervous system from repeated oral exposure at high doses. However, the yellow crazy ant management programme will apply baits containing very small doses of the insecticide Fipronil (0.01g (Antoff), 0.1g (Vanquish Pro/Xstinguish) or 0.26g (ATTRATHOR) of the active ingredient per Kilogram of bait).
- All pesticides will be kept out of reach of children and while using the baits staff will use appropriate PPE and shall not eat, drink or smoke. In the literature no ill effects on humans have been reported through use of the Fipronil.
- Potential risks to human health will be mitigated by fully communicating these risks to the community, placing restrictions (withholding periods) on food

harvesting, close supervision of children, and following all safety precautions during bait application.

- If it is suspected that health effects are occurring during the implementations of this Management Plan, treatment may be discontinued at the discretion of the community.
- After the treatment is completed there will be an exit health survey. This survey will be confidential and is designed to ensure that any adverse health effects of bait use will be detected early and can be dealt with appropriately. No health effects are expected.

Key precautions regarding the use of Fipronil:

- Any insecticide, including Fipronil, must be applied as per specific procedures in technical information sheets.
- Minimize bait waste (toxin release) and maximize bait effectiveness by following the guidelines described in the treatment section (below).
- Follow product label instructions, MSDS (Material Safety Data Sheet) and any other factsheet provided by Pacific Biosecurity or MELAD containing information regarding the correct use of Fipronil baits.
- Health and safety standards will be adhered to by villagers and any other staff participating on the baiting programme.
- At the end of each baiting session and before meals, remove protective gloves and wash hands. Then, wash face with soap and clean running water.

### 5.1.3 Mitigation of social and environmental risks

The following actions will be taken to minimize social and environmental risks related to the baiting programme:

- DO NOT apply the bait if rain is expected over the next 5 hours.
- to minimise non-target effects the bait is being distributed in the dry season and will not be spread on ground less than five metres away from any open water (i.e. the lagoon or ocean shore)
- Around dwellings, granular bait shall not be applied directly on the ground, but either bait paste or contact bait may be discretely applied as appropriate.
- To minimise the risk of bait being tampered with by young children, bait paste and contact bait will be applied at a minimum height of 1.5 metres.
- Notification of treatment. All residents of Ronton will be notified and provided with a copy of treatment information factsheet as well as health and safety instructions.
- If landowners are not present at the time of application, a notice will be left explaining that toxic baits have been applied along with a treatment factsheet attached.
- In the event a landowner does not consent to the application of toxic baits, Pacific Biosecurity will clarify that the yellow crazy ant baiting programme is necessary and notify the local officers.
- Any concerns raised by villagers regarding the baiting programme will be addressed by providing them with a treatment factsheet and referring them to Pacific Biosecurity and local ALD and ECD officers.
- Prior to the commencement of treatment, all noni fruit within the treatment area will be harvested, bagged and removed from the area. Any other edible crops in the treatment area should also be removed.



#### Withholding periods for crop harvesting

- Fipronil in the form of AntOff granular bait, Vanquish Pro/Xstinguish bait paste and ATTRATHOR contact bait are considered to be very low risk in terms of secondary or indirect poisoning effects in humans or livestock.
- These baits are highly unlikely to transfer active ingredients into plants through dermal contact with leaf surfaces. Fipronil is also immobile in soil and so is highly unlikely to be transferred into plant structures through transpiration through soil contamination.
- Notwithstanding, it is considered prudent to apply a withholding period in areas where treatments have occurred and food crops are grown as a precaution, despite it probably being an unnecessary step.
- There is no withholding period listed for any granular products containing Fipronil on crops, however there are withholding periods for liquid sprays containing Fipronil that are applied directly to foliage that vary from 7 days to 42 days depending on plant species.
- For this reason it is considered precautionary to use a 42 day withholding period for crops harvesting in the treated areas.

#### Withholding periods for animal harvesting

- Limited accumulation of toxin has been observed in muscle tissue of some crustaceans (crayfish, copepods)
- No animals should be harvested for food from the treatment area during treatment or in the period after while bait is still visible on the ground.

#### 5.1.4 Staffing requirements

The first round of treatment will be undertaken by two teams of four people and a supervisor. The teams will carry out the bait application. Each team will comprise:

- Four people operating bait spreaders,
- one spreader support person carrying the bait
- one person applying ATTRATHOR
- two people applying Vanquish Pro/Xstinguish
- one supervisor

Specific roles will be allocated on the day. The teams will comprise the following personnel:

- 4-5 ALD personnel
- 4-5 ECD Personnel
- 1-2 PB personnel

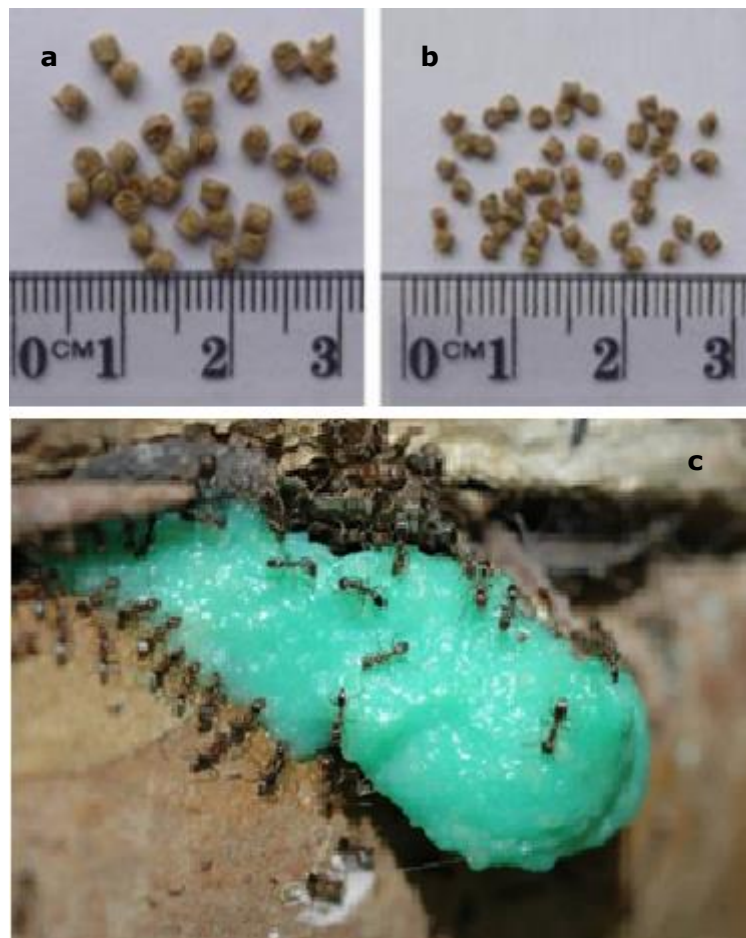
## 5.1.5 Ant treatment materials

### 5.1.5.1 Pesticide descriptions

A copy of the Material Safety Data Sheet for each of these products can be found in Appendix 4.

#### 5.1.5.1.1 Antoff® bait

Antoff® bait will be the main bait used for the control of Yellow crazy ants. The active ingredient in the bait, Fipronil, is a slow acting poison that works on the ants' neuro-system. The bait is in granular in form (Figure 2a and 2b) and will be distributed at a base rate of 10 kg per hectare using manual spreaders. In areas of high infestation an additional application may be required.



**Figure 2:** (a) Antoff bait granules standard size and (b), smaller size (c) Vanquish Pro/Xstinguish insecticide paste

#### 5.1.5.1.2 Vanquish Pro or Xstinguish

Where broadcast bait is inappropriate because it might be handled by small children or eaten by cats or other domestic animals, targeted baiting will be employed. Vanquish Pro or Xstinguish Fipronil based paste baits, will be used in exterior areas. These baits take the form of a green paste, similar in consistency to toothpaste. The paste is distributed in small quantities at three metre intervals in well-hidden spots such as under window ledges or in crevices found in brickwork.

### 5.1.5.1.3 ATTRATHOR

For building interiors, ATTRATHOR, a targeted contact bait, will be used. ATTRATHOR is supplied as a milky white liquid concentrate containing two components - an attractant and a toxicant (Fipronil) each bound in gel-based micro-capsules. The ATTRATHOR concentrate contains 2.6 g Fipronil/litre. It must be stored in a secure area away from drains that open on to the lagoon or into the sea.

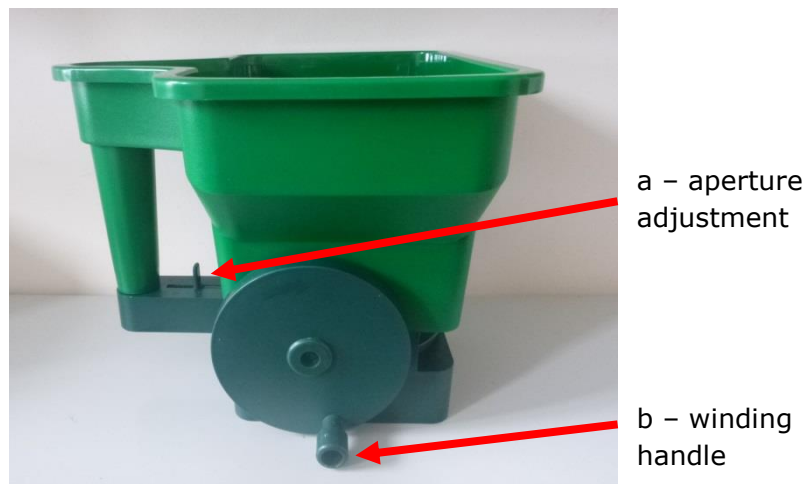
The concentrate is diluted with water at a rate of 10ml of ATRATHOR per litre of water and applied using a standard hand held plant watering bottle. Once the water has evaporated, an invisible film of ATTRATHOR is left behind. This film is attractive to ants and the Fipronil toxin is picked up by the ants when they walk over it.

## 5.1.6 Pesticide application

### 5.1.6.1 Antoff® bait

#### 5.1.6.1.1 Hand held spreaders

These will be supplied by Pacific Biosecurity. The spreaders feature a hopper for holding the bait, a winding handle that agitates the bait and scatters it over the ground, and an adjustable opening that is used to control the amount of bait that is spread.



**Figure 3:** Hand held bait spreader of the type to be used, showing the winding handle (a), the aperture adjustment (b) and correct grip. The aperture should be set at “3”, but may require adjustment to ensure appropriate flow of bait for the terrain and speed of distribution.

With the aperture set at “3” (see Figure 3), the operator winds the spreader handle while walking at a normal pace. The swath width will be approximately 2.5 metres. Application is undertaken by each operator walking in a straight line from one end of the infested area to the other spreading the bait evenly. When a boundary is reached the operator turns and walks back the other way so that the new swath overlaps the previous one by about half a metre.

When multiple operators are treating the same area, they form a line along the boundary of the treatment area. The operators should be spaced approximately 2.25m apart. An easy way to check this is for each operator to hold their arms out parallel to the ground

whilst holding a spreader in one hand. There should be about 30cm between the spreader and the tip of the next operator's fingers (Figure 4).



**Figure 4:** Environment officers check their spacing before commencing bait spreading. Officers are spaced two arms lengths plus the width of one spreader apart. This ensures that the swaths of bait from each spreader overlap.

As the operators move through the treatment area it is important that they remain in a straight line and move at a uniform pace as they pass from one end of the treatment area to the other. By maintaining equal spacing between operators and moving at an even pace it is possible to ensure that the entire treatment area is well covered with bait.

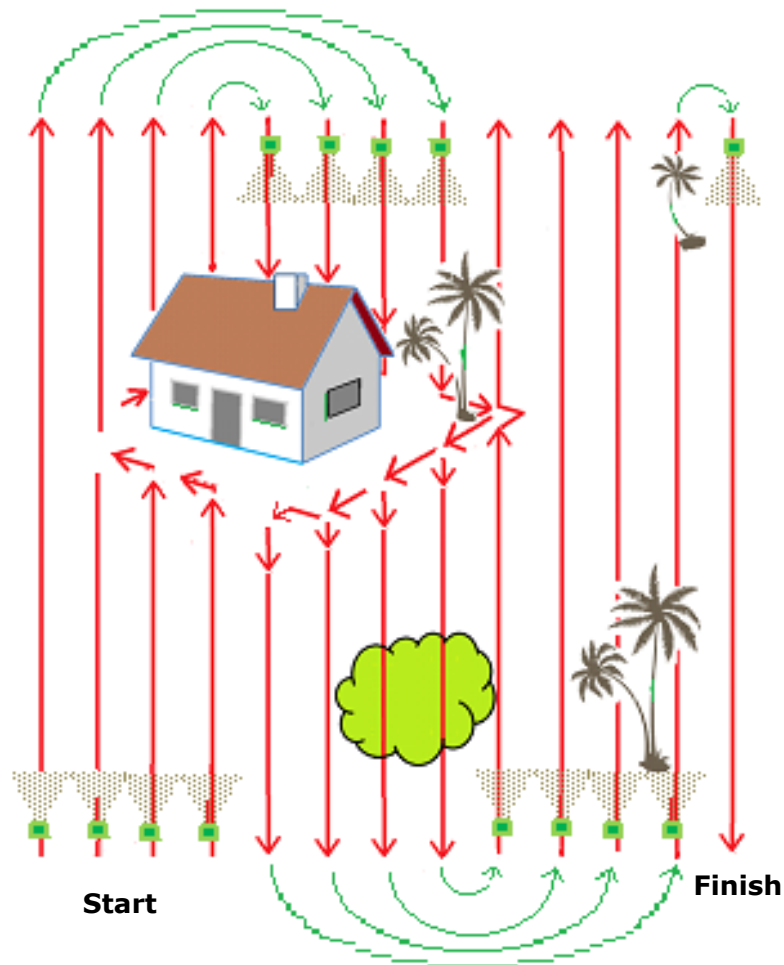
When the boundary is reached, the innermost operator in the treatment area turns around (180 degrees) and steps 2.25m further into the treatment area. The remaining operators regroup around the innermost operator and move back through the next segment of the treatment area. (Figure 5).

Staff will be trained and applications audited to ensure the correct amount is dispensed in all areas (10kg/ha). Staff will be trained to adjust distribution depending on terrain, movement speed and vegetation densities to maintain a 10kg/ha application rate.

Always make sure that:

- Bait is spread evenly
- The swaths overlap
- The spaces between buildings are covered
- No bait is spread within 5 metres of any open water
- No bait is spread within 5 metres of a residential building
- No bait is spread where domestic animals roam

Rainfall within 5 hours of treatment will reduce effectiveness so plan to conduct treatment when rain is not expected for 5 hours.



**Figure 5:** Example of a treatment path taken by four operators treating around an urban structure. The operators are spaced approximately 2.25m apart, and move as a group from one end of the treatment area to the other. The 2.5m swathes of bait overlap ensuring that the entire area is covered. The swath of Antoff bait on the return sweep (Brown dotted triangle and green box) should overlap the swath of the outward sweep. The green arrows show the pattern used for turning the group around. Where obstacles are encountered the operator moves around them taking note of their position. These areas will subsequently be treated with other baits such as Vanquish Pro or ATTRATHOR.

#### 5.1.6.1.2 Measuring bait use

It is important to measure the amount of bait being distributed. This can be achieved by measuring the amount of bait used in each spreader and the area treated.

Each spreader comfortably holds 1 kg of Antoff Bait. Use a 1litre measuring jug / cut off water bottle to fill the spreader; 750ml of AntOff bait equates to approximately 500g, so two 750ml scoops will fill the spreader with 1kg of bait.

The spreader creates a swathe of bait approximately 2.5 metres in diameter. At the optimum distribution rate of 10kg/ha, one spreader load should cover four 100 metre tracks (measured by GPS or paces\*).

If the spreader is empty before you have covered this area, reduce the aperture size and / or increase the speed at which you are covering ground.

Conversely, if there is still bait left after four 100 metre tracks consider increasing the aperture size and / or moving more slowly. In this case you should revisit the treatment area and supplement the bait already spread.

#### 5.1.6.2 Vanquish Pro/Xstinguish

Vanquish Pro/ Xstinguish is a green Fipronil based bait (Figure 3c) that is applied as a paste from a sealed syringe-like cartridge. A "blob" of bait approximately the size of a fingernail is applied to vertical surfaces or into cracks or crevices around buildings or on trees. Application of the paste should be spaced at approximately 3 metre intervals, where ants forage.

Like Antoff, Vanquish Pro/Xstinguish contains a very low concentration of Fipronil (0.1g/kg) and it is unlikely that a child could consume sufficient volume to have any toxic effects. However, the bait should be applied at heights greater than 1.5m to minimise the risk of younger children or roaming animals interfering with it.

#### 5.1.6.3 ATTRATHOR

ATTRATHOR is supplied as a milky white liquid concentrate containing two components - an attractant and a toxicant (Fipronil) each bound in gel-based micro-capsules. The ATTRATHOR concentrate contains 2.6 g Fipronil/litre. It must be stored in a secure area away from drains that open on to the lagoon or into the sea.

The concentrate is diluted with water at a rate of 10ml of ATRATHOR per litre of water and applied using a standard hand held plant watering bottle (Figure 2c.). The officer diluting the ATTRATHOR concentrate must wear nitrile gloves and should only dilute the ATTRATHOR in the secure area NOT in the field.

Once diluted, the solution contains approximately 0.26g of Fipronil/litre (0.26g /kg). A single squirt of ATTRATHOR is applied at a heights equal or greater than 1.5 metres and is repeated every 2-3 metres on a vertical surfaces such as beams, walls in building interiors. Once dry, the ATTRATHOR leaves a film, which is not visible to the human eye.





**Figure 6:** A standard hand held plant watering bottle used for the application of diluted ATTRATHOR solution.

## 5.2 Monitoring plan

Monitoring is used to measure the success of treatment and identify any non-target effects.

### 5.2.1 Social monitoring

#### 5.2.1.1 Health surveys

After the completion of treatment a two page health survey (Appendix 6) will be undertaken with all participants and stakeholders in the treatment area. This survey is confidential and has been designed to detect any of the possible health effects associated with high levels of exposure to Fipronil-based insecticides. No adverse health effects have been reported in association with Antoff granular baits previously.

### 5.2.2 Environmental Monitoring protocols

The monitoring protocols below have been adapted from the Northeast Arnhem Land Yellow Crazy Ant Eradication protocols

Control success can be assessed in three complementary ways:

1. Visual survey. A visual inspection will assess microsites (e.g. tree base, rock, and infrastructure) throughout an area, with each inspection spaced no further than 10 m apart. Each inspection should last for at least 5 seconds per microsite.
2. Attractive baits. Attractive bait will consist of a cotton ball or screwed up tissue soaked in sugar water. The bait is left for at least 15 minutes, and then inspected for the presence of ants.
3. Card counts. Card counts allow a quick assessment of ant density.

#### 5.2.2.1 Visual survey

This method requires a lot of walking and looking. It is best to conduct the visual survey between 6am-10am in the morning and 3pm – 6pm in the afternoon when high temperatures won't prevent ants from being active. If it is cloudy or cooler, these times can be extended.

Survey the entire area where ants are known to occur by walking around and noting occurrences of ants.

- Use a series of overlapping sweeps similar to the way bait was spread in Figure 4 above, (but including the buffer zones where bait stations were used) this will ensure the whole area is covered.
- When searching, disturb the litter layer, soil or infrastructure as it increases ant activity
- Pay particular attention to noni and other flowering plants in the area as they are likely to have ants on them.
- Ants are usually highly abundant within the centre of the infestation, and abundance declines towards the edges (i.e. the 'invasion front').



- It is important to record the edge of the invaded area. Use pink flagging tape to help define the boundaries of the infestation.
- Ants may be present but difficult to detect because abundance declines around the invasion front.
- To enhance detection, stop and observe for a minute or so until an ant is seen. Continue another 5 metres and look around until an ant is seen. Continue doing this until ants are no longer found and mark this with the pink flagging tape as the likely edge of the invasion.

#### 5.2.2.1.1 Monitoring non-target effects

During the visual survey record any crabs, spiders or insects other than yellow crazy ants encountered on the ground in the tally sheet used during the Delimiting and Baseline data Gathering section. See Appendix 2 for the sheet. In addition, record any dead birds, lizards or fish observed and their location.

The ecological outcomes of monitoring will be assessed and reviewed immediately after monitoring has taken place, and reported back to the stakeholders. If monitoring uncovers unforeseen negative impacts, further treatment may be discontinued, but monitoring will continue.

#### 5.2.2.2 Attractive lures

Because visual surveys may overlook ants at very low abundances, attractive lures will be used up to 100 metres beyond the last observation of YCA recorded during the visual survey.

A 20% sugar solution is prepared using granulated sugar and water. Two to four squares of toilet paper are then rolled into a ball and soaked in the sugar solution to make the lure. These lures are then placed on the ground at approximately 10 metre intervals moving away from the delimited edge of the infestation up to a distance of 100 metres. The lures are left on the ground for 15-30 minutes.

Once 15-30 minutes have passed, the lures are revisited and checked for YCA. If YCA are observed their presence is recorded as the new edge of the infestation and further lures are placed up to 100 metres from the point of observation until no further ants are detected.

#### 5.2.2.3 Card counts

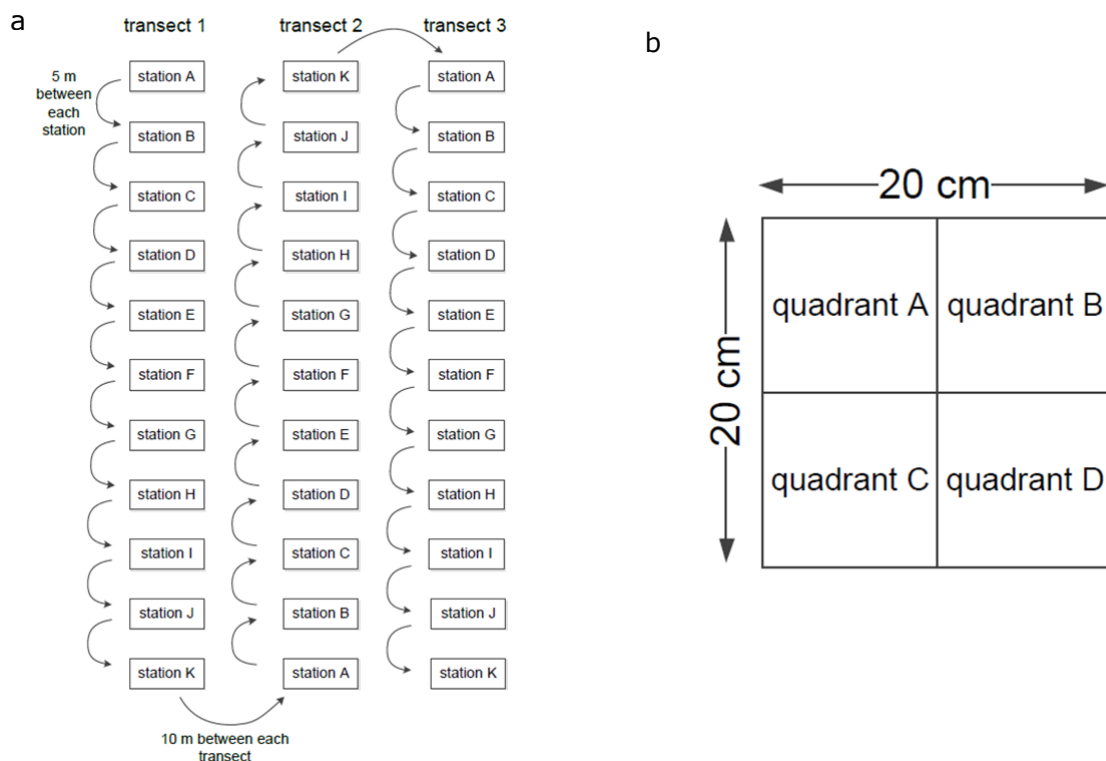
This assesses the density of yellow crazy ants using a count of the number of ants crossing a card in a 30 second period. Four monitoring sites should be randomly chosen per hectare. At each monitoring site measure *A. gracilipes* activity at 11 stations spaced at 5 m intervals along three replicate 50 m transects spaced 10 m apart (Figure 7a). Counts at all stations within each transect are summed, and the mean value of the three replicate transects is used as an index of relative abundance between sites. This method has only been used for yellow crazy ant, but may be applicable to other ants. Alternative means of assessing abundance require more technical knowledge, effort and time.

The card count procedure requires a card and a watch:

1. Make a square card (laminated is preferable as it is stronger and can be re-used, but a sheet of A4 paper works OK. The card / paper should measure 20 X 20 cm, and lines should be drawn on the card to divide it into 4 quadrants (Figure 7b).

2. Choose a starting station (e.g. Figure 5a transect 1, station A)
3. Clear a space on the ground large enough for the card and place the card on the ground
4. Watch the card for up to 20 seconds (time this) and note which of the quadrants is first crossed by an ant ('A', 'B', 'C' or 'D'). Stop timing when an ant has crossed one of the quadrants or at 20 seconds, whichever comes first. If no ants cross the card in 20 seconds use any quadrant for the next step.
5. For 30 seconds count the number of ants that cross the chosen quadrant. Record this number.
6. Move 5 metres (about 6 paces) to the next station (i.e. Figure 5a transect 1 station B). Repeat steps 3 – 5.
7. Repeat steps 3- 5 a total of 11 times so that 11 numbers are recorded (i.e. one for each station in this transect).
8. Move 10 metres (about 12 paces) across to start transect 2, point a.
9. Repeat steps 3 – 7 to complete transect 2.
10. Repeat steps 8 and 9 to complete transect 3.
11. The mean value for all 3 transects is the card count total for the monitoring site. Repeat the above steps for the other monitoring sites.

The card count procedure works well if there are three people: each person can do one transect (walking side-by-side 10 m apart) and the time taken is a lot less than one person alone.



**Figure 7:** (a) Sampling layout for card counts of yellow crazy ant activity. (b) card used for card counts. The cards do not have to be labelled with 'A', 'B', 'C' and 'D', the labels here are to illustrate the method.

## 5.3 Evaluation

### 5.3.1 Evaluate effectiveness of treatment

The target of this management plan is the eradication of the small incursion (covering approximately 1ha in the commercial area of Ronton) by the end of year 3.

Concern was raised during the consultation phase of the project over non target effects of baits, particularly cats, chickens and native wildlife.

Evaluation of the success of management. This section incorporates elements from the SPC General Emergency Response Plan for Invasive Ant Incursions (2008).

The targets outlined in the Activity Design for yellow crazy ant management are:

1. Yellow crazy ant infestation of the commercial area in Ronton eradicated by the end of Year 3
2. Monitoring in Years 3 – 5 finds no resurgence of yellow crazy ants in commercial area infestation

#### 5.3.1.1 Protocols

Infestations may be declared free of yellow crazy ant if both of the following conditions are met:

1. The area infested and the surrounding 50m buffer zone (where possible) has been treated with a broad scale coverage of Antoff ant bait at the rate of 10 kg per hectare.
2. No Yellow crazy ants are found after a minimum of two systematic surveys of the infested area and surrounding buffer zone, post-treatment conducted at least 12 months apart within a 2-year post-treatment timeframe. Surveys as per monitoring protocols above.

### 5.3.2 Evaluation of non-target effects of bait, particularly cats, chickens and native wildlife.

Mortality of non-target species is incorporated in the Monitoring protocols (5.2.2). If high levels of mortality are observed, comparison will be made between similar treated and untreated sites. If marked differences are found to be significant, discussions will be opened with MELAD about review of the management plan.

### 5.3.3 Review management plan

Based on the results of the evaluation above the management plan will be reviewed. It is possible, for example, that Treatment will be necessary in September instead of Monitoring as currently planned. All decisions made will be communicated to all stakeholders prior to implementation of the revised plan.

## 6 Acknowledgements

Dr Ray Pierce of EcoOceania provided updates on delimiting.

Dr Ben Hoffmann of CSIRO provided peer review of the Management Plan.

The Management Plan refers to the following documents:

- Antoff Fipronil Ant Bait MSDS
- ATTRATHOR Targeted Insecticide MSDS
- Doherty, N. (Pacific Invasives Initiative). 2013. Delimiting Surveys for Invasive Ants. Pacific Invasives Initiative, Auckland, New Zealand.
- Gruber, M. 2014. New Zealand Partnerships for International Development Fund Activity: Building resilience to biosecurity threats from invasive ants throughout the Pacific. Environmental and Social Impact Assessment (ESIA) for Outputs 4 & 5 (management of yellow crazy ant incursions in Tokelau and Kiribati)
- Gruber, M. 2014. New Zealand Partnerships for International Development Fund Activity: Building resilience to biosecurity threats from invasive ants throughout the Pacific. Activity Design (ADD)
- Hoffmann, B. 2009. Dhimurru Yellow Crazy Ant Management Plan- A report prepared for Dhimurru Aboriginal Corporation
- Pierce, R., Gruber, M. and Perez, M. 2013. Tokelau Invasive Species Action Plan
- SPC General Emergency Response Plan for Invasive Ant Incursions 2008
- Vanderwoude, C. 2013. Considerations for eradication, containment and longterm monitoring of little fire ants in Tahiti - Report to the Secretariat of the Pacific Regional Environment Programme
- Vanquish Pro Ant Bait MSDS
- Ward D.F. and Toft, R. 2011. Argentine ants in New Zealand. <http://argentineants.landcareresearch.co.nz/> (accessed 05/03/2015).
- Xstinguish Argentine Ant Bait MSDS



**NEW ZEALAND**  
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## 7 Appendices

### 7.1 Appendix 1. Warning poster for Antoff fipronil treatment



**POISON**

# **E KAMAMATE**

**(Fipronil)**



**POISON**

Wakinaki ngkai tiringan te Kinnongo ae te  
**Yellow Crazy Ant**

Man:





**TE BOITIN**

- TAI KUMEA TE BOITINKE NNEN TE BOITIN
- KARAROAIA ATAEI
- TAI KANA TE MWANAI, MAKAURO N TABO ARE E KABOITINAKI

**Ibukin rongorongona rik; Ata Binoka (ALD) ke Katareti Taabu (WCU)**

## 7.2 Appendix 2. Tally sheet for visual monitoring

This table should be used to record crabs, spiders and insects other than ants encountered on the ground during Visual Delimiting Surveys and Monitoring. It is not important to identify animals observed beyond these three classifications. The data collected will be used to assess any non-target effects of the treatment.

Simply use tally marks (III) in the appropriate column for each animal encountered.

<b>Before Treatment</b>					
Crab		Spider		Insect (other than YCA)	
Alive	Dead	Alive	Dead	Alive	Dead
Lizard		Bird		Fish	
Alive	Dead	Alive	Dead	Alive	Dead
<b>After Treatment</b>					
Crab		Spider		Insect (other YCA)	
Alive	Dead	Alive	Dead	Alive	Dead
Lizard		Bird		Fish	
Alive	Dead	Alive	Dead	Alive	Dead



7.3 Appendix 3. Awareness poster for yellow crazy ants

**KO NONORA TE KINNONGO AEI?**

**YELLOW CRAZY ANT (YCA)**

**KANGANGA AIKA A RIKI MAN TE KINNONGO**

Urua ke n tiringa te aroka

**E KANGA ARON TEINA KE KINAKINA**

- Angin te tai e kai nonora te tia mwakuri ao tiaki aia uea n aine.
- E biribiri n te aro n aki akaka
- A ananau waena ao ana antena
- Taan mwakuri abakina 3-5 mm
- Te Uea n aine e bubura riki nakon te tia mwakuri

**Yellow crazy ao Te tia mwakuri**

Tiringia maan aika uarereke, mania, mannikiba, ao te beru

E Kaotinakoa te aetite ao ni kamwengabuakaia aomata ni mwengaia ao n aia tabo ni mwakuri

**Te tia mwakuri (uarereke) ao te Uea n aine (bubura)**

**A KANGA NI MWAMWAE**

**E karabaia inanon**

- Uanikai ma amwarake tabeua
- Bwai ni kateitei
- Aroka ao te tano
- Te mange
- Te aia
- Bwai ni mwakuri aika bubura
- Bao ni mwamwananga

**NGKANA KO NORA TE KINNONGO AEI ke ko kani karekea riki rorongrongona ae bwanin ao reitaki ma aobitia man te ununiki ke te aobitin te man n te tarebon ae 65264.**

**A MAMA EKA IA**

- A kakaraoa ngaioia inanon ao iaan tabo n aron aikai
- Raewawa inanon taian auti ao kateitei
- Banikai, atibu ao kaai
- Barikoriko ni mange
- Banga ni mwanai
- Bwai ni mwakuri aika bubura
- Wakan taian aroka
- Kanni
- Barikoriko n aia

**PACIFIC BIOSECURITY** Cooperate. Control. Protect.

**Pacific INVASIVES INITIATIVE**

**NEW ZEALAND FOREIGN AFFAIRS & TRADE Aid Programme**

Boutokaki man te New Zealand Aid Programme. Rongorongo inanon te beba ae i aki riai



## 7.4 Appendix 4. Material Safety Data Sheets (MSDS) for the pesticides mentioned in this management plan

Material Safety Data Sheet: ANTOFF  
Date of Issue: 2<sup>nd</sup> September 2009

### 1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

**Product Name:** ANTOFF FIPRONIL ANT BAIT

**Recommended Use:** For the control of invasive ants.  
Not for domestic use. Use under permit only.

#### Supplier Details

**Company:** Animal Control Technologies (Australia) Pty Ltd  
**Address:** 46-50 Freight Drive Somerton Vic 3062, Australia  
**Telephone number:** 03 9308 9688 (Monday to Friday, 8:00a.m. – 5:00p.m.)  
**Emergency telephone number:** Poisons Information Centre 13 11 26 (24 hours)

### 2. HAZARDS IDENTIFICATION

**Hazard classification:** Not classified as a hazardous substance. Concentration of active ingredient in finished bait is below the lowest cut off level for classification as a hazardous substance according to the Australian Safety and compensation Council.  
Not classified as a dangerous good according to the Australian code for the transport of Dangerous goods.

**Risk phrase(s):** None

**Safety phrase(s):** None

**Poisons schedule number:** Unscheduled. (Technical grade fipronil is S5)

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

#### Ingredients

Chemical Name:	CAS Number:	Proportion (w/w):
Fipronil	120068-37-3	0.01g/kg (0.001% or 10ppm)
Other ingredients not determined to be hazardous		up to 100%

### 4. FIRST AID MEASURES

**First aid:** If poisoning occurs, contact a doctor or Poisons Information Centre. Have this MSDS or the label with you. Consult a doctor as needed.

**Swallowed:** If swallowed do not induce vomiting. Give a glass of water. Immediately contact poisons information centre.

**Eye:** Flush eyes with copious amounts for water for 15min and consult a doctor as needed.

**Skin:** Avoid skin contact. May cause skin irritation. Remove contaminated clothing and wash affected area with soap and water. Contact a doctor as needed.

**Inhaled:** May irritate the throat and nose and cause coughing. Remove from exposure to fresh air.

**Advice to doctor:** The amount of fipronil in this product is 0.001% and is well below 0.2%, which is the cut off to classification for a hazardous substance. Fipronil is a reversible gamma-aminobutyric (GABA) receptor inhibitor. During intoxication it will induce neurological stimulation with possible convulsions. Fipronil is slow to absorb through the gut and symptoms may be delayed by several hours to a day. Treat symptomatically.

## 5. FIRE FIGHTING MEASURES

Fire & explosion hazards: Bait is not readily combustible.  
Suitable extinguishing media: Carbon dioxide, water, dry agent, foam.  
Hazards from combustion: None known  
Special protective equipment: Fire fighters should wear full protective gear including self contained breathing apparatus. (AS/NZS 1715, 1716).

## 6. ACCIDENTAL RELEASE MEASURES

Spills and Disposal: Wear protective clothing including gloves to avoid contact with skin when cleaning up spills. Sweep up any spilled baits and dispose of in a marked and sealed container. Field persistence of fipronil is low to moderate with a half life water of 10-130h and soil of 45-530h. Do not dispose of spiled bait into subsoil/soil or into surface water/ground water.

## 7. HANDLING AND STORAGE

Precautions for safe handling: To avoid risks for man and environment the instructions for use on the product label are to be followed. Avoid all contact with the product and wear protective clothing and gloves.

Conditions for safe storage: Store in the closed, original container in a dry, cool, well ventilated area out of direct sunlight. Store in a locked room or place, away from children, animals, food, feedstuffs, seed and fertilisers and ignition sources. Fipronil is stable in normal temperatures for one year.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

National exposure standards: No occupation exposure standards have been established for the product.  
Biological limit values: No biological limit allocated.  
Engineering controls: The formulation of this product decreases the concentration of the active ingredient.  
Personal protective equipment: Avoid contact with skin. Wear rubber gloves when handling bait.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Brown small granule with a fish like odour  
pH: Not available  
Vapour pressure: Not applicable  
Vapour density: Not applicable  
Boiling point / range: Not applicable  
Freezing / melting point: Not available  
Solubility in water: 1.9mg/L at 20°C (Technical fipronil)

## 10. STABILITY AND REACTIVITY

Chemical stability:	Stable for extended time (>1 year) under normal storage and handling conditions less than 30°C.
Incompatible materials:	Fipronil is not stable in the presence of metal ions.
Hazardous decomposition products:	Fipronil is degraded by sunlight to produce a variety of metabolites one of which is fipronil-desulfinyl (MB 46513), which is more toxic than the parent compound.
Hazardous reactions:	No dangerous reactions known under normal conditions and use.

## 11. TOXICOLOGICAL INFORMATION

<i>Acute:</i>	Fipronil is a moderately hazardous pesticide and is classed by the WHO Class II pesticide. The low concentration in this product and the low application rate make this product non-hazardous by Australian worksafe standards. Fipronil has an oral LD <sub>50</sub> value in rats of 97mg/kg and a dermal LD <sub>50</sub> value of >2000mg/kg. Human toxicity data is not available. To absorb an LD <sub>50</sub> dose for a 200g rat the rat would need to eat approximately 194g of bait.
<i>Chronic:</i>	Fipronil is not mutagenic or teratogenic. In a chronic toxicity study fipronil caused an increase in the incidence of thyroid cancers in rats given the highest dose. The rat thyroid is more sensitive to chemical than the human thyroid and it is not considered to pose a risk of increased incidence of thyroid cancer in humans.

## 12. ECOLOGICAL INFORMATION

Do not contaminate streams, rivers or waterways with the chemical or used containers. Fipronil is highly toxic to fish and aquatic organisms and dangerous to bees. Fipronil is non-toxic to earth worms.

Persistence and degradability:	Field persistence of fipronil is low to moderate in soil and water. Fipronil has low mobility in soil when in water quickly settles into the sediment.
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## 13. DISPOSAL CONSIDERATIONS

Triple rinse and bury rinsate and empty containers in a local authority landfill. If no landfill is available, bury the containers below 0.5m in a disposal pit specifically marked and set up for this purpose clear of waterways, desirable vegetation and tree roots. Empty containers should not be burnt. Do NOT re-use containers for any other purpose.

## 14. TRANSPORT INFORMATION

This product is not classified as a dangerous good according to the Australian Dangerous Goods Code 7<sup>th</sup> Edn. (2007).

UN number:	Not applicable	UN proper shipping name:	Not applicable
Dangerous Goods Class:	Not applicable	Subsidiary Risk:	Not applicable
Packing group:	Not applicable	Hazchem code:	Not applicable

## 15. REGULATORY INFORMATION

Poisons schedule number:	Finished bait is unscheduled. (Technical grade fipronil is S5)
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## 16. OTHER INFORMATION

Date of Preparation of this MSDS: 2<sup>nd</sup> September 2009

This Material Safety Data Sheet (MSDS) has been developed using the following references:  
National Code of Practice for the Preparation of Material Safety Data Sheets 2<sup>nd</sup> Edn. [NOHSC:2011(2003)]  
Australian Dangerous Goods Code 7<sup>th</sup> Edn. (2007)  
Fipronil – Pestacides database, [www.pan-uk.org/pestnews/Actives/fipronil.htm](http://www.pan-uk.org/pestnews/Actives/fipronil.htm)

The physical values and properties described in this MSDS are typical values based on scientific literature and material produced to date, and are believed to be reliable. Animal Control Technologies provides no warranties, either expressed or implied and assumes no responsibility for the accuracy or completeness of the data contained herein. The information is supplied upon the condition that the persons receiving information will make their own determination as to the suitability for their purposes prior to use of this product. Due care should be taken to ensure that the use of this product and its disposal is in compliance with all relevant Federal, State and Local Government regulations.

End of MSDS



Double click on icon to view an electronic version of the MSDS → MSDS

**Section 1 - Identification of The Material and Supplier**

Ensystem Australasia Pty Ltd  
Unit 3, The Junction Estate  
AUBURN, NSW 2144  
13 35 36 (all hours)

Ensystem New Zealand Ltd  
17C Corinthian Drive  
Albany, Auckland 0752  
0800 ENSYSTE (0800 367 978)

**Chemical nature:** Fipronil is a phenylpyrazole derivative.

**Trade Name:** **ATTRATHOR™ Targeted Insecticide**

**Product Code:** Australia APVMA: 68053 New Zealand HSR Approval: HSR100803

**Product Use:** Agricultural insecticide for use as described on the product label.

**Creation Date:** November, 2013

**This version issued:** September, 2014 and is valid for 5 years from this date.

**Section 2 - Hazards Identification****Statement of Hazardous Nature**

This product is classified as: Xn, Harmful. N, Dangerous to the environment. Hazardous according to the criteria of SWA.

Not subject to the ADG Code when transported in Australia by Road or Rail in packages 500 kg(L) or less; or IBCs (refer to SP AU01). However if transported by Air or Sea, this provision does not apply. Then the product is classed as Dangerous (Class 9 Environmentally Hazardous) by IATA and IMDG respectively. See details below and in Section 14 of this SDS.

**Risk Phrases:** R48/22, R50/53. Harmful: danger of serious damage to health by prolonged exposure if swallowed. Very toxic to aquatic organisms, may cause long-term adverse effects to the aquatic environment.

**Safety Phrases:** S20, S36, S61, S24/25. When using, do not eat or drink. Wear suitable protective clothing. Avoid release to the environment. Refer to special instructions/Safety Data Sheets. Avoid contact with skin and eyes.

**SUSMP Classification:** S5

**ADG Classification:** Class 9: Miscellaneous Dangerous Goods.

**UN Number:** 3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.

**GHS Signal word: WARNING****HAZARD STATEMENT:**

H373: May cause damage to organs through prolonged or repeated exposure.

H410: Very toxic to aquatic life with long lasting effects.

**PREVENTION**

P102: Keep out of reach of children.

P260: Do not breathe fumes, mists, vapours or spray.

P281: Use personal protective equipment as required.

**RESPONSE**

P314: Get medical advice or attention if you feel unwell.

P352: Wash with plenty of soap and water.

P301+P330+P331: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P332+P313: If skin irritation occurs: Get medical advice.

P337+P313: If eye irritation persists: Get medical advice.

P391: Collect spillage.

P370+P378: Not combustible. Use extinguishing media suited to burning materials. Alcohol resistant foam is the preferred firefighting medium but, if it is not available, normal foam can be used.

**STORAGE**

P402+P404: Store in a dry place. Store in a closed container.

P410+P403: Protect from sunlight. Store in a well-ventilated place.

**DISPOSAL**

P501: Dispose of contents and containers as specified on the registered label.

**SAFETY DATA SHEET**

Issued by: Ensystem Australasia Pty Ltd

Phone: 13 35 36 (ALL HOURS)

Poisons Information Centre: 13 11 26 from anywhere in Australia, (0800 764 766 in New Zealand)



### Emergency Overview

**Physical Description & Colour:** Milky white liquid.

**Odour:** Mild, characteristic odour.

**Major Health Hazards:** In a toxicity study involving rats, the clinical signs of toxicity did not reach their peak until two days after treatment in some animals, and deaths did not occur until four days after treatment. Some signs of toxicity and body-weight loss were still evident when the observation period ended at day 7 after treatment.

In rabbits, skin contact Fipronil induced deaths and one or more clinical signs of toxicity including convulsions, sluggishness, salivation, spasms, tremors, hyperactivity, diarrhoea, emaciation, and perioral and perinasal red discolouration in all groups except that at the lowest dose (100 mg/kg).

Clinical signs of oral toxicity included tremors and convulsions of various types, effects on activity or gait, hunched posture, wetness in various body areas, and seizures.

### Potential Health Effects

#### Inhalation:

**Short Term Exposure:** Available data indicates that this product is not harmful. However product may be mildly irritating, although unlikely to cause anything more than mild transient discomfort.

**Long Term Exposure:** No data for health effects associated with long term inhalation.

#### Skin Contact:

**Short Term Exposure:** Available data indicates that this product is not harmful. It should present no hazards in normal use. However product may be irritating, but is unlikely to cause anything more than mild transient discomfort.

**Long Term Exposure:** No data for health effects associated with long term skin exposure.

#### Eye Contact:

**Short Term Exposure:** This product may be irritating to eyes, but is unlikely to cause anything more than mild transient discomfort.

**Long Term Exposure:** No data for health effects associated with long term eye exposure.

#### Ingestion:

**Short Term Exposure:** Significant oral exposure is considered to be unlikely. However, this product may be irritating to mucous membranes but is unlikely to cause anything more than transient discomfort.

**Long Term Exposure:** No data for health effects associated with long term ingestion.

#### Carcinogen Status:

**SWA:** No significant ingredient is classified as carcinogenic by SWA.

**NTP:** No significant ingredient is classified as carcinogenic by NTP.

**IARC:** No significant ingredient is classified as carcinogenic by IARC.

### Section 3 - Composition/Information on Ingredients

Ingredients	CAS No	Conc,%	TWA (mg/m <sup>3</sup> )	STEL (mg/m <sup>3</sup> )
Fipronil	120068-37-3	2.6	not set	not set
Other non hazardous ingredients	various	<10	not set	not set
Water	7732-18-5	to 100	not set	not set

This is a commercial product whose exact ratio of components may vary slightly. Minor quantities of other non hazardous ingredients are also possible.

The SWA TWA exposure value is the average airborne concentration of a particular substance when calculated over a normal 8 hour working day for a 5 day working week. The STEL (Short Term Exposure Limit) is an exposure value that may be equalled (but should not be exceeded) for no longer than 15 minutes and should not be repeated more than 4 times per day. There should be at least 60 minutes between successive exposures at the STEL. The term "peak" is used when the TWA limit, because of the rapid action of the substance, should never be exceeded, even briefly.

### Section 4 - First Aid Measures

#### General Information:

You should call The Poisons Information Centre if you feel that you may have been poisoned, burned or irritated by this product. The number is 13 11 26 from anywhere in Australia (0800 764 766 in New Zealand) and is available at all times. Have this SDS with you when you call.

**Inhalation:** No first aid measures normally required. However, if inhalation has occurred, and irritation has developed, remove to fresh air and observe until recovered. If irritation becomes painful or persists more than about 30 minutes, seek medical advice.

### SAFETY DATA SHEET

Issued by: Ensysstex Australasia Pty Ltd

Phone: 13 35 36 (ALL HOURS)

Poisons Information Centre: 13 11 26 from anywhere in Australia, (0800 764 766 in New Zealand)



**Skin Contact:** Wash gently and thoroughly with water (use non-abrasive soap if necessary) for 5 minutes or until chemical is removed.

**Eye Contact:** No effects expected. If irritation does occur, flush contaminated eye(s) with lukewarm, gently flowing water for 5 minutes or until the product is removed. Obtain medical advice if irritation becomes painful or lasts more than a few minutes. Take special care if exposed person is wearing contact lenses.

**Ingestion:** If product is swallowed or gets in mouth, do NOT induce vomiting; wash mouth with water and give some water to drink. If symptoms develop, or if in doubt contact a Poisons Information Centre or a doctor.

### Section 5 - Fire Fighting Measures

**Fire and Explosion Hazards:** The major hazard in fires is usually inhalation of heated and toxic or oxygen deficient (or both), fire gases. There is little risk of an explosion from this product if commercial quantities are involved in a fire.

Only small quantities of decomposition products are expected from this product at temperatures normally achieved in a fire. This will only occur after heating to dryness.

Fire decomposition products from this product may be toxic if inhaled. Take appropriate protective measures.

**Extinguishing Media:** Not combustible. Use extinguishing media suited to burning materials. Alcohol resistant foam is the preferred firefighting medium but, if it is not available, normal foam can be used. Try to contain spills, minimise spillage entering drains or water courses.

**Fire Fighting:** If a significant quantity of this product is involved in a fire, call the fire brigade. There is little danger of a violent reaction or explosion if significant quantities of this product are involved in a fire. Recommended personal protective equipment is full fire kit and breathing apparatus.

<b>Flash point:</b>	Does not burn.
<b>Upper Flammability Limit:</b>	Does not burn.
<b>Lower Flammability Limit:</b>	Does not burn.
<b>Autoignition temperature:</b>	Not applicable - does not burn.
<b>Flammability Class:</b>	Does not burn.

### Section 6 - Accidental Release Measures

**Accidental release:** In the event of a major spill, prevent spillage from entering drains or water courses. As a minimum, wear overalls, goggles and gloves. Suitable materials for protective clothing include rubber, PVC, Viton. Eye/face protective equipment should comprise as a minimum, protective goggles. If there is a significant chance that vapours or mists are likely to build up in the clean-up area, we recommend that you use a respirator. Usually, no respirator is necessary when using this product. However, if you have any doubts consult the Australian Standard mentioned below (section 8). Otherwise, not normally necessary.

Stop leak if safe to do so, and contain spill. Absorb onto sand, vermiculite or other suitable absorbent material. If spill is too large or if absorbent material is not available, try to create a dike to stop material spreading or going into drains or waterways. Because of the environmentally hazardous nature of this product, special care should be taken to restrict release to waterways or drains. Sweep up and shovel or collect recoverable product into labelled containers for recycling or salvage, and dispose of promptly. Recycle containers wherever possible after careful cleaning. Refer to product label for specific instructions. After spills, wash area preventing runoff from entering drains. If a significant quantity of material enters drains, advise emergency services. Full details regarding disposal of used containers, spillage and unused material may be found on the label. If there is any conflict between this SDS and the label, instructions on the label prevail. Ensure legality of disposal by consulting regulations prior to disposal. Thoroughly launder protective clothing before storage or re-use. Advise laundry of nature of contamination when sending contaminated clothing to laundry.

### Section 7 - Handling and Storage

**Handling:** Keep exposure to this product to a minimum, and minimise the quantities kept in work areas. Check Section 8 of this SDS for details of personal protective measures, and make sure that those measures are followed. The measures detailed below under "Storage" should be followed during handling in order to minimise risks to persons using the product in the workplace. Also, avoid contact or contamination of product with incompatible materials listed in Section 10.

**Storage:** This product is a Scheduled Poison. Observe all relevant regulations regarding sale, transport and storage of this schedule of poison. Check packaging - there may be further storage instructions on the label.

## SAFETY DATA SHEET

Issued by: Ensystex Australasia Pty Ltd

Phone: 13 35 36 (ALL HOURS)

Poisons Information Centre: 13 11 26 from anywhere in Australia, (0800 764 766 in New Zealand)



### Section 8 - Exposure Controls and Personal Protection

The following Australian Standards will provide general advice regarding safety clothing and equipment:

Respiratory equipment: AS/NZS 1715, Protective Gloves: AS 2161, Occupational Protective Clothing: AS/NZS 4501 set 2008, Industrial Eye Protection: AS1336 and AS/NZS 1337, Occupational Protective Footwear: AS/NZS2210.

**SWA Exposure Limits**                      **TWA (mg/m<sup>3</sup>)**                      **STEL (mg/m<sup>3</sup>)**

Exposure limits have not been established by SWA for any of the significant ingredients in this product.

The ADI for Fipronil is set at 0.0002mg/kg/day. The corresponding NOEL is set at 0.02mg/kg/day. ADI means Acceptable Daily Intake; NOEL means No-observable-effect-level. Data from Australian ADI List, Dec 2012.

No special equipment is usually needed when occasionally handling small quantities. The following instructions are for bulk handling or where regular exposure in an occupational setting occurs without proper containment systems.

**Ventilation:** This product should only be used in a well ventilated area. If natural ventilation is inadequate, use of a fan is suggested.

**Eye Protection:** Eye protection such as protective glasses or goggles is recommended when this product is being used.

**Skin Protection:** You should avoid contact even with mild skin irritants. Therefore you should wear suitable impervious elbow-length gloves and facial protection when handling this product. See below for suitable material types.

**Protective Material Types:** We suggest that protective clothing be made from the following materials: rubber, PVC, Viton.

**Respirator:** Usually, no respirator is necessary when using this product. However, if you have any doubts consult the Australian Standard mentioned above. Otherwise, not normally necessary.

### Section 9 - Physical and Chemical Properties:

<b>Physical Description &amp; colour:</b>	Milky white liquid.
<b>Odour:</b>	Mild, characteristic odour.
<b>Boiling Point:</b>	Approximately 100°C at 100kPa.
<b>Freezing/Melting Point:</b>	Approximately 0°C.
<b>Volatiles:</b>	Water component.
<b>Vapour Pressure:</b>	2.37 kPa at 20°C (water vapour pressure).
<b>Vapour Density:</b>	As for water.
<b>Specific Gravity:</b>	1.0 approx.
<b>Water Solubility:</b>	Completely soluble in water.
<b>pH:</b>	5-7 (as supplied)
<b>Volatility:</b>	No data.
<b>Odour Threshold:</b>	No data.
<b>Evaporation Rate:</b>	As for water.
<b>Coeff Oil/water Distribution:</b>	No data
<b>Autoignition temp:</b>	Not applicable - does not burn.

### Section 10 - Stability and Reactivity

**Reactivity:** This product is unlikely to react or decompose under normal storage conditions. However, if you have any doubts, contact the supplier for advice on shelf life properties.

**Conditions to Avoid:** Protect this product from light. Store in the closed original container in a dry, cool, well-ventilated area out of direct sunlight.

**Incompatibilities:** strong acids, strong bases, strong oxidising agents.

**Fire Decomposition:** Only small quantities of decomposition products are expected from this product at temperatures normally achieved in a fire. This will only occur after heating to dryness. Combustion forms carbon dioxide, and if incomplete, carbon monoxide and possibly smoke. Water is also formed. May form nitrogen and its compounds, and under some circumstances, oxides of nitrogen. Occasionally hydrogen cyanide gas in reducing atmospheres. May form oxides of sulphur (sulphur dioxide is a respiratory hazard) and other sulphur compounds. Most will have a foul odour. May form hydrogen chloride gas, other compounds of chlorine. May form hydrogen fluoride gas and other compounds of fluorine. Carbon monoxide poisoning produces headache, weakness, nausea, dizziness, confusion, dimness of vision, disturbance of judgment, and unconsciousness followed by coma and death.

**Polymerisation:** This product will not undergo polymerisation reactions.

### SAFETY DATA SHEET

Issued by: Ensystem Australasia Pty Ltd

Phone: 13 35 36 (ALL HOURS)

Poisons Information Centre: 13 11 26 from anywhere in Australia, (0800 764 766 in New Zealand)

### Section 11 - Toxicological Information

**Toxicity:** When Fipronil was administered as a single dose to mice or rats orally or by inhalation, deaths and signs of toxicity occurred at all or most doses in animals of each sex. Most or all of the deaths occurred within several days of treatment.

There is no data to hand indicating any particular target organs.

#### Classification of Hazardous Ingredients

Ingredient	Risk Phrases
Fipronil	>=1%Conc<3%: Xn; R48/22
<b>For Fipronil:</b>	
LD <sub>50</sub> (Oral), Rat 92 mg/kg	LD <sub>50</sub> (Oral), Mouse 91 mg/kg
LD <sub>50</sub> (Dermal), Rat >2000 mg/kg	LD <sub>50</sub> (Dermal), Rabbit 445 mg/kg
LC <sub>50</sub> (Inhal, 4hr), Mouse 0.36-0.42 mg/kg	
<b>For Product:</b>	
LD <sub>50</sub> (Oral), Rat >2,000 mg/kg	LD <sub>50</sub> (Dermal), Rat >2,000 mg/kg
Dermal Irritation (Rabbit): No irritation after 4 hours exposure	
Eye Irritation/ Corrosion, Rabbit: Not irritating for eye of rabbit	

### Section 12 - Ecological Information

Very toxic to aquatic organisms, may cause long-term adverse effects to the aquatic environment.

**For Fipronil:**

Fish: LC<sub>50</sub> bluegill sunfish (*Lepomis macrochirus*): 0.085mg/L

LC<sub>50</sub> rainbow trout: 0.248mg/L

LC<sub>50</sub> carp: 0.430mg/L

LC<sub>50</sub> Daphnia: 0.19mg/L

In laboratory studies, Fipronil has a half-life of 122-128 days in oxygenated sandy loam. In field studies, dissipation half-life on soil surfaces ranged from 0.7 to 1.7 months. Half-life of

Fipronil applied by soil incorporation ranged from 3 to 7.3 months. Residues remain mainly in the upper 30cm of soil.

Fipronil has low soil mobility - it binds to the soil and has little potential for groundwater contamination.

Fipronil degrades slowly in water and sediment that lack oxygen, with a half-life ranging from 116 to 130 days.

Fipronil is stable to breakdown by water at mildly acidic to neutral pH values.

When exposed to light, Fipronil has a half-life of 3.6 hours in water, and 34 days in loamy soil.

Toxic to bees. Toxic to aquatic organisms.

### Section 13 - Disposal Considerations

**Disposal:** Special help is available for the disposal of Agricultural Chemicals. The product label will give general advice regarding disposal of small quantities, and how to cleanse containers. However, for help with the collection of unwanted rural chemicals, contact ChemClear 1800 008 182 <http://www.chemclear.com.au/> and for help with the disposal of empty drums, contact DrumMuster <http://www.drummuster.com.au/> where you will find contact details for your area.

### Section 14 - Transport Information

Not subject to the ADG Code when transported by Road or Rail in Australia, in packages 500kg(L) or less; or IBCs, but classed as Dangerous by IATA and IMDG when carried by Air or Sea transport (see details below).

ADG Code: 3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.

Hazchem Code: \*3Z

Special Provisions: 179, 274, AU01

Limited quantities: ADG 7 specifies a Limited Quantity value of 5 L for this class of product.

Dangerous Goods Class: Class 9: Miscellaneous Dangerous Goods.

Packaging Group: III

Packaging Method: P001, IBC03, LP01

Class 9 Miscellaneous Dangerous Goods shall not be loaded in the same vehicle or packed in the same freight container with Dangerous Goods of Class 1 (Explosives).

#### SAFETY DATA SHEET

Issued by: Ensystem Australasia Pty Ltd

Phone: 13 35 36 (ALL HOURS)

Poisons Information Centre: 13 11 26 from anywhere in Australia, (0800 764 766 in New Zealand)



### Section 15 - Regulatory Information

**AICS:** All of the significant ingredients in this formulation are compliant with NICNAS regulations.  
The following ingredient: Fipronil, is mentioned in the SUSMP.

### Section 16 - Other Information

**This SDS contains only safety-related information. For other data see product literature.**  
If there is any conflict between this MSDS and the registered label, instructions on the label prevail.

**Acronyms:**

ADG Code	Australian Code for the Transport of Dangerous Goods by Road and Rail (7 <sup>th</sup> edition)
AICS	Australian Inventory of Chemical Substances
SWA	Safe Work Australia, formerly ASCC and NOHSC
CAS number	Chemical Abstracts Service Registry Number
Hazchem Code	Emergency action code of numbers and letters that provide information to emergency services especially fire-fighters
IARC	International Agency for Research on Cancer
NOS	Not otherwise specified
NTP	National Toxicology Program (USA)
R-Phrase	Risk Phrase
SUSMP	Standard for the Uniform Scheduling of Medicines & Poisons
UN Number	United Nations Number

THIS SDS SUMMARISES OUR BEST KNOWLEDGE OF THE HEALTH AND SAFETY HAZARD INFORMATION OF THE PRODUCT AND HOW TO SAFELY HANDLE AND USE THE PRODUCT IN THE WORKPLACE. EACH USER MUST REVIEW THIS SDS IN THE CONTEXT OF HOW THE PRODUCT WILL BE HANDLED AND USED IN THE WORKPLACE.  
IF CLARIFICATION OR FURTHER INFORMATION IS NEEDED TO ENSURE THAT AN APPROPRIATE RISK ASSESSMENT CAN BE MADE, THE USER SHOULD CONTACT THIS COMPANY SO WE CAN ATTEMPT TO OBTAIN ADDITIONAL INFORMATION FROM OUR SUPPLIERS  
OUR RESPONSIBILITY FOR PRODUCTS SOLD IS SUBJECT TO OUR STANDARD TERMS AND CONDITIONS, A COPY OF WHICH IS SENT TO OUR CUSTOMERS AND IS ALSO AVAILABLE ON REQUEST.

Please read all labels carefully before using product.

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### SAFETY DATA SHEET

Issued by: Ensystem Australasia Pty Ltd

Phone: 13 35 36 (ALL HOURS)

Poisons Information Centre: 13 11 26 from anywhere in Australia, (0800 764 766 in New Zealand)



Bait Technology Ltd  
PO Box 100287  
North Shore  
Auckland 0745  
Phone 09 443 9219  
Fax: 09 443 5083

## MATERIAL SAFETY DATA SHEET

Date of Preparation: July 2015

### VANQUISH PRO™ ANT BAIT

#### 1. PRODUCT AND COMPANY IDENTIFICATION

##### PRODUCT NAME

Vanquish Pro™ Ant Bait

##### RECOMMENDED USE

Control and eradication of Argentine ants and other ant species.

##### COMPANY IDENTIFICATION

Bait Technology Ltd,  
42B Ellice Rd, Glenfield, Auckland,  
Phone: 09 443 9219  
Fax: 09 443 5083

##### EMERGENCY TELEPHONE NUMBERS 24 HRS

0800 CHEMCALL™ 0800 243 622  
National Poisons Centre 0800 764 766

#### 2. HAZARDS IDENTIFICATION



##### HSNO Classification

9.1A Very toxic to the aquatic environment with long lasting effects,  
9.4C Toxic to terrestrial invertebrates

Appearance .....Pale green moist paste  
Health Hazards .....No human health hazards when used as directed on the label  
Skin Irritant .....Non-irritant  
Eye Irritant .....Physical irritant only  
Sensitisation .....Not sensitizing  
Flammability .....Not flammable  
Corrosiveness .....Not corrosive

**3. COMPOSITION/INFORMATION ON INGREDIENTS**

Hazardous Ingredients	Wt%
Fipronil	0.01
Non Hazardous Ingredients	99.99

CAS NO. 120068-37-3

**4. FIRST AID MEASURES****SWALLOWED**

Not likely to cause any adverse symptoms unless in excessive amounts.  
Seek medical advice if patient is distressed.

**EYES**

Hold eye open and rinse slowly and gently with water for 15-20 minutes.  
If contact lenses are present, remove after first 5 minutes, then continue rinsing eye.  
Call for medical advice if irritation persists.

**SKIN**

For extensive contamination, remove contaminated clothing.  
Rinse skin immediately with plenty of water for 10 minutes.  
Call for medical advice if adverse symptoms are evident or patient is distressed.

**5. FIRE FIGHTING MEASURES****Flash Point**

100 °C

**Fire and explosion hazards**

Not flammable or explosive

**Fire Fighting Instructions**

Hazchem 3Z

Combustible in fire conditions.

Will give off moderately toxic vapours.

Firefighters should wear NIOSH/MSHA approved self-contained breathing apparatus and full protective clothing.

Evacuate unprotected personnel

Persons who have been exposed to smoke should be checked by a physician for symptoms of poisoning.

## 6. ACCIDENTAL RELEASE MEASURES

### SPILLS AND DISPOSAL

If Vanquish Pro™ Ant Bait is spilled on the ground in an area not intended for ant control or in amounts in excess of the label instructions; the spilled area should be scraped clean and placed in a disposal container for disposal at an approved hazardous waste disposal site.

**DO NOT allow the spill or scraped residue to enter a public sewer, waterway, creek, stream or lake!**

## 7. HANDLING AND STORAGE

**Handling** Avoid prolonged contact with skin and eyes. Avoid breathing dust.

**Storage** Do not contaminate water, food, or feed by storage or disposal.

**DO NOT TRANSFER THIS PRODUCT TO ANOTHER CONTAINER FOR USE OR STORAGE**

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Engineering Controls

The following controls are indicated where a potential for excessive exposure is indicated such as manufacture, packaging or widespread application.

### Eye / Face Protection

A minimum of safety glasses with side shields should be worn when working in industrial environments.

### Body Protection

Skin contact should be minimised by wearing gloves and long-sleeved clothing. Contaminated clothing must be washed before re-use, or disposed of.

### Respiratory Protection

Not normally required unless hazardous quantities of dust are present. An OSH - approved dust mask should be adequate.

### Exposure Limits

None established



**9. PHYSICAL AND CHEMICAL PROPERTIES**

Appearance	pale green
Physical State	creamy paste
Odour	essentially odourless
pH	7
Solubility	disintegrates to an insoluble suspension in water
Decomposition temperature	> 100°C

**10. STABILITY AND REACTIVITY**

Chemical Stability	Stable in intact packaging for at least 2 years. Will not polymerise or react violently when opened.
Bacterial Stability	Contains natural products subject to bacterial decomposition over several days when exposed to air
Conditions to Avoid	Direct sunlight and temperatures above 40°C
Incompatibility	Strong oxidising agents such as free chlorine, nitrites, nitrates, peroxides

**11. TOXICOLOGICAL INFORMATION**

Acute Oral Toxicity	LD <sub>50</sub> Rat (oral) >2000 mg/kg (Technical grade Fipronil 97 mg/kg)
Acute Dermal Toxicity	LD <sub>50</sub> Rabbit >3540 mg/kg
Skin Irritation	Non-irritant
Eye Irritant	Physical irritant only
Sensitisation	Not sensitizing

Vanquish Pro™ Ant Bait has a very low mammalian toxicity and extremely high consumption would be required to achieve toxicity.

**Other information:**

In a chronic toxicity study, rats receiving the highest dose of Fipronil showed an increased incidence of thyroid tumours. The rat thyroid gland is very sensitive to chemicals and functions differently from the human thyroid, and therefore, Fipronil is not considered to pose an increased risk of cancer to humans. Similar studies in mice and dogs did not show an increased incidence of thyroid tumours. Fipronil is not mutagenic and not teratogenic.



## 12. ECOLOGICAL INFORMATION

### Environmental Precautions

Fipronil is extremely toxic to fish and aquatic Invertebrates. This effect will be apparent in the quantities present in Vanquish Pro™ Ant Bait.

DO NOT allow Vanquish Pro™ Ant Bait to wash into sewers, streams, waterways, lakes, rivers or the sea.

Ecological Toxicity	Rainbow Trout LC <sub>50</sub> 2460 mg/L (96 hr)
	Daphnia LC <sub>50</sub> 1900 mg/L (48 hr)
	Oysters LC <sub>50</sub> 7700 mg/L (96 hr)
	Honeybee LC <sub>50</sub> 40 µg/bee

### Environmental Fate

**Soil** The Fipronil active of Vanquish Pro™ Ant Bait binds to soil and has little potential for groundwater contamination.

**Water** The Fipronil active of Vanquish Pro™ Ant Bait is stable to breakdown by water. It degrades with a half-life of 28 days.

### Environmental Exposure Limits

EEL<sub>marine water</sub> 0.22 ng / L (ERMA NZ)  
EEL<sub>fresh water</sub> 78 ng / L

The bait is not to be used in a horticultural or agricultural environment where it could cause residues to occur in edible or export crops.

## 13. DISPOSAL CONSIDERATIONS

Empty tubes must be rendered non-hazardous to the environment by incineration, depositing at an approved landfill or mixing with an inert substance that reduces the residual bait concentration to a negligible level.

Empty tubes must not be disposed of where any remaining content could leach into sewers, waterways, streams, creeks, or the sea.

**DO NOT REUSE EMPTY CONTAINERS**

**14. TRANSPORT INFORMATION**

Where Vanquish Pro™ Ant Bait is transported in multiple packaging and the outer packaging obscures the tube label information the outer packaging must:

- be clearly labelled with information showing that Vanquish Pro™ Ant Bait is ecotoxic with respect to aquatic organisms or
- labelled or marked in compliance with either the Land Transport Rule 45001, Civil Aviation Act 1990 or the Marine Safety Act 1994 as relevant, or
- display an EU "Dangerous to the Environment" pictogram or bear the relevant class or subclass label assigned by the UN Model Regulations
- UN Number 3082
- DG Class 9

**15. REGULATORY INFORMATION**

EPA Manufacturing Approval no. HSR000111

**16. OTHER INFORMATION**

Date: July 2015

**NOTICE**

Information for this product is believed to be reliable, however buyer and user assume all risk of use, handling and storage whether in accordance with directions or not.

Bait Technology Ltd and its agents give no guarantee or warranty of any kind expressed or implied concerning the use of this product and will not accept any responsibility whatsoever whether in contract or tort for any loss including consequential loss arising out of the use of this product or caused by this product.



Bait Technology Ltd  
PO Box 100 287  
NSMC  
Auckland 0745  
Phone 09 443 9219  
Fax: 09 443 5083

## MATERIAL SAFETY DATA SHEET

Date of Preparation: July 2015

### XSTINGUISH™ ARGENTINE ANT BAIT

#### 1. PRODUCT AND COMPANY IDENTIFICATION

##### PRODUCT NAME

Xstinguish™ Argentine Ant Bait

##### RECOMMENDED USE

Control and eradication of Argentine ants and other ant species.

##### COMPANY IDENTIFICATION

Bait Technology Ltd,  
42B Ellice Rd, Glenfield, Auckland,  
Phone: 09 443 9219  
Fax: 09 443 5083

##### EMERGENCY TELEPHONE NUMBERS 24 HRS

0800 CHEMCALL™      0800 243 622  
National Poisons Centre      0800 764 766

#### 2. HAZARDS IDENTIFICATION



##### HSNO Classification

9.1A Very toxic to the aquatic environment with long lasting effects,  
9.4C Toxic to terrestrial invertebrates

Appearance .....Pale green moist paste  
Health Hazards .....No human health hazards when used as directed on the label  
Skin Irritant .....Non-irritant  
Eye irritant .....Physical irritant only  
Sensitisation.....Not sensitizing  
Flammability .....Not flammable  
Corrosiveness .....Not corrosive

**3. COMPOSITION/INFORMATION ON INGREDIENTS**

Hazardous Ingredients	Wt%
Fipronil	0.01
Non Hazardous Ingredients	99.99

CAS NO. 120068-37-3

**4. FIRST AID MEASURES****SWALLOWED**

Not likely to cause any adverse symptoms unless in excessive amounts.

Seek medical advice if patient is distressed.

**EYES**

Hold eye open and rinse slowly and gently with water for 15-20 minutes.

If contact lenses are present, remove after first 5 minutes, then continue rinsing eye.

Call for medical advice if irritation persists.

**SKIN**

For extensive contamination, remove contaminated clothing.

Rinse skin immediately with plenty of water for 10 minutes.

Call for medical advice if adverse symptoms are evident or patient is distressed.

**5. FIRE FIGHTING MEASURES****Flash Point**

100 °C

**Fire and explosion hazards**

Not flammable or explosive

**Fire Fighting Instructions**

Hazchem 3Z

Combustible in fire conditions.

Will give off moderately toxic vapours.

Firefighters should wear NIOSH/MSHA approved self-contained breathing apparatus and full protective clothing.

Evacuate unprotected personnel

Persons who have been exposed to smoke should be checked by a physician for symptoms of poisoning.



## 6. ACCIDENTAL RELEASE MEASURES

### SPILLS AND DISPOSAL

If Xstinguish™ Argentine Ant Bait is spilled on the ground in an area not intended for ant control or in amounts in excess of the label instructions; the spilled area should be scraped clean and placed in a disposal container for disposal at an approved hazardous waste disposal site.

DO NOT allow the spill or scraped residue to enter a public sewer, waterway, creek, stream or lake!

## 7. HANDLING AND STORAGE

**Handling** Avoid prolonged contact with skin and eyes. Avoid breathing dust.

**Storage** Do not contaminate water, food, or feed by storage or disposal.

DO NOT TRANSFER THIS PRODUCT TO ANOTHER CONTAINER FOR USE OR STORAGE

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Engineering Controls

The following controls are indicated where a potential for excessive exposure is indicated such as manufacture, packaging or widespread application.

### Eye / Face Protection

A minimum of safety glasses with side shields should be worn when working in industrial environments.

### Body Protection

Skin contact should be minimised by wearing gloves and long-sleeved clothing. Contaminated clothing must be washed before re-use, or disposed of.

### Respiratory Protection

Not normally required unless hazardous quantities of dust are present. An OSH - approved dust mask should be adequate.

### Exposure Limits

None established

**9. PHYSICAL AND CHEMICAL PROPERTIES**

Appearance	pale green
Physical State	creamy paste
Odour	essentially odourless
pH	7
Solubility	disintegrates to an insoluble suspension in water
Decomposition temperature	> 100°C

**10. STABILITY AND REACTIVITY**

Chemical Stability	Stable in intact packaging for at least 2 years. Will not polymerise or react violently when opened.
Bacterial Stability	Contains natural products subject to bacterial decomposition over several days when exposed to air
Conditions to Avoid	Direct sunlight and temperatures above 40°C
Incompatibility	Strong oxidising agents such as free chlorine, nitrites, nitrates, peroxides

**11. TOXICOLOGICAL INFORMATION**

Acute Oral Toxicity	LD <sub>50</sub> Rat (oral) >2000 mg/kg (Technical grade Fipronil 97 mg/kg)
Acute Dermal Toxicity	LD <sub>50</sub> Rabbit >3540 mg/kg
Skin Irritation	Non-irritant
Eye Irritant	Physical irritant only
Sensitisation	Not sensitizing

Xstinguish™ Ant Bait has a very low mammalian toxicity and extremely high consumption would be required to achieve toxicity.

**Other information:**

In a chronic toxicity study, rats receiving the highest dose of Fipronil showed an increased incidence of thyroid tumours. The rat thyroid gland is very sensitive to chemicals and functions differently from the human thyroid, and therefore, Fipronil is not considered to pose an increased risk of cancer to humans. Similar studies in mice and dogs did not show an increased incidence of thyroid tumours. Fipronil is not mutagenic and not teratogenic.

## 12. ECOLOGICAL INFORMATION

### Environmental Precautions

Fipronil is extremely toxic to fish and aquatic Invertebrates. This effect will be apparent in the quantities present in Xstinguish™ Argentine Ant Bait.

DO NOT allow Xstinguish™ Argentine Ant Bait to wash into sewers, streams, waterways, lakes, rivers or the sea.

Ecological Toxicity                      Rainbow Trout LC<sub>50</sub> 2460 mg/L (96 hr)

Daphnia LC<sub>50</sub> 1900 mg/L (48 hr)

Oysters LC<sub>50</sub> 7700 mg/L (96 hr)

Honeybee LC<sub>50</sub> 40 µg / bee

### Environmental Fate

**Soil**    The Fipronil active of Xstinguish™ Argentine Ant Bait binds to soil and has little potential for groundwater contamination.

**Water**    The Fipronil active of Xstinguish™ Argentine Ant Bait is stable to breakdown by water. It degrades with a half-life of 28 days.

### Environmental Exposure Limits

EEL<sub>marine water</sub> 0.22 ng / L (ERMA NZ)

EEL<sub>fresh water</sub> 78 ng / L

The bait is not to be used in a horticultural or agricultural environment where it could cause residues to occur in edible or export crops.

## 13. DISPOSAL CONSIDERATIONS

Empty tubes must be rendered non-hazardous to the environment by incineration, depositing at an approved landfill or mixing with an inert substance that reduces the residual bait concentration to a negligible level.

Empty tubes must not be disposed of where any remaining content could leach into sewers, waterways, streams, creeks, or the sea.

**DO NOT REUSE EMPTY CONTAINERS**



#### 14. **TRANSPORT INFORMATION**

Where Xstinguish™ Argentine Ant Bait is transported in multiple packaging and the outer packaging obscures the tube label information the outer packaging must:

- be clearly labelled with information showing that Xstinguish™ Argentine Ant Bait is ecotoxic with respect to aquatic organisms or
- labelled or marked in compliance with either the Land Transport Rule 45001, Civil Aviation Act 1990 or the Marine Safety Act 1994 as relevant, or
- display an EU "Dangerous to the Environment" pictogram or bear the relevant class or subclass label assigned by the UN Model Regulations
- UN Number     3082
- DG Class             9



#### 15. **REGULATORY INFORMATION**

ERMA Manufacturing Approval no. HSR000111

#### 16. **OTHER INFORMATION**

Updated June 2015

#### **NOTICE**

Information for this product is believed to be reliable, however buyer and user assume all risk of use, handling and storage whether in accordance with directions or not.

Bait Technology Ltd and its agents give no guarantee or warranty of any kind expressed or implied concerning the use of this product and will not accept any responsibility whatsoever whether in contract or tort for any loss including consequential loss arising out of the use of this product or caused by this product.

## 7.5 Appendix 5. Additional monitoring protocols

The protocols below are useful where information about ant species identity or ant or other invertebrate community structure is required. They have been modified from the Landcare Argentine Ant webpage (<http://argentineants.landcareresearch.co.nz/>)

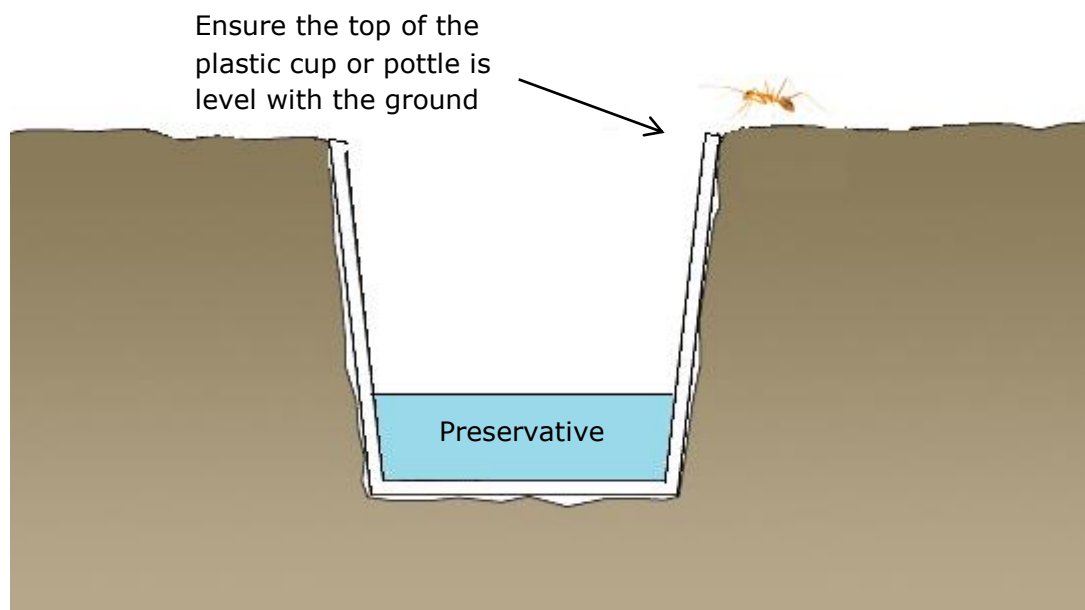
### 7.5.1 Pitfall Trap instructions

Pitfall traps can be a useful technique for collecting yellow crazy ant, other ant species or for getting an idea of the general invertebrate community structure in an area before and after treatment. In fact, in some circumstances pitfall traps may be better than direct searching, or using baits.

Pitfall trapping involves digging a small plastic cup or pottle into the ground, so the open lip is level with the ground (Figure 8). As ants (and other invertebrates) run along the ground they fall into the cup and cannot get out.

When setting the traps, it is a good idea to put two cups in the hole you have dug as soil and other debris will fall into the cup as you set it. When you are happy that the lip of the cup is level with the surrounding earth you can remove the top cup and add the preservative. A preservative of ethanol:gylcol mix (50:50, or 75:25 or propylene glycol alone) is often used to kill invertebrates, preserve them from rotting, and prevent them from crawling out of the cup. For traps that will be in the ground for shorter periods (e.g. 1 day) soapy water will suffice, however it is important to sort the traps and put the specimens in >70% ethanol as soon as they are recovered or the insects you have caught will start to decompose.

The cups used need to be plastic (to avoid them breaking) and about 8cm in diameter. Pitfall traps are usually spaced about 5–10 m apart and should be left out for approximately 24 hours. Pitfall traps give information on presence and absence of yellow crazy ant and other ant species as well the state of other invertebrate communities.



**Figure 8:** A cross section through an embedded pitfall trap.

### 7.5.2 Attractive vials (pottles)

This is a commonly used technique, and has gained wide acceptance for surveillance and monitoring.

Typically, a food-based lure such as tuna, peanut butter, honey or a cotton wool ball soaked in sugar water is placed into a small plastic vial or pot. The bait attracts ants, which recruit other ants to come and collect the bait and take it back to their nest.

Vials are placed out of the sun with lid off for a minimum of 3 hours. Baits can be left out for quite a long period depending on your specific conditions, even up to 24 hours. However, the longer vials are left out means the bait will more likely dry out and become unpalatable, or vials may be vandalised. Vials are usually spaced about 10 m apart, in groups of 10–20 vials. Vials need to be plastic (to reduce breakage) and numbered so that specific locations can be found again if ants of interest are detected.

Baiting gives information on presence and absence of various ant species. In addition, it can give a very rough indication of abundance, though factors such as time of day, time of year and temperature can cause significant variation, so it is suggested this only be viewed as a very rough guide.

### 7.5.3 Baited tiles

This method uses a digital camera to record the numbers of ants on and around a bait placed in the middle of a ceramic tile. The tiles should all be the same size, about 10 × 10 cm being perfect. The tiles should be of a pale colour to contrast with the ants, and have a matt finish rather than gloss, so they do not create glare points that obscure ants when photographing.



**Figure 9:** Three types of attractant bait (tuna, honey and peanut butter) applied to a baited tile showing recruitment by yellow crazy ants.

A line (or grid) of 20 or 30 tiles placed 5–10 m apart provides a good assessment of ant abundance in an area. A small amount of suitable non-toxic bait (e.g. a half-teaspoon of tinned tuna, peanut butter or honey) can be placed in the centre of the tile and the tiles left. Liquid baits are not effective for this method because they run off the tiles, but cotton wool balls soaked in 30% sugar solution will work fine.

If you are doing multiple sites, you can use a marker pen to write a site/transect identifier letter, and the number of the tile in the transect if using fixed positions, e.g. A1, A2, etc.

Return to the tile after one hour and take a photo. A typical compact digital camera (6 megapixel or higher) with a macro function is used to take an image of every tile. Frame the photograph so it is as close as possible to the bait while having the entire tile within the image frame.

Afterwards, view the images on a computer screen. The label on the tile identifies the site and tile number for each photograph. The camera itself records the date and time of exposure in the exif file data that is automatically saved with the image (just ensure the date and time settings on your camera are correct). After recording this data in a spreadsheet, simply count all the ants that are within the bounds of the tile edges (including those on the bait itself and those just walking over the tile). Using the edges of the tile as a boundary gives the exact same area to count in each photo.

The ceramic tiles have sufficient weight that they remain in place, even in windy conditions, and they are easily washed clean for use in later trials. A cloth dampened with methylated spirits can be used to wipe the marker pen lettering off the corner if you wish to re-label them in the future. One drawback with the tiles is if you are using them in an area frequented by pets or birds that may take the bait before counting. In these situations you should consider remaining on site and slowly walking up the line to discourage any animals. You can also shorten the time they are left before photographing to 30 minutes, which is often sufficient in heavily infested areas. However, if using this method to monitor changes, you need to standardise the length of time the baited tiles are left and use that for all subsequent measures.

### 7.5.4 Recording baseline and post-treatment data

Pitfall traps can be useful for assembling information about invertebrate communities before and after treatment. However, it is difficult to identify everything that is caught and can often require expert taxonomist, which can be expensive.

One way to sort traps is by 'morpho-species' – grouping animals that look the same and counting how many varieties are present. For example you may find six different types of beetle, two different crabs and four different spiders in one trap. Studies have shown that this sort of grouping performed by unskilled workers can be as high as 95% as accurate as expert taxonomists.

The table below is a useful way to record what is caught at a particular site for comparison of before and after treatment.

Some invertebrates listed as unique to Kiribati include:

Location:		Inspected by:	Date
Organism type	Tally of morpho-species	Comments:	
Worms			
Crabs			
Spiders			
Beetles			
Ants			
Moths & Butterflies			
Crickets			
Bugs			
Thrips			

- *Rhyncogonus Ugyops cercyo* (planthopper p. 7 of [Bishop Museum](#) pdf file)
- *Rhyncogonus fosbergi* (weevil p. 31 of [Bishop Museum](#) pdf file)
- *Rhyncogonus vagus* (weevil p. 31 of [Bishop Museum](#) pdf file)
- *Drapetis kraussi* (dance fly p. 5 of [Bishop Museum](#) 6 MB pdf file)
- *Calliphora bryani* (blowfly [Bishop Museum](#) pdf file)
- *Gamasomorpha minima* (goblin spider p. 5 of [Bishop Museum](#) pdf file)

Endemic marine invertebrates include:

- *Paramunida haigae* (squat lobster [eol](#))
- *Muricopsis leonardi* (murex snail [CiNii](#)).



## 7.6 Appendix 6. Health Survey

### Information sheet

#### Background and purpose of the study

We want to find out if the pesticide used to control yellow crazy ants has any health impacts on humans. No effects on humans have been previously reported and none are expected, as this pesticide is widely used. A thorough risk assessment has been done, which has assessed the pesticide as being safe. However no studies have been undertaken to confirm this pesticide has no effects on humans. If any effects are detected the pesticide use will be stopped.

#### Informed consent

The Victoria University of Wellington Human Ethics Committee, which has approved this project, requires that all research involves participants who are: 1) fully informed about the nature of the research; and 2) consent to participate. This process is to ensure that research participants and their communities are protected from any negative consequence potentially arising from their participation in the research. This Information sheet and survey meet these requirements. The research is strictly anonymous, an information sheet is supplied and informed consent is given by voluntary participation in answering the Health Survey questions.

#### Survey format

The research involves answering a set of questions about the participant's health in recent weeks. The informal verbal survey will take approximately 10 - 20 minutes and there is no obligation to answer all of the questions. The participant has the right to check their responses if they wish. The surveys will be returned to Victoria University, entered into a database and summarised. A report of the summarised results will be made to ECD WCU / ALD within 1 month of the survey's completion. The surveys and summarised data may be retained for publication in a scientific journal, and destroyed subsequent to publication. Copies of any publication will be provided to ECD WCU / ALD for the interviewee. If there are any questions, concerns or further information required at any time, please contact ECD WCU / ALD officers or Pacific Biosecurity:

Monica Gruber / Allan Burne  
Pacific Biosecurity, Victoria Link Limited, Victoria University of Wellington  
PO Box 600, Wellington 6140  
New Zealand  
ph: +64 4 463 5026 / +64 27 658 9903  
email: monica.gruber@vuw.ac.nz / allan.burne@vuw.ac.nz

**ANT MANAGEMENT HEALTH SURVEY**

**Date:**

Have you been unwell **before** April 23 2015

- Yes
- No

If Yes, please give details of your symptoms

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Have you experienced any of the following symptoms **before** April 23 2015

- Skin irritation
- Excessive sweating
- Nausea
- Vomiting
- Head ache
- Stomach pain
- Dizziness
- Weakness
- Seizures

Have you been unwell **after** April 23 2015

- Yes
- No

If Yes, please give details of your symptoms

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Have you experienced any of the following symptoms **after** April 23 2015

- Skin irritation
- Excessive sweating
- Nausea
- Vomiting
- Head ache
- Stomach pain
- Dizziness
- Weakness
- Seizures

If you ticked any of the boxes above, what date did you first experience the symptoms?

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If you ticked any of the boxes above, how long did the symptoms last?

- 1 day
- 3 days
- 1 week
- Longer than 1 week

Have you experienced these symptoms before April 2015?

- Yes
- No

If Yes, please give details (all information will be treated as confidential)

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Do you have an existing medical condition?

- Yes
- No

If Yes, please give details (all information will be treated as confidential)

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Have you touched Antoff bait while working with it?

- Yes
- No

If Yes:

- How long ago did you last touch the bait?

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- How long did you work with the bait for (how many hours / days)?

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Were you wearing any of the following Personal Protection Equipment (PPE):

- Gloves
- Long sleeved shirt
- Long trousers
- Enclosed shoes
- Dust mask

Have you eaten Antoff bait?

- Yes
- No

If Yes:

- How long ago did you eat the bait?

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- How much bait did you eat?

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Have you eaten animals (Chicken, Fish, Crab, etc.) or plants collected from within or near the treatment area?

- Yes
- No

If Yes:

- Where were the animal(s) / plants collected?

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- Which animal(s) / plants did you eat?

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- How long ago did you eat the animal(s) / plants?

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- How many did you eat?

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**Thank You**



## 7.7 Appendix 7. Record of outcomes of treatment and monitoring

### 7.7.1 April 2015

<b>Date</b>	<b>Activity</b>	<b>Results</b>	<b>Outcomes</b>
22 Apr Wednesday	Meet with ALD and WCU staff to introduce project, discuss management plan, treatment activities for the week. Health and safety briefing - ensure all safety gear etc. is available to staff	Attendees: Ata Binoka, Katareti Taabu, Aana Tetan, Taan Teraira, Eera Tiira, Tairo Kaintoa	The talks were well received. Suggestions for improvement included the use of an overhead projector and provision of a light lunch.
23 Apr Thursday	Morning: Visual delimiting and baseline data gathering of the infestation  Afternoon: Communication with affected stakeholders Put up warning signs around treatment area.	A pre delimiting talk was given outlining the methods that would be used. Visual delimiting with follow up use of attractive lures was employed. Results of visual delimiting were comparable to those recorded by Ray Pierce in February 2015 (Figure 1) with two exceptions: 1. YCA were observed on a row of noni near the Kiribati tourism office. This is between 20 and 30 metres away from the Commerce office where YCA have previously been spotted. 2. No YCA were found around the generators behind the WCU Office. Sugar ants ( <i>Camponotus</i> sp.) comparable in size and colour to YCA were observed at that location raising the possibility of misidentification at this location in the earlier survey. Pre-treatment observations of wildlife other than YCA were sparse. Of the eight personnel involved in the survey only three recorded any observations. All observations were of living insects. It is unclear whether the remaining blank sheets reflect a lack of observations or a lack of recording.	The main outcome of this exercise was that the infestation does not appear to have expanded. With the exception of the ants observed on noni by the Tourism office (which is close to where YCA were previously observed) there were no observations made of YCA outside the area delimited in February, 2105. It is certainly advisable to re-survey in July 2015 before commencing follow up baiting as there is a slim possibility that there may be expansion of the ants' distribution after the wet season.

		The onset of heavy rain in the afternoon prevented sugar lures from being checked.	
24 Apr Friday	8:00 -11:00 am Review team safety. Start (and hopefully finish) treatment. Divide into two teams: Each team will have one spreader operator, on bait station installer and two support people carrying bait.  11:00-3:00 Break  3:00-6:00 Finish Treatment	A talk about personal safety handling bait and restricted use around open water was given before management activities commenced. Due to periods of heavy rain, it was decided not to broadcast bait using spreaders and only to use bait stations. 38 ground stations were deployed haphazardly between. Typically beneath or near noni or well hidden to avoid potential tampering. Tree bait stations were also used at the James Cook Hotel Store (n=13), The Water Supply Depot (n=6) and the Copra Warehouse (n=11).	The outcome of this activity is a good example of active management. As a result of either poor advice or atypical weather conditions the scheduled baiting activity fell in what turned out to be the tail end of the wet season. Rain precluded any broadcast baiting. Fortunately, the B&G ground bait stations offer protection against the rain and could be deployed. Good coverage of the infested area was achieved with 38 bait stations supplemented with a further 30 tree bait stations under cover
25 Apr Saturday	Contingency for some staff to complete treatment.	PB staff checked traps am. to see what recruitment was like. Very low recruitment (fewer than five stations with YCA and fewer than 3 YCA on any station) to bait was observed. YCA were observed foraging on noni or in the area around the majority of bait stations, suggesting a lack of recruitment to bait rather than a lack of foraging activity due to rain. One bait station had been removed and could not be found in the surrounding area. P.m. Based on the suspicion that the matrix was not attractive, a 50% sugar solution was mixed and added to all bait stations by PB staff.	This was an unexpected outcome, which required an ad hoc remedy. Given that factors including seasonal variation in diet and foraging activity, inclement weather and abundance of other food source such as noni might have been affecting recruitment to bait it was decided to add a carbohydrate component (sugar water) to the bait in an attempt to make it more attractive.
26 Apr Sunday	a.m.: Check on bait stations	PB staff checked a subset (8) bait stations. Still no significant recruitment observed	The negligible recruitment observed may be the result of an inappropriate matrix (generally or for this specific point in the season), an aversion to bait stations compared to broadcast baiting or because of insufficient density of stations in the area relative to the abundance of ants. Further research is required.

27 Apr Monday	a.m.: Workshop on Surveillance, Monitoring and Movement Controls.	a.m.: Workshop on Surveillance, Monitoring and Movement Controls.	The talk given was slightly different to the one in Tarawa as the group had already had practical experience of delimiting and management.
28 Apr Tuesday	a.m.: monitoring and discussions with stakeholders Re-evaluation and communication	Little recruitment to bait observed as above. A second bait station had been removed. Both missing stations had been placed where crab burrows subsequently appeared. The majority of bait stations in the CCH stores had been emptied and/or destroyed by rats. All remaining bait stations brought in and washed out. Inventory made of materials and supplies taken to Kiritimati and all gear stowed in WCU office for return. Health Surveys distributed. Discussion around an appropriate time to return for a second round of Management.	

### 7.7.2 August 2015

<b>Date</b>	<b>Activity</b>	<b>Results</b>	<b>Outcomes</b>
5 Aug Wednesday	Arrived in Kiritimati	Met Ata and Eera at airport.	Ata told me that it had been raining fairly constantly since I was last here. It tends to be brief periods of intense rain, which I believe will not prevent us from baiting. Ata also mentioned that he and his team would not be able to attend the catch up scheduled for this afternoon, because of the plane that is leaving later. We agreed to meet tomorrow at 8:30
	Deet mishap	At some point the entire can of Deet insect repellent emptied itself in my hold baggage.	There was Deet throughout my suitcase. I cleaned it off as best I could, but am concerned that residue on one of the spreaders might taint the bait.
	Catch up with ALD and WCU partners and recap on management	Went to WCU mid-morning to drop off gear. Only Aana was present, so the Management recap has been postponed until tomorrow.	I dropped off the gear. Only Aana was present, who told me Katareti was tied up at the ministry all day. I went back a couple of hours later and had a brief chat with him in preparation for tomorrow. The PIAkey does not work on his computer.

	methods/plan for following days		
	Visual delimiting (Allan only)	YCA do not appear to have expanded their coverage in Ronton and seem to be at lower abundance than in April this year	<p>I went looking for ants around 3:30pm. YCA observed around the Fisheries Offices, Captain Cook Hotel Store and surrounding derelict buildings, but appeared to be at lower abundance than in April this year. YCA were present around the CPPL buildings, but again seemed to be quite sparse. A number of other ant species were observed on the noni in this area including sugar ants (<i>Camponotus</i> sp).</p> <p>The ants were present at the commerce building, particularly where there was a large pile of empty drink cans. None were seen on the noni next to the tourism office.</p> <p>I was unable to gain access to the water supply building or copra warehouse, but the noni outside the fences by those buildings did not have YCA foraging on them.</p>
6 Aug Thursday	a.m: Meet with WCU and ALD partners, recap on management methods/plan for following days	Management recap Attendees: Ata Binoka ♂ ALD, Katareti Taabu ♂ WCU, Aana Tetan ♀ ALD, Taan Terair ♀ ALD, Eera Tiira ♀ WCU, Tairo Kaintoa ♂ ALD, Kautabuki Kamatie ♂ WCU, Tekeua Auatabu ♂ WCU, Ataieta Ioale ♂ WCU.	<p>Management meeting was well attended. The attendees that were there previously appeared to have retained the bulk of the information from the previous workshop.</p> <p>There was a larger number of WCU attendees than previously. Katareti told me this is because April is their busy period for monitoring nesting birds. August is a much better time for them to attend training.</p>
	Visual delimiting and baseline data gathering of the infestation	Visual delimiting and use of attractant lures indicated a slight change in distribution of YCA. There was no sign of YCA in the noni by the Tourism office. The Commerce office now appears to be the southern boundary of their distribution. The ants were present throughout the CPPL, Fisheries office, James Cook Hotel Store area, but seemed to be at lower abundance than the survey in April. Other ant	<p>The delimiting survey did not differ from my solo effort yesterday except that a new nest was found beyond the Captain Cook Hotel Store. No YCA were found further North and fortunately the YCA have not spread into the inhabited area to the West.</p> <p>There appear to be fewer YCA than in April. It was difficult to get the team to stay evenly spaced and to move in formation through the search area.</p>

		<p>species including sugar ants were noted throughout this area. One small, but very active, nest of YCA was noted two houses North of the Captain Cook Hotel store around a disused compost toilet. No YCA were observed in or around the Water Supply Building.</p> <p>Sugar lures and a visual search was done approximately 100 metres into the inhabited area to the West of the James Cook Hotel Store. No sign of YCA was found and when asked, most residents said they had experienced no problems with ants. One elderly couple complained that they were not comfortable with the ants in their dwelling. On inspection we found a large nest of sugar ants (<i>Camponotus</i> sp.) present.</p> <p>Sugar lures placed behind the row of shops showed no evidence of YCA, though several other species of ants were present.</p>	<p>However, I do not think anything was missed and a thorough search was conducted.</p> <p>It was helpful to have a translator with me to ask villagers about the ants.</p>
	<p>p.m: Communication with affected stakeholders Put up warning signs around treatment area.</p>	<p>After discussion with the WCU and ALD partners Warning Posters and information leaflets were distributed around the treatment area and in selected public gathering places including the Linux building, the hospital and the clinic.</p> <p>It rained briefly during the afternoon.</p>	<p>Some concern was raised about the 42 day withholding period. Noni is routinely harvested from the treatment area by locals to be either fed to pigs or for medicinal use. After some discussion, Ata said that he would tell them to collect their noni from outside the treatment area as it is abundant everywhere. I do not believe the rain that fell would be sufficient to stop baiting. Discussion with Katareti and Ata suggested that July to October is the best time for PB to visit Kiritimati as it is the dry season and coincides with the period when WCU are least busy with nesting birds.</p>
7 Aug Friday	<p>8:00 -11:00 am Review team safety. Start (and hopefully</p>	<p>8:00 am meeting scheduled to recap on safety and the plan for today, which commenced around 8:30-8:45. Attendees:</p>	<p>The team moved quickly and efficiently through the infested area. Good spacing and pace was adhered to throughout.</p>



	<p>finish) treatment. Antoff bait distributed using 4 bait spreaders</p>	<p>Katareti Taabu ♂ WCU, Eera Tiira ♀ WCU, Tairo Kaintoa ♂ ALD, Kautabuki Kamatie ♂ WCU, Tekeua Auatabu ♂ WCU, Ataieta Ioale ♂ WCU</p> <p>9:00am began broadcast baiting at South end of infestation near tourism office moved North to James Cook Hotel Store and finished at Water Supply Warehouse at 10:45. The entire infested area plus a 10-20m buffer was baited using approximately 10kg of bait (The remains of the bucket opened in April).</p>	<p>Thick undergrowth at the South end impaired progress at first.</p> <p>The generic "non-Scotts" spreaders are inferior to the Scotts spreaders, jam frequently and are difficult to regulate flow with. The operators of these spreaders needed to stop frequently in order to clear and fix them.</p> <p>The copra warehouse was open but was full of copra. This will make access difficult for the use of either ATTRATHOR or Vanquish Pro. The workers inside said they had not seen any ants inside, but frequently saw them outside.</p> <p>Bait was seen to be taken by YCA immediately after it was spread near the Captain Cook Hotel Store and around the Fisheries building.</p>
	<p>11:00-1:30 Break</p>	<p>It rained during this time. There were three light showers of rain each lasting about 20 minutes between 11:20 and 1:00. The bait we laid this morning was softened by the rain, but remained intact.</p>	<p>I am not sure whether the rain would have caused the Fipronil to wash out of the bait.</p> <p>Despite speaking to the villagers surrounding the treatment area, a rooster, hen and several chicks were seen foraging in the treatment area. It is possible they were eating the bait. I asked the team to speak to the owners of the chickens and to remind them not to eat the eggs or flesh of the chickens for 42 days.</p>
	<p>3:00-6:00 Finish Treatment. Once broadcast baiting is completed, ATTRATHOR and Vanquish-Pro will be used in selected areas</p>	<p>Spot applications of ATTRATHOR and Vanquish Pro were completed throughout the treatment area</p>	<p>The Fisheries office and Captain Cook Hotel Store interiors were treated with ATTRATHOR as were well sheltered areas outside each building. Vanquish Pro was also applied to the exterior of these buildings. Recruitment to the bait was rapid.</p> <p>The interior of the Water supply building was treated with both ATTRATHOR and Vanquish Pro, and the exterior was also treated with Vanquish Pro. The Commerce building and adjoining Fale were also treated with Vanquish Pro.</p>

			The interior of the copra warehouse was found to be filled with copra. Between a third and half the building was stacked high with sacks of copra making the walls and other potential treatment areas inaccessible. The remainder of the space is filled with open bags of copra, so it seems inadvisable to spray ATTRATHOR. As the copra workers wanted to close the warehouse, we will return on Monday and apply Vanquish Pro where possible.
	Significant rainfall	A major downpour of rain lasting approximately one hour occurred at 5pm	The rain occurred more than five hours after we completed broadcast baiting. Hopefully the YCA will have taken a large proportion of the bait before the downpour. The Vanquish and ATTRATHOR were applied in sheltered or interior areas, so should not be affected by the rain.
8 Aug Saturday	a.m Contingency for some staff to complete treatment.	Baiting was completed yesterday. This contingency was not required.	Ata's team would have been unavailable anyway as they are attending a farewell. I did not get the impression that the rest of the team were keen to work the weekend. In future I may schedule delimiting for the afternoon of the first day and allow two weekdays for baiting.
	p.m (Allan Only) does preliminary monitoring of bait take	Good evidence of poisoning observed around the Fisheries Office and Captain Cook Store. Limited evidence elsewhere with apparently normal YCA foraging on noni near the derelict building.	The YCA around the Fisheries office are displaying typical signs of poisoning. There was less activity than yesterday, with a few workers seen moving brood (all life stages observed). There were several individuals of non-target species dead -predominantly millipedes (Diplopoda) and woodlice (Isopoda). The Vanquish appears to have been taken by ants and survived the downpour. Small amounts were still visible in the cracks where it was applied and there was no evidence to suggest it had been washed out. There was little evidence of YCA outside the Captain Cook Store, but the gates were locked, so I was unable to check inside.

			There were several YCA on the noni by the derelict building area. Although it is early to make this call, I believe it would be prudent to distribute some more AntOff in this area on Monday.
9 Aug Sunday	No work planned	Several bursts of heavy rain each lasting half an hour or more over the course of the day.	So much for this being the dry season!
		A visit to the Fisheries Office and derelict buildings at the northern end of the infestation found next to no YCA. Noni between derelict building and salt store all had YCA foraging.	It is a good idea to bait around the noni situated between the derelict buildings and the salt store with Vanquish Pro and possibly ATTRATHOR in the sheltered areas.
10 Aug Monday	All day Ant Biology and Identification workshop and evaluations	A workshop and practical demonstrations of the microscopes and PIA key was given between 8:30 and 3:45 with a one hour lunch break (12:30-1:30) 8 Attendees: Ata Binoka ♂ ALD, Katareti Taabu ♂ WCU, Aana Tetan ♀ ALD, Eera Tiira ♀ WCU, Tairo Kaintoa ♂ ALD, Kautabuki Kamatie ♂ WCU, Tekeua Auatabu ♂ WCU, Ataieta Ioale ♂ WCU..	This workshop appeared to go well with good engagement from all participants - especially during the afternoon's practical microscope and PIA key sessions. The workshop feedback forms tell a different story however, with several low scores, but no real explanation as to what the participants were dissatisfied with. The forms were distributed and completed before the practical sessions in the afternoon, which may have been a mistake. The sections that were followed up with practical demonstrations and exercises scored lowest.
11 Aug Tuesday	am Monitoring and possible top up of paste bait if permitted	With some notable exceptions ant numbers in the treatment area appeared lower than before treatment. Spot treatments with ATTRATHOR and Vanquish Pro were done in some areas where YCA numbers were comparable to before treatment. The newly discovered nest in the compost toilet of a dwelling two doors North of the Captain Cook Store showed clear signs of poisoning, with many disorientated workers carrying brood away from the nest. A follow	There were a few YCA workers foraging on the conifer outside the Fisheries Office, otherwise this area was almost devoid of YCA. There were four active nests found in the treatment area: one in a salt bush by the newly constructed tourist accommodation inside the yard of the Captain Cook Hotel Store, another at the base of a large noni on the South East corner of the Captain Cook Store, a third in a horizontal telegraph pole opposite the CPPL and a fourth at the base of the noni next to the concrete outhouse in the grounds of the copra warehouse (there were also bees beginning to nest

		<p>up treatment with ATTRATHOR and Vanquish Pro was done in what appeared to be a newly formed nest under some rubbish and a broken outrigger on the property.</p> <p>A new infestation was found in the Lobster works next door to the above property. The building exterior was treated with a combination of Vanquish Pro, ATTRATHOR and Antoff granules and the interior perimeter was treated with ATTRATHOR.</p> <p>After Treatment monitoring was completed. A large number (~80) of dead millipedes and woodlice were found around the Fisheries Office, otherwise there was no evidence of non target poisoning.</p>	<p>there). All of these nests were treated with a combination of ATTRATHOR along the trails leading into the nest and Vanquish Pro strategically placed nearby.</p> <p>Small numbers of workers were also seen foraging in the noni around the tea store building and a few were observed at the Fale next to the commerce build. ATTRATHOR was applied to corrugated iron sheet the ants were seen trailing over and Vanquish was placed strategically in both areas.</p> <p>The two concrete ramps to the South of the Fisheries Office had reasonable number of workers on them, and I suspected they might harbour a nest. They were treated with a combination of ATTRATHOR and Vanquish Pro and the area in between them was baited with AntOff.</p> <p>The copra warehouse remained full, but was treated where possible with Vanquish Pro.</p> <p>Because of the spot treatment carried out today, I requested that Ata and Katareti lead their teams in follow up YCA monitoring in ten to fourteen days (21<sup>st</sup> or 24<sup>th</sup> of August) Will follow this up with an email when I get back to NZ.</p>
	pm Monitoring and top up of paste bait and talk with stakeholders	Monitoring and top up completed am, but Ata and I went North of the new infestation to ensure it hadn't spread any further. No evidence of YCA was found	A visual inspection of rubbish and buildings North of the new infestation showed no evidence of YCA. The inspection was done as far as the hospital (~1km).
	Packing gear in WCU offices.	Packed gear. Arranged for health survey distribution on Friday 14 <sup>th</sup> of August and for recollection a week later (21 <sup>st</sup> ) Will follow this up with email when I am back in NZ.	<p>I placed the following items in the Black Drum in the store room:</p> <ul style="list-style-type: none"> <li>• 1 full 12.5kg tub of Antoff with a small (&lt;1kg) amount of leftover small granules added in and taped shut.</li> <li>• 1 tub of rubbish (used gloves, paper masks waste bait, empty Vanquish Pro tubes etc.) for eventual return to NZ.</li> <li>• 2x Scotts and 1x generic spreaders.</li> </ul>

			<ul style="list-style-type: none"> <li>• 1 box containing ATTRATHOR concentrate in multiple plastic bags.</li> <li>• 3 unopened tubes of Vanquish Pro</li> </ul> <p>The following items were added to the bag:</p> <ul style="list-style-type: none"> <li>• 1x generic spreader</li> <li>• 1 nearly empty tube of Vanquish Pro</li> </ul> <p>One box of Nitrile gloves and one bag of paper face masks were used up during this round of treatment.</p>
	Discuss next visit	Discussed next visit.	<p>I stressed the need for Katareti and Ata to send me information about ant numbers in the treatment area - particularly the new infestations.</p> <p>I asked for some detail about why the feedback ratings for the workshop were low (2/5, 3/5) and what I could improve next time? Nobody offered any suggestions, so I asked them to discuss among themselves and email me.</p> <p>Ata requested a workshop on response and also some information about how to catch and preserve ants.</p> <p>It was acknowledged that a further round of management may be necessary.</p>
12 Aug Wednesday	a.m Attempt to download software for Katareti to use PIA key on his laptop.	Software downloads failed due to poor internet connection.	I left Katareti with step by instructions on how to download the necessary software to run the PIA key. I will check Freecycle for an old laptop and see if I can set that up for them to use for the PIA key
	p.m. Allan departs for Fiji		



### 7.7.3 October 2015

<b>Date</b>	<b>Activity</b>	<b>Results</b>	<b>Outcomes</b>
7 Oct Wednesday	am Arrive in Kiritimati	Allan spoke with Ata	Moana (fishing guide at Ikari house) told me that there has been rain and flooding in Ronton over the last few weeks, but no rain in the past two weeks.
	Pm Allan to complete a preliminary survey of the area Treated in August 2015.	<p>Allan assessed the treatment area. Yellow crazy ants remain present in patches of the treatment area, but in much lower abundance than was observed in August. Workers were only seen foraging on or around six noni trees patchily distributed along the eastern margin of the treatment area and around the lobster processing shed North of the Captain Cook Store. No YCA were observed anywhere else in the treatment area.</p> <p>The infested noni were situated at:</p> <ol style="list-style-type: none"> <li>1. The southeast corner of the northernmost CPPL building (Blue). 1 worker observed.</li> <li>2. northeast of the derelict building. 2 workers observed</li> <li>3. at the northwestern corner of the salt store opposite the concrete ramps. 5 workers observed.</li> <li>4. South of the large abandoned boat by the south end of the Captain Cook Store. 6 workers observed.</li> <li>5. below the largest noni on a concrete slab immediately southeast of the Captain Cook Hotel store. 1 worker observed</li> <li>6. at the northeastern corner of the Captain Cook Hotel Store. 1 worker observed.</li> </ol>	<p>There was no evidence of recent flooding in the areas of Ronton that I inspected.</p> <p>Where present, the YCA appear to be at very low abundance. This lack of obvious foragers may cause problems in terms of treatment, because there may be too few workers foraging to deliver sufficient bait to the nest in order to kill it.</p>

<p>8 Oct Thursday</p>	<p>am Meet with available WCU and ALD staff. Collect Health Surveys from August visit, discuss outcomes of previous management round and outline Monitoring for current visit</p>	<p>Met with Ata and Katareti. We discussed monitoring and Workshop programme for 2016.</p>	<p>Only Ata and Katareti were present. I was informed that a delegation from Tarawa are holding a series of public meetings over the next few days. Monday's meeting will focus on agricultural and environmental development, so both Ata and Katareti and their teams will need to attend. Furthermore, tomorrow (Friday is a public holiday). I mentioned the plan for the in country team to monitor in January 2016, Ata said that he could organise this. I asked which topics would be useful to them for Workshops in 2016, again response was mentioned (by Ata). Because of the poor response to the last workshop, I also asked whether it would be better to do one on one sessions with Ata and Katareti and for them to disseminate information to their teams, but they thought full workshop were better.</p>
	<p>am Monitoring treatment area with available WCU and ALD staff. Pre-treatment. Monitoring forms to be completed.</p>	<p>Only Ata and Katareti available for monitoring. The three of us monitored the entire infested area</p>	<p>Monitoring results revealed were much the same distribution as my solo effort yesterday with a few additional sightings as follows:</p> <ol style="list-style-type: none"> <li>1. 3 foragers observed on noni on west side of derelict building opposit salt stor</li> <li>2. 1 forager observed on noni on East side of salt store</li> <li>3. Several workers were observed in the small noni immediately north an next to the large abandoned boat on the Southeast side of the Capt.Cook Store.</li> <li>4. A few workers observed around the north end of the inspection ramps. Possibly a small nest as three workers went in to a large crack in the concrete.</li> <li>5. A nest was found in a disused water tank outside a house next door to the Captain Cook Hotel Store.</li> <li>6. Several workers were observed around a disused outrigger float next to the disused compost toilet of the house two doors down from the Capt. Cook store.</li> </ol>

			<p>7. five workers observed foraging on an overgrown concrete slab next to a noni between the water supply and building works buildings. Possible nest?</p> <p>7. There were many more workers foraging on the noni next to the the southeast corner of the northernmost CPPL building (Blue) than yesterday. This building is disused and full of rubbish.</p>
	pm Place sugar lures around infested area.	Sugar lures were haphazardly placed at 5 metres apart throughout the treatment area and 100 metres to the North and West. Only two lures had YCA on them. These lures were situated where ants had been observed during monitoring (at the CPPL and by the concrete ramps).	Recruitment by YCA to sugar lures was minimal, though several other ant species were abundant. Presumably this indicates that YCA numbers are low (as observed on noni during the visual survey). No YCA were detected beyond the limits identified in the visual survey indicating that the infestation has not advanced any further. Spot treatment with ATTRATHOR and Vanquish Pro will commence tomorrow
	pm Advise stakeholders of forthcoming treatment, place posters and distribute leaflets as necessary	Ata and Katareti told stakeholders in the proposed spot treatment areas that baiting would be undertaken in the next few days.	People were aware of the ants and noted that the numbers had declined significantly since the last visit in August. They also, understood about the baits being used and it was decided not to distribute leaflets. I left Katareti with a supply of leaflets, Health surveys and posters for future use.
9 Oct Friday	Public Holiday	No WCU or ALD staff available as this is a public holiday	It is important to check for public holidays before organizing a trip in future. There are several sites which list Kiribati Public Holidays accessible via a Google search. On this occasion the infestation is small and easily treated by a single individual, but if it were larger and more staff were required an unexpected public holiday could compromise the successful completion of treatment/monitoring.
	am	Spot treated northeastern portion of CPPL building, North end of inspection ramps, East	A potential nest was identified on the southeast corner of the blue CPPL building, but the entrance was not clear.

	Allan only to commence spot treatments where necessary.	side of Salt store, South east section of Capt. Cook and first house North of Captain Cook with ATTRATHOR and Vanquish Pro. There were a large number of small children playing between the second house North of the Capt. Cook Store and the Lobster factory, so this spot will need to be treated later.	Trails were treated with ATTRATHOR and the surrounding area with Vanquish Pro. However, this site is a candidate for a small amount of AntOff to be spread because there was sufficient worker activity to carry enough bait to kill a nest. Will re-assess on Monday, when I have access to the WCU building and AntOff Bait. There is a small nest on the West side of the North end of the inspection ramps and another on the Northwest side of the Salt store. Both were treated with Vanquish Pro and ATTRATHOR, which should suffice - Will re assess on Monday. The eastern end of the overgrown area behind the Fisheries building would benefit from a light treatment of AntOff. Several noni in the area (between the derelict building and the South end of the Capt. Cook Store) have YCA workers foraging on them, but there is no clear evidence of a nest.
	pm Allan to continue follow-up treatment as necessary	Heavy rain in multiple outbursts prevented follow up on the Lobster factory	There were several torrential downpours of rain throughout the afternoon - each lasting approximately 20 minutes. The ATTRATHOR and Vanquish distributed this morning were largely placed in sheltered areas, but it may be worth re-applying tomorrow on the way to treat the Lobster factory.
10 Oct Saturday	am Allan to complete any follow-up treatment as necessary	Completed spot treatments with ATTRATHOR and Vanquish-Pro	No evidence of YCA activity at the North end of the inspection ramps and only one "staggering" YCA worker observed at the blue CPPL building. I will re assess on Monday and may reconsider using AntOff in these areas. Treated area around outrigger, compost toilet and surrounding area of second house North of Capt. Cook Store and also treated the Lobster factory and its fence. There were an large number of active workers present on the disused water tank in the grounds of the 1st house North of Capt. Cook Store, they appear to be nesting inside the breeze blocks - I treated the obvious trails with

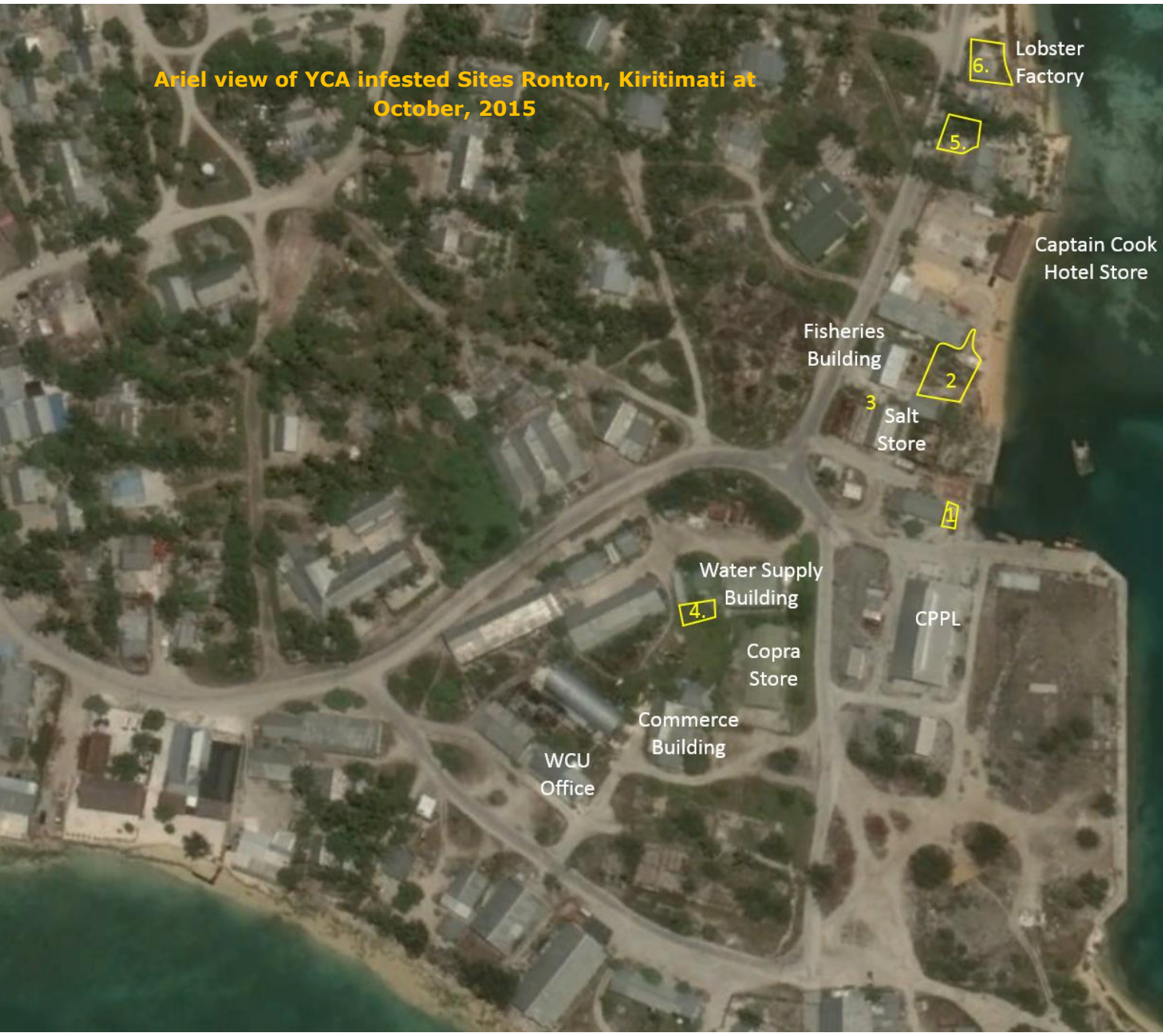
			<p>ATTRATHOR again and spotted Vanquish Pro into cracks in the masonry.</p> <p>In total, the spot treatment over the past two days has used approximately 600ml of diluted ATTRATHOR and approximately 90gm of a 100gm tube of Vanquish Pro.</p>
	pm	Intermittent heavy rain from mid afternoon and throughout the night.	Fortunately, the rain began around four hours after the Vanquish and ATTRATHOR were put out.
11 Oct Sunday	No work planned	Heavy rain all day	It is uncertain what effect this rain will have on the efficacy of the bait and what impact it will have on the YCA.
12 Oct Monday	Day 2 of 3 day Public Meeting about development of Kiritimati.	Today the public meeting focuses on Agricultural and Environmental Development, so both Ata and Kataretis' teams must attend. Allan to do spot treatments where necessary.	<p>It rained early in the morning between 4:00am and 7:00am. The road through Ronton and surrounding village area is flooded from the Coconut Bar North past the lobster factory. I was told by Katareti that this sort of weather event is very uncommon (perhaps once every ten years).</p> <p>I met Katareti at 8:00 am and collected AntOff Bait, a spreader and wheel barrow from the WCU office. The weather cleared and I was able to spread bait in a portion of the overgrown area between the North end of the derelict building, the South end of the Captain Cook Store and the back of the Fisheries Building. This area was not flooded and had several piles of rubbish scattered around where I observed a reasonable amount of YCA worker activity.</p> <p>I also treated the path between the derelict building and the Salt Store, where small numbers of workers were had been observed.</p> <p>There was still a small amount of worker activity at the East end of the blue CPPL building. I considered there were too few workers to warrant broadcast bait, but scattered a small handfull of AntOff around the base of the noni where they forage.</p> <p>I also treated a small area between the water supply building and the building supply store with a combination of AntOff and the remaining 10gm of Vanquish Pro.</p>



			In total, I estimate that I distributed approximately 400-500gm of AntOff (half a spreader load) across the entire area described above.
	Pm Show Katareti where remaining ants are	Showed Katareti where remaining ants are	Katareti was unable to attend the village meeting because of a missing staff member. Later in the afternoon I showed him all the remaining sites where YCA are present and explained how I had treated each site. I requested that he perform a visual survey a week to ten days after I leave and email me the results. Depending on the outcome of this survey we will discuss if a further round of treatment is necessary before the middle of next year.
13 Oct Tuesday	am Ata and Katareti (plus their teams as available) to assist with any final treatments	Treatment already completed, visual survey (Allan only)	A few YCA foragers are still evident on the noni by the Blue CPPL building, by the boat at the South end of the Capt. Cook Store and at the Lobster Factory. I have requested that Ata and Katareti
	pm Pack gear	Allan Packed gear	The ATTRATHOR is returning to New Zealand for use in Tokelau later this Month. There are two unopened syringes of Vaquish Pro left and sufficient gloves and paper face masks for another round of treatment next year. There is still approximately 12.5 kg of AntOff remaining. Bait, spreaders and Waste are stored in the sealed black drum in the WCU office store room and masks and gloves are in a carry all bag on top of the drum.
	Pm Inspect wharf and Fuel depot	Allan checks wharf and fuel depot and does not find YCA	An opportunity arose to check the wharf and fuel depot for YCA. There were none present. A large quantity of copra (recently imported from one of the other islands) was being loaded for storage in Ronton. As this was an internal movement of goods it is unclear whether biosecurity checks had been done on the copra. I will discuss with Ata.

<p>14 Oct Wednesday</p>	<p>am Post Treatment Survey</p>	<p>Three people participated in a post treatment survey (Ata Bioka, Katareti and Allan)</p>	<p>There were a few YCA seen foraging by the blue CPPL building, around the abandoned boat at the South end of the Capt. Cook Store and at the Lobster Factory. None were seen in any of the other treated areas.</p> <p>The occupant of the house next door to the Capt. Cook Store showed us a new trail of YCA climbing the ladder to his toddy bottles. The occupant was concerned that the ants would transfer poison into his toddy and told us that he was abandoning that batch. I told him that if the ants did transfer any poison into the toddy it would be such a small amount that it would be very unlikely to have any harmful effect. He was not convinced. I asked Katareti and Ata to keep an eye on the sites that still showed evidence of YCA activity and explained about bait shyness to ensure they were not treated again too soon. I also asked Katareti to make sure the Health surveys are distributed and to check on the man who was concerned about his Toddy. There was abundant insect life throughout the treatment area. Noni were typically covered in small black ants and there we noticed a new nest of honey bees at the West side of the tourism office.</p>
	<p>Discuss 2016 monitoring with ALD and WCU partners</p>		<p>Ata and Katareti agreed to monitor YCA in the treatment area in January and to perform some follow up treatment if necessary if I advised them by email on which poison to use where.</p> <p>Apart from response, they were uncertain which workshop topics they would find useful next year. I agreed to send them a list of options for them to choose from.</p> <p>It was agreed that July (except for the week of independence day public holidays) and October best fit with their schedules and the weather for trips next year</p>

**Ariel view of YCA infested Sites Ronton, Kiritimati at  
October, 2015**



**Suggested treatment plan for January  
2016**

1. Treat exterior of building with Vanquish Pro and ATTRATHOR. If possible check interior for presence of YCA
2. Treat with Antoff granules. Pay particular attention to rubbish under grounded boat and area NE of Salt store
3. Monitor N end of inspection ramps for return of YCA. If found treat with Vanquish Pro and AntOff.
4. Treat area between water supply and building supply buildings with Antoff Granules and treat large concrete slab behind shipping container with Vanquish Pro
5. Treat with Vanquish Pro and Antoff Granules. Advise resident not to use toddy for 43 days after treatment
6. Treat with Compost toilet area Vanquish Pro and ATTRATHOR. Treat fence with Vanquish Pro and IF UNINHABITED distribute Antoff Granules around exterior perimeter of building.

### 7.7.4 March 2016

<b>Date</b>	<b>Activity</b>	<b>Results</b>	<b>Outcomes</b>
15th March 2016	Monitoring Visual survey of infested area	Katareti Taabu reported that he had recently performed a visual survey of the treatment area and had found no evidence of YCA around CPPL building, at the Fisheries Office or inside the compound of Motor Pool (CCH's boat yard). However YCA were still present at the northernmost tip of the infested area and were seen foraging near the live fish export building and in the grounds of the gentleman that makes toddy (see October 14 <sup>th</sup> entry). Katareti expressed concern about a pile of rubbish outside the gentleman's house.	Allan Burne suggested that Katareti make sure that the rubbish is not moved from the infested area and, if the owner is agreeable, that it should be spot-treated with some Vanquish Pro and Antoff granules. If necessary, Pacific Biosecurity could compensate the owner for the loss of his batch of toddy due to potential contamination by poisoned ants. Allan told Katareti that the rubbish dump should be inspected to see if there are YCA present. It is possible that they may already have been introduced there from the infested area. It was also suggested, that the water tank pillar in the gentleman's garden is checked for YCA. If they are found to be present, and the rain has cleared, then ATTRATHOR should be applied around the nest entrance and across any trails seen. Similarly, the compost toilet, outrigger float and woven fence at the Live Fish Export place need to be checked. If YCA are present, the toilet and float should be treated with ATTRATHOR and Vanquish-Pro should be put in the cracks in the concrete. As Allan Will be returning to Kiritimati in late July /early August 2016 this treatment will need to be done by the end of April to ensure there is sufficient time between treatments to reduce the possibility of bait shyness.

### 7.7.5 July/August 2016

<b>Date</b>	<b>Activity</b>	<b>Results</b>	<b>Outcomes</b>
Wednesday 27 July Am	Arrive Kiritimati		
Pm	Allan to complete a preliminary survey of the area Treated in August 2015.		
Thursday 28 July Am	Meet with available WCU and ALD partners		
Pm	Monitoring (and pre-treatment survey) of treatment area.		
Friday 29 July Am and Pm	Spot treatments where necessary		
Saturday 30 July Am and Pm	Continue spot treatments (Allan Only)		
Sunday 31 July	No work scheduled		
Monday 1 August Am and Pm	Inspect rubbish tip wharf and Koil for YCA.		
Tuesday 2 August	Meet with WCU and ALD to discuss any treatment/ movement controls needed for newly inspected areas.		
	Implement any treatments in rubbish tip etc.?		
Wednesday 3 August	Post Treatment Survey		

## 7.8 Appendix 8. Monitoring results

### 7.8.1 Pre- and post-treatment monitoring April 2015 (8 observers)

<b>Before Treatment</b>						<b>23/04/2015</b>					
Crab			Spider			Insect (other than YCA)					
Alive	Dead		Alive	Dead		Alive	Dead				
1	1+					18+2+13 (33)					
Lizard			Bird			Fish					
Alive	Dead		Alive	Dead		Alive	Dead				
<b>After Treatment</b>						<b>28/04/2015</b>					
Crab			Spider			Insect (other than YCA)					
Alive	Dead		Alive	Dead		Alive	Dead				
1			3	1+1 (2)		13+2 (15)			4+3 (7)		
Lizard			Bird			Fish					
Alive	Dead		Alive	Dead		Alive	Dead				
<b>Difference</b>											
0	-1		+3		-2	-18			-7		
0	0		0		0	0			0		

**Conclusion:** some non-target effects?

### 7.8.2 Pre and post treatment monitoring August 2015 (8 observers)

6 forms returned before treatment, 7 after treatment

<b>Before Treatment</b>						<b>06 /08/2015</b>					
Crab			Spider			Insect (other than YCA)					
Alive	Dead		Alive	Dead		Alive	Dead				
1						15+3+1+2+3 (24)					
Lizard			Bird			Fish					
Alive	Dead		Alive	Dead		Alive	Dead				
2+3+1+1 (7)		1									
<b>After Treatment</b>						<b>11/08/2015</b>					
Crab			Spider			Insect (other than YCA)					
Alive	Dead		Alive	Dead		Alive	Dead				
						40+2+18+10+1 (71)			30+30+23 (83)		
Lizard			Bird			Fish					
Alive	Dead		Alive	Dead		Alive	Dead				
2											
<b>Differences</b>											
-1	0		0		0	47			-83		
-5	+1		0		0	0			0		

The majority of the dead "insects" (largely millipedes and slaters) were found around the Fisheries office.

**Conclusion:** some non-target effects?



Three forms completed prior to treatment.

<b>Before Treatment</b>						<b>08 / 10 / 2015</b>	
Crab		Spider		Insect (other than YCA)			
Alive	Dead	Alive	Dead	Alive	Dead		
		3		5+109+234 (348)	36		
Lizard		Bird		Fish			
Alive	Dead	Alive	Dead	Alive	Dead		
3		3					
<b>After Treatment</b>						<b>11 / 08 / 2015</b>	
Crab		Spider		Insect (other than YCA)			
Alive	Dead	Alive	Dead	Alive	Dead		
1+1(2)	1+3 (4)	2+1(3)		193+215+33 (441)	28		
Lizard		Bird		Fish			
Alive	Dead	Alive	Dead	Alive	Dead		
<b>Differences</b>							

There were many ant species present on all noni and a large number of honeybees were observed both before and after treatment. The majority of dead "insects" observed were millipedes mainly seen at the Water Supply building - the reduction in the number of dead insects observed at the same location is likely because the torrential rain that occurred after treatment washed them away.

### 7.8.3 Health Survey results

Survey completed 28<sup>th</sup> April 2015

	No	Yes	Symptoms Experienced	Duration of Symptoms	Details
Felt unwell <b>before</b> April 23 2015	6	0	Na	Na	Na
Experienced symptoms associated with Fipronil poisoning <b>before</b> April 23 2015	4	2	Skin irritation (1 person) Headache & stomach pain (1 person)	Na	Na
Has been unwell <b>since</b> April 23 2015	5	1	Diarrhea, nausea		
Experienced symptoms associated with Fipronil poisoning <b>after</b> April 23 2015	5	1	Nausea beginning 25/04/2014 (sic?)	3	The subject stated they had not experienced these symptoms prior to April 2015
Has existing medical condition	6	0	Na	Na	Na
	No	Yes	Time of Contact/Consumption	Duration of Contact/Quantity consumed	Details
Touched Antoff bait while working with it	1	5	Participants that answered "yes" stated they had been in contact with Antoff bait over the course of two, (two respondents), three (two respondents) and five (one respondent) days	One respondent qualified their exposure over three days as amounting to "at least three hours"	
Was PPE Worn	0	6	Na	Na	All respondents wore [nitrile] gloves whilst handling the bait.
Subject ate bait	6	0	Na	Na	Na
Subject ate animals from Treatment area	6	0	Na	Na	Na

**Conclusion:** the only subject who reported any symptoms after fipronil contact concluded this was more likely to be a gastric ailment.