Ministry of Agriculture and Forestry, New Zealand
Te Manatu Ahuwhenua, Ngaherehere, Aotearoa

PEST RISK ANALYSIS: ANTS ON SAWN TIMBER IMPORTED FROM THE SOUTH PACIFIC REGION

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SUMMARY

This pest risk analysis has been undertaken in response to:

- the recent find of Crazy ants (*Anoplolepis gracilipes* and *Paratrechina longicornis*) on the Ports of Auckland wharf,
- the belief that the wharf may have been infested, and is being re-infested, from imported cargo, and
- the two recent finds of Yellow Crazy Ants (*Anoplolepis gracilipes*) on commercial consignments of sawn timber from the south Pacific region.

The pathway for risk assessment was therefore commercial consignments of sawn timber from the south Pacific region. Two ant species and an ant genus had been recorded on commercial consignments of sawn timber from this region since 1950; Yellow Crazy Ants (*Anoplolepis gracilipes*), Crazy Ants (*Paratrechina longicornis*), and Carpenter Ants (*Camponotus* sp.). While all three ant species or genera have the potential to impact negatively on New Zealand, this assessment was only able to determine with a reasonable level of confidence that Yellow Crazy Ants (*Anoplolepis gracilipes*) have the potential to establish in New Zealand off commercially imported sawn timber from the south Pacific region.

The main countries of concern within the south Pacific region that currently trade with New Zealand in commercial sawn timber were found to be Fiji, the Solomon Islands and Papua New Guinea (PNG). The assessment determined that the current measures for Yellow Crazy Ants (*Anoplolepis gracilipes*) on commercial consignments of sawn timber from Fiji, the Solomon Islands and Papua New Guinea do not adequately mitigate the risk of their establishment in New Zealand.

The risk analysis identified a number of options to reduce the risk of establishment of Yellow Crazy Ants (*Anoplolepis gracilipes*) to an acceptable level. The options recommended for action include:

1. An immediate implementation of a 100% "break bundle" inspection system OR 100% fumigation requirement (importers option) on all commercial consignments of sawn timber imported from Fiji, PNG and the Solomon Islands;
2. Investigating options for reducing the pre-inspection waiting period for all commercial consignments of sawn timber imported from Fiji, PNG and the Solomon Islands;
3. Investigating the efficacy of the application of a pest agitator as a means of increasing inspection efficacy for ants in bundles of sawn timber, and to establish effective methods of implementing this procedure within the inspection methodology;
4. Research an alternative sampling system for inspection that will provide a more appropriate and consistent level of biosecurity assurance for this pathway;
5. Ensure adequate records are collected of ant species interceptions on sawn timber imported into New Zealand so that a review of this analysis can be undertaken as soon as possible.
6. Contacting the appropriate authorities in Fiji, the Solomon Islands and PNG to notify them of these actions and to begin discussions on establishing systems to store recently milled or treated timber to ensure they do not become infested with ants before export to New Zealand.

CONTENTS

TABLES AND FIGURES

1 INTRODUCTION

Forest Biosecurity carries out risk analyses to ensure measures applied to forestry produce pathways and forestry pests are both appropriate to the biosecurity risks associated with those pathways or pests and effective at mitigating any risks that are considered unacceptable.

This pest risk analysis investigates the following:

- the risks of importing unwanted species of ants with commercial consignments of sawn timber exported to New Zealand from the south Pacific region (excluding Australia),
- the likelihood of those imported ants establishing in New Zealand,
- the effectiveness of the biosecurity measures and border clearance systems currently in place at mitigating those risks, and
- any additional biosecurity measures that may be required to reduce the biosecurity risk to an acceptable level.

1.1 DEFINITIONS

Entry (of a pest)

Movement of a pest into an area where it is not yet present, or present but not widely distributed and being officially controlled (FAO 1995).

Establishment

Perpetuation, for the foreseeable future, of a pest within an area after entry (IPPC 1997).

Environment (Biosecurity Act (1993))

Includes: (a) Ecosystems and their constituent parts, including people and their communities; and
(b) All natural and physical resources; and
(c) Amenity values; and
(d) The aesthetic, cultural, economic, and social conditions that affect or are affected by any matter referred to in paragraphs (a) to (c) of this definition.

Import Health Standard

A document issued under section 22 of the Biosecurity Act 1993 by the Director General of MAF, specifying the requirements to be met for the effective management of risks associated with the importation of risk goods before those goods may be imported, moved from a biosecurity control area or a transitional facility, or given a biosecurity clearance.

Hitchhiker pest

A pest that is carried by or with a commodity and is not a pest of the commodity.

Pest

Any species, strain or biotype of plant, animal or pathogenic agent, injurious to plants or animals (or their products) or human health or the environment.

For other definitions see:

- Secretariat of the International Plant Protection Convention, International Standards for Phytosanitary Measures, Glossary of Phytosanitary Terms. 2001.
- Biosecurity Act (1993)

2 INITIATION EVENT FOR THIS ANALYSIS OF RISK

A number of relatively recent events have lead to the perception that the biosecurity risk to New Zealand of ant infested sawn timber imported from the south Pacific has changed. These events include:

1. The establishment of the Argentine Ant (*Linepithema humile*) in New Zealand (estimated at just prior to 1990) and its spread in the North Island, suggesting some ants should be regarded as high impact pests that have the capacity to invade the New Zealand environment.
2. The discovery (in 2001), eradication response and subsequent hazard analysis of Red Imported Fire Ant (*Solenopsis invicta*) by Ministry of Agriculture and Forestry further raising the risk profile of ant species.
3. The recent discovery of a persistent nest of Crazy ants (*Anoplolepis gracilipes* and *Paratrechina longicornis*) and Ghost Ants (*Tapinoma melanocephalum*) on the Ports of Auckland wharf (2002-2003).
4. The recent border interception and post border detection of Yellow Crazy Ants (*Anoplolepis gracilipes*) on two separate consignments of sawn timber imported from the south Pacific region (2003).

These events have all raised the awareness of the potentially serious biosecurity threat invasive ant species are to New Zealand. With the spread of the more serious species internationally, especially into the south Pacific region, the biosecurity risk of these ants to New Zealand is increasing.

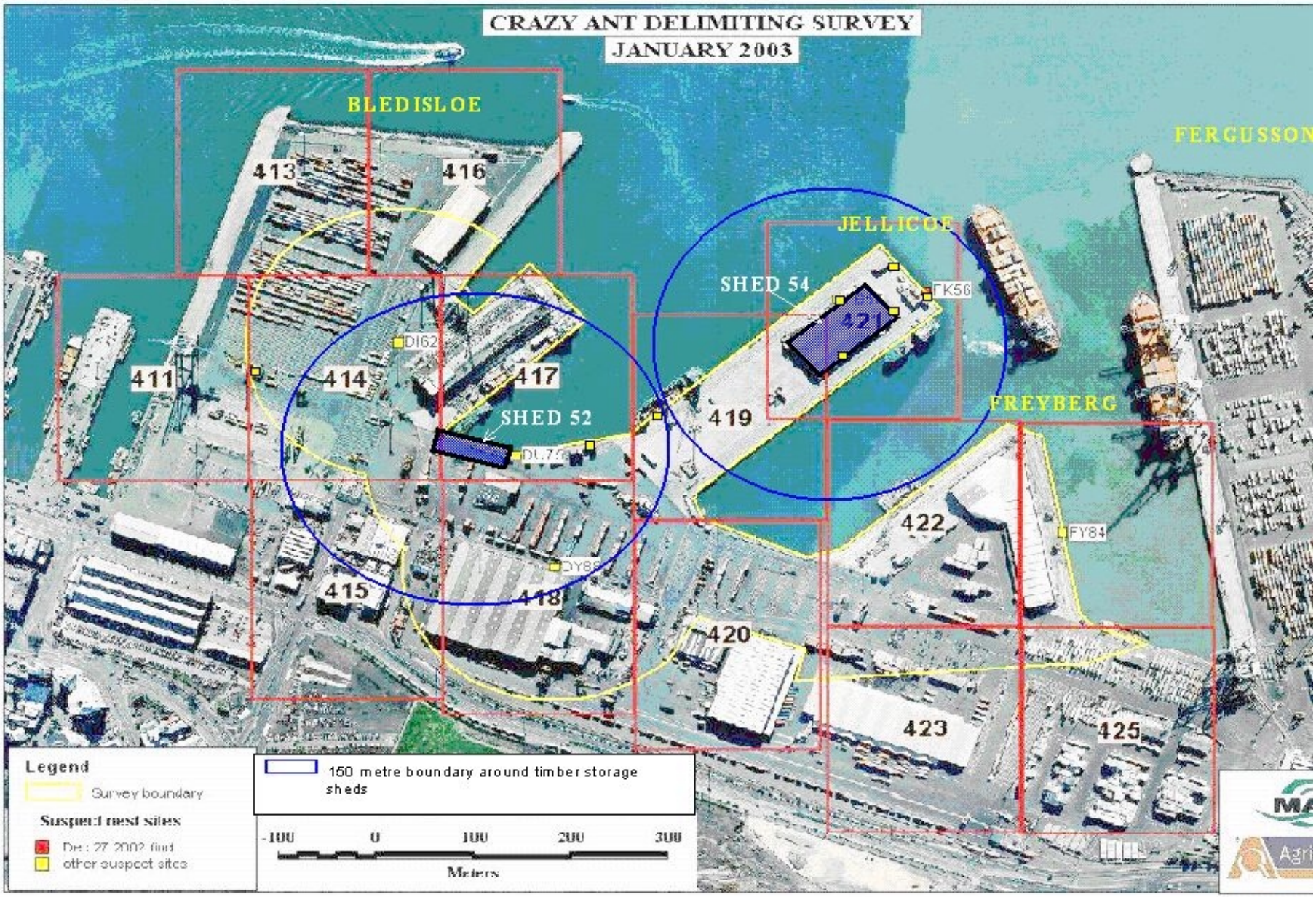
This particular risk analysis, investigating the imported sawn timber pathway from the south Pacific region, has been initiated primarily as a response to:

- The recent find of Crazy ants (*Anoplolepis gracilipes* and *Paratrechina longicornis*) on the Ports of Auckland wharf,
- The belief that the wharf may have been infested, and is being re-infested, from imported cargo, and
- The recent border interception and post border detection of Yellow Crazy Ants (*Anoplolepis gracilipes*) on timber consignments from the south Pacific region.

Presented on the following page are the summarised results of a Crazy ant delimiting survey at the Ports of Auckland, showing the distribution of Crazy Ant (*Paratrechina longicornis*) infestations (yellow and red spots) in relation to the location of timber storage sheds (blue buildings).

The purpose of this risk analysis is therefore to:

1. Establish whether current measures and border clearance activities are sufficient to adequately mitigate the risk of unwanted ants establishing in New Zealand via sawn timber imported from the south Pacific region, and
2. Identify further measures to mitigate the risks should current measures or border clearance activities be considered inadequate.


CRAZY ANT DELIMITING SURVEY
JANUARY 2003
BLEDISLOE
FERGUSSON
JELLICOE
FREYBERG
SHED 54
SHED 52
413
416
411
414
417
419
421
422
415
418
420
423
425
DI62
FK56
FY84
DY85
Legend
Survey boundary
Suspect nest sites
Det : 27 2002 find
other suspect sites
150 metre boundary around timber storage sheds
-100
0
100
200
300
Meters

3 PEST RISK ANALYSIS

The procedures used in this pest risk analysis are described in the Forest Biosecurity Risk Analysis Handbook currently being drafted. The process of risk analysis follows 3 main steps:

1. Hazard Identification
2. Risk Assessment
3. Risk Management

As risk is described as a combination of the likelihood of an event occurring and the magnitude of the event, risk assessment in this instance therefore seeks to provide an estimate of the:

- magnitude of the (unwanted) impact of the hazard should it occur, and the
- likelihood of the hazard occurring as a result of the event occurring.

3.1 DESCRIPTION OF PATHWAY AND RISK (HAZARD IDENTIFICATION)

As mentioned in Section 2, the pathway of concern is the commercial importation of sawn timber from the south Pacific region. Timber may be imported into New Zealand as break bulk (not containerised) or containerised. If it is assumed that the average size of a bundle is 2-3 cubic metres (m^3) (depending on weight of wood), Table 1 provides the average consignment size and number of bundles for each country in the south Pacific region that exports timber to New Zealand.

Table 1: Average consignment size and estimated bundle number for 2002.

Country of Origin	Average Consignment Size	Estimated Average Number of Bundles per Consignment
Fiji	21 cubic metres (m^3)	10
Indonesia	28.5 cubic metres (m^3)	13
PNG	76 cubic metres (m^3)	30
Solomon Islands	48 cubic metres (m^3)	20
Samoa	6 bundles (1 instance)	6 (1 import only)
Tonga	2 bundles (1 instance)	2 (1 import only)

The majority of the imported timber is used as a substitute for native New Zealand timbers in the building industry and by home handymen.

The countries in the south Pacific region from which sawn timber is imported, the frequency of importation in 2002, and the ants intercepted on sawn timber from these countries are shown in Table 2.

Table 2: Recorded ant interceptions from sawn timber imported commercially from the south Pacific region, and the number of consignments imported in 2002.

Country of origin	Number of Consignments of Sawn Timber in 2002	Recorded Ant interceptions since 1950 on Sawn Timber from Listed Countries
Fiji	26	*Camponotus* sp. (Carpenter ants) *Paratrechina longicornis* (Crazy Ant)
Indonesia	186	*Camponotus* sp. (Carpenter ants)
PNG	19	*Anoplolepis gracilipes* (Yellow Crazy Ant)
Solomon Islands	12	*Camponotus* sp. (Carpenter ants)
Samoa	1	*Pheidole* sp. (Big headed ants)
Tonga	1	*Camponotus* sp. (Carpenter ants)

The information provided above was recorded in databases held by the Ministry of Agriculture and Forestry (Bugs Database and QuanCargo). It is accepted that the records are far from complete, as over recent years the MAF Quarantine Service has sent few insect interceptions for diagnosis (though all consignments in which pests have been intercepted have been fumigated). The frequency of interceptions of ants on sawn timber imported from the south Pacific region is therefore unknown. It is also likely that other species of ants have been intercepted on imported timbers from these regions but were not identified or recorded.

The recent interception at the border and post-border of Yellow Crazy Ants (*Anoplolepis gracilipes*) on imported timber could be a result of two recent events:

1. The circulation of a flyer to timber importers and MAF employees providing pictures and a description of Crazy Ants (*Paratrechina longicornis*). Not having known of the significance of exotic ants in the past may have prevented people from reporting them when they found them. This conclusion is supported by the occurrence of the Crazy ant nests on the Ports of Auckland wharf. Border inspection staff were reported to be aware of the infestations up to 12 months before the ant colonies were reported to the Ministry of Agriculture and Forestry Biosecurity Authority.

2. This ant species only recently becoming associated with commercial timber consignments being imported into New Zealand. This also seems possible, and is discussed further in section 4.2.8.

It is therefore possible that both of these events have occurred.

The data provided do indicate that ants can be associated with sawn timber imported from any of the south Pacific countries New Zealand currently trades with.

4 RISK ASSESSMENT

This pest risk assessment identifies or provides, for the pathway and risk described in section 3.1, the:

1. An indication of the potential impact of the ants should they become established in New Zealand; and

2. Likelihood that the ants would become established in New Zealand via the commercial import of sawn timber from the south Pacific region.

4.1 Assessment of Potential Impact

This assessment of risk is focusing on pest species that are primarily of environmental or health concerns and as such the potential impact of each pest has been assessed by other groups and/or departments. This assessment will simply demonstrate that a number of the ants shown to be at risk of entry on this pathway have the potential to cause a "significant" unwanted impact without attempting to measure that potential impact.

Information on potential impact has been provided below for three ant species: Crazy Ants (*Paratrechina longicornis*), Yellow Crazy Ants (*Anoplolepis gracilipes*), and Carpenter Ants (*Camponotus* sp.).

4.1.1 Crazy Ants (*Paratrechina longicornis*)

The Department of Conservation has declared Crazy Ants (*Paratrechina longicornis*) an unwanted organism under the Biosecurity Act (1993). Details of the likely impact are provided in the unwanted organism determination (see Appendix 1).

New Zealand is currently considered by the Ministry of Agriculture and Forestry to be free of Crazy Ants (*Paratrechina longicornis*) except where small populations are under official control.

4.1.2 Yellow Crazy Ants (*Anoplolepis gracilipes*)

The Department of Conservation has declared Yellow Crazy Ants (*Anoplolepis gracilipes*) an unwanted organism under the Biosecurity Act (1993). Details of the likely impact are provided in the unwanted organism determination (see Appendix 2).

Currently New Zealand is considered by the Ministry of Agriculture and Forestry to be free of Yellow Crazy Ants (*Anoplolepis gracilipes*).

4.1.3 Carpenter Ants (*Camponotus* sp.)

A description of Carpenter ants in the USA provides an indication of the potential impact these ants would have on New Zealand if they became established.

> The diet of carpenter ants is quite varied and includes living and dead specimens of other insects, honeydew from aphids, sweets of all kinds, meat and fats. Foraging workers collect all the food for the colony. They carry it back to the nest intact or ingested and later regurgitate it to non-foraging members in the nest. These ants may forage up to 100 yards from the nest in search of food.

Carpenter ants may become pests in houses by foraging there for food. The greatest concern, however, is that they may cause serious damage to wood in the structure. Unlike termites, they do not feed upon wood but merely use it as a place to nest.

Carpenter ants normally construct their nests in hollow trees, logs, posts, landscaping timbers and wood used in homes and other structures. These ants prefer wood that is moist and rotting or that has been "hollowed out" by rotting or by termites. They may locate nests in hollow doors or small void areas produced during construction. They may move from decaying portions of the wood into sound lumber in the process of enlarging the nest. They cut galleries with the grain of the wood following the softer parts of the wood. The ants leave harder wood as walls separating the tunnels and cut openings in these walls to allow access between tunnels. Access to the outside may be through natural openings, or the ants may cut openings where none exist naturally.

The ants keep occupied galleries clean. They remove wood in the form of a coarse sawdust-like material, which they push from the nest. This often results in a cone-shaped pile accumulating just below the nest entrance hole. This pile may include, in addition to the wood fragments, other debris from the nest, including bits of soil, dead ants, parts of insects and remnants of other foods.

The habits of all species of carpenter ants, as far as is known, are similar. The major difference in species is the size of the colonies. Foraging activity is highest at night. Solitary ants seen during the day are usually scouts.

http://muextension.missouri.edu/xplor/agguides/pests/g07423.htm

New Zealand has one established (endemic) species of Carpenter ant (*Camponotus newzealandicus*), for which there is no documented evidence to suggest it has caused any significant economic or environmental impact.

4.2 Likelihood of Entry and Establishment.

As mentioned earlier, ants are associated with commercial consignments of sawn timber as hitchhiker pests. The possible exception, Carpenter ants, may, if given the opportunity, establish a colony within (rather than on) the sawn timber boards. It is assumed here, however, that the period between the timber being milled and the arrival of the sawn timber in New Zealand is insufficient to allow any significant colonies to be formed within the timber.

A hazard identification and import release assessment on Red Imported Fire Ants (*Solenopsis invicta*) (RIFA) was completed by the Animal Biosecurity group of MAF Biosecurity Authority. This assessment established the following for RIFA:

"The establishment of RIFA would require the importation of a viable queen; either as a newly-mated female or through the inadvertent importation of all, or part, of a RIFA nest. Introduction by air or sea transportation could occur.

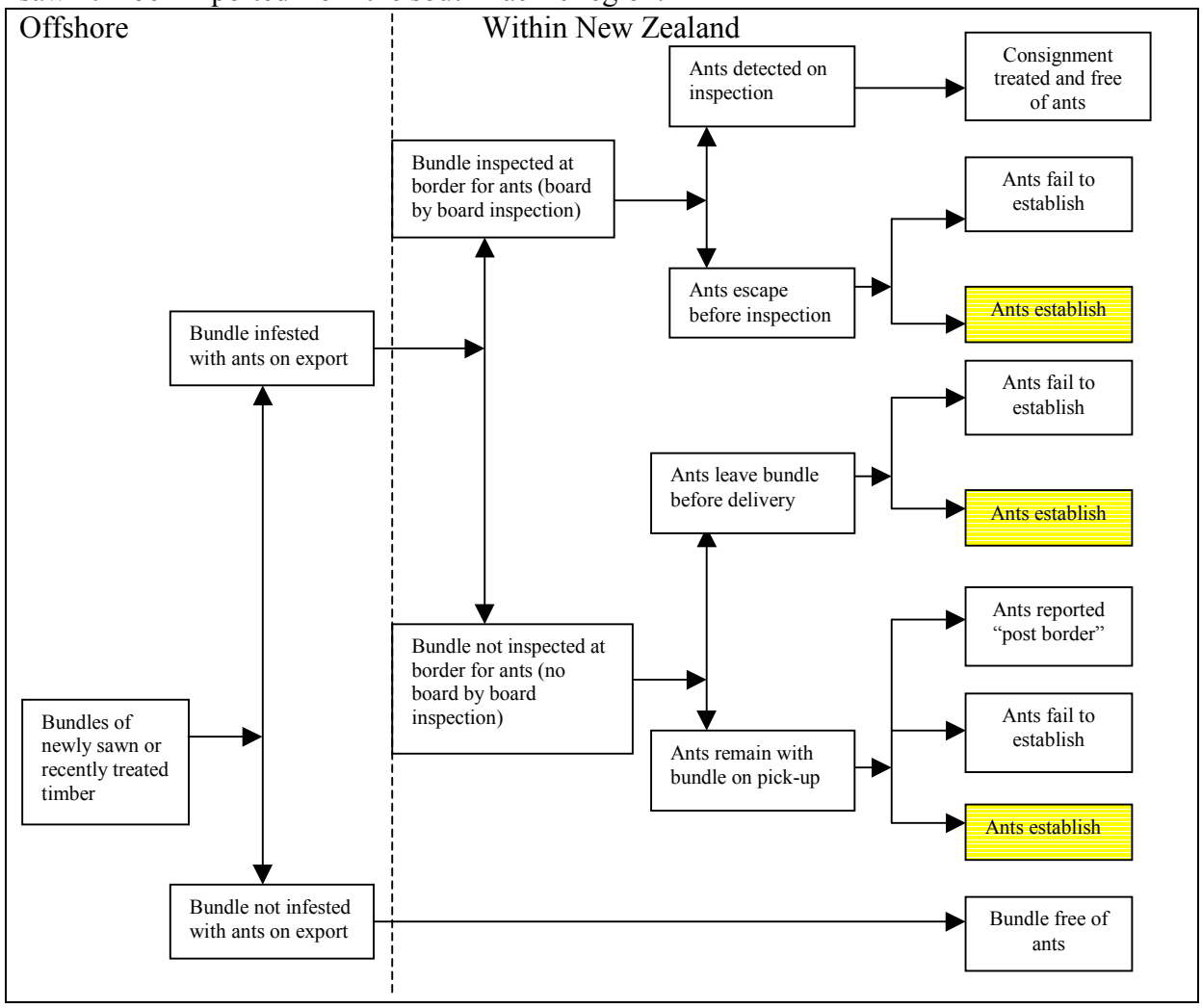
A newly-mated queen is essentially a hitchhiker pest and could be transported on a variety of imported items, including traded commodities, containers, packaging, aircraft, vessels, and in passenger baggage. Goods imported from an infested area that contain soil, are contaminated with enough soil to support a small colony or have suitable moist cracks and crevices, have the potential to be carrying a RIFA nest infestation. Goods that have spent periods of time outside, in contact with the ground, have the greatest likelihood of RIFA infestation."

While it is possible that a single reproductive unit (e.g. a queen ant) from the species of ant being assessed in this document could be transported between countries on sawn timber, for the purposes of this assessment it was decided that the focus should be on the far greater and established risk posed by sawn timber infested with a colony of ants. As records of ant

interceptions do not detail the type of ant found (e.g. single worker, queen, colony with queen), it will be assumed that all interceptions of the assessed ant species were of complete colonies.

The following scenario tree describes the pathways for hitchhiker ants (Figure 1) to establish in New Zealand from commercially imported consignments of sawn timber.

Figure 1: Scenario tree for the pathway to introduction (establishment) of hitchhiker ants on sawn timber imported from the south Pacific region.



4.2.1 Sources of pathway variability

While the general pathway to introduction will be similar for all sawn timber imports, there may be a number of pathway differences that could affect the likelihood of exotic ants being introduced into New Zealand:

1. Country of origin: Some countries will have habitats able to sustain higher concentrations of ants potentially resulting in higher rates of infestation. Particular ant species may only be present in some of the countries.

2. Treated or untreated timber: Treated timber, which is expected to have a lower rate of infestation, is not given the same level of inspection on arrival in New Zealand as untreated timber.

4.2.2 Distribution of risk ant species

Carpenter ants (*Camponotus* sp.) are distributed world wide, with an estimated 1500 species identified. A number of species in North America are known to cause on occasion significant damage to wooden structures.

Crazy Ants (*Paratrechina longicornis*) is of African or Asian origin and is found throughout the tropics and subtropics. It has been recorded in the United States (Florida to South Carolina and west to Texas; also much of the eastern U.S. and in California and Arizona), Africa, Southeast Asia, Japan, Cameroon and Brazil (Trager 1984, Passera 1994). It has been recorded in parts of Europe in heated buildings and glasshouses (Switzerland, France and the British Isles) (Freitag *et al* 2000). In the Pacific it has been recorded in Samoa, Tahiti, Tonga, Hawaii, Tokelau, Cook Islands and Marquesas (Wilson and Taylor 1967). Interception records from New Zealand databases would also suggest this ant species has established in Fiji, PNG, and the Philippines. In Australia it has been recorded in the states of New Territory (N coastal, N Gulf), Queensland (N Gulf) and Western Australia (N coastal) (Shattuck and Barnett 2002).

Yellow Crazy Ants (*Anoplolepis gracilipes*) have been recorded in the following areas: India, Peninsular Malaysia, Hawaii, Papua New Guinea, and the Solomon Islands (CPC 2002). It is possible that these ants have also established in other areas of the south Pacific as they have been intercepted on imported goods arriving in New Zealand from Samoa, the Cook Islands, and Wallis/Futuna Islands.

4.2.3 Timber imported from Tonga, Samoa, and Indonesia

Sawn timber imported from Tonga, Samoa, and Indonesia is considered by those responsible for inspecting the consignments (pers. com MQS) to be relatively free of ant infestation. The seizure rates for sawn timber imported these areas in 2002 are shown in Table 3.

Table 3: Seizure rates for sawn timber imported from Tonga, Samoa, and Indonesia during 2002.

Country of Origin	N^{o} of Consignments	N^{o} of Seizures	% of Seizures
Indonesia	186	5	3%
Samoa	1	0	0%
Tonga	1	0	0%
Total	188	5	3%

4.2.4 Timber imported from Fiji, the Solomon Islands and Papua New Guinea

Sawn timber imported from Fiji, the Solomon Islands and Papua New Guinea is considered by those responsible for inspecting the consignments (pers. com MQS) to be regularly infested by ants. The infestation level of consignments from PNG was suggested to be as high as 1 in every 2, although the seizure rates for 2002 (Table 4) suggest that at most one in every 5 consignments is infested.

Table 4: Seizure rates for sawn timber imported from Fiji, the Solomon Islands and Papua New Guinea during 2002.

Country of Origin	N° of Consignments	N° of Seizures	% of Seizures
Fiji	26	8	31%
Papua New Guinea	19	3	16%
Solomon Islands	12	2	17%
Total	57	13	23%

It should be noted with regard to tables 3 and 4 that the information on seizure rates was taken from QuanCargo, a database system used by Ministry of Agriculture and Forestry to record the clearance into New Zealand of imported risk goods. During this brief and narrow focused assessment a number of errors and incomplete records were found in the data recorded, suggesting that much of the data recorded in this database may be unreliable.

4.2.5 Inspection and treatment efficacy

Currently the Ministry of Agriculture and Forestry carries out two types of inspections on imported sawn timber:

1. Timber imported without a valid treatment certificate (or phytosanitary certificate containing treatment details) is given a 10% "board by board" inspection and a once over (external) inspection of the entire consignment.
2. Timber imported with a valid treatment certificate is given a once over (external) inspection of the entire consignment to verify the treatment was effective A "once-over" inspection involves a visual examination of the outside of each bundle for evidence of live pest infestation.

These inspections or parts of these inspections may occur:

- While the sawn timber is still on the vessel (e.g. break bulk consignments)
- Immediately after the sawn timber has been unloaded from the vessel
- Up to two days after unloading. Normally inspection would occur on the same or following day, however, several days may lapse if unloading occurs just prior to a weekend.

Prior to inspection, unloaded sawn timber is stored either in the container in which it arrived (on the wharf or at the importer's premises) or in break-bulk bundles within designated buildings or sealed areas on the wharf.

It should be noted that the 10% inspection is not a random inspection of 10% of the entire consignment, but rather an inspection of a selected portion of the consignment equating to 10% of the total. What this means in practice is if a consignment consists of 10 bundles of sawn timber of approximately equal size, only one of those bundles will be inspected. Given that ants have an equal chance of being associated with any one of the bundles, and are far less likely to be detected in an unbroken bundle, the bundle inspection system is far less likely to detect an ant infestation than a truly random inspection system.

If ants are detected during inspection the entire consignment is fumigated.

4.2.6 Inspection of untreated timber

If it is assumed that the "board by board" inspection would be 100% effective at detecting a colony of ants on the actual bundle inspected, the likelihood that a single ant infestation (one bundle infected) would go undetected in a consignment of timber containing more that 10 bundles, is 90%. This figure would be considered the worst case scenario for the following reasons:

- multiple infestations (more than one bundle) would increase the likelihood of detection,
- the once over inspection can also detect infestations when foraging ants are found,
- Many consignments are less than 10 bundles in size, so inspection efficacy could be as high as 100% (consignment of one bundle only would be 100% inspected with no likelihood that an ant infestation would go undetected).

For consignments from PNG and the Solomon Islands, the Ministry of Agriculture and Forestry may also spray parts of the consignment with a pest agitator (e.g. pestigas; 0.4% pyrethrum and 2% piperonyl butoxide, with carbon dioxide as a carrier gas), which irritates ants contained within and brings them out of the stacks or bundles. This treatment is being undertaken in response to the high level of ant infestation on this pathway and is not currently prescribed in the import health standard. While the efficacy of this treatment is unknown, anecdotal evidence suggests it greatly improves the level of infestation detection on inspection. As this inspection technique is not currently prescribed in the import health standard, it will not be considered as in current use, but rather as an extra possible measure (see section 3.4).

4.2.7 Inspection of treated timber

Timber imported with a valid treatment certificate could have undergone three main types of treatment before export to New Zealand:

1. Chemical impregnation, where the timber is treated with a preservative to kill any existing infestation and/or prevent re-infestation within (but not on) the timber after treatment.
2. Fumigation with methyl bromide gas (at 80 g/m^3 in a minimum temperature of 10^OC for 24 hours). This treatment is expected to kill all infesting invertebrates at the time of treatment, but has no residual effect (will not stop re-infestation). This treatment is also used on timber infested with ants on arrival in New Zealand. Re-inspection of ant-infested timber after fumigation has verified that this treatment is effective at killing ant colonies.
3. Heat treatment, at 70^OC for 4 hours (core temperature). This treatment is expected to kill all infesting invertebrates and micro-organisms at the time of treatment, but has no residual effect (will not stop re-infestation).

The timber is considered free of any ant infestation immediately after treatment. However, in all cases a consignment of timber may become infested after treatment if not stored appropriately before shipping. There are currently no requirements on the storage of treated timber before shipping to New Zealand.

Timber that has been certified treated will be given a once over inspection on arrival in New Zealand. There is no data available to verify the efficacy of the once-over inspection at detecting an ant infestation. However, comments from the Officer who inspected the consignment recently found to be infested post-border with Yellow Crazy Ants indicated that no ants or other pests (invertebrates or fungi) were visible when the consignment was given a

once-over inspection. The infestation of Yellow Crazy Ants was later detected when the bundle was broken during unloading at the importer's premises. This would suggest that the efficacy is potentially quite low.

Another factor affecting the likelihood of certified treated timber being infested is the possibility that the treatment was not correctly applied, or was not applied at all (false certificate). In both these cases the likelihood of ant infested wood entering New Zealand would be equivalent to infested untreated wood that has not undergone a board by board inspection.

4.2.8 Ability of ants to establish in New Zealand from imported sawn timber

Available records suggest that no Carpenter ants (*Camponotus* sp.) have established in New Zealand other than *Camponotus newzealandicus*, which may or may not be a native ant. The reason for this is not obvious, as Carpenter ants are established in many climates similar to New Zealand's. The level of invasiveness of Carpenter ants (their ability in invade new areas) is unknown, although Florida has a number of species introduced from bordering countries. This assessment is looking only at ant species inhabiting tropical regions of the south Pacific.

Given that:

- Of the 85 recorded ant interceptions on imported wood produce since 1950, 73 were Carpenter ant species; and
- No Carpenter ants have established in New Zealand over the last 50 years; and
- There is no evidence to suggest the rate of Carpenter ant infestation of imported sawn timber is increasing;

It would be reasonable to accept that Carpenter ants from the south Pacific region are unlikely to establish in New Zealand from imported sawn timber.

This statement assumes that the current efficacy of import measures with regard to ant infestations will remain or improve, and that the distribution or density of Carpenter ant species in the south Pacific region has not or will not change significantly.

Yellow Crazy Ants (*Anoplolepis gracilipes*) and Crazy Ants (*Paratrechina longicornis*), hereafter referred to together as "Crazy ants", have only been recorded on sawn timber imported from the south Pacific region four times in the last 50 years, two of those times within the last month. It is likely that the discovery of Crazy ant colonies on the Ports of Auckland wharf, and the subsequent distribution of flyers containing pictures and descriptions of the Crazy ant *Paratrechina longicornis* (see flyer attached as Appendix 3), has increased the awareness these ants leading to their recent reporting. It is also possible that for some reason Crazy ants have recently become more likely to be associated with sawn timber imported from Fiji, PNG or the Solomon Islands.

Reasons for the possible change in the numbers of Crazy ants associated with the imported sawn timber from these countries could include:

- Crazy ants have become established in areas where sawn timber is milled and treated, or collected for export (e.g. ports);
- Sawn timber is being imported from new areas in these countries, areas that are infested with Crazy ants;

- The density of Crazy ant colonies has recently increased in the areas where sawn timber is milled and treated, or collected for export (e.g. ports).
- There has been a change in the manner in which the sawn timber is handled or stored post milling and./or treatment.

Given that:

- Crazy ants have only been reported on sawn timber from the south Pacific region in the last few years; and
- Evidence suggests that Crazy ants have only recently been introduced into New Zealand; and
- It is possible that the colonies that have established here did so from sawn timber imported from the south Pacific region;

It is reasonable to suggest that the risk of importing Crazy ants into New Zealand on sawn timber imported from the south Pacific region has increased in recent years to an unacceptable level.

To get some idea of the likelihood of establishment of a colony of Crazy ants from sawn timber imported from the south Pacific region, it is necessary to know, for a specified period:
- The number of consignments of the sawn timber imported from those regions (see Tables 3 and 4);
- The likely infestation rate of that sawn timber with Crazy ants (see Tables 3 and 4); and
- The number of times Crazy ants have managed to establish in New Zealand from imported sawn timber.

From January 2002 to March 2003 there were 57 consignments of sawn timber from Fiji, the Solomon Islands and Papua New Guinea (areas that are known to be infested with Crazy ants). In approximately the same period there have been 3 interceptions of the Crazy ants on these consignments, all of which were the Yellow Crazy Ants (*Anoplolepis gracilipes*). Yellow Crazy Ants (*Anoplolepis gracilipes*) have established on the Ports of Auckland wharf at least once, and probably during this period. This gives a minimum infestation rate of 5% or 1 in 20 consignments, with an establishment rate of at most 1 in every 3 infested consignments.

The assumptions behind these figures can be challenged in a number of ways.
1. As stated previously the MAF Quarantine Service instigated an unofficial procedure of treating but not diagnosing ants (and other invertebrates) on infested sawn timber. If it is assumed that every seized consignment of timber during that period was infested with Yellow Crazy Ants (*Anoplolepis gracilipes*), 21% or 1 in 5 consignments would have been infested giving a rate of establishment of about 1 in 12 infested consignments. This also assumes 100% detection ability during border inspection, which has also been shown to be incorrect.
2. The Yellow Crazy Ants (*Anoplolepis gracilipes*) may have become established prior to 2002. It is probably not now possible to determine the time of establishment.

These observations would suggest that a colony of Crazy ants is able to readily move from the consignment on which it was imported into the surrounding environment. It is also worth noting that the established colonies were all found at or near the place of first arrival of the consignments. Sawn timber is likely to be held in these areas for up to a week only, and then

for at most only 2 to 3 days before inspection. The ants therefore leave the consignment within a few days of the consignments arrival in New Zealand, possibly due to the disturbance caused by the unloading of the consignments.

This observation is supported by the following statement based on the biology of Crazy ants: "*P. longicornis* often occupy …. local sites that sometimes remain habitable for only a few weeks or days" and "Colonies of these species are characterised by extreme agility - a readiness to move when only slightly disturbed and an ability to swiftly discover new sites and organise emigrations" (Holldobler and Wilson, 1990).

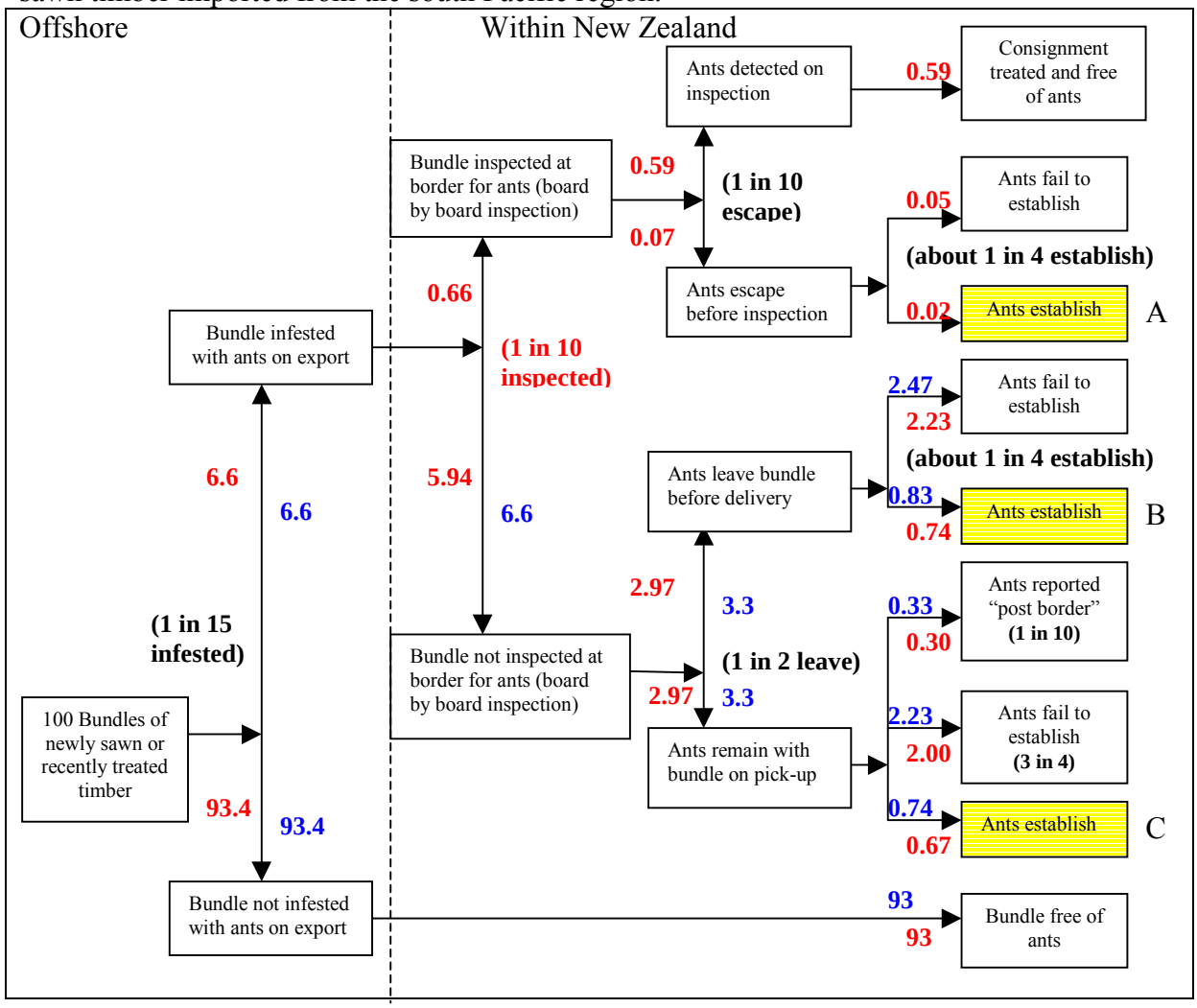
4.2.9 Overall likelihood of establishment in New Zealand

From the estimates of likelihood calculated above it is possible to get an idea of the overall likelihood of establishment in New Zealand of the Crazy Ants via the import of commercial consignments of sawn timber from Fiji, PNG or the Solomon Islands. The scenario tree in Figure 2 includes worst case scenario estimates of likelihood of consignment infestation for each step in the tree for treated (Blue) and untreated (Red) timber imported from Fiji, PNG or the Solomon Islands. It should be stressed that these are estimates only, and should not be used as indications of a quantitative assessment of risk but rather as a broad guide to the relative levels of risk.

To establish the likelihood estimates in the scenario tree, the following assumption have been made:

1. All recorded infestations of imported sawn timber were of whole (complete) ant colonies.
2. The infestation rate for sawn timber exported from Fiji, PNG and the Solomon Islands is the same or nearly the same. An average of the infestation rates has been used.
3. On average, 6.6% or 1 in every 15 consignments from Fiji, PNG or the Solomon Islands are infested with Crazy ants. This is based on the discussion in section 4.2.8, and finding a middle figure between the minimum (1 in 20) and maximum (1 in 12) infestation rates.
4. On average 25% or 1 in every 4 infestations will result in a colony becoming established in New Zealand. This is based on the discussion in section 3.3.2.8, and finding a middle figure between the minimum (1 in 5) and maximum (1 in 3) establishment rates.
5. That the infestation levels are the same for untreated timber and timber arriving with a treatment certificate. This assumes that the Crazy Ants can colonise bundles of timber within a short time (12 hours) and that treated timber is stored before export in a manner and for a duration similar to untreated timber.
6. 1 in 10 ant infestations escape before inspection. This assumes that it takes 12 hours for an ant colony to leave a bundle of timber without detection, and that only 1 in 10 consignments are left before inspection for more than 12 hours.
7. 1 in 2 ant infestations that remain in the consignment after clearance escape before the consignment is delivered to the importers premises. This assumes pick up for delivery usually occurs the next day (12 hours after clearance), and only 50% (1 in 2) ant colonies choose to leave the bundle during that period.
8. The general public or the importer will report an ant infestation on timber (after it has received biosecurity clearance) on 1 in 10 occasions. There are no firm figures for this estimate, but expert opinion suggests that members of the public are unlikely to look at ants very closely unless they appear or act very differently from locally common ant species.

Figure 2: Scenario tree for the pathway to introduction (establishment) of hitchhiker ants on sawn timber imported from the south Pacific region.



The numbers provided in the scenario tree in figure 2 suggest, in broad terms, the following:

1. That the likelihood of Crazy ants establishing from treated timber (1.57 per 100 bundles (B+C)) and non-treated timber (1.43 per 100 bundles (A+B+C)) are similar.
2. That the likelihood that the ants will establish at the point of unloading of the timber (0.83 (B) or 0.76 (A+B) per 100) is similar to the likelihood of that the ants will establish post-border (0.74 (C) or 0.67 (C) per 100).
3. That inspection significantly reduces the likelihood that the ants will establish from this pathway (0.2 (A) per 100 for inspected bundles, 1.41 (B+C) per 100 for bundles not inspected).

While these numbers are only very broad estimates, they provide a useful measure of the relative levels of risk associated with the different commodities on this import pathway.

5 RISK MANAGEMENT

The aim of the analysis of the risks established in the risk assessment of the previous sections is to identify where measures or improvements can be applied to the import or clearance requirements to reduce, to an acceptable level, the risk of ant establishment from the assessed pathway.

5.1 Options for Biosecurity Measures

The following sections suggest options for reducing the risks of introducing each type of ant species (or genus) from the assessed pathway.

5.1.1 Carpenter ants (*Camponotus* sp.)

For Carpenter ants (*Camponotus* sp.), given that:

- The frequency of Carpenter ant interceptions on wood produce at the border (of the 85 recorded ant interceptions on imported wood produce since 1950, 73 were Carpenter ant species); and
- The efficacy of inspection requirements for sawn timber have changed little or improved over the last 50 years; and
- No Carpenter ants have established in New Zealand over the last 50 years;

It would be reasonable to accept that the current inspection requirements for sawn timber imported from the south Pacific region adequately address the risk of Carpenter ants (*Camponotus* sp.) establishing in New Zealand. Should any of the factors above change in the future, the risk from this group of ants would have to be reassessed. It is therefore essential that adequate and accurate border interception records are maintained and reported to MAF Biosecurity Authority.

5.1.2 Crazy ants (*Anoplolepis gracilipes* and *Paratrechina longicornis*),

Given that both these ant species have managed to establish colonies in New Zealand in recent times, and that at least for Yellow Crazy Ants (*Anoplolepis gracilipes*) the colonies more than likely established from sawn timber imported commercially from the south Pacific region, it appears that the current biosecurity measures and/or border clearance systems for this pathway are not adequately mitigating the risk. The pathway of concern includes both untreated timber and timber that arrives with a treatment certificate.

The following is a list of possible options for reducing the biosecurity risk, which can be used either individually or in combination.

A: 100% "break bundle" inspection for all (untreated and certified treated) sawn timber imported from Fiji, PNG and the Solomon Islands.

Implementing a 100% "break bundle" inspection capable of reliably detecting ant-infested bundles would remove the likelihood of establishment of these ant species post-border, and significantly reduce the likelihood of establishment at the point of unloading (on the wharf). Coupled with either option D, the risk of one of these ant species impacting New Zealand from this pathway would be negligible. The downside to this

option is the significant delay caused by the increased inspections, resulting in a significant increase in costs to the importer. It should also be noted that as many bundles (14 out of 15) are not likely to be infested, the increase in costs for these "clean" consignments would seem unnecessary.

B: Spray all sawn timber imported from Fiji, PNG and the Solomon Islands with A pest agitator.

This treatment would be considered very cost effective should it be shown to be effective in increasing the likelihood that bundles of timber infested with ant species will be detected on inspection. Consideration would need to be made to the method of implementing the treatment (applying the gas and leaving the bundles overnight may increase the rate of port of entry establishment of the ants). Research is required on the efficacy of the treatment and the method of application prior to implementation.

Should it be shown to be effective, implementing this measure alone would remove the likelihood of establishment of these ant species post-border, and significantly reduce the likelihood of establishment at the point of unloading (on the wharf). Combining this treatment with option D would reduce to negligible the risk of ant species impacting from this pathway.

C: Fumigate all consignments of timber imported from Fiji, PNG and the Solomon Islands.

Implementing this measure would remove the likelihood of establishment of these ant species post-border, and significantly reduce the likelihood of establishment at the point of unloading (on the wharf). The downside to this option would be the increased use of methyl bromide, an ozone depleting gas, and increased costs to importers. It should also be noted that as many (14 out of 15) bundles are not likely to be infested, the increase in costs for these "clean" consignments would seem unnecessary. Combining this treatment with option D would reduce to negligible the risk of ant species impacting from this pathway.

D: Inspect (or fumigate) immediately on unloading of the consignment.

On it's own this measure would only reduce the level of establishment by an estimated 0.02 per 100 bundles (see figure 2). Combined with options A, B (once tested) or C above would reduce to negligible the risk of ant species impacting from this pathway.

E: Improve surveillance around areas of first arrival of timber consignments.

Improved surveillance would detect the establishment of colonies of ants around the inspection areas. While this is a worthwhile activity, it should not be seen as an effective measure to prevent establishment in New Zealand as ant colonies that escape from imported wood may move to other goods being stored at the inspection sites. These other goods may then transport the ants further into New Zealand.

F: Establish a more effective sampling systems for selecting sawn timber for inspection

The 10% board by board inspection system is in urgent need of review as it is currently only sampling 1 in 10 bundles and is not providing a consistent level of assurance across different consignment sizes or types of risks being posed. The risks associated with this pathway may be able to be adequately mitigated through the implementation of a statistically appropriate sampling system. Research needs to be undertaken on the development of more a effective sampling system for inspection.

G: Require adequate post milling or treatment and pre-export storage of timber from Fiji, PNG and the Solomon Islands to adequately reduce the likelihood of consignments become infested.

Given the countries in question, Fiji, PNG and the Solomon Islands, it seems unlikely that a suitable storage system could either be identified or consistently implemented in the short term. Efforts should be made, however, to notify the appropriate authorities in these countries of the of the risk imposed to New Zealand by the ants on the commercial sawn wood pathway, and suggest that discussions be held to investigate ways of implementing a pre-export assurance system.

While there is currently no problem free method of mitigating the risks identified in this risk assessment, the use of 100% "break bundle" inspection or 100% fumigation will in the interim allow the risks to be significantly reduced while research is undertaken to establish other less intrusive methods of risk mitigation. It will also be necessary to ensure appropriate border clearance systems are implemented to ensure adequate records of ant interceptions are maintained for imported sawn timber. Once sufficient records have been collated a review of this analysis should then be undertaken to test the many assumptions made in support of the implementation of these measures.

Ultimately it is likely that a combination of:

- improved inspection methods;
- improved border clearance activities; and
- co-operation with the at-risk countries in introducing controls on the handling and storage of export sawn timber;

will be developed to mitigate the risk without impacting to greatly on the commercial viability of the pathway.

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6.3 Acknowledgements

Many thanks to Amelia Pascoe and Travis Ashcroft for the information they provided, and to the internal peer review team who gave such valuable critique of the first draft of the risk analysis.

7 RECOMMENDATIONS

I recommend that you:

a) **Note** the contents of this document

noted

b) **Agree** to the implementation of a 100% inspection system OR 100% fumigation requirement (importers option) on all commercial consignments of sawn timber imported from Fiji, PNG and the Solomon Islands.

agreed/not agreed

c) **Agree** to investigate options for reducing the pre-inspection waiting period for all commercial consignments of sawn timber imported from Fiji, PNG and the Solomon Islands.

agreed/not agreed

d) **Agree** to investigate the application of a pest agitator as a means of increasing inspection efficacy for ants in bundles of sawn timber, and to establish effective methods of implementing this procedure within the inspection methodology.

agreed/not agreed

e) **Agree** to research an alternative sampling system for inspection that will provide a more appropriate and consistent level of biosecurity assurance for this pathway.

agreed/not agreed

f) **Agree** to prepare standards for a border clearance system that adequately collects and records ant species interceptions on sawn timber imported into New Zealand, so that a review of this analysis can be undertaken once sufficient records have been collated.

agreed/not agreed

g) **Agree** to contacting the appropriate authorities in Fiji, the Solomon Islands and Papua New Guinea to notify them of these actions, and to begin discussions on establishing systems to store recently milled or treated timber to ensure they do not become infested with ants before export to New Zealand.

agreed/not agreed

Yours sincerely

National Adviser, Import Health Standards
Forest Biosecurity
_____/_____/__2003

Director
Forest Biosecurity
_____/_____/__2003

APPENDIX 1: Unwanted Organism determination of *Paratrechina longicornis* (Crazy Ant) 28 May 2002

To be determined an Unwanted Organisms by the CTO-Conservation, the organism must meet the following criteria;

Criteria No	Criteria	Criteria met
i.)	is not established in New Zealand; or	
ii.)	is possibly established in New Zealand (for which there is insufficient information to confirm whether or not it is established); or	√
iii.)	has been established in New Zealand and from which a Chief Technical Officer has announced or is shortly to announce that New Zealand is provisionally free; or	
iv.)	is established in New Zealand and subject to statutory controls, or an area of low prevalence can be demonstrated; or	
v.)	is established in New Zealand and determination as an unwanted organism is required so that powers under the Biosecurity Act can be used in the management of the organism	
	AND IS CAPABLE OR POTENTIALLY CAPABLE OF –	
vi.)	forming self sustaining populations in New Zealand, taking into account the ease of eradication; and	√
vii.)	displacing or reducing any native species or any introduced species for which the Department of Conservation is responsible; or	√
viii.)	causing the alteration or deterioration of natural habitats; or	
ix.)	causing adverse effects to New Zealand's indigenous biological diversity; or	√
x.)	causing disease, being parasitic, or becoming a vector for animal or plant disease affecting indigenous flora and fauna or introduced species for which the Department of Conservation is responsible.	

2. Explanation for criteria indicated

ii.) is possibly established in New Zealand (for which there is insufficient information to confirm whether or not it is established;

Paratrechina longicornis is not thought to be established in New Zealand. However, on 17 April 2002, a number of nests were found on two wharfs at the Auckland container terminal (classified as a border transitional facility). After a thorough search of the wharf these nests were treated with chemicals and eradication of all known populations thought to have been achieved. However, subsequently on 14th May a second population was discovered at a container "devanning" premises in South Auckland. The second site has also been treated and eradication thought to have been achieved. The wharf and the devanning premises are

significant areas for conveying cargo goods so there is a possibility that the ant may have spread further in cargo shipments to other sites.

AND is capable or potentially capable of –

vi.) Forming self sustaining populations in New Zealand, taking into account the ease of eradication;

Information from international studies indicates there is a serious risk that *P. longicornis* is capable of forming self-sustaining populations in New Zealand.

Natural dispersal of *P. longicornis* occurs primarily as a result of nest budding, where the female will leave an existing nest and walk a maximum of 100m to start a new nest. Nests contain ~200 workers and 40 queens (Mallis in Passera 1994) and are established at relatively high densities. This ratio of queens to workers is relatively high in comparison to other tramp ant species. Trager (1994) reports that in warm regions, sexuals may be reared throughout the year, but in cooler climates this is limited to summer months only. Mating occurs on the ground near the nest entrance and nuptial flight is not thought to take place (Trager 1984 in Passera 1994).

P. longicornis is regarded as a tramp ant (Passera 1994, Yamauchi & Ogata 1995) and has been introduced over a wide geographic range through commerce and trade activities. Populations are frequently found in association with human habitation. Tramp ants possess particular life history traits that make them efficient colonisers and enables them to dominate ecosystems (Nishida and Evenhuis 2000). After establishing in a new area, they frequently outcompete most other ant species, then dominate all food sources in the area, especially sources of honeydew and nectar. Tramp ants also typically prey upon many species of invertebrates and can be responsible for the death of vertebrates such as lizards, frogs and birds, particularly nestlings. This species has the potential to colonise new sites when delivered there through human assisted transport pathways, even those that initially may appear beyond their adaptive abilities.

Tramp ant species are the focus of many international biosecurity strategies to prevent their further spread (Ellen venGelder pers. comm). Other examples of tramp ant species are the yellow crazy ant (*Anoplolepsis gracilipes*), the red imported fire ant (*Solenopsis invicta*), the little fire ant (*Wasmannia auropunctata*), and the Argentine Ant (*Linepithema humile*). Currently the Argentine Ant is spreading through New Zealand and has been shown to kill and exclude all other ants from areas it has colonised (pers. observ.). *P. longicornis* has shown the same capabilities in areas is has colonised overseas. In a closed ecosystem experiment (Biosphere 2) undertaken in Arizona USA, in less than 6 years, *P. longicornis* had firmly established and apart from the honey-dew producing insects which the ant was farming, plus a few that had effective defences against ants, it was the single insect to be thriving, all others had been destroyed (Wetterer *et. al*. 1995).

P. longicornis is thought to be of Asian or African origin (Trager 1984) but it is so widely distributed now that it is difficult to determine its true origin. The species is now widely dispersed in the United Stages (Creighton 1950, Trager 1984), throughout the Pacific Islands, including Samoa, Tokelau Islands, Cook Islands, Tahiti, Marquesas, Hawaii (Wilson and Taylor 1967), Australia (Shattuck and Barnett 2002), Brazil (Banks and Williams 1989) and South Africa (Prins *et al* 1990 in Passera 1994). Although the ant appears to do particularly

well in tropical areas it is also present in areas of the Eastern US, for example New York, where winter temperatures can be much cooler than northern New Zealand. The fact that the ant has been found alive in New Zealand during autumn-early winter, suggests this species is capable of establishing in New Zealand.

This species is highly adaptable, living in very dry as well as moist habitats and nests under any object on the ground or protected elevated site (Smith 1965). *P longicornis* is therefore unlikely to be limited by lack of food or nest sites in New Zealand.

Should *P. longicornis* become established it is likely to be extremely difficult to eradicate. As a tramp ant with multi-queened nests it would quickly become widely spread via the transport of goods and cargo.

vii.) Displacing or reducing any native species or any introduced species for which the Department of Conservation is responsible;

Like most ants, workers of *P. longicornis* are omnivorous, feeding on live and dead insects for protein, honeydew, nectar, fruits and plant exudates for carbohydrates. *P. longicornis* will "farm" scale insects and aphids to produce honey dew but will also take seeds as food. There are likely to be seasonal preferences in food depending on the state of development of the nest, with high protein requirements during warmer summer months.

Overseas literature shows that *P. longicornis* is capable of displacing and reducing a variety of invertebrate and vertebrate species. The example referred to above is one of the best studied, where the ant completely overtook the Biosphere 2 closed ecosystem study (Wetterer *et al* 1999). The Biosphere 2 featured several different terrestrial habitats, including a desert, savannah, a rain forest, and the ant dominated throughout. A variety of invertebrate species had been introduced into this ecosystem, and *P. longincornis* removed many of these over a relatively short period (Wetterer *et al* 1999). This species has also been reported displacing various other ants in Australia where it represented up to 46% of total ant captures at one study site (Anderson 1993). Considering the ant fauna in Australia, such dominance is noteworthy.

ix.) Causing adverse effects to New Zealand's indigenous biological diversity

New Zealand has approximately 10 native ant species out of a total ant fauna of 40-50 species. Native species generally have small nests and are not known to be invasive. It is likely that *P. longicornis* would have a significant impact on New Zealand native ants and a wide range of other invertebrates that have no defences against such tramp ants. Any ant that is capable of dominating over a wide range of invertebrates is also likely to impact vertebrates through indirect effects, especially on insectivorous groups such as birds, frogs, bats and lizards.

If *P. longicornis* was to establish in New Zealand it would be likely to invade areas of regenerating or disturbed bush, and possibly also forested habitats in Northern New Zealand, as it has been shown to occupy dry and moist sites overseas (Smith 1965). As a tramp ant it would reduce local biodiversity in affected areas. It is expected that the most heavily affected invertebrate groups would be soft bodied insect larvae and groups such as Collembola and spiders. There would be consequent flow on effects up the food chain resulting in reduced populations and lower carrying capacity for a wide variety of native fauna with potential

localised extinctions. Northern New Zealand island habitats, which have a mild, subtropical climate, would be particularly susceptible to adverse impact. There are reports overseas of *P. longicornis* preying upon vertebrates however these could not be clearly substantiated in this review. There may therefore be direct impacts on (ground or tree nester) nestlings and reptiles or amphibians.

Nursery trade/Pet Trade Considerations
There are not likely to be any direct impacts to the nursery or pet trade as a result of this determination. However, in the event that establishment occurs, the nursery trade may be a primary vector for spread around the country. Unwanted Organism status will enable controls to put in place to prevent this spread, however this may place undue constraints on the ability of nurseries to conduct their business.

Notifiable Organism recommendation
It **is** considered appropriate for *Paratrechina longicornis* to be nominated for Notifiable Organism status.

The ability of government agencies to successfully eradicate *P. longicornis* will be dependent on early detection. It is therefore crucial that any post border incursions or interceptions be reported in a timely manner.

Additional Considerations
There are no other legislative considerations impacted by this determination.

This determination has been made by the CTO-Conservation following a request from the Chief Technical Officer-Animals Biosecurity to evaluate this species for unwanted organism status. Unwanted Organism status will enable MAF as lead agency for terrestrial and freshwater incursions to introduce measures to prevent the introduction of *P. longicornis.* These measures may include revision of relevant border processes and the use of movement controls and other Biosecurity Act 1993 powers in the event of future incursions. Similarly, this status will enable Local Authorities and the Department of Conservation to access appropriate powers in the event that establishment occurs and long term management action is required.

This determination was based on information received from Chris Green, TSO Invertebrates, Department of Conservation, Auckland Conservancy. All personal communications and personal observations were his and not those of the CTO-Conservation.

Consultation
No objection to the consideration of *Paratrechina longicornis* declaration as an Unwanted Organism was received from any other Chief Technical Officer.

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Information required for the purposes of the Ministry of Agriculture and Forestry Unwanted Organism Database.

	Organism Details
Scientific Name	*Paratrechina longicornis*
Common Name	The crazy ant (hairy ant)
Synonyms	*Formica longicornis* Latreille (1802), *Prenolepis longicornis* Roger (1863), *Formica vagans* Jerdon (1851), *Formica gracilescens* Nylander (1856) *Tapinoma gracilescens* F. Smith (1858), *Paratrechina currens* Motschoulsky (1863), *Prenolepis (Nylanderia) longicornis* Emery (1910),
Class	Insecta
Order	Hymenoptera
Family	Formicidae
Contact Person for Enquiries	Rachel Garthwaite
Chief Technical Officer-Conservation	Dr Geoff Hicks
Date Determined	May 2002
Criteria of departmental policy that apply	ii.), vi.), vii.), ix.).
National Plant Pest Accord List Candidate	N/A
Regional Council Request?	No
Notifiable Organism status	Yes

APPENDIX 2: Unwanted Organism determination of *Anoplolepsis gracilipes* (yellow crazy ant) 28 May 2002

1. To be determined an Unwanted Organisms by the CTO-Conservation, the organism must meet the following criteria;

Criteria No	Criteria	Criteria met
i.)	is not established in New Zealand; or	
ii.)	is possibly established in New Zealand (for which there is insufficient information to confirm whether or not it is established); or	√
iii.)	has been established in New Zealand and from which a Chief Technical Officer has announced or is shortly to announce that New Zealand is provisionally free; or	
iv.)	is established in New Zealand and subject to statutory controls, or an area of low prevalence can be demonstrated; or	
v.)	is established in New Zealand and determination as an unwanted organism is required so that powers under the Biosecurity Act can be used in the management of the organism	
	AND IS CAPABLE OR POTENTIALLY CAPABLE OF –	
vi.)	forming self sustaining populations in New Zealand, taking into account the ease of eradication; and	√
vii.)	displacing or reducing any native species or any introduced species for which the Department of Conservation is responsible; or	√
viii.)	causing the alteration or deterioration of natural habitats; or	
ix.)	causing adverse effects to New Zealand's indigenous biological diversity; or	√
x.)	causing disease, being parasitic, or becoming a vector for animal or plant disease affecting indigenous flora and fauna or introduced species for which the Department of Conservation is responsible.	

2. EXPLANATION FOR CRITERIA INDICATED

i.) is possibly established in New Zealand (for which there is insufficient information to confirm whether or not it is established);

Anoplolepis gracilipes was found at the Auckland container terminal wharf on 16 April 2002 and its identity confirmed on 17 April 2002 by the Ministry of Agriculture and Forestry. A single nest was found during a thorough search of the wharf area for another new ant, *Paratrechina longicornis*, found the day before. The nest was treated with chemicals aimed at eradication. After one month there have been no further sightings of *A. gracilipes.* Given that the wharf is a significant area for conveying cargo goods there is a possibility that *A. gracilipes* may have spread further in cargo shipments to other sites.

AND IS CAPABLE OR POTENTIALLY CAPABLE OF –

vi.) forming self sustaining populations in New Zealand, taking into account the ease of eradication;

Information from overseas studies indicates that *A. gracilipes*, is capable of forming self-sustaining populations in warmer areas of New Zealand.

A. gracilipes, is regarded as a tramp ant (Nishida and Evenhuis 2000; Passera 1994; Yamauchi and Ogata 1995) and has been spread over a wide geographic range as a result of commerce and trade activities. *A. gracilipes* is frequently found in association with human habitation. Tramp ants possess particular life history traits that make them extremely efficient colonisers and enable them to dominate ecosystems (Nishida and Evenhuis 2000). After establishing in a new area they frequently out-compete most other ant species then dominate all food sources in that area, especially sources of honeydew and nectar. Tramp ants also typically prey upon many species of invertebrates and can be responsible for the death of vertebrates such as lizards, frogs and birds, particularly nestlings.

Tramp ant species are the focus of many international biosecurity strategies to prevent their further spread (Ellen vanGelder pers. comm.). Other examples of tramp ant species are the crazy ant (*Paratrechina longicornis*), the red imported fire ant (*Solenopsis invicta*), the little fire ant (*Wasmannia auropunctata*), and the Argentine ant (*Linepithema humile*). Currently the Argentine ant is spreading through New Zealand and has been shown to kill and exclude all other ants from areas it has colonised (pers. observ.). *A. gracilipes* has shown the same capabilities in areas it has colonised overseas. For example, on Christmas Island super-colonies have grown to cover areas greater than one square kilometre and have modified the entire ecosystem by destroying in their millions keystone species, particularly the endemic red crab. This has changed seed germination patterns resulting in the modification of the whole forest structure (David Slip, Parks Australia North, pers. comm.).

A. gracilipes is thought to be of African origin (Wilson and Taylor 1967) and has now invaded much of Polynesia (Wilson and Taylor 1967), Hawaii (Huddleston and Fluker 1968), Japan (Yamauchi and Ogata 1995), New Guinea (Baker 1976), several islands in the Indian Ocean including Zanzibar, Mauritius, Reunion and the Seychelles (Haines and Haines 1978b), Sri Lanka, Myanmar (Burma), India (Veeresh 1990 in Passera 1994), South Africa (Prins et al 1990 in Passera 1994) and most recently in Australia where there is an eradication programme underway (James 2001).

Detailed observations carried out over several years in the tropical Seychelles showed that maximum foraging activity occurred when soil surface temperatures were between 26-30 degrees C, however there was significant activity at the lowest recorded temperatures between 21-25 degrees C (Haines and Haines 1978a). Although the ant appears to do particularly well in warm tropical areas the identification of an active nest in Auckland over the autumn-winter period suggests the species is capable of establishment in this country. It is expected that activity in New Zealand would be more seasonal than in tropical countries with expansion of colonies and spread occurring primarily during the warmer summer months.

Should *A. gracilipes* become established for even a short period in New Zealand it is likely to be extremely difficult to eradicate. As a tramp ant with multi-queened nests it would take little time to become widely spread through transport of goods and cargo.

vii.) displacing or reducing any native species or any introduced species for which the Department of Conservation is responsible;

Overseas literature shows that *A. gracilipes* is capable of displacing and reducing a wide variety of other invertebrate species, as well as killing a variety of vertebrates.

Like most ants *A. gracilipes* workers are omnivorous, feeding on live and dead insects for protein, honeydew, nectar, fruits, and plant exudates for carbohydrates. The species will "farm" scale insects and aphids to produce honeydew but will also attack and kill small reptiles and other vertebrates including new-born pigs, dogs, cats, rabbits, rats and chickens (Haines and Haines 1978b). There are likely to be seasonal preferences in food depending on the state of development of the nest, with high protein requirement during warmer summer months. The ant is highly adaptable, living in both very dry as well as moist habitats (Reimer 1994). It nests under any object on the ground or in crevices in the ground but will also nest above ground in trees where suitable sites exist.

The success of this species at dominating other invertebrates is largely due to their ability to forage 24 hours a day (Haines and Haines 1978a). This characteristic is also present in some other tramp ants, including Argentine ant (pers. observ.). Although winged males and females are produced no nuptial flights have been observed so the usual method of colony formation is through budding where a female will mate on the ground then leave the nest with some workers to start a new nest nearby (Haines and Haines 1978b). The species is capable of rapid colonisation into new sites, particularly if disturbed (Baker 1976). In tropical areas there can be close to 700 nests per hectare containing up to 36,000 workers and 23,000 brood (Haines and Haines 1978a). *A. gracilipes* can attain very high densities capable of over-running other invertebrate fauna.

In Hawaii *A. gracilipes* has displaced many other ant species and its high densities threatened endemic invertebrate and plant species found around high-elevation geothermal areas (Wetterer 1998).

New Zealand has approximately 10 native ant species out of a total fauna of about 40 – 50 species. Native species generally have small nests and are not known to be invasive. It is very likely that *A. gracilipes* would have a significant impact on New Zealand native ants and a wide range of other invertebrates that have no defences against such tramp ants. Elsewhere in Hawaii *A. gracilipes* has devastated a variety of native flies found in association with freshwater habitats (Hardy 1981) and been implicated in the exclusion of native spiders in forest habitats (Gillespie and Reimer 1993). In the Seychelle Islands, these ants have been observed to attack, kill and

dismember arthropods such as cockroaches and centipedes and to attack other ant species and a range of other insects, isopods, myriapods, molluscs and arachnids. They have also been observed to carry small reptiles and other vertebrates (Haines, et al 1994). Such dominance over a wide range of invertebrates is also likely to impact vertebrates through indirect effects, especially on insectivorous groups such as birds, bats, frogs and lizards. This is in addition to the direct impacts of preying upon new-born vertebrates such as those mentioned above. Older animals are also irritated by the presence of the ants and tend to move away from areas where heavy infestations are present (Haines et al 1994).

ix.) causing adverse effects to New Zealand's indigenous biological diversity;

If *A. gracilipes* was to establish in New Zealand it could invade areas of regenerating bush, and possibly also forested habitats in northern New Zealand as it has done in Hawaii and on Christmas Island (David Slip, pers. comm.). As a tramp ant it would reduce local biodiversity in affected areas potentially in a wide variety of faunal groups, both invertebrate and vertebrate. All tramp ants are capable of significant adverse impacts on certain invertebrate groups, particularly ants through competition, but also through predation of other, typically soft—bodied invertebrate groups, such as Collembola, spiders, and flies (Haines et al. 1994).

A. gracilipes is unusual in its mode of action in taking on large prey, particularly vertebrates. Unlike many other tramp ants it has an effective poison gland secretion which it sprays over soft tissue of its prey (Fluker and Beardsley 1970). On Christmas Island it is this secretion that is used to kill the large red crab by spraying it into the eyes and mouth area rendering the crab blind and defenceless (David Slip, pers. comm.) In New Zealand vertebrates such as the diverse lizard and bird fauna could be particularly vulnerable to this ant.

The impacts discussed under criteria vii above could also indirectly affect New Zealand fauna through a ripple effect up the food chain resulting in reduced populations and lower carrying capacity for a wide variety of native fauna, with potential localised extinctions. It is likely that important northern New Zealand conservation island habitats, which have a mild subtropical climate, could be particularly susceptible to adverse impact.

Nursery trade/Pet Trade Considerations

There are not likely to be any direct impacts to the nursery or pet trade as a result of this determination. However, in the event that establishment occurs, the nursery trade may be a primary vector for spread around the country. Unwanted Organism status will enable controls to put in place to prevent this spread, however this may place undue constraints on the ability of nurseries to conduct their business.

3. Notifiable Organism recommendation

It **is** considered appropriate for *Anoplolepsis gracilipes* to be nominated for notifiable Organism status.

The ability of government agencies to successfully eradicate *Anoplolepsis gracilipes* will be dependent on early detection. It is therefore crucial that any post border incursions or interceptions be reported in a timely manner.

4. Additional Considerations

There are no other legislative considerations impacted by this determination.

This determination has been recommended by the CTO-Conservation following a request from the Animals Biosecurity Chief Technical Officer. Unwanted Organism status will enable MAF as lead agency for terrestrial and freshwater incursions to undertake measures to prevent the introduction of *A. gracilipes* through the introduction of measures for relevant border processes and will also facilitate the use of movement controls and other Biosecurity Act 1993 powers in the event of future incursions. Similarly, this status will enable Local Authorities and the Department of Conservation to access appropriate powers in the event that establishment occurs and long term management action is required.

5. Information obtained from:

This determination was based on information received from Chris Green, TSO Invertebrates, Department of Conservation, Auckland Conservancy. All personal communications and personal observations were his and not those of the CTO-Conservation.

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6. Consultation with other Chief Technical Officers

No objection to the consideration of *Anoplolepsis gracilipes* for declaration as an Unwanted Organism was received from any other Chief Technical Officer.

Information required for the purposes of the Ministry of Agriculture and Forestry Unwanted Organism Database.

	ORGANISM DETAILS
Scientific Name	ANOPLOLEPSIS GRACILIPES
Common Name	THE YELLOW CRAZY ANT (LONG-LEGGED ANT)
Synonyms	*FORMICA LONGIPES* JERDON (1851), *PLAGIOLEPIS LONGIPES* (EMERY 1887), *ANOPLOLEPSIS LONGIPES* (EMERY 1925)
Class	INSECTA
Order	HYMENOPTERA
Family	FORMICIDAE
Contact Person for Enquiries	RACHEL GARTHWAITE
Chief Technical Officer-Conservation	DR GEOFF HICKS
Date Determined	MAY 2002
Criteria of departmental policy that apply	II.), VI.), VII.), IX.).
National Plant Pest Accord List Candidate	N/A
Regional Council Request?	NO
Notifiable Organism status	YES

Crazy ant species found in Auckland

January 2003

Two new suspect crazy ant nests (scientific name: *Paratrechina longicornis*) were found at Jellicoe Wharf at the Ports of Auckland over the Christmas period. The ants were detected during follow up monitoring after treatment of crazy ants at this site in April 2002. The ants have been treated and to date no further activity has been noted.

MAF will continue to monitor the site, but we need your help. If you notice any unusual ants in the port area or on or around goods that have come from the Auckland port,please contact the **MAF Exotic Disease and Pest Emergency Hotline on 0800 809 966.**

Overseas, crazy ants are a costly nuisance in the urban environment and in New Zealand they could compete with some of our native species. Some common questions and answers are…

Can I identify a crazy ant by just looking at it?

No, generally not. The worker ants have longer legs and antennae, and thinner bodies, than most ants. However they can still be easily confused with other ants established in New Zealand (see photos below). They are black and their average size is 2.5 to 3mm.

Crazy ant, actual size 2.3 to 3mm

Too close to tell: These photos show two different species of ant magnified to about 6 to 7 times normal size. The one on the left is a crazy ant. The one on the right is a common established ant species.

A common ant, actual size 3 to 3.5 mm

Do these ants sting or are they aggressive?

No, crazy ants do not sting but, as with all ants, they may bite if provoked. If disturbed, the ants do begin to move in an erratic manner, weaving around very rapidly. This is how they got their name of crazy ants.

Will these ants survive in New Zealand?

Crazy ants originate from more tropical climates than experienced in New Zealand. However, to survive the ants may seek out warm places to start a nest. For example, inside buildings around tea rooms or kitchens, in walls, beneath carpets, and other suitable spaces in and around your property including rubbish bins and heating pipes.

What can I do to help?

The less food sources and places to nest the ants have the less likely they are to become established. Take care to clear away food scraps and other possible food sources around and surrounding property. If you notice any extra ant activity around your work site take a closer look and call **0800 809 966** if you suspect they are crazy ants.

Protect New Zealand
Tiakina Aotearoa

For more information visit www.maf.govt.nz/crazy-ants