Prioritised surveillance for invasive ants in Southland

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Summary

Project and Client

- Provision of advice on surveillance for invasive ant species was undertaken for Environment Southland by Landcare Research in July – September 2007.

Objectives

- The aim of this report is to summarise the advice and recommendations given to Environment Southland biosecurity staff at a meeting on the 21st August in Invercargill.
- The outcome is to prevent the establishment of targeted invasive ant species in Southland.

Recommendations

Public awareness

- Develop a short-term public awareness campaign to raise awareness of invasive ants and to allow members of the public to contact Environment Southland of suspect ant finds.
- Develop a public awareness strategy that utilises the media over a long-term period.
- Educate and liaise with stakeholders where there is a high risk of invasive ant incursions (based on high risk site prioritisation), e.g. nurseries.
- Upskill and develop a relationship with key pest controllers in Southland so there is the capability in Southland to immediately control invasive ant incursions.
- Become better connected with ongoing invasive ant programs lead by Biosecurity New Zealand (MAF).

Prioritisation of high risk sites and baseline survey

- Classify high risk sites on the basis of the 'Northland Invasive Ant Strategy', where sites and businesses associated with high risk goods are deemed high risk.
- Sites classified as high risk should be visited first. These include:
    - 1) ports of entry into Southland (seaport and airport), and where goods are moved to devanning sites (i.e. transitional facilities), and truck depots, and
    - 2) sites which receive high risk goods which are often associated with ants (e.g. nursery, soil, landscaping, timber merchants etc).
- Undertake a baseline survey, aimed at detecting the presence of invasive ants in Southland. This should occur of the warmer summer months.
- For any surveillance, direct searching for ant species should be used, as this method is highly suitable for detecting the presence or absence of invasive ant species.
- Approximately 30 minutes should be spent at each site.
- If this surveillance strategy is to be carried out over multiple years, it is recommended that high risk and high priority sites are re-visited before other sites of lower priority.
- The results of the surveillance should be briefly evaluated after the first year. This will assist in developing a longer term surveillance strategy and optimising the process of site prioritisation.

Introduction

Currently there are 28 invasive ant species established in New Zealand (Ward 2005, see Appendix 1). Several of these invasive ant species are widespread throughout the country, especially the North Island, and are usually conspicuous, as they often occur in residential areas and houses. This is in contrast to the small native ant fauna of 10 species, which are seldom seen and more commonly found in native ecosystems.

Of the invasive species already in the country, of most concern is the Argentine ant, whose negative impact on native biodiversity and horticulture has been well documented overseas. However, Darwin's ant (*Doleromyrma darwiniana*), and the white-footed house ant (*Technomyrmex albipes*) have also been recently identified as threatening species (Ward 2007).

Invasive ant species are currently receiving considerable attention around the globe. There is increasing evidence of economic and agricultural losses, health effects on humans, and disruption to natural ecosystems as a result of invasive ants.

Ants are the second most common family of insects intercepted at the New Zealand border. A total of 115 ant species from 4355 interceptions have been detected over the last fifty years at the New Zealand border (Ward et al. 2006). Many of the species commonly intercepted are invasive species, and several have already become established in New Zealand.

To reduce the threat of invasive ant species three aspects need to be identified: 1) a national priority list of invasive ant species, 2) the regions and habitats most at risk, and 3) high risk pathways, vectors, and commodities, both into and within the region of interest (Anon 2006).

A recent assessment has examined the 1st and 2nd of these issues. In the report of Ward (2007) a risk assessment of exotic ant species in New Zealand was undertaken and distribution modelling identified the regions most at risk. A strategy to address the 3rd issue has also been developed for the Northland Region (Ward 2006).

This current report builds on the above information for high risk invasive ant species in Southland.

Surveillance overview

To reduce the threat of invasive ant species two major points of action need to be considered: measures to prevent their entry, and responses to eradicate or control incursions (Anon 2006). Both of these points rely heavily on surveillance strategies to detect invasive ants.

Risk goods should be targeted in the following order (Murphy 2004). The first targets are the points of entry into New Zealand (ships and aircraft). The second targets are goods moved to devanning sites (i.e. transitional facilities). The third targets are essentially those that fall "outside" the first two, in particular sites where requirements for the survival and reproduction of species are met (Murphy 2004).

Murphy (2004) outlined the concept of high risk site surveillance (HRSS). This is the deliberate targeting of high risk sites associated with risk goods and pathways, and are thus more likely to be sites of establishment that spread invasive species (Murphy 2004).

This is the approach that Southland should take for preventing the establishment of invasive ant species in Southland.

Recommended Surveillance Strategy

Public awareness

Advocacy and education of businesses and residents in the Southland region will also play a key role in the surveillance and management of invasive ant species.

It is recommended that Environment Southland:

- **Develop a short-term public awareness campaign to raise awareness of invasive ants and to allow members of the public to contact Environment Southland of suspect ant finds.** Educating the public on the need to be vigilant with an 'invasive ant' flyer would be a useful strategy in any baseline surveillance, and also for the early detection of invasive ants in general.

- **Develop a public awareness strategy that utilises the media over a long-term period**. This could include a regular newspaper column on a wide range of biosecurity issues. If a regular column where established, it may become a useful way of notifying the public of important/urgent biosecurity issues.

- **Educate and liaise with stakeholders where there is a high risk of invasive ant incursions (based on high risk site prioritisation), e.g. nurseries**. Develop a network of 'eyes' in Southland that could notify biosecurity staff of any suspect ants. Talking with personnel at high risk sites and educating them on the need to be vigilant, with an 'invasive ant' flyer is a key strategy in the early detection of invasive ants.

- **Upskill and develop a relationship with key pest controllers in Southland so there is the capability in Southland to immediately control invasive ant incursions**. Having pest controllers skilled in the control of ants would be beneficial if incursions are detected in Southland, because ant control could be initiated immediately, without the need for a 'learning curve'.

- **Become better connected with ongoing invasive ant programs lead by Biosecurity New Zealand (MAF).** MAF have several invasive ant programs underway. Strong regional council connections to these would benefit both the individual regions but also New Zealand as a whole. It would benefit information sharing and probably increase the detection of ant incursions. Two current programs are 'antspotters' and the 'high risk port surveillance program'.

High risk site prioritisation

It is recommended that Environment Southland:

- **Classify high risk sites on the basis of the 'Northland Invasive Ant Strategy'**, where sites and businesses associated with high risk goods are deemed high risk (see Appendix 2). See the report 'Prioritised surveillance strategy for invasive ant species in Northland' by Ward (2006) for the methods.

    - Sites classified as high risk should be visited first. These include:
        - 1) Ports of entry - are where goods are unloaded into a site that is the first point of entry into New Zealand. These sites include seaports and airports, and also where goods are moved to devanning sites (i.e. transitional facilities), and truck deports bringing goods into Southland.

- 2) Sites which receive high risk goods which are often associated with ants (e.g. nursery, soil, landscaping, timber merchants etc). These sites have a higher probability of acting as a source for the spread of invasive ants, and as sites of early establishment within a region. The basic approach to select these sites is to search the Telecom yellow pages for business categories that could be associated with risk goods. These categories were given a high-medium-low ranking (Appendix 2), and businesses (i.e. sites) were compiled into an excel spreadsheet.

- **Undertake a baseline survey, aimed at detecting the presence of invasive ants in Southland.** This should occur of the warmer summer months. Combine any surveillance activities with public awareness and education of personnel at high risk sites. Use the sampling methods listed below.

Baseline survey - frequency and intensity of sampling

- Sites with a high risk or a high priority are the most important to visit first. However, flexibility is also a key element in any surveillance strategy. It may be beneficial to examine a combination of high and medium risk sites at the same time within a region to save on travel time/costs.

- Depending on the number of sites and resources available, it may be useful to split the total number of medium risk/medium priority sites across different years.

- If this surveillance strategy is to be carried out over multiple years, it is recommended that repeat surveillance visits be made to the high risk and high priority sites before other sites of lower priority. The surveillance results should be briefly evaluated after the first year. This will assist to develop a longer-term surveillance strategy and optimise the ability of site prioritisation.

- For the baseline surveillance, direct or hand searching should be used. This involves searching for, and collecting, ants in different microhabitats within an area. Direct sampling is particularly useful when the main objective is to determine which ant species are present or absent, and no information is required on their abundance or biology. Direct searching it is highly suitable for detecting the presence or absence of invasive ant species.

- Direct searching uses a minimum of material in the field. Field materials include: an aspirator (to collect ants), vials (5mm, plastic, to store ants), ethanol (95%), a timer, and site labels. An additional advantage of direct searching is that less time is needed in the laboratory to sort and identify ant species. No time is needed to extract ants from messy baits, or from the litter or soil. The amount of time spent in the surveillance of sites is therefore maximised.

- Direct searching is an easily learned technique. It basically requires good observation skills and careful examination of different microhabitats where ants are commonly found: such as curbing and the edges of paths, garden edging, bare ground, leaf litter, twigs, under and on plants, under stones/metal, at the base of plant roots. Although most ant species are quite small (1-4 mm), they are usually diurnal and active on the ground. Therefore, they should be relatively easy to observe.

- When ants are discovered, an aspirator is the best method to collect them. The aspirator (also known as a “pooter”) is used to “suck” ants into a tube, where they can then be transferred to a vial. Approximately five ant specimens should be collected if possible – having several specimens may help during identification. Every vial should be labelled with site name/code, date, and collector. Labels should be written either in pencil or with a drawing pen (e.g. Staedtler pigment liner) – otherwise the ink will run when placed into the ethanol. A biro pen is not suitable.

- To standardise collecting effort, it is recommended that the time spent searching for ants at each site be recorded. Approximately 30 minutes should be spent at each site, however, this may vary depending on the size of the site. At the end of the 30 minute period all ants collected are placed into one vial of ethanol.

- This sampling methodology can be used to detect a wide range of invasive ant species.

- Ants should be identified using a binocular microscope of between 10-40x power. Any difficult or suspicious specimens can be sent to the author.

- To identify ants, the online key to New Zealand ants in combination with a reference collection is an excellent method. The online key can be found at:
  http://www.landcareresearch.co.nz/research/biocons/invertebrates/ants/key/

References

Anon. 2006. Threat abatement plan to reduce the impacts of tramp ants on biodiversity in Australia and it territories. Department of the Environment and Heritage, Commonwealth of Australia, Canberra.

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Ward, D.F. 2006. Prioritised surveillance strategy for invasive ant species in Northland. Landcare Research Report 0607/044 to Northland Regional Council.

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Appendix 1. Endemic and exotic ant species recorded from New Zealand. Subfamily groupings follow Ward (2005). * - refers to previous history of being exotic in another country. AF - of African origin, T – widespread tramp species; all others are of Australian origin.

Subfamily	Genus + species	Biostatus
Poneromorphs		
Amblyoponinae	*Amblyopone australis*	Exotic
	Amblyopone saundersi	Endemic
Ponerinae	*Hypoponera eduardi*	Exotic*, AF
	Hypoponera punctatissima	Exotic*, T
	Pachycondyla castanea	Endemic
	Pachycondyla castaneicolor	Endemic
	Ponera leae	Exotic
Proceratiinae	*Discothyrea antarctica*	Endemic
Formicoids		
Dolichoderinae	*Doleromyrma darwiniana*	Exotic
	Iridomyrmex sp.	Exotic
	Linepithema humile	Exotic*, T
	Ochetellus glaber	Exotic*, T
	Technomyrmex albipes	Exotic*, T
Ectatomminae	*Rhytidoponera chalybaea*	Exotic
	Rhytidoponera metallica	Exotic
Formicinae	*Paratrechina* sp.A	Exotic
	Paratrechina sp.B	Exotic
	Prolasius advenus	Endemic
Heteroponerinae	*Heteroponera brounii*	Endemic
Myrmicinae	*Cardiocondyla minutior*	Exotic*, T
	Huberia brounii	Endemic
	Huberia striata	Endemic
	Mayriella abstinens	Exotic
	Monomorium antarcticum	Endemic
	Monomorium antipodum	Endemic
	Monomorium fieldi	Exotic
	Monomorium pharaonis	Exotic*, T
	Monomorium smithii	Endemic
	Monomorium sydneyense	Exotic
	Orectognathus antennatus	Exotic
	Pheidole megacephala	Exotic*, T
	Pheidole proxima	Exotic
	Pheidole rugosula	Exotic
	Pheidole vigilans	Exotic
	Solenopsis sp.	Exotic
	Strumigenys perplexa	Exotic
	Strumigenys xenos	Exotic
	Tetramorium bicarinatum	Exotic*, T
	Tetramorium grassii	Exotic AF

Appendix 2. Risk categories obtained from the Telecom Northland Yellow Pages 2006/07. Categories not listed are considered of negligible risk.

Risk	Category	Page
High	Bark products	67
	Garden and Horticultural Suppliers	251
	Fruit and Vegetable Wholesalers	235
	Packhouse-Flowers, Fruit and Vegetables	354
Medium	Lawn and Turf	316
	Tree Services	480
	Rubbish Bin Hire/Waste Disposal	412/499
	Scrap Metal Dealers	419
	Orchardists' Suppliers	351
	Landscape Contracting and Supplies	312
	Timber Merchants	468
	Hire-plants	279
	Garden Centres and Nurseries-Retail	249
	Holiday Parks and Camping Grounds	279
Low	Aero clubs	44
	Automotive Parts, Truck Parts	58/483
	Backpackers	65
	Boat Charter, Repairs	81/83
	Building Suppliers	103
	Bus Charters	105
	Caravan Rentals	117
	Carriers and Cartage	127
	Earthmovers	190
	Farm Supplies & Services, Machinery	212/213
	Fishing Trips	225
	Forestry Equipment	230
	Freight Forwarders	234
	Fruit and Vegetable Growers, Wholesalers	235
	Furniture Removals	239
	Garden Maintenance	251
	Importers	288
	Lawn mowing Services	317
	Machinery Importers and Dealers	328
	Motels and Lodges	340
	Packaging Machinery	354
	Pallet Hire, Manufacturing	358
	Port Services	379
	Quarries, Stone and Rock Merchants	385/446
	Recycling	393
	Rental Vehicles	395
	Sawmills	468
	Second-hand Dealers	421
	Shipping Agents	433
	Storage	446
	Supermarkets and Grocers	451
	Tours and Sightseeing	471
	Tree and Shrub Seeds	483