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Stowaways

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Contents

Manaaki Whenua
Landcare Research

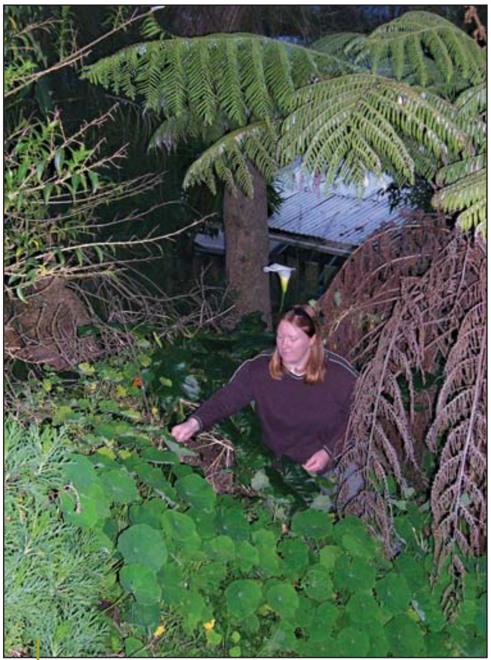
Hello Goodbye

Big changes are afoot in the invasive invertebrate team.

We are currently developing our research priorities for the next 10 years or so. Don't worry – we are still committed to developing strategies to control wasps and ants, as well as any other invaders that might breach our borders. We are also interested in designing monitoring programmes to detect invertebrates before they can establish, modelling the potential distribution of invasive invertebrates to assess whether they could establish in New Zealand, assessing the potential environmental impacts of new invasive invertebrates, and identifying the pathways (air, sea) that are high risk for transporting these species here.

A new researcher, Margaret Stanley, has joined the team to provide some of the expertise we need to achieve our priorities. Margaret is based in Auckland, one of the hotspots for invasive species in New Zealand, and is currently working on identifying high-risk invasion pathways (see page 6). Margaret's research interests include invertebrate ecology, plant-animal interactions, and pest control strategies. As well as working for Landcare Research, Margaret is an Honorary Lecturer in the School of Biological Sciences, University of Auckland.

On the other side of the ledger, Richard Harris has left Landcare Research at Nelson and moved to Western Australia. His presence here is missed, but the emails are already running hot! Richard led the invasive invertebrate research programme over the last year and contributed significantly to our knowledge of ants and wasps in New Zealand. He recently designed a web-based key to identify New Zealand ants (see our website), led the way in developing toxic baits to control social wasps and Argentine ants, and designed baiting regimes to maximise effectiveness of control operations. Richard is still involved with the team, providing us with his expertise on ants and other



Darren Ward

Margaret Stanley searching for invertebrates in the foliage creepy crawlies. When he gets time away from answering emails from his former colleagues, he is really enjoying meeting all the invertebrates in his new backyard – his latest discovery is scorpions.

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All wasps are not the same

Richard Toft

Vespula vulgaris *or is it?*

In New Zealand, we have two species of wasps belonging to the genus *Vespula*: *V. vulgaris*, also known as the common wasp, and *V. germanica*, the German wasp. These species have been in New Zealand for many decades, but are originally from overseas.

As the name suggests, the common wasp is found in many countries. Over the years many wasp researchers from Europe and North America have visited New Zealand and commented that our common wasps don't look the same as "their" common wasps. This comment has been made often enough to make us think it's time we investigated whether the New Zealand common wasp is in fact the same species as common wasps in Europe and America.

The New Zealand common wasp was identified as *V. vulgaris* in the 1980s by comparing the physical appearance of the New Zealand species with specimens of wasps from overseas. In our study we had the advantage of using molecular biology techniques that compare species at the DNA level.

There are many species of *Vespula* wasps described around the world and through colleagues in the UK and USA we managed to acquire some ethanol-preserved specimens (ethanol doesn't damage DNA but kills live organisms) sent to New Zealand.

When the DNA of the three *V. vulgaris* samples was compared, we found a surprising result. The UK and New Zealand wasps were identical, but the "*V. vulgaris*" from the USA was not the same species. More work will be required to determine if the USA common wasp is another described species or a new species. The other species in New Zealand, *V. germanica*, was identical to the *V. germanica* in Australia.

Using molecular biology techniques we are also looking at how many times these wasps species have been introduced to New Zealand, but that's another story...

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This work is funded by a the Foundation for Research, Science and Technology

Richard Toft

Health impacts of exotic bees and wasps in New Zealand

Invasive species are having major global impacts on native biodiversity, agricultural production, tourism and human health. Over the last two centuries, six exotic species of public health concern have established in New Zealand: two species of bees (*Apis mellifera* and *Bombus terrestris*) and four species of wasps (*Polistes humilis*, *P. chinensis*, *Vespula germanica* and *V. vulgaris*). New Zealand honeydew beech forests have the dubious honour of having the highest density of *Vespula* wasps in the world.

In 2001 we started a project to investigate the health impacts of bees and wasps in New Zealand. To establish the prevalence of sting injuries in New Zealand, we analysed national health statistics data collected between 1988 and 2003, and compared them with data from over 2000 retrospective questionnaires posted out in Wellington, Nelson and St Arnaud covering the period from October 2001 to March 2002.

The incidence of bee and wasp sting-related hospitalisations remained similar over a 12-year period from 1988 to 1999, with an average of 3.1 stings for every 100 000 people per year. This rate is higher than that reported for the USA but lower than Australian hospitalisation rates. Of these injuries, 80% were due to bees and 20% to wasps, constituting 75% of all insect/arachnid injuries. During this period 12 deaths from sting injuries were reported.

However, results from the questionnaires (based on a 6-month period) indicated a significantly higher prevalence of sting injuries than reported in the New Zealand and overseas health statistics data; 1300 stings per monthor every 100 000 people and a hospitalisation rate of 7.15 people people per month for every 100 000 people.

Richard Toft

We estimate the degree of under-reporting in NZ health statistics from sting injuries could be as great as 53-fold. New Zealand's unique environment (which leads to high densities of wasps) together with New Zealanders' outdoor lifestyle may explain the high prevalence of sting injuries.

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This research is funded by the University of Otago

Richard Toft

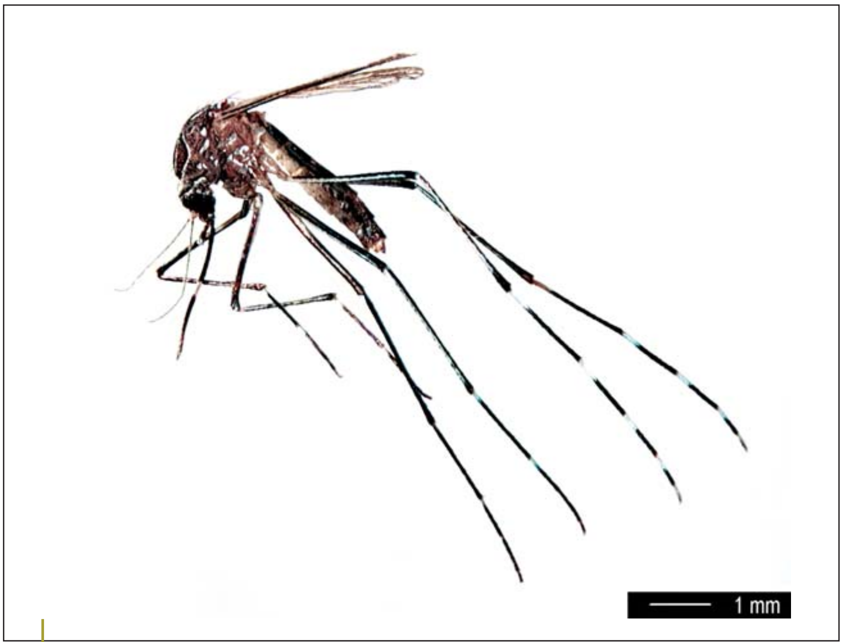
Comparison of a wasp sting (top) and a bee sting (bottom)

Wasps have a lance-like stinger without barbs and can sting repeatedly. The sting is like two swords lying alongside one another; using alternate thrusts of each sword the wasp drives the sting in. Once the sting is well into the victim, venom is pumped into the wound.

Bees have a barbed stinger, can only sting once, and using their sting results in their death. The barb anchors the sting into the victim causing the sting and venom sac, along with other parts of the bee's abdomen, to detach from the bee. Muscular contractions of the venom sac pump venom into the wound.

Is West Nile virus a threat to our iconic bird species?

Recently *New Scientist* reported that extreme weather events brought about by climate change have been linked to an upsurge in disease around the world. One such disease is that caused by West Nile virus (WNV), a bird virus that sometimes causes illness and death in mammals. The prevalence of WNV is increasing within its traditional range, and emerging in new geographical areas. Outbreaks in Europe have been more severe than usual and in 1999 WNV first appeared in North America, where it infected over 140 species of bird causing many deaths. Should we be concerned for our native birds in New Zealand?



Richard Toft

Ochlerotatus notoscriptus

West Nile virus is an arbovirus from the family Flaviviridae, which includes viruses causing Dengue and Yellow fevers. It is part of the Japanese encephalitis antigenic complex that includes Kunjin and Murray Valley encephalitis in Australia. In fact Kunjin is now thought to be a strain of WNV.

First identified in 1937 in the West Nile district of Uganda and subsequently found in Egypt in the 1950s, WNV is now known to be endemic to Africa, Western Asia, and the Middle East. It was first found in Europe in 1958 and since then there have been outbreaks in the western Mediterranean and southern Russia in 1962–64, Belarus and Ukraine in the 1970s and 80s, in Romania in 1996–97, the Czech Republic in 1997, and France, Italy and Israel in 1998. In 1999 WNV reached North America.

Although WNV can cause illness in mammals, it is primarily a bird virus, spread by mosquitoes specialised to feed on the blood of birds (*maintenance vectors*). In South Africa many wild birds have antibodies for WNV without any records of unusual bird deaths. However, when WNV reached North America it caused a large die-off of American crows.

Scientists have suggested that the spread of viruses such as West Nile are linked to climate change. With global warming, new areas are now suitable for colonisation by mosquitoes and with them the risk of virus transmission increases. It seems that in Africa and the Middle East the virus occurs naturally in wild birds, the incidence fluctuating seasonally with the weather and mosquito abundance. However, as mosquitoes spread into new areas birds not immune to the effects of WNV are being affected.

The problem for mammals is that some species of mosquito are generalist feeders (*bridge vectors*). Feeding on blood from both birds and mammals they pass the virus to so-called "incidental" mammal hosts. WNV has been isolated from camels, cattle, horses, lemurs and dogs, as well as humans. Mammal hosts are unlikely to transport the virus to new regions, as WNV does not usually build up to high enough levels for a mosquito to become infected.

Three trends for WNV have emerged: an increase in the frequency of outbreaks in humans, an apparent increase in severe human disease, and high avian death rates accompanying the human outbreaks. A new variant of WNV, lineage 1, is likely responsible for the severity of human disease and the many bird deaths in North America.

What are the pathways that could bring the virus to New Zealand, and could it survive and establish? Infected mosquitoes could arrive in

New Zealand on aircraft or after short sea voyages. In Europe migrating rooks and other corvids likely bring WNV from northern Africa and the Middle East. However, it is thought that WNV reached North America in a pet bird rather than through migration.

In Europe wild birds such as those in the crow family and semi-domestic birds like house sparrows and feral pigeons are common species that carry WNV, and the latter two are present throughout most of New Zealand. Rooks are present primarily in the Hawke's Bay/Wairarapa/ Wellington and the Christchurch/ Banks Peninsula/Peel Forest regions.

WNV commonly circulates in tropical regions. The fact that WNV is now established in North America as far north as New York implies New Zealand is within the latitudinal range that could support WNV cycling between birds and mosquitoes.

Five or six species of mosquito in New Zealand feed on both birds and humans. None of them have been recorded as maintenance vectors for WNV. The introduced *Culex quinquefasciatus* has had WNV isolated from it elsewhere in the world, and is found north of a line joining Nelson and Picton. Female *Cx. quinquefasciatus* readily bite humans and birds, feeding mainly at night both indoors and out. However, laboratory tests in California have shown it to be a poor bridge vector for WNV.

The endemic *Cx. pervigilans* is found throughout the country and could probably be a bridge vector too.

Other potential mosquito bridge vectors, such as *Ochlerotatus japonicus* and *Aedes albopictus* have been intercepted at the border in New Zealand. Both are suited climatically and environmentally to New Zealand, and both are established in North America where they are bridge vectors for WNV.

Is WNV a threat to New Zealand? The lack of a maintenance vector here should not be a cause for complacency; there is still much that we do not understand. For example in the UK where the disease is not found, migrating corvids undoubtedly bring the virus from North Africa each spring, and the country has competent maintenance and bridge vectors. And in Florida, where bridge vectors are present but maintenance vectors are not, WNV is well established. For New Zealand it would appear possible for the virus to establish, and ultimately it may be the lineage of the virus we get that determines the seriousness of the problem here.

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This work is funded by the Foundation for Research, Science and Technology

Gideon Climo

Kakapo *(Strigops habroptilus)*

International trade: A risky business

Aircraft from Austria, books from Barbados, chemicals from China...

New Zealand imports weird and wonderful goods from many places throughout the world. Unfortunately, our fondness for overseas wares could also lead to ants from Argentina, beetles from Bangladesh, cockroaches from Canada...

Where does our freight come from? Do we get freight from countries that harbour pests we want to keep out of New Zealand? How much and what kind of freight do we get from these countries? How likely is it that these pests could hitch a ride on freight, ships, or aircraft heading for New Zealand?

MAF Biosecurity is funding an ant pest risk assessment project that is trying to get to the bottom of this risky freight business. Landcare Research is leading this collaborative effort with help from Victoria University and Otago Museum. The ant risk assessment will identify ant species of high risk to New Zealand and tackle issues such as the likelihood of entry and establishment. While climate modelling is being used to predict the likelihood of establishment should particular ant species arrive in New Zealand, we need to examine freight pathways if we are to understand the likelihood of new pest ant species gaining entry to New Zealand.

Luckily for us, Statistics NZ assembles relevant information on freight (origin, type of freight, arrival port) from the data collected by customs officials. From this information we can prepare GIS global maps of high- and low-freight volume pathways to New Zealand. We are able to examine freight data (type and volume) for imports from countries that harbour pest ant species. Our first surprise was the sheer number of ports around the world from which New Zealand imports sea or air freight (Fig. 1)!

Using GIS we can overlay the current distribution of each pest ant species with freight pathways to highlight the extent of overlap of the distribution of the ant and pathways to New Zealand (Fig. 2). We can also map how much of the freight ends up at each New Zealand port (Fig. 3). Using interception records we can identify what freight is high risk for harbouring each ant species. For those species it is a priority to keep out of New Zealand our work will help MAF make decisions on risk mitigation measures for incoming freight and also help prioritise and focus surveillance on high risk freight and arrival points. Everyone would like to see pests intercepted before they sneak past the border and become established in New Zealand.

However, data gaps must be addressed for this analysis to be really useful. Current data from the import entry forms are coarse and have numerous gaps and errors, e.g., there is little information available on empty

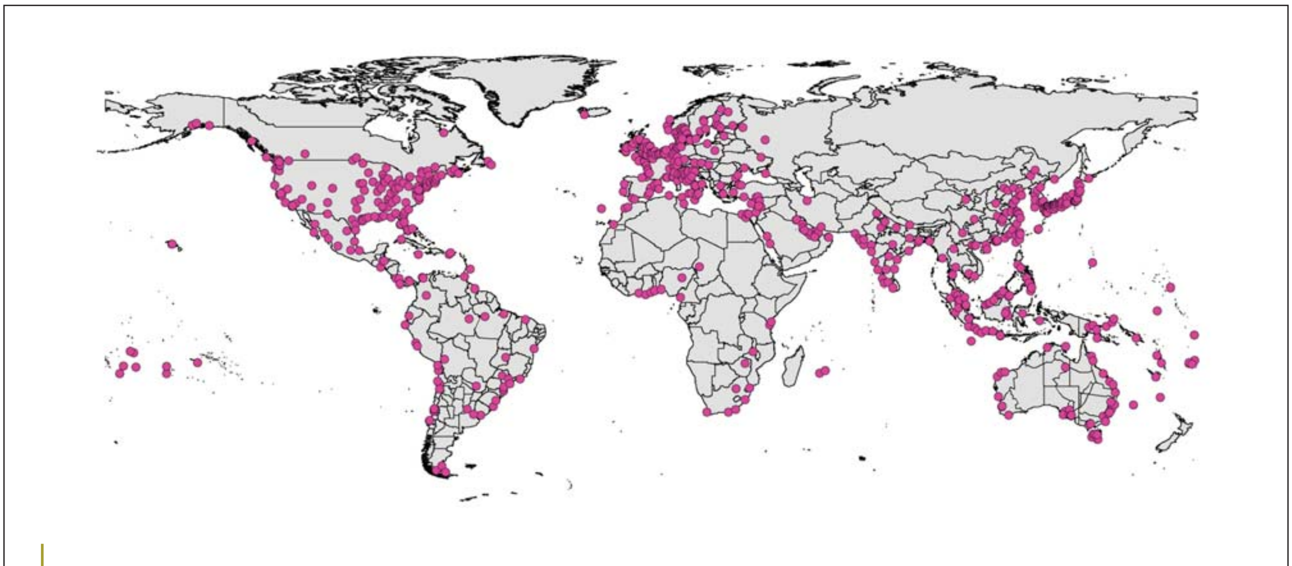

Figure 1. Ports from which New Zealand received sea or air freight, 2000–2003. We import goods from many ports around the world.

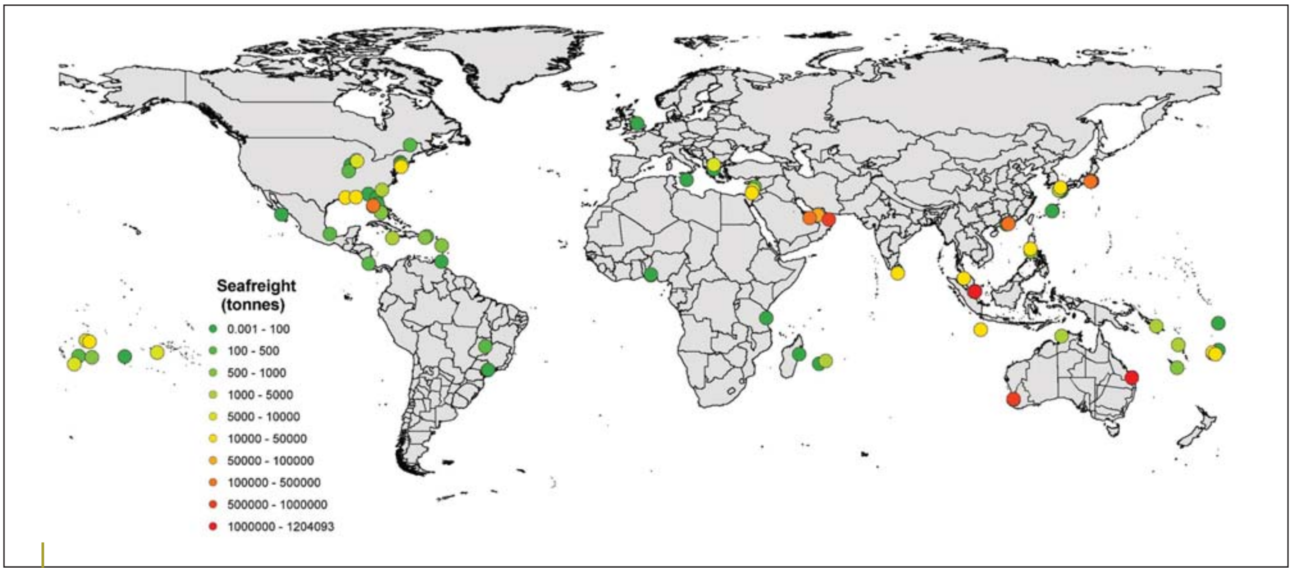

*Figure 2. Volume of sea freight New Zealand receives from ports within 100 km of a distribution record of the crazy ant (*Paratrechina longicornis*).*

containers, and even pest distribution records are often incomplete. We need improved ways to collect and compile data on freight movements.

What's next? This project has focused on ants, but other pest species also pose a high risk to New Zealand. We need to refine the data collected at the border and then design a system where this data can be feed into the BIOSECURE system (see *Stowaways* Issue Number 2, for more information on BIOSECURE). This will allow biosecurity authorities to access freight pathway maps for organisms that interest them, and eventually to plan surveillance strategies for maximum detection.

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This research is funded by MAF Biosecurity and the Foundation for Research, Science and Technology

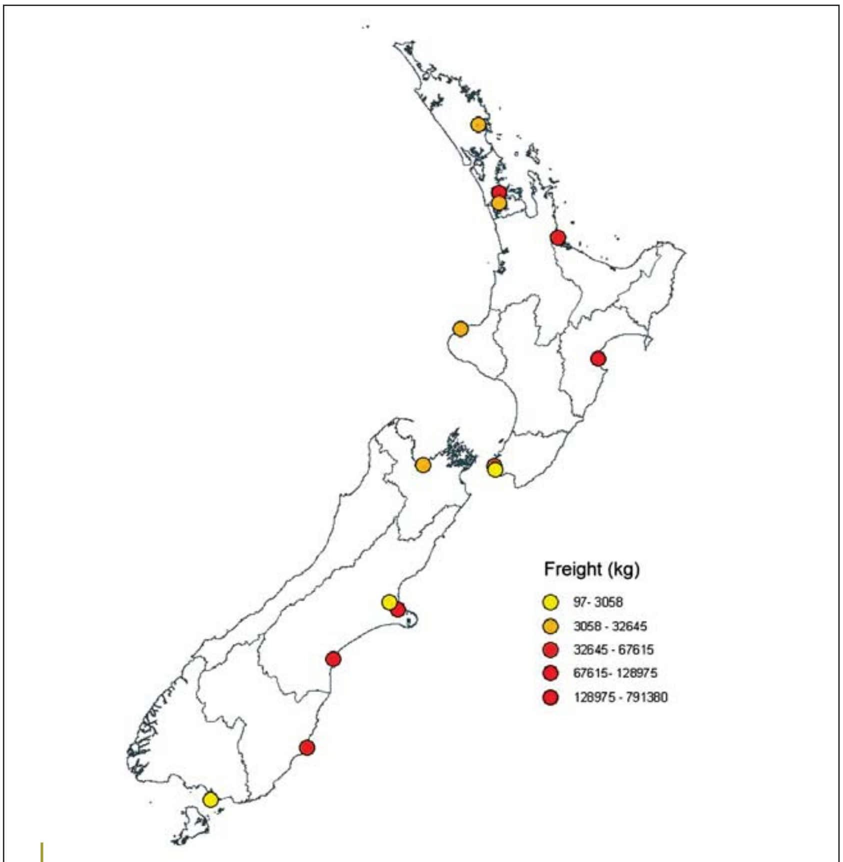

Figure 3. Freight from countries where Lasius neglectus *(pest ant in Europe) is present ends up in air- and sea-ports all around New Zealand.*

An Aussie time bomb

Is Darwin's ant (*Doleromyrma darwiniana*) shaping up as a major pest in New Zealand? The Landcare Research team hopes to find out before it is too late.

Richard Toft

Darwin Ant (Doleromyrma darwiniana)

The first record of Darwin's ant in New Zealand was a large colony living in a rock wall at Penrose, Auckland, in 1959. This population was promptly eradicated, and the species was not recorded again until 1979, when it was found established at various sites around Christchurch. The source of the Christchurch populations was thought to be wood from the Lyttelton Harbour Board timber yard. Darwin's ant is now a major nuisance for householders in infested areas of Christchurch. Surveys in the last few years found populations of Darwin's ant in towns as far north as Whangarei, a major northward expansion in distribution. We do not yet know if these new populations have all resulted from transfers from Christchurch or are the result of new incursions.

In its native Australia, Darwin's ants form small colonies of a few hundred individuals and are regarded as occasional minor pests around houses. In New Zealand, however, Darwin's ants form extremely large colonies and are a major pest for householders in areas where they establish. Sound familiar? Many of the world's worst invasive insect species behave in surprising ways when introduced to new lands. A classic example is the Argentine ant, which is now renowned for forming super-colonies away from its native range. Disturbingly, Darwin's ant is closely related to Argentine ant (they used to be classified in the same genus). The two species look very similar and are difficult to distinguish, even under a microscope. The easiest way to differentiate them is by crushing the ants in your fingers and employing your nose: Darwin's ants have a pungent and unpleasant odour, while Argentine ants do not. Darwin's ants are also similar to Argentine ants in that they appear slow to disperse under their own steam, but appear adept at making use of human transportation systems.

In the areas they are found, Darwin's ants occur in enormous numbers and early observations suggest they displace other ant species in the area. They are omnivorous and feed on sweet substances, such as nectar, honeydew, ripe fruit, and protein, mostly in the form of other insects. If they spread into native habitats there is a risk they will have significant environmental impacts through displacement of native ant species, predation on insects, and competition for resources.

But will they spread into native habitats? This is one of the questions the research team is hoping to answer, as well as determining their potential impact on native species if they do. One of the areas that Darwin's ant is abundant is at the base of the Port Hills in Christchurch. Already they appear at home on the lower slopes among gorse and boneseed, suggesting that some native shrubland environments may be at risk. The fact they do so well in the Port Hills environment also suggests they may have wider temperature tolerances than the Argentine ant.

While authorities work hard at keeping known environmental pest ant species out of the country, the unknown menace of Darwin's ant is threatening from within. We need to understand that threat as soon as we can.

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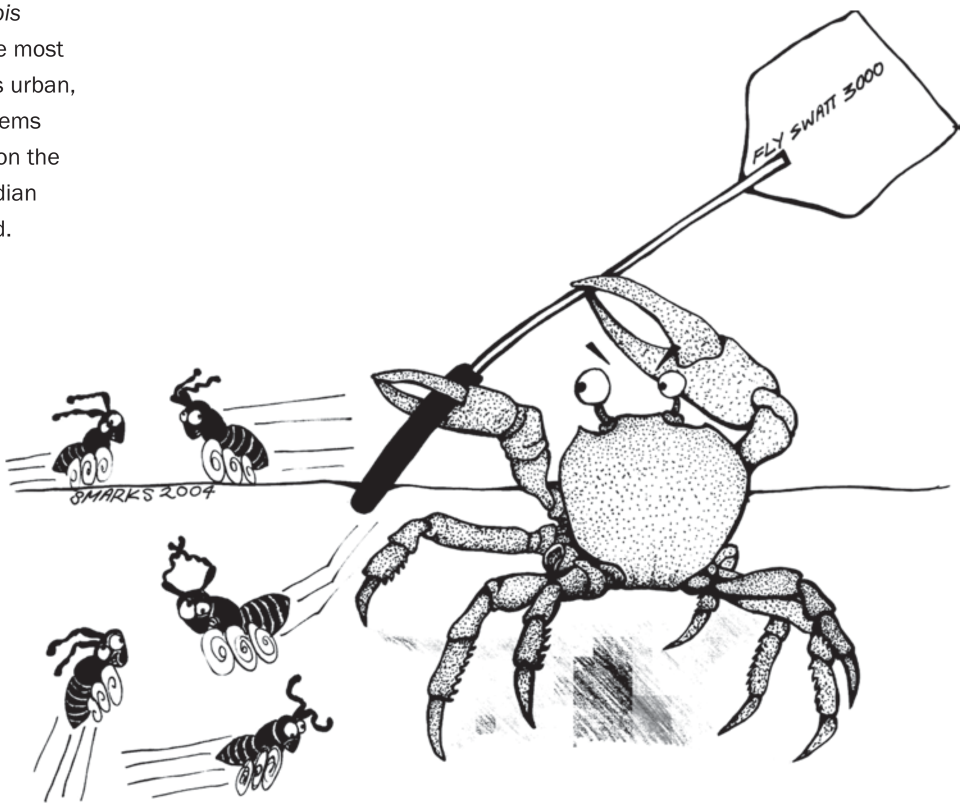
Crazy ants in the Pacific

The yellow crazy ant, *Anoplolepis gracilipes*, is globally one of the most invasive ant species. It invades urban, agricultural and native ecosystems and has had a serious impact on the several island groups in the Indian Ocean where it has established.



On Christmas Island these impacts include killing approximately 20 million red crabs (about 30% of the entire population). By eliminating red crabs, crazy ants have affected the rainforest, changing its structure and composition and endangering many of the species unique to the island.

Yellow crazy ants are now widespread in the Pacific region, with records of ants being found on over 70 islands. Records date back to the late 1800s, indicating a long history of invasion and human-mediated spread across the Pacific. However, this is probably an underestimate because of the small number of biological surveys completed in the region.

We modelled the potential distribution of *A. gracilipes* in the Pacific region, based on the climatic preferences of the species (mean annual temperature and annual precipitation) from records of *A. gracilipes* global distribution, using BIOSECURE (see *Stowaways* Issue 2).

Much of the Pacific region suits *A. gracilipes*. Although *A. gracilipes* is already widespread throughout the Pacific region, there is potential for it to continue to expand that range via human transportation, particularly within the islands of a nation or territory. Data suggest cool temperatures and high rainfall will likely limit its spread in some countries in southern latitudes or with mountainous interiors.

We plan next to test our predicted distribution of *A. gracilipes* in Fiji with ground surveys and, as we learn more about the ant, refine our model to include a wider set of parameters such as population dynamics, dispersal, resources use and competitors.

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This work is funded by a Doctoral Scholarship from the Foundation for Research, Science and Technology

Yellow crazy ant: Fact sheet

- Named after their frantic movements and frequent changes in direction, especially when disturbed
- Can form multi-queened super-colonies in which ants occur at very high densities
- The density of foraging worker ants in super-colonies can reach 1000 per square metre, or 79 million per hectare of bush
- Farm honeydew-secreting Homoptera
- The ants squirt out fine jets of formic acid from their acidpore to subdue their prey. This acid can blind humans.

Phantom menaces: Finding the last ant

Eradicating an insect pest from an area, even a small infestation, is not an easy task. It starts out relatively easily. With modern control techniques, killing off most of the population is not all that difficult. However, most of the budget and effort goes into killing the last 1% of the population. Eradication is not eradication unless all individuals have been eliminated. Often with insect pests, we know how to kill these last few individuals but we just can't find them — they are the phantom menaces of pest control!

Did we eradicate every individual? Are there any survivors? How do we find the survivors so we can kill them?

These are the questions asked by those trying to eradicate Argentine ants. How do we detect and mop up survivors on Tiritiri Matangi Island, where the bait developed by Landcare Research has been highly effective at reducing Argentine ant populations to extremely low levels? Imagine trying to find a few surviving 2.5-mm ants in about 10 ha (20 rugby fields!) of flax, muehlenbeckia and other vegetation.

Our research is starting to focus on ensuring Argentine ants can be detected at low densities. This will lead to early detection and allow small infestations to be targeted before population numbers build up again. Trials have been underway in Auckland to compare baiting with different trapping techniques. Preliminary results indicate the non-toxic version of the ant bait developed by Landcare Research is better than pitfall traps at detecting ants at low densities.

On the Galapagos Islands, staff at the Charles Darwin Foundation have assessed the effectiveness of baiting to eradicate the little fire ant (*Wasmannia auropunctata*) across 25 ha using about 40 000 peanut butter sticks each year for 3 years – that's a lot of effort! Such an approach with the Argentine ant bait on Tiri would be ideal to confirm eradication or the presence of survivors, but is too expensive to be a realistic option for large-scale eradications.

We need to improve our baiting strategy to optimise the detection of any remaining ants and to reduce the labour-intensiveness of laying the bait. This will involve working out the optimal bait spacing to achieve both objectives. Future research will also apply search and detection theory used by search and rescue teams to find those elusive phantom menaces.

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This research is funded by the Foundation for Research, Science and Technology, with logistic support from the Department of Conservation

New Argentine ant bait approved by ERMA

A new bait to control and, in some situations, eradicate Argentine ants is now commercially available. *Xstinguish* Argentine Ant Bait was developed by Western Australia Department of Agriculture and modified by Landcare Research for New Zealand conditions.

This new bait is highly attractive to Argentine ants and our product testing has shown that even after one treatment with *Xstinguish* Argentine Ant Bait there is a dramatic reduction in ant numbers. The bait has also been shown to be particularly attractive to several other pest ant species (*Pheidole rugosula*, Darwin ant, *Paratrechina vaga*, *Monomorium antipodum*), all pests of urban environments.

The bait is available under licence to Landcare Research from:

Bait Technology
PO Box 303-439
North Harbour, Auckland
Ph 09 444 0350 or 027 444 4005
Email: info@baittechnology.co.nz

Gum leaf skeletoniser

Gum leaf skeletoniser (*Uraba lugens*) is a native Australian moth. Its arrival in New Zealand is of concern as it is a major threat to ornamental and plantation eucalypt trees in New Zealand

Uraba lugens was first discovered in New Zealand in 1992 on eucalypt trees on a Mt Maunganui golf course. The population was effectively controlled there in the 1990s, but reappeared in Onehunga, Auckland in 2001, and is now widespread in the southern Auckland area.

The gum leaf skeletoniser caterpillars damage gum trees by feeding on their leaves. Young larvae eat the green tender parts of the leaves and leave the tough veins, which results in the leaves having a skeletonised appearance, hence the name. Older larvae consume entire leaves except for the veins and midrib of old foliage. This damage can slow tree growth or, in severe cases, even kill younger trees.

In Australia, *Uraba lugens* is found from the subtropics through to temperate and mountainous areas. It is therefore capable of surviving in most areas of New Zealand where eucalypt trees are grown.

In Australia *Uraba lugens* caterpillars are commonly referred to as "itchy grubs" as their hairs cause a stinging sensation followed by a persistent itchy rash when they contact human skin. Older caterpillars are commonly recognised by their habit of stacking previously shed head capsules at each moult – resulting in their characteristic "hat".

The Ministry of Agriculture and Forestry is currently subcontracting Forest Research to investigate options to control *Uraba lugens* in New Zealand.

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Toni Withers

Uraba lugens *caterpillar displaying the characteristic "hat"*

Skeletonizer Blues

Uraba is a gruesome beast:

We do not like her in the least;

It makes us fly into a rage

To see this eucalyptophage

Devouring everything myrtaceous:

Has no one taught her? Goodness gracious!

You'd learn from any decent Mum

The naughtiness of chewing gum.

And here's another thing: that stack

Of hollow heads upon her back:

It's like a little starved cadaver

Made from each earlier instar larva

I think it shouldn't be allowed

(Though Ozzy Osbourne might be proud)

One man alone can help *Uraba*:

A starved-cadaver-larva-barber.

Robert Hoare
June 2004

Red Imported Fire Ant at Port of Napier

The Red Imported Fire Ant (RIFA), *Solenopsis invicta*, was found at the Port of Napier on 14 February 2004 during a surveillance operation. It is believed RIFA arrived at the port sometime after March 2001 on imported product from either the USA or Brisbane. *S. invicta* is not established in New Zealand and poses a significant threat to New Zealand's unique biodiversity as well as economic and human health impacts.

MAF staff responded immediately, setting up a programme to contain and eradicate the RIFA infestation. Non-toxic baiting and visual inspection were used to determine nest(s) location, foraging distances, and the area that needed to be treated. RIFA were found foraging for 30 to 40 m along the Port, and a number of suspect entry and exit holes were also found. However, as the foraging area was concrete and rock, the nest was not obvious.

Luckily DNA analysis determined the nest was monogyne, i.e. only one queen per nest rather than many (polygyne). As a result, overseas experts believe only one nest (a small possibility of two) was present at the Port.

Toxic baits, specifically designed to kill RIFA, had a dramatic effect in knocking down the number of ants. After baiting, a residual insecticide was sprayed over the area and holes drilled in the concrete to help the chemical reach any underground infestations that might not have been killed by the toxic bait.

Ongoing monitoring of the infested areas over the past 5 months indicates the treatment was successful – no live RIFA have been found since 5 March 2004.

To determine the spread of the infestation, MAF field contractors surveyed not only the area within a 500-m radius of the infestation but also all areas within the Port of Napier boundary. No further finds of RIFA were recorded during this delimiting survey.

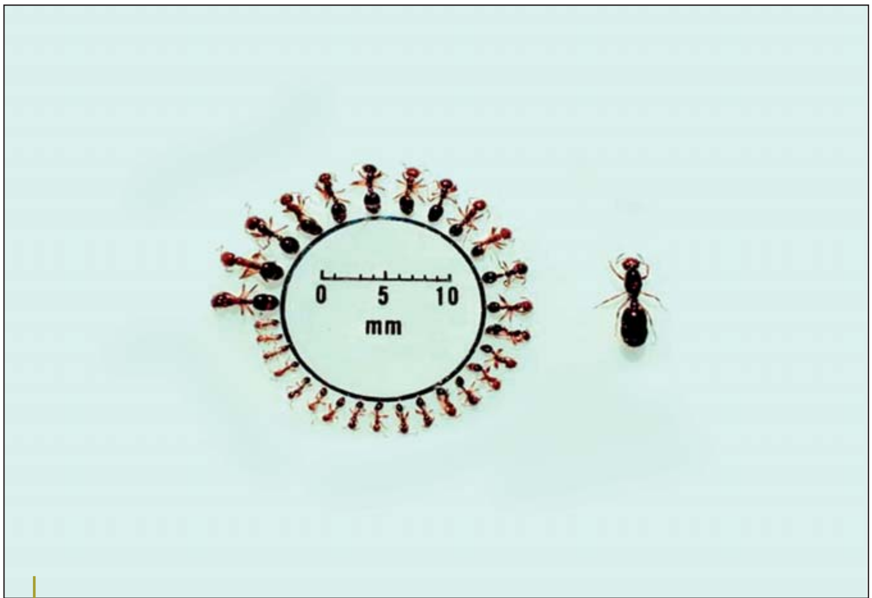
RIFA could spread from the infestation site on vectors (e.g., shipping container, organic or inorganic material), in the drainage system, or as a result of a mating flight. As a result of site observations and the spread characteristics of monogyne populations it was concluded there was a low likelihood of spread from the known site by a vector or via the drainage system.

However, to prevent vectors spreading RIFA, movement controls were implemented on container bays close to the RIFA infestation and restrictions were placed on containers in other areas near RIFA-friendly habitat. These containers underwent an inspection before they were released or until delimiting surveys found these areas free of RIFA.

It is uncertain if a mating flight had occurred before the discovery of the nest(s) in February. Wind modelling indicated areas where a fertile queen might have landed on days conducive to mating flights, and checks of potential landing sites found no signs of RIFA, which indicated a flight might not have occurred.

An information flyer was sent to all properties within a 2-km radius of the infestation site, and the public was encouraged to call the MAF Exotic

Travis Ashcroft



Size range of RIFA found at Port of Napier

Disease and Pest Emergency Hotline if they believed they had found RIFA. No RIFA were identified as a result of the public awareness campaign.

At this point MAF staff are confident the RIFA nest at the Port of Napier has been destroyed and there is no evidence to date of spread outside the known infestations. However, in line with MAF policy, surveillance will continue throughout 2005 to ensure eradication has been successful and that no spread has occurred outside the known infested boundaries.

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Travis Ashcroft

Searching for RIFA at Port of Napier

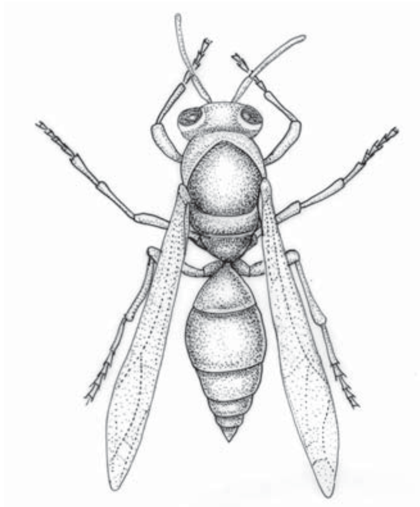
Biosecurity bits

A Raglan insect "enthusiast" trapped an odd-looking wasp, put it in the freezer and promptly forgot it for 2 years. When MAF was finally handed the wasp on ice, its identification as a median wasp sparked a search of the area for any other specimens. No further median wasps were found. It is not known how this lone insect ended up in Raglan, but one scenario considered was via a Japanese iron-sand carrier that had been off the coast of Raglan in 2002.

The Ministry of Agriculture and Forestry has successfully eradicated a new pest scale insect found in the glasshouses at Auckland's Wintergardens. The Florida red scale is a frost-sensitive pest of citrus crops overseas and could have an impact on citrus growers in Northland. The glasshouses will be monitored by MAF over the next year to ensure that the scale has been eradicated.

Eagled-eyed MAF-accredited stevedores discovered giant African snails and eggs on a container ship coming into Auckland from the Pacific Islands. The giant African snail can grow up to 20 cm, weigh up to 1 kg, produce up to 1200 eggs a year, and live up to 9 years. They eat almost any vegetation and also carry a form of meningitis that can be passed to humans.

On the other side of the world, a native NZ mud snail is threatening California's commercial trout hatcheries. This tiny gastropod infests rivers and displaces native species. It can also clone itself and populations can reach up to 750 000 per square metre, often making up 95% of the biomass of infested rivers. In New Zealand the mudsnail populations are regulated by a small worm parasite.



Rebecca Wagstaff

American authorities are looking at the possibility of importing these worms as biocontrol agents.

Additional information:
Amelia Pascoe & Greg Gill
Ministry of Agriculture and Forestry.

Source: *Protect* Winter 2004 26, New Zealand Biosecurity Institute.

An Irish invasion

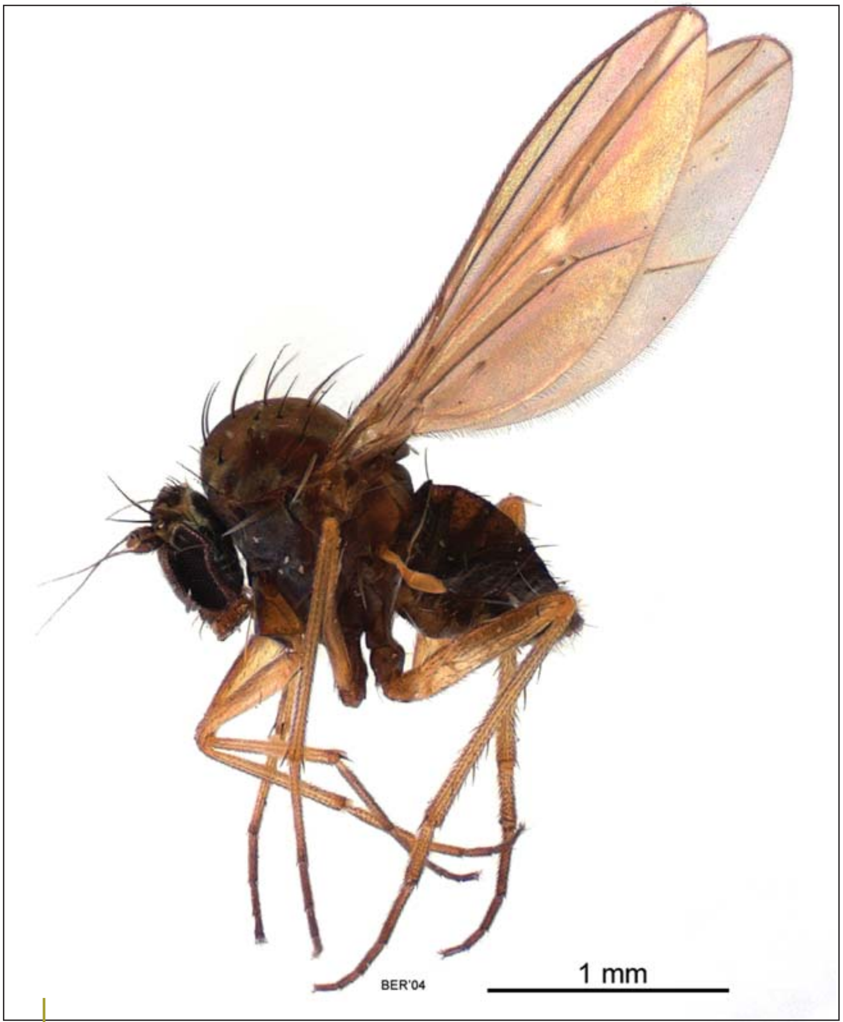
New Zealand 1, British Isles 0

I have been collecting Diptera (flies) in the British Isles since the 1960s and am familiar with the Diptera fauna of Britain and Ireland. Since 1968 I have made frequent collecting visits to Ireland and on several trips, dating back as far as 1971, I collected a small dark greenish fly belonging to the family Dolichopodidae (known colloquially among British dipterists as "dolies") that was obviously different from all the other dolies found in Ireland or Britain. Although I collected in most parts of the island, my earlier finds of the fly were only near Dublin and Belfast, close to the east coast.

Members of the dolie family often possess secondary sexual characters in the male including elaborate ornamentation of the legs. This species, however, lacked such characters: both sexes were undistinguished in appearance except for a narrow, whitish strip along a crossvein on the otherwise grey wing, a character not found in any known British species.

Dolie specialists, such as Peter Dyte in England and Marc Pollet in Belgium, examined the fly, agreed it belonged to the dolie subfamily Sympycninae, but could not identify it as any known Palaearctic (Northern Hemisphere) species.

One of the sites where I found this dolie species in high numbers was close to Holywood, County Down, where the great 19th century dipterist Alexander Haliday had lived. Haliday was particularly interested in Dolichopodidae and contributed the chapter on the family to the 1851 volume of *Insecta Britannica* by Francis Walker. Even though this fly was fairly insignificant, being only 2 to 3 mm in length, I thought it unlikely Haliday would have overlooked it if it had occurred there in his day so I concluded this species was likely to be an introduction to Ireland.



Birgit E. Rhode

Micropygus vagans

I later discovered the fly in Scotland. In 1995, on a collecting trip in Ayr (south-west coast of Scotland opposite Northern Ireland) I caught two females of the fly. Others found the fly in high numbers at eight other localities in the region, indicating that it was well established there. As in Ireland, the fly was in native broad-leaved woodland as well as wooded habitats in formal parks and gardens. As other organisms have been introduced to the same regions from the Southern Hemisphere (most notorious are the New Zealand flatworms that have decimated British earthworms), I decided to investigate this possibility.

I sent specimens to Dan Bickel, who works on this family at the Australian Museum in Sydney. He confirmed my suspicions. The fly is an antipodean dolie *Micropygus vagans,* a native of New Zealand. Unfortunately little is known about this species. There are 16 species in the genus *Micropygus* all endemic to New Zealand. Other members of the family are predatory, both as adults and larvae. Some have aquatic larvae but *Micropygus* probably develops in damp soil.

Micropygus vagans was presumably introduced to the British Isles with plant material from New Zealand, but the place and time of the first introduction cannot be determined. We only know that it was before 1971. Recent records (since 2000) from Counties Mayo and Cavan in Ireland and Perthshire in Scotland suggest it is still spreading, although its spread south and east in Britain may be limited by climatic factors. There is insufficient evidence to determine whether the arrival of *M. vagans* has had any impact on the native British Diptera fauna.

It would be interesting to know its current status in New Zealand and whether the potential for its transport outside the country still exists.

Peter Chandler
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Insect headlines

Locusts swarms

Africa is on the brink of its worst plague of locusts for nearly 20 years. Swarms of locusts containing 50 million insects (big enough to engulf London) are sweeping southwards from breeding grounds in North Africa. A single locust devours its own weight in vegetation a day, with a swarm able to consume the same as thousands of people in a matter of hours.

Argentine ant supercolonies

Melbourne

A giant colony of ants has been discovered spanning 100 km across Melbourne. The supercolony of Argentine ants stretches from Taylors Lakes, north-west of Melbourne, to Sorrento, south of the city. The ants have also been spotted in Altona, in the western suburbs and in Blackburn, in Melbourne's east.

Europe

Researchers have discovered an enormous supercolony of Argentine ants that extends across 6000 km of southern Europe stretching from northern Italy, along the Mediterranean coastline past France and Spain and curving around the Iberian Peninsula past Portugal.

California

Argentine ants first arrived in California around 1910, and since then have formed a huge supercolony that stretches throughout the state: a 1000-km-long subterranean network of Argentine ants stretching from Northern California to the Mexican border.

Recent Publications

Barker, G.M. *ed.* 2004: Natural enemies of terrestrial molluscs. Wallingford, CAB International. 640 p.

Beggs, J.R; Wardle, D.A. 2004: Keystone species: competition for honeydew among alien and indigenous species. *In:* Allen, R.B.; Lee, W.G. *eds* Biological invasions in New Zealand. Springer. Ecological studies (in press).

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Rutledge, D. 2004: LENZ – a new view of New Zealand. *Soil Horizons 10:* 11–12.

Spurr, E.B.; Sandlant, G.R. 2004: Risk assessment for the establishment of West Nile virus in New Zealand. *Landcare Research Science Series No. 25*. Lincoln, Manaaki Whenua Press. This paper can be downloaded from: http://www.mwpress.co.nz/store/downloads/LRSciSeries25_Spurr2004_4web.pdf

Stanley, M.C., Fowler, S.V. 2004: Conflicts of interest associated with the biological control of weeds. *In*: Cullen, J.M.; Briese, D.T.; Kriticos, D.J.; Lonsdale, W.M.; Morin, L.; Scott, J.K. *eds* Proceedings of the XI International Symposium on Biological Control of Weeds. Canberra, Australia. CSIRO Entomology Pp. 322–340.

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Ward, D.F.; Stanley, M.C. 2004: The value of RTUs and parataxonomy versus taxonomic species. *New Zealand Entomologist* 27 (In press).

Website

More information on invasive invertebrates is available on our website:http://stowaways.landcareresearch.co.nz

Stowaways is available on this site too.

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