# National Invasive Ant Surveillance Programme annual report

## Introduction

The National Invasive Ant Surveillance programme (NIAS) detects newly established exotic ant species in New Zealand and provides information on range extensions of species already known to be established. Ants are widely dispersed through human activity and commonly intercepted in air and sea cargo including fresh produce, timber, sea containers and personal baggage. They are major urban pests, invading homes and businesses where food is readily available. They also threaten natural biodiversity by displacing native invertebrate species and encouraging horticultural pests.

High-risk sites for ant entry are determined by pathway and site risk analyses undertaken annually. High-risk sites include seaports, airports, sea container storage and repair sites and Transitional Facilities that receive international freight. Sites are then scheduled to be surveyed from mid-summer to early autumn each year.

The identified risk sites are surveyed by ground teams coordinated by AsureQuality Ltd. Small plastic pottles, alternately baited with carbohydrate (sugar solution) or protein (peanut butter, oil and sausage meat) are placed in grid formation (**Figure 1**). Additional pottles are used to collect live ants found by visual inspection. Pottles are left out at each site for about 2 hours under favourable environmental conditions to maximise the number of foraging ants collected before the bait dries out and becomes less attractive.

For a third year in a row, dome-type ant traps (a long-term trapping system) were used on a trial basis at the Ports of Auckland and 3D-printed traps that are similar to the dome traps with better modifications were also trialled. These traps consist of a base section containing a glycol-filled capture chamber coated with Teflon and three types of attractive baits (honey, peanut butter and fish oil), with a plastic dome cover over the top (**Figure 2**). Ants attracted to the baits fall into the capture chamber and are preserved in the glycol. The general principle is the same as with a pitfall trap but the capture chamber is raised and housed in a unit that can be deployed on hard surfaces (i.e. no ground excavation is required). These traps can be left deployed for days or weeks before being retrieved and contents examined. Work has been ongoing to modify the design of the dome trap through 3D printing to improve operational deployment in the field (Ross, 2018).

Twenty-two dome traps and four 3D-printed traps were tested in the multi-cargo area of the Ports of Auckland for 7-day spells during the period from 20 January to 8 February 2019, giving an effective total of 198 trap-days. The multi-cargo area is a known hot spot for exotic ant activity (FBA Consulting, 2017) and is also the type of environment the dome and 3D printed traps were designed to monitor. Pottle surveillance was also undertaken in the area where the traps were deployed, to compare the performance of dome traps, 3D-printed traps and pottles.

GPS locations and associated data are recorded on hand-held data loggers. All samples are tracked electronically from the field to identification in the laboratory. Pottles, dome and 3D-printed traps are sent to the Flybusters Consulting diagnostic laboratory for initial ant identification. Suspect exotic ant specimens are sent to MPI's Plant Health and Environment laboratory (PHEL), Tamaki, for validation of identification. Once an exotic ant find has been validated, an investigation is initiated to track down and eradicate nests near the location of the original find.

Figure 1: NIAS protein pottle deployed at Ports of Auckland, with local *Iridomyrmex suchieri* workers foraging on bait

Figure 2: A 3D-printed dome trap deployed at Ports of Auckland

## Results

In the 2019 season, 40,998 pottles were deployed nationally, with 19 pottles recording exotic ants. Of these, 11 were confirmed

from active established nests (**Table 1**). Three dome traps caught exotic ants, one of which was confirmed to be from an active, established nest (**Table 2**). Four exotic incursions were not found to be associated with any nests during follow-up inspections. The 19 detections produced 15 urgent measures responses and all detections of exotic ants and associated nests were eradicated from the sites where they were found.

The timing of pottle deployment varies from year to year owing to variations in site selection and weather. Weather significantly affects ant distribution, behaviour and the number and size of nests. The environmental factors to which ants are sensitive include air and soil temperature, rainfall and soil moisture deficit. Accordingly, favourable conditions during the lead-up to the surveillance period have been implicated as a cause of increased interceptions: the presence of more nests means more interceptions are likely (Gunawardana et al., 2013; Browne et al., 2012; Porter, 1988).

The weather from winter 2018 to summer 2019 was considered to be variable but good for supporting ant populations. In particular, the mild winter and early spring would have encouraged ant activity and nest expansion early on in the season. Early summer was more variable, with high rainfall slowing ant activity and then more settled, dry and hot conditions resulted in a surge of ant activity in February.

Six exotic species were recorded in pottles (**Table 1**), including *Tapinoma melanocephalum* (ghost ant) *Paratrechina longicornis* (crazy ant), *Trichomyrmex destructor* (Singapore ant), *Monomorium dichroum* and *M. indicum* (no common names). Also, for the first time this year *Lepisiota* sp. was detected. This shows that the NIAS system is working well in picking up a variety of exotic species. Results from this season demonstrate the value of early intervention in helping to prevent the establishment and spread of exotic ant species in New Zealand.

**Table 1: Location and numbers of ant detections during NIAS, 2019**

| Species | Location | Number of nests found |
|---|---|---|
| *Tapinoma melanocephalum* | Auckland International Airport | 1 |
| *Paratrechina longicornis* | Port of Tauranga | 1 |
| *Tapinoma melanocephalum* | Port of Tauranga | multiple |
| *Paratrechina longicornis* | Port of Napier | 1 |
| *Paratrechina longicornis* | Port of Tauranga | 0 |
| *Monomorium dichroum* | Port of Tauranga | 1 |
| *Paratrechina longicornis* | Port of Timaru | 1 |
| *Monomorium dichroum* | Christchurch (Transitional Facility) | 1 |
| *Lepisiota* sp. | Ports of Auckland | 0 |
| *Monomorium dichroum* | Ports of Auckland | 1 |
| *Monomorium dichroum* | Port of Otago | 1 |
| *Monomorium indicum* | Mt Maunganui (Transitional Facility) | 0 |
| *Trichomyrmex destructor* | Port of Timaru | 1 |
| *Monomorium dichroum* | Port Otago | 0 |
| *Tapinoma melanocephalum* | Opua Marina, Northland | 1 |

## References


Browne G, Craddock P, Mattson L (2012). National Invasive Ant Surveillance Programme Annual Report: 2012. Unpublished report prepared by FBA Consulting & AsureQuality Ltd for the Ministry for Primary Industries, June 2012, 44 pp.

FBA Consulting Ltd (2017). Ports of Auckland Prophylactic Baiting Programme: Season Report 2016/17. Unpublished report prepared by FBA Consulting for Ministry for Primary Industries, June 2017, 37 pp.

Gunawardana DN, Peacock LR, Flynn AR, Ashcroft TT, Green OR (2013). Why is Napier sea port a hot spot for invasive ants? *New Zealand Plant Protection* 66, 10–16.

Porter SD (1988). Impact of temperature on colony growth and development rate of the ant *Solenopsis invicta. Journal of Insect Physiology* 34(12), 1127–1133.

Ross, A (2018). 3D printing and biosecurity. *Surveillance* 45(2), 33–34.



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**Table 2: Location and numbers of ant detections in dome and 3D-printed traps at Ports of Auckland during NIAS, 2019**

| Species | Number of detections in traps | Number of nests found |
|---|---|---|
| *Paratrechina longicornis* | 2 | 1 |
| *Pheidole fervens* | 8 | 0 |
| *Brachymyrmex obscurior* | 4 | 0 |