Pacific INVASIVES INITIATIVE

PII NEWS

DECEMBER 2012

This summary of invasive species management activities undertaken by people and agencies that the Pacific Invasives Initiative (PII) works with is collated and circulated by the PII Team. Contributions are welcome. Thanks to all those who contributed to this one! Feedback is also welcomed - contact either the PII Team (PII@auckland.ac.nz) or the people directly involved in projects. The views expressed by authors are not necessarily those of PII. Visit our website or find us on Facebook for more information.

WHAT'S INSIDE

Typhoon Bopha and Cyclone Evan

This cyclone season has not started well for the Pacific and our condolences go to all those people, and especially our colleagues and friends and their families, who have suffered from Cyclone Evan and Typhoon Bopha. We hope that the recovery from the destruction will be rapid and successful. Our thoughts and prayers are with you all during this difficult time.

Best wishes to all for 2013,
The PII Team (Souad, Bill, Natasha and John)

UPDATES FROM PII SUPPORTED AGENCIES

Fiji: National Trust of Fiji Invasive Plant Team Activities.

From Baravi Thaman and Savenaca Delai, National Trust of Fiji

The National Trust of Fiji (NTF) was recently represented by Pita Biciloa (Senior Ranger, Yadua Taba Crested Iguana Sanctuary), Savenaca Delai (Senior Ranger, Sigatoka Sand Dunes National Park) and Baravi Thaman (Volunteer project officer) at the PII Invasive Plant Management training course in Apia, Samoa. Following this course, the NTF team decided to put together an invasive plant team tasked with tackling invasive plaat all NTF sites. The following is a short update of the activities conducted by the team at some NTF sites.

Sigatoka Sand Dunes National Park

The native vegetation of Sigatoka Sand Dunes National Park is of considerable conservation significance because of the unique sand dune environment and the presence of many species that are uncommon in typical Fijian beach forests. Invasive plants are taking over the native areas and the Park Rangers and the NTF invasive plant team have been busy.

A September follow-up visit (after the training course) from PII project coordinator Bill Nagle, provided an opportunity to assess the success of treatments applied to African tulip (AFT - *Spathodea campanulata*), leucaena (LEL – *Leucaena leucocephala*) and rivina (RIV – *Rivina humilis*) at the Sand Dunes in May, 2011. Using a scoring system of 1-10 (1=completely alive, 10=completely dead) it was observed that out of the 24 AFT trees treated with herbicide (100% glyphosate 560, 6ml/10cmDBH), an average score of 7 was obtained showing that treatment was successful to a certain extent.

RIV had been hand-pulled from two plots and left untouched in two nil-treatment plots. Grass had grown in the hand-pulled plots but in one plot a lot of native seedlings (false sandalwood - *Vavea amicorum,* stinkwood - *Dysoxylum richii*) are growing. Two LEL plots had received cut-stump treatment (sawed at ground level, 100% glyphosate 560 applied around cambium and phloem) and two were left untouched. Grass had taken over, but no LEL regrowth was evident from the cut-stump plots.

National Trust of Fiji Invasive Plant Team (Photo: NTF)

As part of the invasive plant management planning at the Sand Dunes, a meeting in Suva decided on priority areas for restoration based on the remaining native plant associations and the priority invasive plant targets in those areas and across the Park (Table 1). These plants were chosen taking into consideration their invasiveness category, how well established each of the species are and their concentrations in the priority areas. The NTF invasive plant team was assisted in this work by Randy Thaman and Shingo Takeda from USP and Bill Nagle from PII.

Seedlings growing in RIV plot (Photo: Savenaca Delai)

The NTF invasive plant team assisted the Park Rangers with the on-going invasive plant management work at the Dunes on the 30th of October. The focus of the work was to continue treatments on AFT trees that have established themselves well in a few areas within the park. This species has proven to be a serious invader and the Rangers have taken it upon themselves to ensure that this problem is controlled to zero density within the next three years. The team used the cut-stump method to treat 83 AFT plants (trees <10cm DBH sawed off at ground level and 120g/kg glyphosate salt applied as a gel with blue marker dye), uprooted 78 AFT seedlings and treated a further 59 AFT plants using the hack-and-squirt method with the herbicide glyphosate at 100% concentration (glyphosate 450 at 3ml/10cm DBH applied with an applicator).

AFT treatments at Sigatoka Sand Dunes, National Park. Immature trees (<10cm/DBH) are treated with cut-stump method. (Photo: Savenaca Delai)

Another invasive plant found throughout the Park is spiked pepper (PPA - Piper aduncum). 53 seedlings had been hand-pulled in August and November and a large tree was treated with glyphosate gel during the follow-up visit in September. Prior to that, 250 seedlings had been hand-pulled in 2009.

Table1: Invasive plants selected for control to zero density at Sigatoka Sand Dunes National Park.

Target species across the Park			Additional target species at priority areas		
TLA^	Species	WRA score*	TLA^	Species	WRA score*
COL	*Antigonon leptopus*	19		*Albizia lebeck*	7
	Asparagus setaceous	13	IVG	*Coccinia grandis*	21
	Asystacia gangetica	12	LEL	*Leucaena leucocephala*	11
	Centrosema pubescens	11		*Passiflora foetida*	26
	Derris malaccensis			*Passiflora suberosa*	12
	Gliricidia sepium	-3	PPA	*Piper aduncum*	18
MEP	*Merremia tuberosa*	18	RIV	*Rivina humilis*	11
	Passiflora edulis	6			
	Passiflora laurifolia	6			
	Ricinus communis	21			
SMS	*Samanea saman~*	4			
AFT	*Spathodea campanulata*	14			
	Stictocardia tiliifolia				

^ Three Letter Abbreviation (used in unique identification)
* From Pacific Island Ecosystems at Risk (PIER) website
~ In outer dune areas

A good start has been made on invasive plant management at Sigatoka Sand Dunes National Park and the NTF invasive plant team wants to continue with the programme and see the remnants of native forest restored and enlarged.

Yadua Taba Crested Iguana Sanctuary

Herbicide trials for the highly invasive plant LEL were carried out on Yadua Taba on 24th October 2012 by the invasive plant team under the supervision of the Project Officer Jone Niukula. These herbicide trials are part of the wider Yadua Taba invasive plant project in an attempt to establish the most effective and economical method for the control of the LEL species on the island. The results obtained from these treatments should assist in finalizing the feasibility study for invasive plant management on Yadua Taba.

AFT treatments at Sigatoka Sand Dunes, National Park. Mature trees were treated with hack-and-squirt method a year ago (Photo: Savenaca Delai)

A total of 270 individual trees were treated under three concentrations (100%, 75%, 50%) of the herbicide glyphosate (glyphosate 450). Each concentration was further divided into different application rates depending on the tree diameter at breast height (DBH) (1ml, 2ml, 3ml/10cm DBH). A total of 30 trees were treated in each class and were marked with different colour flagging tape, to distinguish between concentrations. The rate was indicated by a number written on the flagging tape.

Constant monitoring of the treated trees was carried out by the ranger and preliminary results were observed 13 days after initial treatment. For trees treated with 100% and 75% total defoliation was observed. For trees treated with 50% some dying leaves were still attached to the trees growing in areas of shade. Full death of all trees in all categories was observed after 35 days. Due to the isolation of the trial site, observations were done on ranger patrols therefore dying time may be a few days less than reported, which is favourable.

The herbicide trials have proved successful overall, however the results show that a further reduction in herbicide concentration is possible. Therefore in addition to on-going LEL treatments, further trials will be conducted in the area of concentration, in order to economise on use and minimize the amount of herbicide entering into the environment.

LEL herbicide trials at Yadua Taba to determine the most effective and economical method for control. Flagging tape marked with a specific number indicated what rate was to be used on the tree (Top). The Hack-and-squirt method was used (Bottom) (Photos: Baravai Thaman)

New Caledonia: Feasibility Study for the management of the red vented bulbul.

From Fabrice Brescia & Alexandre Thouzeau, Institut Agronomique néo-Calédonien

The red-vented bulbul (*Pycnonotus cafer*) was introduced intentionally to New Caledonia by the release of pet birds from Nouméa, the capital, in 1983. Within 30 years it spread approximately 30 km north and south of its introduction area. Fortunately, up until now, bulbuls appear to remain close to human activity and have not been found in native forests.

Nevertheless, it has been found to adapt to a wide range of different habitats, and more isolated sightings were recently reported in the far north of New Caledonia (more than 400 km from Nouméa). Bulbuls are in full expansion phase in the invasive process and are not yet present on the islands: the coral island of Isle of Pines (in the extreme south) and also the Loyalty Islands (Ouvéa, Lifou and Maré).

Bulbuls are known, in areas where they have been introduced, to be a pest of crops but are also responsible for the dispersal of invasive plants. In New Caledonia, bulbuls impact on crops (e.g. lychees, oranges, mandarins, tomatoes, strawberries, eggplants, flowers) and on biodiversity (predation on clutches of other birds) have been recorded.

A programme for the management of bulbuls was started in 2012. A technical committee composed of several members, from scientists, institutions in charge of environment and agriculture, fruit grower associations and the local bird society was created. A management plan is under development and a feasibility study has been initiated in late 2012.

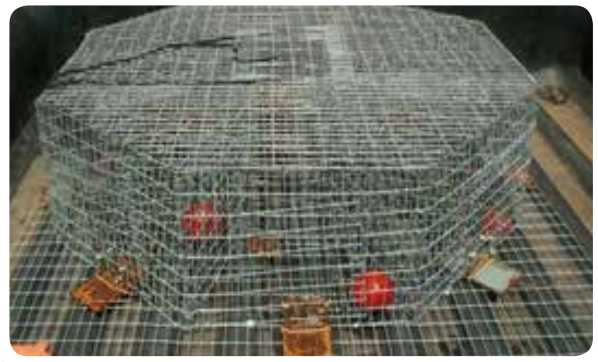
This feasibility study was developed according to recommendations identified in the PII Project Process and PII Resource Kits and was also enriched by discussions held at the Invasive Bird Management Workshop organized by Durrell Wildlife Conservation Trust, PII and Landcare Research in Samoa in July 2012.

The project aims to stop the spread of the red-vented bulbul in New Caledonia by live trapping, in order to reduce damage on crops and biodiversity. Particular concerns and objectives are being pursued to: prevent their introduction to islands where it is not yet present; stop them spreading north and south; control the species in areas known to have high densities (Nouméa); and to reduce damage to crops (and biodiversity).

Trapped bulbuls maintained in captivity to serve as decoys to increase attractiveness of traps (Photo: Fabrice Brescia)

The first step in the feasibility study is to test different live traps and baits to evaluate the feasibility of catching birds. A multi-catch trap used in the French territory of La Réunion (Clergeau et al. 2002) for the management of the red-wiskered bulbul, (*Pycnonotus jocosus*) and also the Pee Gee's Myna trap, are currently being tested

The first bulbuls were captured in October 2012; they are being kept in captivity and are intended to be used as decoys to increase the attractiveness of traps. Different baits have been tested and tomatoes appear to be quite efficient.



The multi-catch trap used in La Reunion for the Red-Whiskered bulbul (Top).
The Pee Gee's myna trap tested for bulbuls (bottom).
(Photos: Fabrice Brescia)

As of November 2012, mapping of the distribution of bulbuls is being established from bird counts in order to evaluate their invasiveness. This will also assist with the trapping to stop the bulbuls spreading. Meanwhile, posters are being produced to provide awareness of the species. The aim is to record new areas where the bulbul may be present, its impact elements of ecology, and prepare for an early eradication of bulbuls as soon as they are detected in new areas.

Reference: Clergeau, P., Madon-Dalger, I. & Georger, S. (2002). Mise en place d'une gestion intégrée d'un oiseau ravageur des cultures à la Reunion. Ingénieries, 30 : 71-80.

Samoa: Invasive Species & Forestry. From Ministry of Natural Resources & Environment (collated by Elizabeth Kerstin)

The Forestry Division (FD) of the Ministry of Natural Resources and the Environment (MNRE) of the Government of Samoa has major projects underway that all have an invasive species component; Integration of Climate Change Risk and Resilience into Forestry Management (ICCRIF), Forest and Protected Area Management (FPAM) and Samoa Agroforestry and Tree Farming Program (SATFP). Invasive species already identified include silk tree, guava and African tulip. Mynas are also a concern as they are suspected of spreading invasive plant seeds.

The ICCRIF project is a project for both lowlands and uplands and surveys of local villages have shown that invasive species are a problem for communities. The project area continues inland towards the northern boundary of the O Le Pupu Pue National Park and contains numerous invasive plant species. Merremia (MEP - *Merremia peltata*) is the major invasive vine problem with four tree species: silk tree (SKT - *Albizia chinensis*), Panama rubber tree (PRT - *Castilla elastica*), kerosene tree (FAM - *Falcataria moluccana*) and African rubber tree (ART - *Funtumia elastica*) recognised as needing effective management options. There is work going on to identify ways to utilise some of the invasive trees.

At O Le Pupu Pue National Park, there is a restoration programme under way to repair areas that have been severely damaged by cyclones. Although many people use herbicides in their plantations, most invasive plant management in Forestry areas is done by hand at present. Planting lines are slashed with a bushknife and native trees are planted. Regrowth, mainly MEP and grasses, is hand-pulled or slashed in rings around trees.

Most of the seedlings planted at O Le Pupu Pue National Park are raised in Forestry nurseries. Trees are planted into hard lava rock and a digging-stick is used to open up existing cracks. Native trees are planted at a rate of 25ha/year in rows 5m apart and trees 4m apart within rows. Weeding is done monthly for the first year and 2-monthly in the second year, 3-monthly in the third year, etc. It is expected that native trees will shade out the invasive plants when the canopy closes.

During a PII Invasive Plant Management Training Course follow-up visit Bill Nagle, PII Project Coordinator, was able to observe the many issues facing staff working on the forestry projects. It is hoped that PII will be able work with Forestry Division to progress the invasive species management components of the various projects.

MEP and other invasive plants affecting O Le Pupu Pue National Park (Top). Native seedlings planted at Park as part of the restoration programme (Right). (Photo: Bill Nagle)

Samoa: Mt Vaea Restoration Project.

From Ministry of Natural Resources & Environment (collated by Josef Pisi)

The Parks and Reserves Office of the Division of Environment and Conservation (DEC) of the Ministry of Natural Resources and the Environment (MNRE) of the Government of Samoa continues to make progress in the task of restoring the native forest of Mt Vaea. A major survey had shown that 62% of plants encountered in transects were invasive and 58% of those were from five species: silk tree (SKT - *Albizia chinensis*), Panama rubber tree (PRT - *Castilla elastica*), kerosene tree (FAM - *Falcataria moluccana*), African rubber tree (ART - *Funtumia elastica*), African tuple tree (AFT - *Spathodea campanulata*).

As there are no established 'best practice' methods to treat these plants, other than physically removing the bark, work has gone into trialling different treatments. The first trial used glyphosate herbicide as well as manual ringbarking/stripping but the opportunity for monitoring the trial was limited and results were inconclusive. A second trial investigated three herbicides (2,4D+dicamba, glyphosate, triclopyr – all applied as hack-and-squirt and triclopyr applied as a basal bark spray with diesel) on PRT and ART. This trial was seriously affected by Tropical Storm 'Rene' but good information was gained.

Initial results suggested that the glyphosate treatment was effective on both the small (<20cm DBH) and large (>21cm DBH) PRT size classes and the triclopyr hack-and-squirt treatment was effective on the large PRT size class. Results from the small ART size class were inconclusive, but glyphosate was more effective on the large ART size class. Those results were good news as glyphosate is the least harmful of the herbicides and DEC is committed to using the safest treatments possible in its battles against invasive plants.

Signs of death on ART (Funtumia elastica) from the second of the project's trials (Photo: Bill Nagle)

To try and find out the minimum rate of glyphosate that could be used, a third trial was established after the PII Invasive Plant Management Training Course in May, 2012. This trial used a measured, targeted hack-and-squirt application with applicator equipment rather than a spray treatment. Unfortunately, the trial was affected by the very long dry season which even saw nil-treatment trees suffer some defoliation. Monitoring is continuing and results should be more apparent after the wet season (See PII News, September 2012 for more information).

A July visit from PII project coordinator Bill Nagle, as a first follow-up visit after the May training, provided the opportunity to exchange information regarding the current status of the restoration project and a field visit to the project site instigated new ideas and recommendations for continuing the work on Mt Vaea. As a result it has been decided to plant nursery-grown native trees directly into the existing area despite the fact that most canopy species are invasive.

This will give native trees the opportunity to establish in a protected environment and without competition from invasive vines. Invasive trees can then be slowly removed over time as the natives grow. It was also decided that any treatment used on the invasive trees must kill them slowly so that a light-well is not suddenly opened up as this would encourage fast-growing invasive seedlings and vines and subject natives to attack from pests and diseases.

A project to investigate the best treatment for FAM and SKT was started in August. About 1,400 trees were manually ringbarked/stripped or treated with glyphosate or triclopyr in a targeted and measured hack-and-squirt application. An important part of this project was to plant natives into the area of treated trees which amounted to 200 replanted seedlings. Monitoring of this project is continuing.

A November follow-up visit from Bill Nagle led to discussion on the next steps forward as well as the current status of the project. During this visit, he provided new herbicide injector needles for the backpack targeted application equipment that is used for the operations to kill invasive trees. These injectors are to ensure efficient herbicide application rates for the operation. The tools, as with others PII has supplied to DEC, were received with much appreciation by the staff of the Parks and Reserves section.

An exciting and challenging part of this second follow-up visit was a hike straight up the eastern slope of Mt Vaea. The PII/DEC team was joined by the new SPREP Invasive Species Advisor, David Moverley from New Zealand and the regional coordinator of the GEF PAS Projects for

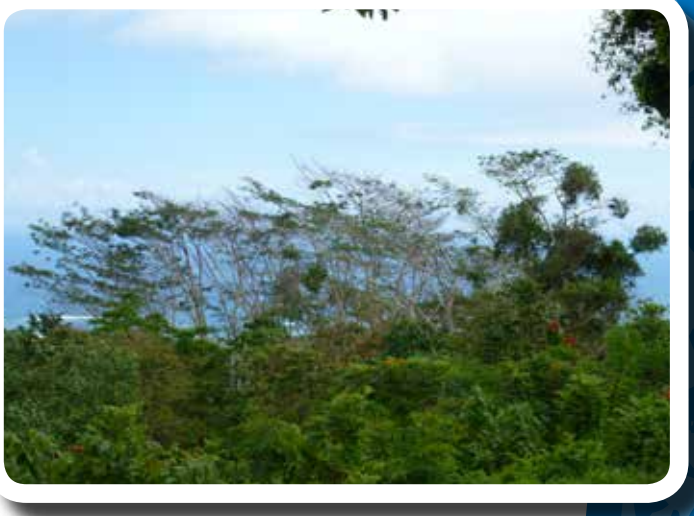
SPREP, Gianluca Serra from Italy. Both people could not finish the hike but they have pledged their support to the Mt Vaea project and the exchange of new ideas and expert advice provided more positive feedback.

An inspection of the second trial site and the area replanted in 2010, where a well-established stand of native trees of up to 4-5m high was observed, was one of the scheduled activities of the day. Some of the trees treated during the trial establishment stage were seen rotted-out and it appeared that treated trees that did not die quickly were then attacked by pests and diseases and were still standing but waiting to fall. More invasive plants of the same species have regrown on the site (particularly the two rubber trees), but nevertheless, it was good to observe the presence of native trees on patches of high invasive coverage. This supports the idea of a succession replanting on the site.

The outcomes of the PII follow-up visits are outlined below;

1. Continue monitoring of the third trial site and the FAM and SKT project until December 2012
2. Continue maintenance of planted areas by hand-pulling vines from stems and cutting off lower branches of replanted trees to avoid climbing vines that hinder plant growth
3. Carry out a new assessment of the second trial site to identify the long-term effect of the treatments on the trees
4. Re-survey the original transects of the second trial site to assess the revegetation status
5. Set up a trapping grid for determining the rat population in the area, as rats may be consuming seeds and be the cause of problems for pollinating native plant species
6. Continue succession replanting starting from areas of good native forest heading towards areas of poor vegetation outlook
7. Prevent clearing or cutting out of the forest for replanting because this will attract more invasive plants to the sites
8. Upon availability of funds, focus on killing mature rubber trees (*Castilla elastica, Funtumia elastica*) first and then deal with seedlings later
9. Develop awareness materials for Mt Vaea Information Centre encouraging public participation in pulling out Koster's curse (CLH - *Clidemia hirta*) and other invasive plants like Night cestrum (*Cestrum nocturnum*) and AFT commonly found along the Mt Vaea tracks

The follow-up trips by PII provided Parks and Reserves staff with much broader areas to consider as they manage invasive species on Mt Vaea and information acquired from the trips will be incorporated in the annual work-plan as part of the Project's list of activities to undertake. MNRE wishes to thank all our partners with great appreciation for their effort to provide technical and other assistance in accomplishing the main objectives of the project, one of which is primarily to restore the forest of Mt Vaea Nature Reserve. This project has involved many people from many agencies over the years and the efforts of all those people are acknowledged. More effort will be required to complete the project and we look forward to continued support.



View from Robert Louis Steveson tomb at Mt Vaea showing FAM (Falcataria moluccana) before (Top) and after (R) herbicide treatment (Photos: Bill Nagle)

Cook Islands: An invasive plant Biocontrol Plan.

From Quentin Paynter, Manaaki Whenua Landcare Research

Much of the Cook Islands' natural habitats and agricultural lands are being threatened by invasive plants. Indeed, there are now more introduced plant species growing in the Cook Islands than indigenous species and their impacts threaten the sustainable development of the island group. In particular, invasive woody vines are smothering and killing trees, causing massive deforestation and replacing the native forest with impenetrable vine thickets. There are concerns that this may have a devastating impact on natural watershed systems on Rarotonga and other islands, and consequently on the economy and quality of life of the islanders.

Biocontrol is an environmentally friendly alternative to herbicide use that could be used to tackle weeds in the Cook Islands. Defined as "the intentional introduction of an exotic, usually co-evolved, biocontrol agent for permanent establishment and long-term pest control" it can suppress weed species permanently, so that the benefit-cost ratio of a successful weed biocontrol programme can be extraordinarily high. Weed biocontrol has a long history internationally and an excellent safety record.

With funds provided by New Zealand's Ministry of Foreign Affairs and Trade (MFAT), two Landcare Research scientists, Sarah Dodd and Quentin Paynter, recently scoped out a 5-year plan for developing weed biocontrol in the Cook Islands. To do this they travelled to the Cook Islands to meet with local experts involved in agriculture, biodiversity conservation and biosecurity.

Workshop delegates in Rarotonga (Photo: Quentin Paynter)

At a workshop these experts provided key information needed to identify the best and worst biocontrol targets. Initially, fifty-two of the worst invasive plants were discussed. Nine were rejected from further consideration as they had some desirable properties (e.g. edible fruit, or cultural importance) so there would likely be opposition to any biocontrol attempts. Two species, the giant sensitive plant (*Mimosa diplotricha*) and lantana (LAN - *Lantana camara*) were also removed from the list because they are already well controlled by biocontrol agents that have been introduced to the Cook Islands.

The remaining 41 plants were ranked by the panel of experts, who scored each plant according to how important they thought it was to control, based on their impacts on agriculture, biodiversity and/or ecosystem processes. The best biocontrol targets were identified using these scores, which were combined with a predicted biocontrol impact (feasibility) score and offset against a score that reflected the cost (effort) of implementing biocontrol on them, using a ranking system developed by Landcare Research.

Feasibility of programmes against plants that have already been biocontrol targets in other countries is relatively easy to determine as successes and failures are often repeated. These programmes are also the cheapest as development costs are minimal. Novel targets were scored according to the presence or absence of plant traits that predict biocontrol success and cost.

Eventually 8 invasive plant species were selected for inclusion in the 5-year plan, including 5 high importance invasive plants for which host-specific biocontrol agents are already available that could be released in the Cook Islands at relatively little cost (listed in Table 1). Work against 3 novel biocontrol targets: red passionfruit (RPF - *Passiflora rubra*), African tulip tree (AFT - *Spathodea campanulata*) and merremia (MEP - *Merremia peltata*) was also recommended.

RPF could be a difficult biocontrol target due to the risk of a non-target attack affecting other Passiflora species that are cultivated for their edible fruit. However, a literature review found strong evidence that some Heliconius butterfly species are adequately host-specific to RPF and readily available from livestock suppliers for butterfly houses. It seems likely that biocontrol of RPF could proceed fairly rapidly and cheaply, without the need for extensive native-range surveys, although host-range testing of the Heliconius butterflies would be required to confirm their host-specificity.

AFT is a major invasive tree throughout the Pacific Region for which biocontrol is predicted to have a medium feasibility. Preliminary surveys for biocontrol agents have been conducted in Ghana, where this tree is native, funded by the Secretariat of the Pacific Community. Considerable further investment would be required before any agents could be released in the Cook Islands.

MEP is considered to be a highly problematic plant that can climb over and smother trees up to 20m tall. There is, however, uncertainty regarding its status in Rarotonga

and throughout the Pacific region. As it was present in Rarotonga when the first European botanists began documenting the flora, it is listed as being native to Rarotonga. However, the rampant spread of the weed suggests otherwise and it could conceivably have been introduced by Europeans or by Polynesians, prior to the first botanical surveys of the Cook Islands. It was, therefore, recommended that the genetics of MEP should be investigated to determine, if possible, how and when MEP colonised the Pacific region and that a biocontrol programme should proceed only if there is convincing evidence that MEP is a recent introduction.

As part of this scoping project Maja Poeschko, of the Ministry for Agriculture in Rarotonga, travelled to New Zealand and spent time with Landcare staff learning more about invasive plant biocontrol. Maja has previously worked on biocontrol for insect pests but is keen to be involved in developing solutions for weeds. Everything is now in place to implement a 5-year programme to develop biocontrol for at least eight weeds in the Cook Islands, just as soon as the necessary funding can be found, and that will be the next task.

Many thanks to MFAT for providing the funds for this project and to all those who attended the workshop and provided valuable information, especially Gerald McCormack and Maja Poeschko.
Contact: Quentin Paynter (paynters@landcareresearch.co.nz)

Table 1. Priority invasive weed species identified

TLAs	Scientific name	Common name	Impacts on
'Repeat' programmes using already tested agents			
	Arundo donax	Giant reed	Agriculture, fire risk
	Xanthium pungens	Cockleburr	Agriculture: cropping and pasture
	Cardiospermum grandiflorum	Grand balloon vine	Biodiversity, forested watershed
MIK	*Mikania micrantha*	Mile-a-minute	Agriculture, biodiversity, forested watershed
	Psidium cattleianum	Strawberry guava	Biodiversity
Novel biocontrol programmes			
	Passiflora rubra	Red passionfruit	Biodiversity, forested watershed
AFT	*Spathodea campanulata*	African tulip tree	Agriculture, biodiversity
	Feasibility study		
MEP	*Merremia peltata*	Merremia	Agriculture, biodiversity, forested watershed

MEP (Merremia peltata) in Aitutaki (Photo: Quentin Paytner)

Hawaii: Detector dogs help vulnerable Hawaii petrels on Maui.

From Steve Sawyer, Ecoworks New Zealand

During September 2012 the Ecoworks Team from New Zealand travelled to Maui, Hawaii to undertake a detector dog search for the Vulnerable Hawaiian petrel (*Pterodroma sandwichensis*).

The week long search at Kahikinui on the summit of Mt Haleakala was part of a mitigation programme for the Auwahi Wind Power Project which is managed by Tetra Tech Consultants from Oregon. The mitigation requirements established by the US Fish and Wildlife Service require that private companies estimate accidental take and the potential impacts of the wind farms on protected species, such as the Hawaiian petrel and Vulnerable Nene goose (*Branta sandvicensis*) and undertake mitigation programmes to enhance the plight of threatened species and their habitats on the Hawaiian Islands.

As part of this project the Ecoworks NZ team travelled to Maui with two specialist seabird detector dogs to search for remnant Hawaiian petrel burrows. Steve Sawyer, with his dog 'Scrag' and Jo Simm, with her dog 'Maddie', arrived in Maui on September 15th and searched the Kahikinui conservation mitigation area for seven days.

Maddie and Scrag specialist seabird detector dogs (Photo: Ecoworks NZ)

In addition to the Ecoworks team, Tetra Tech LLC sent six staff to assist with the search, and to undertake rodent population indexing as well as establishing remote camera surveillance on active petrel burrows.

The main crater on Mt Haleakala holds one of the largest extant populations of breeding Hawaiian petrel. Kahikinui During September 2012 the Ecoworks Team from New Zealand travelled to Maui, Hawaii to undertake a detector dog search for the Vulnerable Hawaiian petrel (*Pterodroma sandwichensis*).

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The main crater on Mt Haleakala holds one of the largest extant populations of breeding Hawaiian petrel. Kahikinui is only two kilometres from the main crater colonies and contains approximately 50 known burrows. However, only a handful of these burrows are active, many of them are historic burrow sites and a large number appear to have been impacted over the years by the presence of invasive species such as cats, rats, goats and mongoose.

Rich Young and Laura Nagle and a new petrel burrow found by Scrag (Photo: Ecoworks NZ)

Mt Haleakala is a difficult site in which to manage a dog team. The dogs needed to wear search and rescue booties to protect their pads from being badly damaged on the extremely sharp basalt lava. Working at altitude, over 3,000 m (10,000 feet) above sea level, was also a serious factor for several of the human search team and one of the dogs during the trip. The heat was also extreme in many parts of the search area, the midday heat exceeded

37°C and the radiant heat from the lava made it even hotter again particularly for the dogs. A lack of shade meant the dogs needed to drink water every twenty minutes and the shady lava tubes became valuable sites to cool and water the dogs. Each dog team consumed over 5 litres of water within the 5-6 hour search period.

During the week a total of nine new and active burrows were located amongst the lava. Two dead Hawaiian petrels were also found. One of the birds appeared to have been killed by a feral cat. Ship rats (*Rattus rattus*) were recorded onsite and goats were seen regularly. Tetra Tech plans on instigating a pest control programme in an effort to improve chick fledging rates at Kahikinui.

The detector dog team flew back to New Zealand in early October and the dogs spent ten days in animal quarantine in Auckland.

Ecoworks has also worked in West Maui with the dog team and is now involved in building predator proof fences and using acoustic attraction to re-establish petrel and shearwater populations on Maui.

If you would like any more information about these projects please contact:
Steve Sawyer at ecoworksnz@xtra.co.nz

Hawaii: Plant Pono - A new online resource for Hawaii and Pacific Islands.

From Christy Martin, Coordinating Group on Alien Pest Species

The Hawaii Pacific Weed Risk Assessment (HPWRA) launched a new website in September called Plant Pono (www.plantpono.org). "Pono" is a Hawaiian word that means righteous, upright, and just, and the site is intended to help people make good planting decisions.

The Plant Pono website showing the Australian tree fern (Cyathea cooperi) which is still being planted as an ornamental even though they are invading pristine native forests like the Alaka`i Wilderness Preserve on Kaua`i.
(Photo: The Nature Conservancy of Hawaii)

The website allows visitors to search the more than 1,400 plants that have been screened with the HPWRA to assess their potential to invade Hawaii and similar Pacific islands. The HPWRA is like a background check for plants, which uses expert plant screeners to research published information to answer 49 key questions about the plant, resulting in a prediction that is more than 90% accurate at identifying the invasiveness of plants. The HPWRA changed from being a research project led by Curt Daehler of the University of Hawaii at Mānoa, and Julie Denslow, now retired from the U.S. Forest Service, to a free service supported by the Hawaii Invasive Species Council.

To find out whether a plant is invasive or not, just type in the common or botanical name, or part of the name, to automatically search the database. If the plant hasn't been screened, submit the plant name to Chuck Chimera (chimera@hawaii.edu) and Patricia Clifford (pattic@hawaii.edu) for an assessment. Over the next few months, photos of each of the plants will be added, thanks to additional funds provided by the U.S. Forest Service.

The website also features the Plant Pono Forum, a moderated page for questions and answers on invasive plants, which will be archived and searchable.

For gardeners in Hawaii, Plant Pono provides planting guidelines on some native Hawaiian and non-invasive ornamental plants as good, safe choices and information on invasive plants and their impacts. For landscape and nursery businesses and garden clubs, this site provides a user-friendly interface for making decisions.

The complexity of State and Federal regulations means that the issue of plant introductions to Hawaii has to be looked at very closely, because once in Hawaii, invasive plants tend to jump their way across the Pacific. Today, with the HPWRA and www.plantpono.org, we have the tools to significantly reduce the importation, use, and spread of invasive plants, and that's "pono".

New Zealand: Predators gone, site restored, what's next? Acoustic attraction, that's what! From Steve Sawyer, Ecoworks New Zealand

Acoustic attraction to enhance seabird populations has been used for a number of years throughout the world. Because most pelagic seabirds are colonial breeders and vocalisations appear to play a major role in their breeding behaviour it is a great tool as well as a cheap tool to use - if you have the right site.

During 2007, Ecoworks New Zealand set up a remote sound system at Young Nicks Head Peninsula, on the east coast of New Zealand, in an attempt to attract grey-faced petrels (*Pterodroma macroptera gouldii)* back to their historic nesting site from where they had been extirpated since about 1931. The sound system was installed during November 2007 and has played seabird calls from dusk until dawn every night since. The results were more surprising than first expected. After only seven months, grey-faced petrels were landing within 25 metres of the speaker system and beginning to prospect and clear out the artificial plywood and drainage pipe burrows which had been installed onsite by the Ecoworks team. Breeding commenced in 2009 and this site now produces 10 chicks per season.

Fluttering shearwater (*Puffinus gavia*) (Photo: Ecoworks NZ)

Our second effort involved adding the fluttering shearwater *(Puffinus gavia*) call to the nightly playback repertoire. During 2009 we recorded the first fluttering shearwaters onsite. This species is now a regular visitor to Young Nicks Head. No breeding has been recorded yet, primarily due to competition for burrow space with the larger grey-faced petrel. We have recently installed a sound system further along the coast, playing fluttering shearwater and fairy prion (*Pachyptila turtur*) calls with adjacent burrow chambers more suited to this species.

Our next aim was to utilise sound attraction in an effort to encourage the little blue penguin (*Eudyptula minor*) to breed at Orongo Beach, Gisborne, also on the east coast of New Zealand. Prior to 2007, the site had been grazed heavily by cattle and no penguins nested there. The site was fenced, planted with native coastal forest species and more intensive invasive species control was started. Penguins began visiting the site to moult, however no breeding occurred. After we installed the sound system in 2009 pairs began to appear and start breeding. We believe the sound anchoring was a pivotal step in getting the species to stay and breed onsite. Monitoring of this species has revealed that 14 chicks have been produced from this site.

Australasian gannets (Morus serrator). (Photo: Ecoworks NZ)

Our next effort involved installing a sound system in an effort to attract Australasian gannets (*Morus serrator*) to the headland at Young Nicks Head. Efforts to attract gannets had been tried many times throughout the world and

had not been successful. This made us very keen to attempt the project. We deployed 18 gannet decoys, built nest mounds with flapjack seaweed and sprayed white acrylic water based paint across the site to replicate guano. We also played the recordings of a raucous gannet colony during daylight hours. The first gannet flew overhead within 60 seconds of turning on the sound system. Within one month we had 45 gannets on the ground amongst the decoys. Chick fledging rates have steadily climbed from 2 chicks in 2008 to 38 chicks fledged during 2012. We currently have over 200 adult gannets onsite and nest building is underway for the 2012/13 season.

Steve Sawyer and Greg Spencer discussing the site for the new seabird predator proof fences at Makamaka'ole, West Maui, Hawaii (Photo: Ecoworks NZ)

Our most recent acoustic attraction project includes working with Greg Spencer at Firstwind Energy at the Makamaka'ole site in Maui, Hawaii.. Here we are constructing two large predator-fenced enclosures and within these sites we will be eradicating invasive species, such as mongoose, rats and cats, and building artificial burrows. We will also be using decoys for nocturnal pelagic Vulnerable Hawaiian petrel (*Pterodroma sandwichensis*) and Endangered Newell's shearwaters (*Puffinus newelli*). We hope to have sound attraction systems in place and operational by May 2013, in time for prospecting Hawaiian petrels arriving in Maui.

Recently we recorded yet another pelagic species at Young Nicks Head, Gisborne. During a burrow inspection by Ecoworks staff we recorded a fairy prion inside a petrel burrow which is a fascinating discovery, mainly due to the fact that we do not play fairy prion calls through the playback sound system. This bird appears to have been attracted solely by the activity of the other two species (grey faced petrel and fluttering shearwater) and the calls from the sound system.

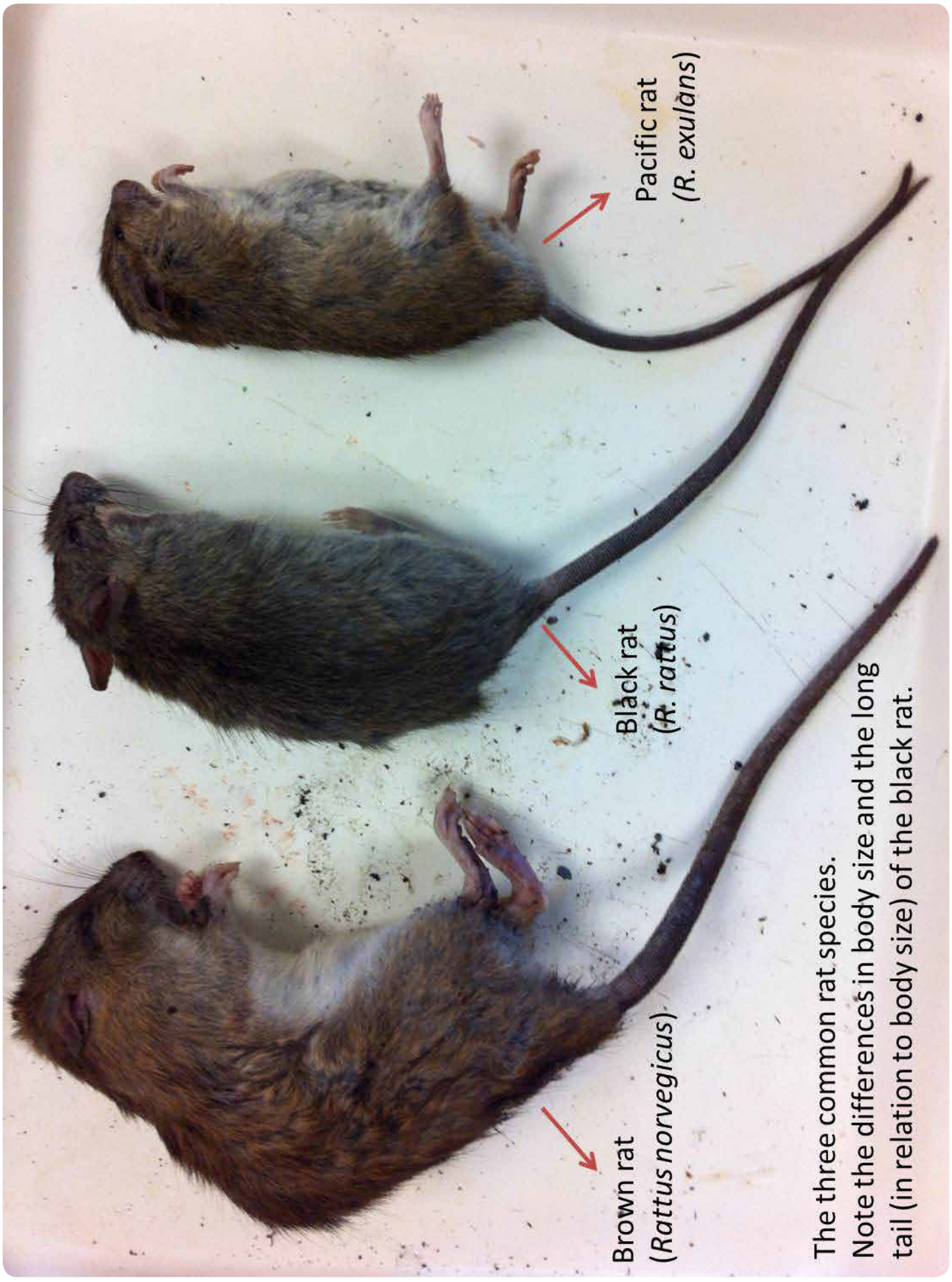
This is an excellent way to attract and anchor seabirds to a conservation site after invasive species have been removed. Prior to establishing the sound systems we had no records of either grey-faced petrel, fairy prion or fluttering shearwater visiting Young Nicks Head at all. All we knew was that petrels were historically present prior to 1931, however no shearwater or prion records existed. It has proved to us that seabirds are prospecting mainland coastal sites for potential nesting sites and that they are not solely philopatric, they can quite easily and cheaply be encouraged to investigate and stay at novel nesting sites. For more information on Ecoworks NZ check out: www.ecoworks.co.nz

Grey-faced petrels (Pterodroma macroptera gouldii) (Photo: Ecoworks NZ)

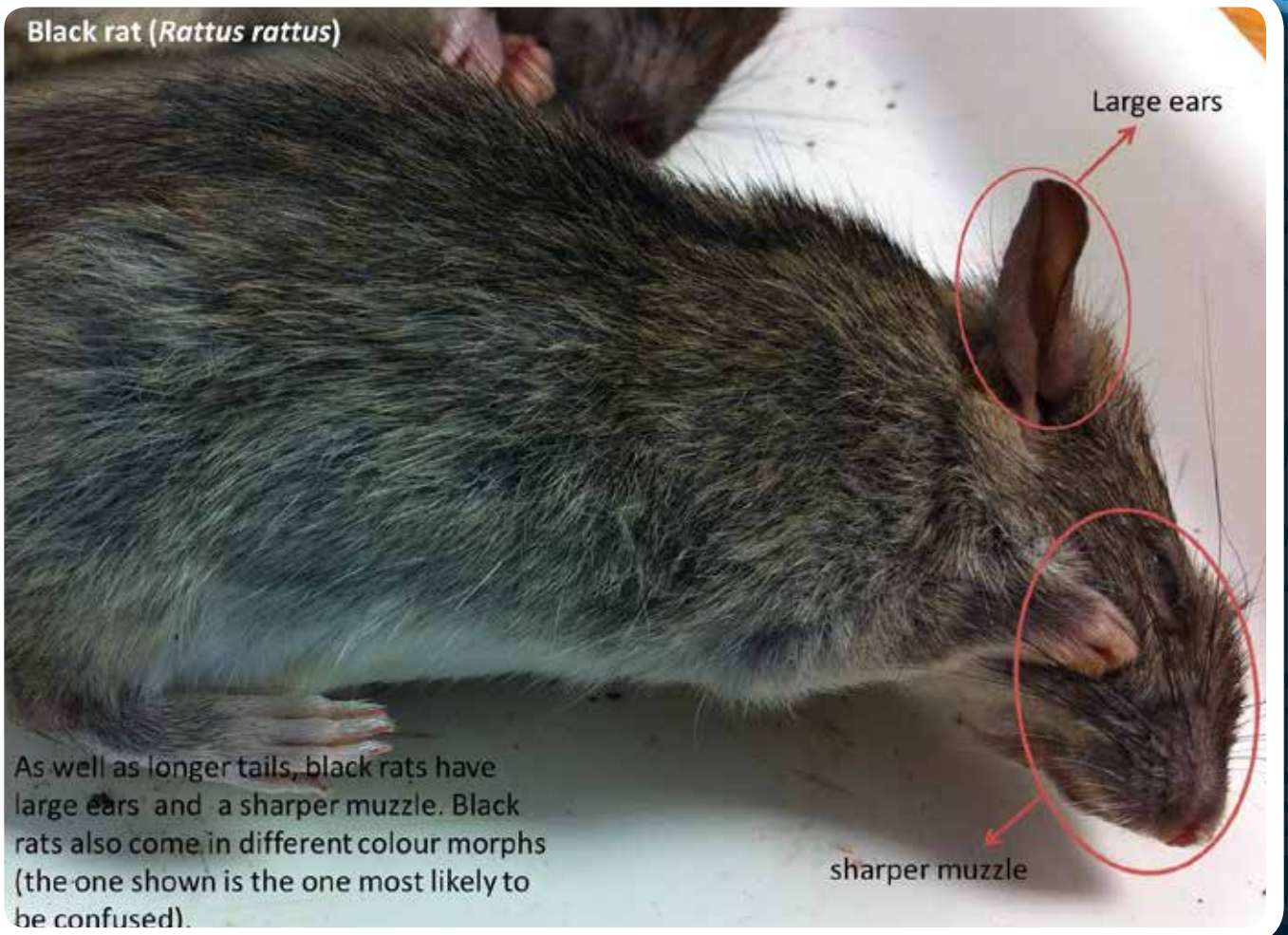
Fairy prion (Pachyptila turtur). (Photo: Ecoworks NZ)

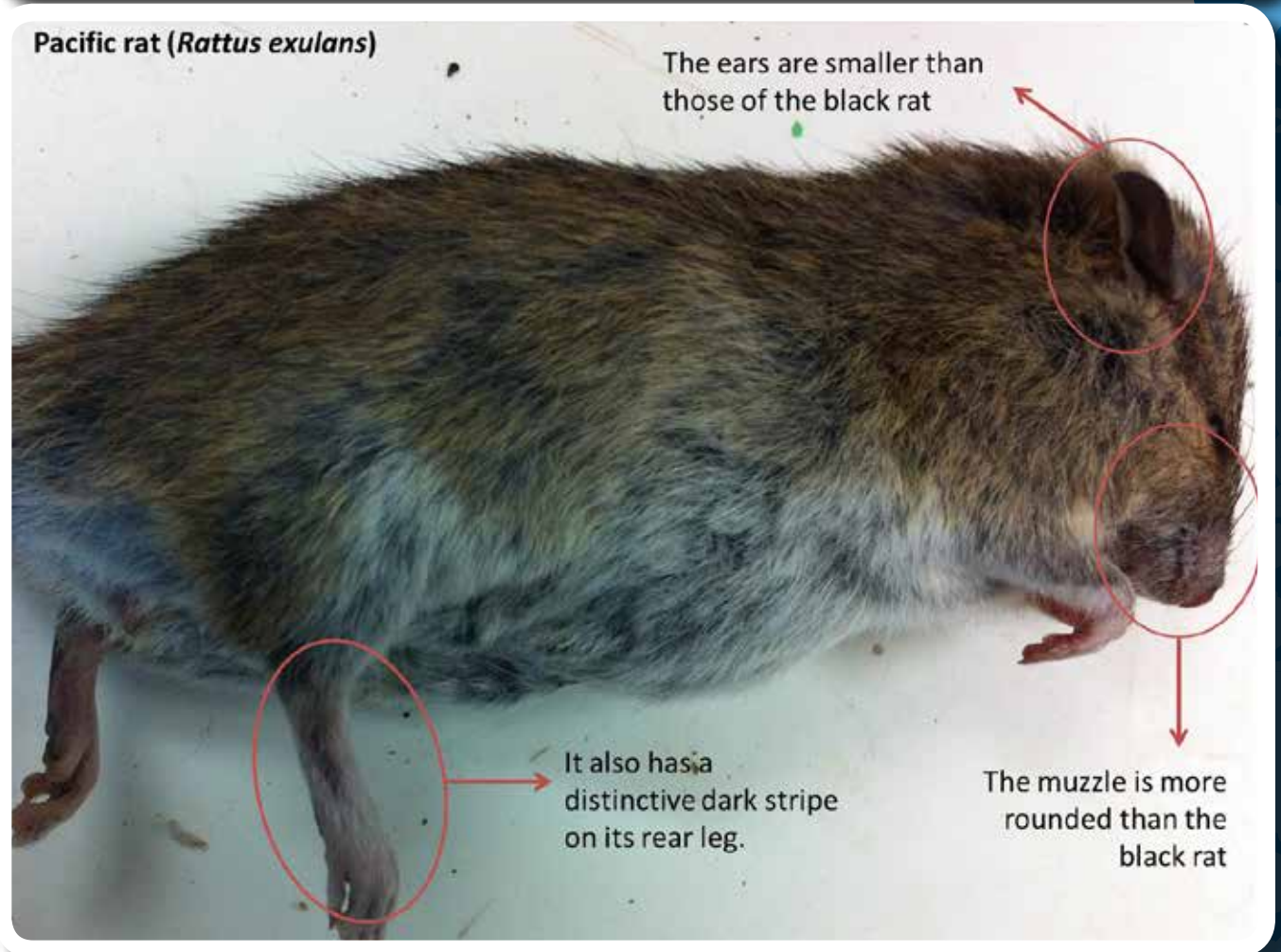
EXPERT OPINION

Rats - what's the diference? Samples supplied by James Russell. Photos: Natasha Doherty



The three common rat species.
Note the differences in body size and the long tail (in relation to body size) of the black rat.





Reference: Guide to the identification and collection of New Zealand rodents < http://www.doc.govt.nz/documents/science-and-technical/rodent-identification.pdf>
Multiple Geographic Origins of Commensalism and Complex Dispersal History of Black Rats <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0026357>

ANNOUNCEMENTS

NEW SPREP Invasive Species Advisor

David Moverley has recently been appointed to the position of Invasive Species Adviser (ISA) for SPREP. David is from New Zealand and has worked with PII on invasive plant management courses across the Pacific.

PII welcomes him to his new position and looks forward to working with him. He has over 20 years' experience in the invasive species and ecological restoration industry and holds a Postgraduate Diploma in Science from the University of Auckland and a Bachelor's degree in Parks and Recreation Management from Lincoln University.

David joined SPREP from Te Ngahere Native Forest Management, NZ, where he worked for almost 10 years in various capacities including project manager, researcher and adviser, and recently as Technical and Business Development Manager. David started official duties at SPREP on 15 October and will be working closely with the Biodiversity and Ecosystem Management Team and looks forward to developing and fostering more comprehensive and effective management of invasive species in the Pacific.

David Moverley, SPREP Invasive Species Advisor (L) with Josef Pisi, Senior Parks & Reserves Officer, MNRE (R) on Mt Vaea (Photo: Bill Nagle)

Post-Graduate Diploma in Endangered Species Recovery.

From Jamie Copsey, Durrell Wildlife Conservation Trust

Durrell Conservation Academy will be launching a new Post-Graduate Diploma in Endangered Species Recovery course in Mauritius in April 2013. This five month course will be run in collaboration with the Durrell Institute of Conservation and Ecology (DICE) University of Kent and the Mauritian Wildlife Foundation. It will give participants the chance to gain first-hand experience of species conservation and monitoring through work in the field teams, as well as theoretical training in conservation biology, endangered species recovery and project management and leadership. By the end of the course participants should be equipped with the skills needed to run conservation projects.

You can download the course profile and information on logistics and costs at http://www.durrell.org/academy/Courses/NEW-PGDip-in-Endangered-Species-Recovery/.
Or contact the course director, Jamie Copsey, on jamie.copsey@durrell.org for further information.

HEAR closing.

From David Duffy, Pacific Cooperative Studies Unit/University of Hawaii

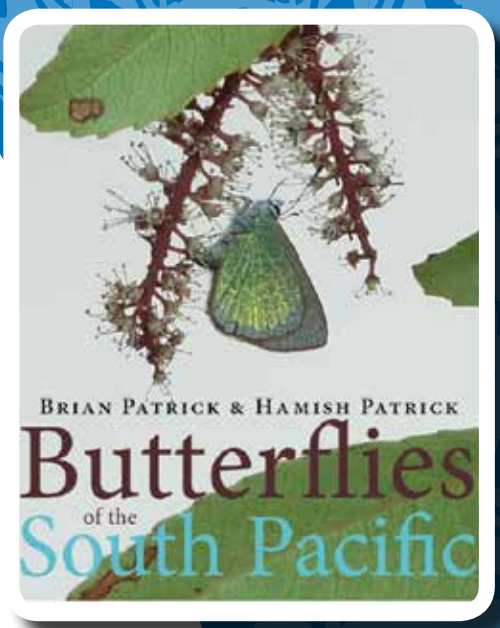
Because of a lack of funds, the Hawaiian Ecosystems at Risk project (HEAR) (http://www.hear.org) may close as soon as December, although there may be enough funds to extend it until February 2013. This will mean several things. The web site will be placed on a new server although it is not clear who will pay for the server or for transitioning the site. HEAR data will not be updated.

The Pacific Ecosystems at Risk (PIER) site (see http://www.hear.org/pier/abtproj.htm) will also become frozen, as will numerous books, reports and papers. As software evolves we will likely lose the ability to access the data. The various list servers will need new owners, otherwise moderated lists will cease to function altogether, while other lists will not be able to add or delete members. The Starr photo collection will remain accessible, but only through a third party site that will charge for access.

We have already lost the original home of the Pacific Basin Information Node (PBIN) website, although it has found temporary refuge. Together with HEAR, this site represents the corporate memory both here in Hawaii and across the Pacific of efforts to sustain our natural ecosystems and agriculture against problems caused by species alien to the islands. HEAR also serves as the glue that holds the community together, providing information and facilitating communication. Let us hope hindsight is kind to this decision.

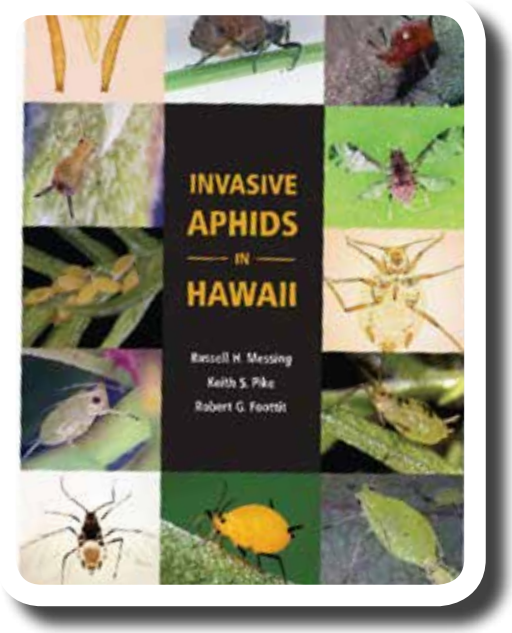
NEW PUBLICATIONS

Butterflies of the South Pacific
Brain Patrick and Hamish Patrick



The South Pacific is a vast expanse of ocean – over 50 million km² – with tiny scattered islands and island groups. From Kiribati, Tuvalu and Fiji in the west, to the far-flung Marquesas and Austral Islands in French Polynesia in the east, this book surveys and discovers the butterfly inhabitants of these tropical islands. For completeness, Hawai'i to the north – where there are many fewer islands in an otherwise empty ocean – is included. To the south and with a much larger land area, lies temperate New Zealand, with a further string of islands reaching into subantarctic waters.

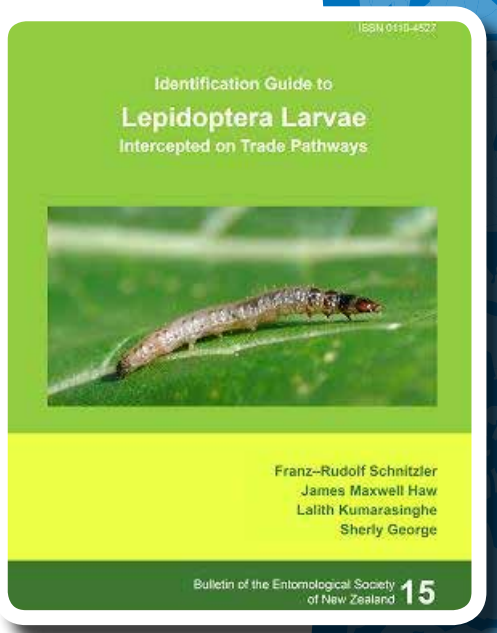
It is easy to misjudge butterflies as fragile flying insects: their distribution across a wild and expansive Pacific Ocean proves otherwise. Long ago they colonised by flight isolated and tiny atolls and they continue to claim new territory. Others came by land bridges when sea levels were lower, to mark out their distribution and perhaps establish new species. More recently, people have made their way into the South Pacific region, and the final chapter considers the impacts of human migration and population growth, and identifies conservation issues



Invasive Aphids in Hawaii
Russell H. Messing, Keith S. Pike and Robert G. Foottit

Invasive Aphids in Hawaii describes over 100 alien species of aphids that can be serious pests of agricultural and native plants in Hawaii. The book's 266 pages provide keys to aphid characteristics and list their island distributions, the plant diseases they vector, and their host plants. Hundreds of color photographs of both live and slide-mounted aphids further enable identification of these pests.

Identification Guide to Lepidoptera Larvae Intercepted on Trade Pathways
Franz-Rudolf Schnitzler, James Maxwell Haw, Lalith Kumarasinghe and Sherly George



This Lepidoptera larval identification guide was prepared using invertebrate interception data collected from fresh produce imported into New Zealand covering pre- and post-border interceptions from 1990—2008. Imports into New Zealand include a wide range of fresh produce from all over the world and these commodities are essentially the same as those imported into Pacific Island countries. The guide provides information on the recognition of common interceptions as well as economically significant pests associated with fresh produce frequently imported into and exported from Pacific island countries. Moreover, the scope was expanded to include some potential interceptions, NZ natives, and other taxa of importance. The keys are simplified using basic terms where possible and contain multiple photographic and diagrammatic illustrations. Thus the guide is an ideal identification tool for training and to assist biosecurity officers throughout the Pacific with informed decision making.

Pacific
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