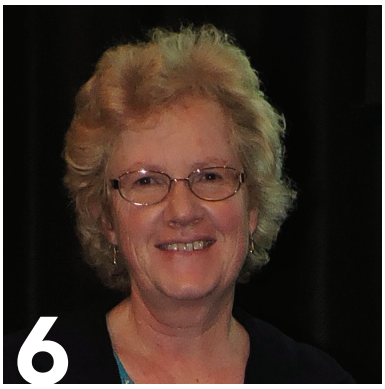
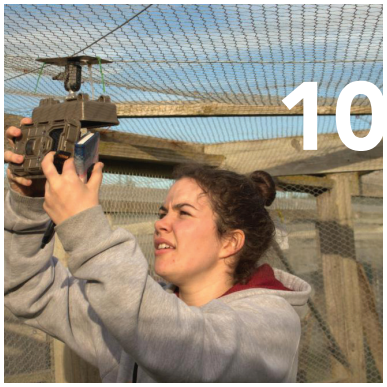
New Zealand Biosecurity Institute

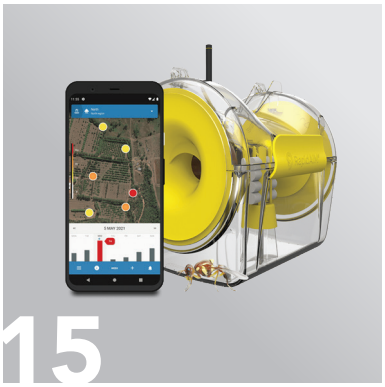
the magazine of the NZBI Summer 2022/23

Protect

PROTECT SUMMER 2022/23







inside

New Zealand Biosecurity Institute

Working together to ensure New Zealand is protected from the adverse impacts of invasive species

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The New Zealand Biosecurity Institute can be found on the web at www.biosecurity.org.nz

From the Editor

A very busy season

In this issue we hear about some of the more unusual airport seizures, including an onion that was sprouting in a passenger's handbag, and a dead rat detected in a boot inside baggage.

We learn about the problems created this summer for border staff, by cruise ships and misplaced airline baggage.

We hear that there is now scientific proof that possums are smarter than we may have previously suspected.

There's also a story that could have come from a James Bond movie, but it's true, and it's far more sinister than snakes on a plane.

There are items on new tools and technology including clever robots and clever traps.

It's been a busy summer.

Noho ora mai

Stay well, look after yourself

Chris Macann
Editor

A note from the Executive

Sharing our stories

The NZBI Executive Committee met on Wednesday February 15 2023. Some members were on the verge of travelling to Wellington for the planned in-person meeting before we agreed to hold the meeting on-line as a result of disruptions associated with Cyclone Gabrielle. This was an unprecedented weather event and we all felt for our colleagues across the North Island, in particular Hawke's Bay and Tairāwhiti. It just goes to show how important adaptability is no matter what sector you work in. Planning is well underway for NETS2023 at Paihia. I hope as many of you as possible can plan early to make the trip to Northland. The theme for NETS2023 is: 'Toitū Te Whenua, Toitū Te Moana, Toitū Te Tangata - If the land is well, and the sea is well, the people will thrive', recognising the critical role that biosecurity plays in protecting the taiao or environment. In keeping with the theme, we encourage submissions for presentations on how members are working with local communities or mana whenua to improve the health of Te Taiao or protect what our people value from the impact of invasive species. I also encourage members to share their stories through Protect Magazine. The magazine is for members to share their stories. Lastly, the Executive Committee is always keen to hear suggestions from members about how NZBI can continue to foster great networking opportunities to those working across the biosecurity system. Keeping connected is key. Keep up the good work.

Jono Underwood
President, NZ Biosecurity Institute

Thanks Paul Champion

Long-time Institute member Paul Champion retired at the end of 2022.

At the time of his retirement Paul was Principal Scientist, Freshwater Ecology at NIWA.

Colleagues, friends and family gathered in Hamilton in December to celebrate his long service to the sector and to the Institute. Earlier the Central North Island Branch presented Paul with an NZBI Fellowship.

Paul was well known for his quizzes and occasional alternative award presentations at NETS gatherings.

"I joined the Institute of Noxious Plants Officers in 1988. Back then you could only be a full member if you were a practising NPO (there were well over 150 of them, and few, if any, are still practicing in biosecurity roles) so I was granted Associate Membership."

Since then, Paul has presented at almost every NETS conference.

Paul was the Central North Island branch representative on the Executive Committee for a significant number of years and the National Vice President from 2000 to 2003. Paul has played key roles in organising NETS conferences and presided over at least one organising committee, in Hamilton. He has been involved in preparing submissions to MPI and the government on behalf of the Institute, including the development of a Biosecurity Strategy for New Zealand. Paul has been awarded the Institute's Peter Ingram Award for excellence in sharing knowledge in the field of pest plants.

Paul said he is proud to have been associated with the transition during which the animal pest and plant pest sector organisations combined to become the NZ Biosecurity Institute.

Paul Champion addresses NETS2016 in Auckland.

Protect cornered Paul, and asked him for a few thoughts on his career, biosecurity in general, and the Institute in which he has played a major part over so many years.

The evolution of the NZBI

It is great to have seen the development of the Institute from a gathering of NPOs (which was always a great opportunity for me to catch up with officers that I worked with across the country) to an all-inclusive who's who of biosecurity in NZ, including policy makers, management agencies from central and regional government, educators, researchers and field staff. From a research perspective, NETS is the go-to conference of the year and NIWA has consistently sponsored these over the years. I really want to acknowledge the efforts of the one and only Lynley Hayes who was the major driver of this transformation.

People and presentations

I have enjoyed working with a wide range of folk, especially those who share a passion for the environment and a commitment to protect it from the ravages of invasive pests.

My favourite NETS presentation was given by Kate Blood, a weedie from Victoria and guest presenter at NETS way back in the early 2000s. She talked about how technology was going to transform biosecurity management into the future. A truly inspirational talk, with many of the changes Kate spoke about now being reality.

NETS, at least pre-Covid NETS, always attracted some very interesting overseas speakers and also kiwi entertainers such as Ruud Kleinpaste and Annie Whittle. In my role as unofficial MC at conference dinners, I've enjoyed having a joke and chat with them. Just about every one of them was really impressed with the energy and enthusiasm of the biosecurity crowd.

I've loved being part of the Peter Ingram Award presentations, Peter and I had some great discussions early in my career; he was a great mentor. My favourite would have been giving the Award remotely to Dr Ian Popay, who wasn't able to travel at that time, relaying the proceedings to him through my cellphone.

> "I joined the Institute of Noxious Plants Officers in 1988. Back then you could only be a full member if you were a practising NPO (there were well over 150 of them, and few, if any, are still practicing in biosecurity roles) so I was granted Associate Membership."

The work

I love communicating our research findings and seeing them incorporated into the development of policy and management directions, also providing strategic guidance to central and regional government agencies and other resource managers. Examples include providing the science behind national pest management strategies such as the National Pest Plant Accord and National Interest Pest Responses, a freshwater biosecurity strategy for the Department of Conservation, and regional initiatives such as regional pest management plans, best practice for aquatic weed management and region-wide lake protection strategies.

I've essentially done the same job for over three decades, so I would say I've enjoyed all aspects; the subject matter, field work, and conferences in equal measures. I have enjoyed the variety in the job and opportunities to visit almost all of the country, well the wet bits of the country anyway. I'm very proud of the achievements my team at NIWA have made working alongside various individuals in management agencies. The national, region wide and whole of waterbody aquatic weed eradication programmes are pretty well unmatched anywhere else in the world.

The main challenges have been securing sufficient funding for research and the legislative hoops you have to jump through to get things done in our aquatic environment.

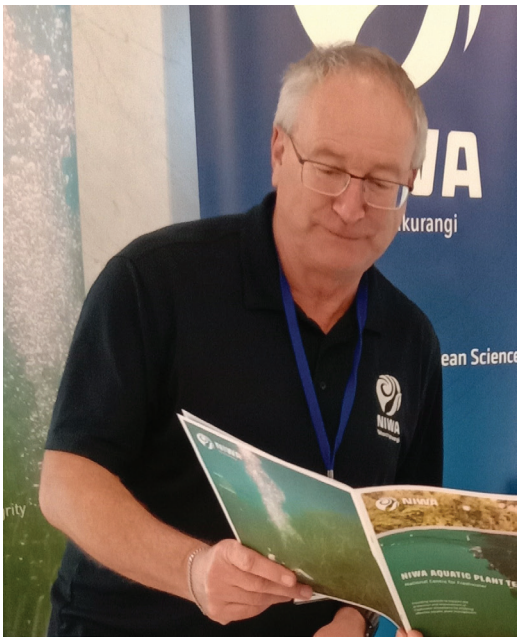
Journeys

I've been lucky to have several overseas trips as part of my career at NIWA. Standouts include several trips to the USA, to Aquatic Plant Management Society conferences. The atmosphere and collegiality there are the nearest thing I've experienced to NETS, but with the narrow focus on aquatic weeds. Field visits were always the highlight and gave you a real appreciation of weed impacts and provided an incentive to stop similar issues arising in NZ.

Probably my most memorable trip was to the various small dots in the Pacific Ocean just north of the equator that make up Micronesia and Palau. We were invited to join a team assessing the risk of new pests on these islands resulting from increased deployment of US troops to the region. The impact that brown tree snakes (accidentally introduced from Papua New Guinea in WW2) had on Guam's birdlife obviously was the driver of this work to ensure there was no repeat in the 2000s.

Memories of NETS

I get a lot of pleasure seeing other biosecurity warriors progressing through their careers. NETS may be a forum where you are preaching to the converted but I've always come away from them feeling really inspired and ready to meet the next bunch of challenges.



Paul Champion making things clear at NETS2022 in Christchurch.

They are all memorable. Probably the most stressful was organising the Hamilton 'Touch, Pause, Engage' NETS. However, a great local committee and the indefatigable Carolyn Lewis made it a great success.

Shantytown on the West Coast was definitely my favourite venue which included a Trans-Alpine train trip to the wild west, biosecurity style.

Technology

I joined the forerunner of the NIWA Aquatic Plant team in 1988. I remember the first Apple computer we got not long after that, shared between our team of six. Photos had to be taken with non-digital cameras, sent away to be developed - hopefully getting the money shot rather than one out of focus. GPS's in those days were the series of road maps or topographic maps, with stopping and asking for directions severely frowned upon. Written communications were equally as problematic. Gee I'm sounding like a real old-timer!

It's hard to believe how technology developed over such a relatively short time has completely revolutionised how we do things. It has definitely made things easier.

Thank you Vicki Wilson

In February a familiar face for NETS-goers retired.

Vicki Wilson has left the Department of Conservation after 17 years of service.

Outside of her DOC role, Vicki worked with NETS organiser Carolyn Lewis and organising committees to ensure the smooth running of the conferences over several years, providing much needed support for the conference organiser and delegates.

Here is a tribute prepared by her colleagues.

Throughout her time with DOC, Vicki has provided administrative support to many DOC science and technical advisor teams. Whilst those of you who work for DOC will know Vicki in her administrator role, she has worn a number of hats over the years to support conservation and biosecurity.

What you may not know though is that 'our Vicki' has been supporting the Weedbusters programme for many years. Over many years, Vicki made sure that the national coordinator, regional coordinators, and community groups got materials and resources they needed for their Weedbusters efforts on the ground. Vicki was the 'safe pair of hands' that kept things going behind the scenes, so that the rest of us could continue to make a difference in our weed awareness, engagement and control work throughout New Zealand.

More recently Vicki's enthusiasm and passion for Weedbusters has kept the programme alive through its hiatus and transition, and like a nurse with a defibrillator in hand she worked to keep 'Woody' alive.

Vicki Wilson.

Vicki has been the voice on the end of the line for staff wanting Weedbusters products, co-ordinated and sought out answers for community groups asking weedy questions through the info line, worked to keep the website relevant and updated; minded and tracked the four Woody Weeds around the country, recorded the history of Weedbusters NZ and organised Weedbusters committee meetings.

Thank you so much Vicki for everything you have done for conservation, Weedbusters, Woody Weed, biosecurity, and NETS.

We will miss your kindness, generosity, passion, and enthusiasm.

Who is Woody

Woody Weed is the mascot of Weedbusters. Many a dedicated biosecurity staffer has donned the teal spandex in the name of promoting the cause. There are four Woodys about the country. Presumably the colour was chosen to make it clear that Woody wasn't a real plant.

Woody makes an appearance at NETS2013 in Hokitika.

What Lies ahead: The New Zealand Biosecurity Forum 2022

Auckland hosted the New Zealand Biosecurity Forum 2022 at the end of October.

It was framed around the future of New Zealand's biosecurity system and also about the work underway to refresh the biosecurity system strategy.

It was an opportunity to engage in the early development of the strategy known as Te Mana o Te Taiao - The Aotearoa New Zealand Biodiversity Strategy.

Key themes from the gathering included the place of youth for the future, and the role of Māori in biosecurity .

The Director-General of the Department of Conservation, Penny Nelson, spoke on the interface between biodiversity and biosecurity in which she mentioned the battle against browsers and mammalian predators, and exotic plant species noting alligator weed and the European sea spurge in particular, as well as kauri dieback, wilding pines and didymo.

She said the Biodiversity Strategy and the wide range of actions already underway is a great foundation, "but we have an even bigger opportunity to really join up the Natural Resource Sector on biodiversity and biosecurity".

Dr Chris Locke, Australia's Deputy Secretary of the Biosecurity and Compliance Group, Department of Agriculture, Fisheries and Forestry, said the two countries have been brought much closer together by their borders shutting, and the high tempo virtual work done together to navigate the pandemic. He said it has meant the challenge of the recent foot and mouth issues has been worked into already mature conversations.

He highlighted the joint work underway on things such as investigations to profile and target illegal activities with border agencies, and work to improve biosecurity systems, such as automation, and tapping into industry data sources, and many scientific and technical partnerships such as between our quarantine facilities.

He said Australia's discussions with New Zealand about the challenges of managing *M.bovis* have been particularly insightful.

"Climate change is the most obvious disruptor across our system, creating new vectors and pathways, the effects of pests and diseases, and our ability to respond. We also have shifting trade and travel patterns – which have seen Australia's supply chains increase in complexity.

We need to think creatively about opportunities to do things differently in the future, drawing upon our very strong and enduring partnership," he said.

Between late April and June 2023, MPI will run online workshops with stakeholders. Input from the workshops will help flesh out the objectives, activities and milestones for priority areas. The draft strategy will go to wider public consultation later in 2023.

All about Aliens: International Congress on Biological Invasions

The 4th International Congress on Biological Invasions (ICBI2023) will be hosted in Christchurch from 1 - 4 May 2023.

The Congress will provide a science forum to discuss effective responses to the global challenges and threats that Invasive Alien Species (IAS) present to biodiversity, food production and security in terrestrial, freshwater and marine ecosystems.

Innovation, collaboration, and partnership are the themes. The broad focus is on invasive animals (vertebrate and invertebrate), pathogens and weed species, and spans the biosecurity continuum (pre-border, at-border and post-border), and long-term pest management, including impacts on biodiversity.

Better Border Biosecurity Conference

The Better Border Biosecurity (B3) Conference 2023 is being held in conjunction with the International Congress, on 5 May 2023 at the same venue.

The shortened B3 Conference 2023 will target the broader biosecurity community and will include updates from government, industry, iwi and other B3 partners.

Helping the curious kea: repellent field trials complete

The Department of Conservation reported in December that field trials to test the use of a bird repellent to reduce risk to kea in predator control operations have been completed near Arthur's Pass.

The Department of Conservation and OSPRI are jointly investigating whether the repellent, anthraquinone, can be used to reduce the risk of kea eating 1080 baits during aerial operations. A new method is being tested without the use of animal carcasses to lure kea to the baits, as trialed previously.

About 100 kea have been tracked by radio transmitter over the past six months to monitor their movements and survival. However, results of the trial won't be known until hundreds of hours of video footage of kea interacting with the repellent bait are analysed. This will take several months.

DOC Landscapes Manager Peter Morton says predator control is crucial to stop the decline of kea populations, but unfortunately 1080 also poses a risk to kea, particularly in areas where they have learnt to scavenge from people.

"We chose to trial the repellent technique around Arthur's Pass where kea are at a higher risk of eating 1080 bait due to their exposure to human food.

"Sadly, our monitoring found that seven kea died from 1080 toxin following the OSPRI Otira/Taipo operation in September and four kea died after the DOC Arthur's Pass west operation in October.

"It's too early to know whether the repellent method was effective in this trial. Until the results are analysed in coming months, we won't know whether the kea that died, or other monitored kea, interacted with the repellent bait prior to the aerial operations.

"It's upsetting and disappointing to lose kea, however, we know the kea population in this area will benefit significantly from reduced predation by stoats over the next two years, as will great spotted kiwi and other native species," says Peter Morton.

The benefits to native wildlife are enhanced by the two aerial operations occurring within six weeks of each other, resulting in 73,000 ha where predators are suppressed. The likelihood of predator reinvasion is also reduced.

The remaining radio-tagged kea will be monitored over the next year to see if their survival benefits from the predator control.

The field **trials involved exposing kea to non-toxic bait containing anthraquinone, which makes birds feel temporarily sick, to 'teach' them to avoid 1080 baits.** Audio lures (kea calls) were used to attract kea to 25 'aversion training' sites across the predator control areas, where their interactions with the repellent bait were filmed.

Zero Invasive Predators (ZIP) had trialed anthraquinone in multiple 1080 predator elimination operations as part of Predator Free South Westland, where animal carcasses were used to lure kea to sites where they were exposed to non-toxic repellent bait. DOC had also used this method in predator control in South Westland. The results showed promise, but further evidence was needed on the repellent's effectiveness without animal carcasses, before being adopted more generally, before being adopted more generally.

If aversion training repellent methods are proven to reduce the risk to kea, they will be added to DOC's Code of Practice for use of 1080 in kea habitat.

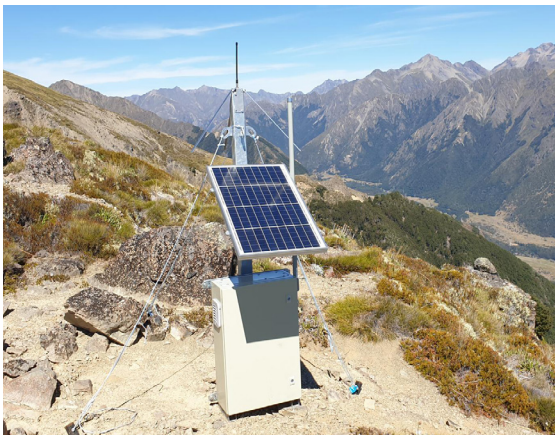
A second repellent, d-pulegone, has also been trialed in non-toxic baits to see if kea dislike the peppermint-flavoured additive. The results are currently being analysed.

Curious kea. Photo Daniel Pietzsch

OSPRI and ASG Tech to lead the way for Possum Monitoring using Artificial Intelligence

OSPRI has partnered with technology innovator ASG Tech to investigate how they can use Artificial Intelligence (AI) to help with their possum control efforts.

Real-time image of a familiar face.



PredaSAT solution in action.

OSPRI has always been on the cutting edge of technology adoption, so it was no surprise that with talk of AI emerging in the early 2000s, they began to conceptualize ideas for how it could be used in their efforts to fight Possums in New Zealand.

In 2020 OSPRI started its relationship with ASG Tech, a technology incubator which works with corporates and government agencies around emerging technologies. Their first collaboration was in early 2021, as part of the OSPRI project to trial 'state of the art' trapping devices to advance possum surveillance and control.

Following the trial, it was agreed that ASG Techs **PredaCAM** units, supported by a number of **PredaSAT** gateways, would be deployed into Rainbow Valley for the purpose of gauging Possum populations in the area following an earlier control activity. The project ran for 8 months in 2022, and the post-trial analysis saw an 84% accuracy for the primary class of interest (Possum). Being only the second deployment into the field of the new AI model, these results are regarded as highly encouraging and provide OSPRI with valuable information.

PredaLINK Solution

PredaLINK is ASG Tech's innovative AI solution to monitor and report on various species. Operational considerations necessitate the need for a reliable, low-cost solution that can be deployed almost anywhere – even in the harshest conditions and most remote corners of New Zealand.

The PredaLINK solution consists of three main subcomponents: **PredaCAM, PredaSAT** and **PredaCLOUD**.

Driven by artificial intelligence (AI) built into the cameras, the **PredaCAM** is trained to identify a target species, where each encounter is logged, and all the intelligent data is collected and reported. For OSPRI's remote rural deployments, the PredaCAM units transmit data using LoRa communications protocol to a satellite-enabled gateway - PredaSAT. ASG Tech also have devices available using other communication protocols, which removes the need for a gateway for data backhaul to the cloud.

A single **PredaSAT** gateway can service more than 1,000 PredaCAM devices. The PredaSAT gateway is normally deployed via helicopter on a geographically high site (top of a mountain) to provide all the IoT communication services for a specific area, which makes it both cost-effective and the most reliable technology option available. The PredaSAT utilises low-orbiting satellites to transport intelligent data to cloud for additional processing.

ASG Tech's PredaCLOUD is where all the intelligent data is collected, processed, and normalised for visualisation on a user-defined dashboard. The system can raise alarms, manage updates, and allow for reports to drill down into device data.

Noting the wide range of potential applications, ASG Techs PredaLINK Solution can develop customised (and species-specific) reports for users to receive data representation in the most usable and meaningful way.

Next steps

Richard Curtis, OSPRI R&D Manager commented, "Using LED lights for lures, PredaCAMs with solar cards can be placed in the bush for extended periods of time without requiring regular servicing. We are really excited about being able to gather consistent, long-term data on possum population density very cost-effectively, to help us plan control programmes and move towards eradication of bovine TB in possums faster."

OSPRI and ASG Tech are continuing their synergistic relationship and collaboration for further projects in 2023.

For more information please visit: www.asgtech.co.nz

Possums are good students

There's never been any doubt that animal pests are pretty smart, and now there's even more proof.

Possums can learn by watching each other according to new research, which showed, for the first time, that possums were more successful in solving a puzzle after they had observed others tackling it first.

Using a $9 dog treat toy, University of Canterbury Masters student Emma Godfrey has conducted research showing, for the first time, that common brushtail possums can learn from their peers.

"As far as we were able to find, this study is the first to have looked into the social learning abilities of common brushtail possums, which is very exciting," Godfrey says.

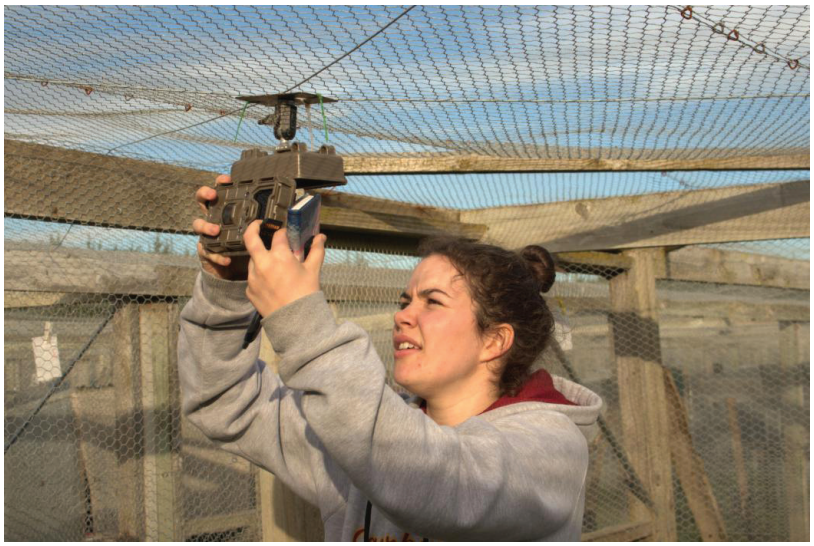
The toy served as a puzzle she says, with five different coloured domes of which two were 'target domes,' containing chocolate hazelnut spread. "We were trying to teach them to open the target domes to get to the rewards as an incentive for learning."

Meanwhile 'observer' possums in adjacent pens watched the 'demonstrator' possums for five nights before getting the chance to solve the puzzle themselves.

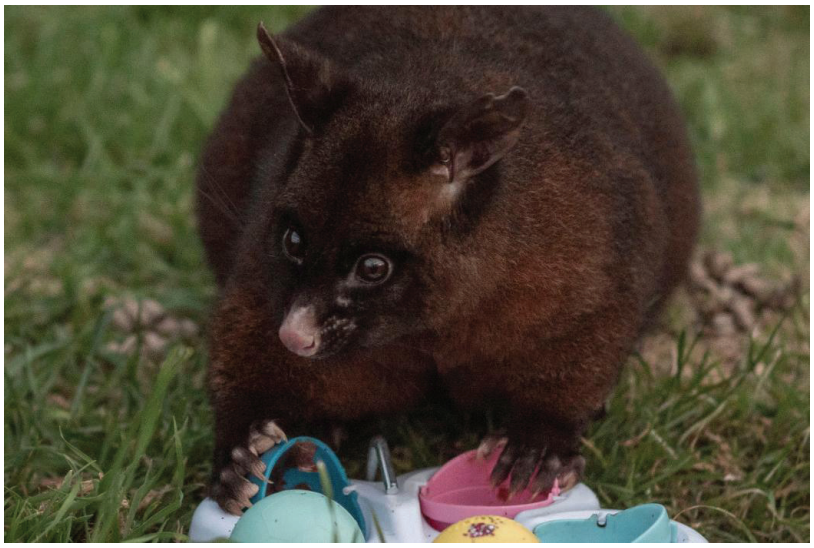
While two of the eight demonstrators solved the puzzle on the first night, and three succeeded on later nights, the possums who watched them did much better. All 15 of the 15 observers succeeded in solving the puzzle on the first night, strongly suggesting they learned from watching the demonstrators.

Although the experiment sounds fun, it has potentially serious implications for pest eradication in New Zealand.

"I think the more we can understand about how possums (or stoats or rats) learn, **this can hopefully provide us with ways of improving current methods or creating new ways of pest control.**



Possum watcher Emma Godfrey.



Possums can learn by watching each other.

Any new knowledge that can help with eradication is important in order to protect our native species," Godfrey says.

The next stage is to explore whether possums can also learn from each other what to stay away from. **"More research needs to be done to test, explicitly, if social learning is helping possums avoid baits and traps."**

The paper, 'Social learning in a nocturnal marsupial: is it a possum-ability?' was published with supervisors Professor Elissa Cameron (Ngāi Tahu) from UC and Graham Hickling from Manaaki Whenua - Landcare Research, in Biology Letters.

This is an edited version of an article supplied by the University of Canterbury.

Fiordland island predator incursion response in full swing

In December the Department of Conservation reported that work to stamp out predator incursions on Te Kākahu-O-Tamatea/Chalky Island and Mauīkatau/Resolution Island was a top priority this summer.

Field staff will be flying and sailing to and from the islands in tight rotations, and a New Zealand-wide network of staff is supporting logistics, planning, mapping, and dog handling to remove invading predators, in a response that began in winter.

A single male stoat continues to elude capture on previously predator free Chalky Island, while eleven rats have been caught so far on Resolution Island.

"We can't afford to slow our efforts on these unique island havens that provide habitats for some of our most critically endangered species, such as kākāpō," says DOC Southern South Island Director Aaron Fleming.

"The response to these predator incursions is bigger than DOC and involves help from government Jobs for Nature projects, RealNZ and Pure Salt. We are working together to ensure the biodiversity gains we've made on these islands over the years are not lost."

Eradicating the stoat and rats is proving challenging and the teams' approach is continually being adapted to meet the changing situations on the islands, says Aaron Fleming.

"Teams of expert trappers, dog handlers and staff on the ground haven't been able to catch all the rats on Resolution Island so a small aerial operation has been undertaken over almost 600 ha to help with the eradication effort.

"The response has also involved creative thinking with the support team recently sourcing 500 metal tea strainers which are perfect for holding peanut butter (much loved by rats) inside the traps. The strainers stop mice nibbling the bait."

The stoat on Chalky Island has been seen on camera, but so far has avoided the 100 stoat traps that have been set.

"Chalky and Resolution islands are home to some of New Zealand's precious little spotted kiwi, Te Kākahu skink, kākāpō, Fiordland skinks, geckos and giant land snails. Protecting these vulnerable species and their ecosystems is critical and will continue to have our highest priority," says Aaron Fleming.

Stoat prints were detected in August on Chalky Island, which had been free of stoats since 1999.

Two rats were found in traps on Resolution Island in July during a standard stoat trap check. While the island has mice and very few stoats and deer, it is free of possums, and up till now was one of New Zealand's largest islands without rats.

> "We are working together to ensure the biodiversity gains we've made on these islands over the years are not lost."

In February DOC provided this update:

"The operation is carrying on into the new year, with a few field teams having deployed on and off the islands. **We have not trapped any further rats on Resolution Island, nor seen evidence of rat activity where the aerial drop took place,** which is encouraging, though there are obviously rats on the mainland close to the island. The stoat continues to evade dogs, handlers and trappers on Chalky, and fresh scat was found on the roof of the bivvy on the island last week [early February]."

Boneseed predator discovered by chance on Christchurch's Port Hills

Boneseed leafroller caterpillar.

A boneseed leafroller caterpillar was recently discovered on Christchurch's Port Hills.

Nature constantly surprises and **the discovery of a foreign moth on the Port Hills may be one of the biggest satisfactions of the year.**

Nobody thought the boneseed leafroller moth and especially its caterpillars escaped being eaten by predatory wasps and ants.

But a chance discovery of the South African caterpillars by Abbie Roper, an Environment Canterbury Biosecurity Officer, changed all that.

To understand why, we need to start with boneseed. It's a South African shrub or small tree with bright yellow daisy-like flowers that escaped from New Zealand gardens.

It quickly forms dense thickets and replaces most natives under 2 metres high. It colonises disturbed sites faster than natives and grows happily in coastal areas, cliffs, sand dunes, estuary margins, roadsides, and inshore islands.

One boneseed bush can produce 50,000 seeds a year.

Local authorities across the country have declared it a pest plant, and it can't be sold, propagated or distributed anywhere.

In 2005, Manaaki Whenua–Landcare Research got permission to release the boneseed leafroller moth as a 'biological control'.

The moth's caterpillars "construct feeding shelters at the tips of boneseed stems by webbing two or more neighbouring leaves together", wrote Angela Bownes, a senior researcher and knowledge broker at Manaaki Whenua – Landcare Research.

"The caterpillars eat the leaves and stems of boneseed from the safety of this shelter. Feeding by the caterpillars kills the shoot tips and terminal leaves, and mature caterpillars feed on leaves further down the stems, sometimes completely defoliating plants, resulting in reduced seed production and vigour, and sometimes death."

In 2007-2008, moths were released in Northland, Auckland, Manawatū–Whanganui, Wellington, Bay of Plenty Tasman and Canterbury.

By 2011, the moth was established in a few sites on the North Island and none on the South Island, where the programme was described as a "total failure".

But in June 2022 year, ECan's Roper was working on the Port Hills above Christchurch when she came across characteristic evidence of leafroller caterpillars on boneseed bush.

Further investigations showed the moths had survived and were doing their thing.

In South Africa, the leafroller produces three generations a year. If that's happening in Christchurch, they could be 40 generations along.

"It can take a long time for biocontrol agents to overcome establishment obstacles and build up to noticeable populations," Bownes said.

She applauded Roper's hard work in discovering the moth.

They are being collected and released at other boneseed sites in the area.

Adapted from an item in the Christchurch Press, December 2022, based on an article contributed by Manaaki Whenua - Landcare Research.

Boneseed. Photo courtesy of Weedbusters.

A Managed Balance: Cruise Ships and Biosecurity

In early January Biosecurity New Zealand and the Cruise Association said they were working together to reduce the number of cruise ships being sent for last-minute cleaning.

Over the past month, four cruise ships had been denied entry or given only restricted access to New Zealand ports because of algal build-up or invasive species attached to their hulls.

A joint meeting was held on January 9th between Biosecurity NZ and the NZ Cruise Association to address the growing numbers of ships needing extra cleaning when they were already on their way to the country.

Association chief executive Kevin O'Sullivan said an increase in biosecurity inspections may be contributing to the issue.

"Nothing in particular has changed, with the exception that there were probably more inspections being carried out this season because of the gap since ships were here last."

During the pandemic, many ships were docked for months or years - giving algae, barnacles and other organisms the perfect opportunity to grow.

Now, a shortage of international cleaning facilities meant some were missing out on regular cleaning.

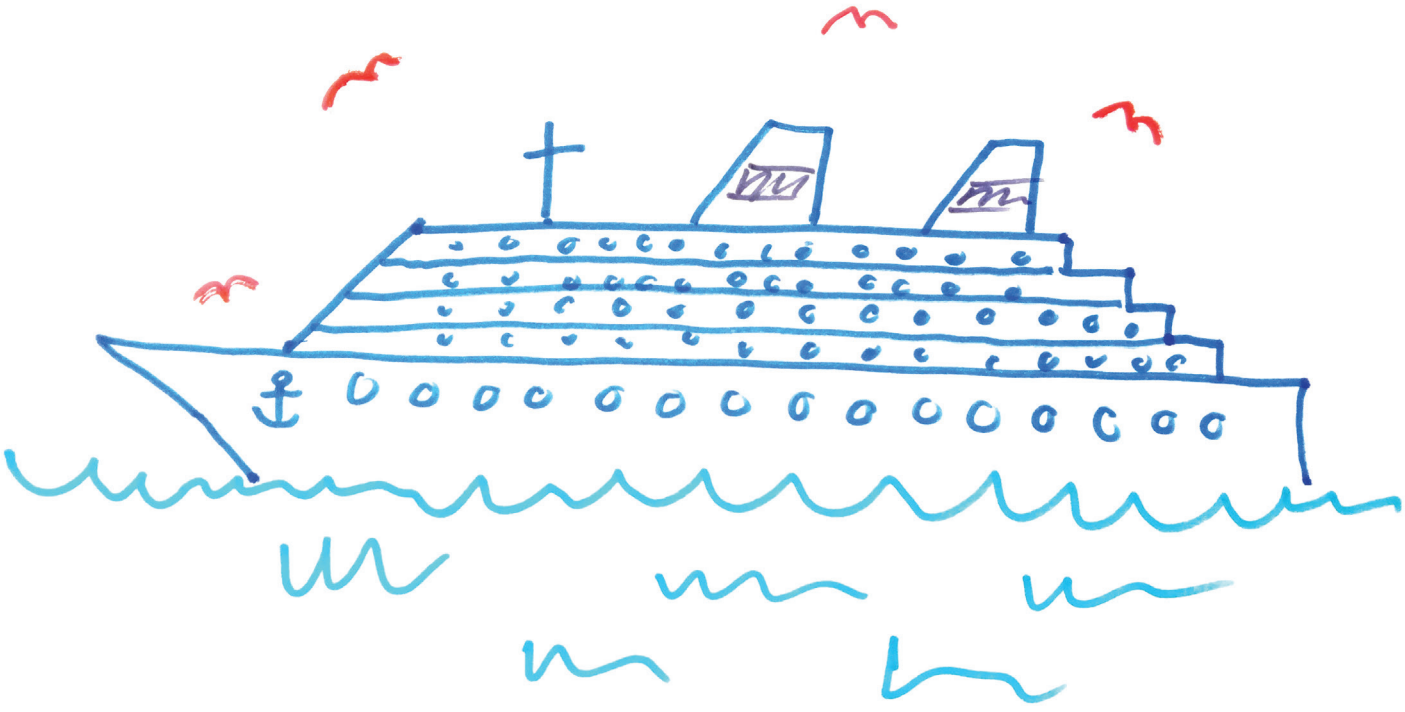
"The protection of New Zealand's marine environment is critically important for the cruise industry and that's especially true in our most sensitive areas. We're continuing to work closely with government agencies about any future undertakings and resolve the issues that are happening at the moment."

O'Sullivan believed last-minute cleanings may be prevented if cruise lines were encouraged to begin inspections well before the season starts.

It said Biosecurity New Zealand will continue to work very closely and actively with vessel operators."

Biosecurity NZ also said in January that biofouling on the underside of vessels is responsible for introduction of nearly 90% of marine pests.

Adapted from a Radio NZ report, January 9th, 2022.



A big biosecurity workload: Cruise ships and lots of mishandled baggage

It's been a busy summer so far for biosecurity officers at the border.

Biosecurity officers screened over half a million arriving passengers in December, reported Mike Inglis, Northern Regional Commissioner, Biosecurity New Zealand.

With borders reopening, the increase in passenger traffic has been matched with a rise in infringement notices for travellers who fail to declare items that pose a biosecurity risk.

Officers issued 511 infringement notices in December, compared with 467 issued in November.

"The $400 fine provides a wake up call for travellers who unintentionally expose New Zealand to biosecurity risk."

Fresh produce was the most commonly seized undeclared item in December (420). Used equipment, such as hiking boots and camping gear, was the next highest (83), followed by meat products (58).

Some of the more unusual airport seizures included an onion that was sprouting in a passenger's handbag and a dead rat detected in a boot inside baggage.

"International travel has ramped up. But we've also processed huge amounts of international mail and parcels. And the return of international cruise ships has contributed to the workload. Our staff have done a brilliant job in very challenging times.

"We are continuing to manage an increase in mishandled baggage that arrives separately from passengers. We have been working with Auckland Airport, ground handlers and airlines to address the issue, and have rostered more staff to do biosecurity screening of those unaccompanied bags and we are successfully clearing that baggage.

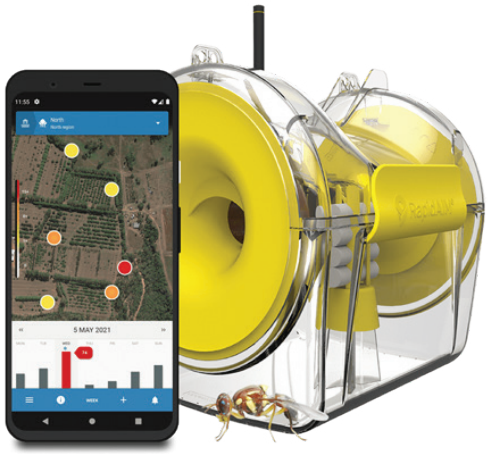
"We have also been working closely with the cruise industry to ensure passenger vessels arrive in New Zealand with clean hulls.

"We know that biofouling on the underside of vessels is responsible for introduction of nearly 90% of marine pests."

Unaccompanied baggage has kept border staff very busy this summer.

Fruit fly detection: Its all about the algorithms

Biosecurity New Zealand's announced in November that its National Fruit Fly Surveillance programme is trialling 60 state-of-the-art traps, with the aim to bolster the detection of exotic fruit fly species.



The RapidAIM smart trap.

"The growth in global trade and travel increases the opportunity for fruit flies to enter the country," said Biosecurity New Zealand's Director of Diagnostic and Surveillance Services, Veronica Herrera.

The fruit fly surveillance programme runs from September to July each year to coincide with the heightened risk of fruit flies entering New Zealand. More than 7,800 traps are currently stationed across the country.

Biosecurity New Zealand has found the Queensland fruit fly (QFF) half a dozen times in surveillance traps and has successfully eradicated it each time.

This season, 60 additional RapidAIM traps have been deployed across 11 Auckland suburbs to target the Queensland fruit fly. The hi-tech traps are on trial from the Australian company RapidAIM. **Sensors in the traps evaluate the behaviour of insects entering the unit. An algorithm then predicts whether it is a Queensland fruit fly.** If detected, an alert identifies the trap location, enabling a field officer to collect the sample within 48 hours.

"The chief benefit of the RapidAIM system is the possibility of an immediate notification of a suspect QFF," Ms Herrera says.

"Biosecurity New Zealand began working with RapidAIM in 2020 to see if the traps were compatible with the New Zealand environment and cellular network. Wider introduction of the traps will be dependent on the success of trials and is some years off. In the meantime, work is ongoing to develop sensors that could detect all economically important exotic fruit flies.

"We want to embrace the new technology to reduce costs and respond to incursions immediately, but **we must be certain that the sensitivity and efficacy is as good or better than what we are currently using.** Our goal is to make surveillance operations more effective and efficient."

The brown marmorated stink bug (BMSB) surveillance programme also got under way in November 2022.

Biosecurity New Zealand will monitor traps at 86 high-risk sites during the BMSB season, which runs from November to April.

Appropriate steps

A review into *Mycoplasma bovis* infection in Wakanui, mid-Canterbury, shows appropriate steps are being taken to remove infection in the area, said programme director Simon Andrew at the end of January.

The review was commissioned in mid-2022 after it became apparent that infection was circulating in a small geographical area despite the use of disease control measures, which have proven successful in other areas around New Zealand.

The review concluded the unusually high amount of infection on the Five Star Beef feedlot could have allowed for airborne transmission that is highly unlikely to have occurred in other areas of New Zealand.

Antibody testing robot

In January Biosecurity New Zealand announce that testing for animal disease is now faster and improved with the arrival of a new antibody testing robot now in action at the Biosecurity New Zealand Animal Health Laboratory.

The $580,000 high throughput diagnostic robot is the first of its kind in New Zealand and will increase testing accuracy and consistency during future biosecurity responses.

"The *Mycoplasma bovis* outbreak gave us useful insights into how our laboratory could increase its capacity during a response. In particular, it highlighted the need for automation," said animal health laboratory manager Joseph O'Keefe.

The clever robot working unsupervised.

"If an exotic disease such as foot-and-mouth disease (FMD) arrived here, our people could need to test some 3,000 up to 7,000 samples a day.

"Automating this process will make the whole process faster for farmers, better for the wellbeing of our people and for the animals involved too."

The Explorer G3 workstation was manufactured in Germany and is designed to test up to 7,000 samples per day for antibodies to FMD and other exotic diseases.

Dr O'Keefe says the robot doesn't need frequent attention or intervention, freeing animal health laboratory staff for other testing and providing stability throughout intense response periods. The robot can even run tests overnight without staff present.

The 750 kg robot took a week to set up, with each part being brought safely into the biosecure containment area. Once it was assembled, the team ran it through stringent testing and calibration to ensure the tests were as accurate as the current manual process. Now that this has been confirmed, the robot has begun day-to-day diagnostic testing.

The machine achieves its efficiency through moving test plates around. Each plate can contain approximately 90 samples and the robot manages up to 40 plates at once. Simultaneously it adds samples and different reagents, washes and incubates the test plates.

Outside of responses, the robot is used to perform antibody tests for surveillance programmes, and for testing groups of animals for import or export purposes.

Exporting Special Agents and Expertise

Over the past 18 months, and despite ongoing Covid-19 travel restrictions, researchers in Manaaki Whenua's Weed Biocontrol group have been able to extend their expertise overseas, working with teams in eight Pacific nations as part of the collaborative Managing Invasive Species for Climate Change Adaptation in the Pacific (MISCCAP) resilience-building programme.

In May 2022, before borders had been reopened, Manaaki Whenua was able to successfully ship a courier package containing African tulip tree (*Spathodea campanulata*) leaves infested with gall mites (*Colomerus spathodeae*) to collaborators in Tonga.

Gall mite Colomerus spathodeae damage on an African tulip tree.

The African tulip tree is considered one of the 100 worst alien invasive species in the world and one of the top 30 terrestrial invasive plants. Introduced to many Pacific islands as an ornamental plant, the trees pose a huge threat to island biodiversity across the region. Native to tropical Africa, this fast-growing evergreen tree infests rainforests, out-competes native vegetation and impacts agricultural production. **Natural enemies are now the only possible solution for reducing the impacts of this tree in many Pacific nations.**

Work to control the African tulip tree is one of many projects being supported by the Global Environment Facility and New Zealand's Ministry of Foreign Affairs (MFAT) to better manage invasive species in the Pacific. Manaaki Whenua, the Secretariat of the Pacific Regional Environmental Programme (SPREP), and the New Zealand Department of Conservation have joined forces under the auspices of MISCCAP to support Pacific Island countries and territories (PICTs) to take stronger action against invasive species, and thereby build resilience to climate change.

Manaaki Whenua's Pacific Natural Enemies – Natural Solutions (NENS) coordinator Temo Talie said **this shipment was an important milestone for Tonga,** representing the first natural enemy imported to control an invasive plant there since 2008. Although natural enemies have been safely and successfully used to control invasive weeds in the Pacific for more than 100 years, there has been little activity in this space in most Pacific nations in recent years. So, **rebuilding the capability to undertake this critical work in the Pacific has become an urgent task,** which Manaaki Whenua is assisting with.

"The gall mites are a specialist natural enemy of the African tulip tree and form leaf galls known as erinea, which stunt new growth and reduce the invasive plant's competitive ability," says Temo.

After the gall mites were brought to New Zealand from Ghana, via South Africa, in 2016, they were mass-reared in our containment facility in Auckland before being released in the Cook Islands. The mites have established readily on Rarotonga, and have now spread to some outer islands.

Weed Biocontrol technician Stephanie Morton boxing African tulip tree flea beetles to be sent to Rarotonga.

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In 2021, a second natural enemy for African tulip tree was imported into New Zealand in the same manner. **The African tulip tree flea beetle (*Paradibolia coerulea*) was reared in containment in Auckland for a few months before being released in Rarotonga when a travel bubble opened up.** Both the adults and larvae damage the leaves. Monitoring for establishment and impact is ongoing, and more beetles were shipped to Rarotonga in September 2022 to increase the likelihood of success.

It is expected that both natural enemies will be needed to reduce the invasiveness of African tulip tree. The gall mites and beetles have been extensively tested to ensure no other plants are at risk. Great care is undertaken to ensure that all risks, costs and benefits are weighed up before a decision is made by a Pacific nation to introduce a natural enemy in this manner.

While the introduction of both African tulip tree agents to Rarotonga was a world first, many other Pacific nations are now keen to benefit from them too. Following the shipment to Tonga, gall mites were taken to Vanuatu in July. Also, at recent workshops held in Fiji and Samoa facilitated by the Manaaki Whenua team, stakeholders determined the African tulip tree natural enemies to be their highest priority, and work is now underway to gain permission to introduce them to these countries.

Both African tulip tree natural enemies are currently being reared in containment at Lincoln until such time as these Pacific nations, and others, are ready to receive them.

Snakes in the bath

Sounds like a scene from a James Bond film, but it's not. It's way worse than snakes on a plane, and it's true. An Auckland man's plans to take a dip in his spa were paused by a snake hidden in the pool. "I thought that maybe my flatmate had put a snake back there but I took a closer look, and it was too detailed for that." A Biosecurity officer from MPI collected the snake. MPI said the snake had been dead too long to be able to tell exactly what species it was, but that it was non-venomous.

New Zealand **Biosecurity** Institute

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