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CONservation SCIENCE newsletter

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Department of
Conservation

EDITORIAL

A Service provider

When I get telephone calls from Field Centre and Conservancy staff, I often get asked "How much will it cost to get X number of copies of . . . ?" Usually I am able to tell them that there will be no cost — as we are here to service the Department with scientific information and reports. All of our desktop published reports, and most of our printed books are available to DoC staff in Field Centres and Conservancies, at no cost.

What, you may ask, does cost? Well when we are able to provide access to scientific material from other publishers, then some cost will always be involved.

Sometimes we sell books prepared by other sections of the Department and we may have to charge staff for copies of those.

All in all we attempt to make a wide range of Conservation Science available to our staff; at the least possible drain on already depleted budgets.

We are also a service provider to the larger community interested in or using Conservation Science. We make all of our published material available at the most reasonable price we can manage, because we want the public at large to see what they are buying with their taxes and to enable them to make use of the information in their own conservation causes.

We are always interested in hearing from our clients. If you have ideas to make our services better, please let us know!

Kaye Green
Editor

CONTENTS

Conservation Science Newsletter is issued by Science Publications, Science and Research Division, Department of Conservation, P.O. Box 10-420, Wellington. Contributions are invited from our readership, and should be sent to the Editor, at that address.

Department of Conservation
Te Papa Atawhai

CAS PROFILE!

Our forth CAS profile is written by Wanda Vivequin, of Northland Conservancy. She has worked closely with Ray Pierce and gives us a picture of his day-to-day activities.

In the north it's always summer!

Every now and then during the region's 12 month summer, Northland CAS Ray Pierce can be seen signing out for an extended lunch hour or two wearing shorts and clutching a distinctive bat.

Some would say that this foray into the sunshine was to satisfy his insatiable appetite for a game of tennis. He would argue however, in order that science effectively underpins management (and tennis), he was studying the behaviour of urban *Hemiphaga novaeseelandiae* and *Nestor meridionalis,* and not solely to find ways of minimising their disruptive flights during critical parts of a match.

But seriously, the CAS role sees Ray advising on an array of research, monitoring and management projects that span the islands, harbours, dunelake and forest ecosystems of Northland. Research projects have increased in recent years and now include diverse management issues like kiwi recovery, predator control, Kaimaumau wetland restoration, island restoration, dwarf inanga recovery plus many others, some driven by, or supplemented by NPP funding. Universities, local polytechs, CRIs and the public are now also becoming more involved with research and monitoring projects, a desirable trend but which is also demanding of time.

In recent years, more money for management has meant a greater need to develop new and efficient monitoring systems, still in catch-up mode up in some areas. Fortunately several new positions have been filled by graduates thereby easing pressure on CAS and other specialists, for now at least. Monitoring systems for single species and vegetation are now well established in many sites with different management regimes including mainland islands, the least of which is Ray's own 10 acre forest patch.

Trends established through some of this monitoring has been important in finding out the pros and cons associated with a particular management or inaction.

Even the setting up of simple databases have proved their worth e.g. a kiwi deaths database has greatly influenced attitudes and policy on dogs in kiwi areas. Ray ran both the research and advocacy arms of the kiwi programme in Northland, although kiwi advocacy has now become a separate job.

Ray's personal research has seen him work on kukupa ecology, a meaty topic in many Northland circles and not without occasional drama including being accosted for poaching by former Minister of Police John Banks out for a Sunday morning jog!! The evidence, a struggling kukupa being extracted from a mistnet, all very clear in the eyes of the then Minister - his first poaching bust. Results from the kukupa work and forest bird surveys convinced conservancy management and many iwi authorities that it was time to act to protect kukupa. More recent predator work on the Chickens Islands is examining hypotheses of kiore impact on biota and responses following rat removal. Clear trends are now emerging for plants, landbirds and seabird productivity. His choice of study area is the envy of many of his colleagues, although only the more deserving (or persistent?) generally score a trip to these idyllic islands sooner or later.

Prior to coming to DoC in 1990 Ray had an extensive background in ornithology and particular interests in wader ecology and predator impacts

Ngati Wai representative Alan Fleming and CAS Ray Pierce (*right*) processing some of the post-kiore booty on Lady Alice Island.

on birds. Several forays into different corners of the globe have prepared him well for work in Northland. The results of some more recent work are listed below.

Recent Publications

1992. Pierce, R.J. and Montgomery, P.J. The fate of birds and selected invertebrates during a 1080 operation. Department of Conservation, Wellington. *Science & Research Internal Report No.121*.

1992. Clapperton, B.K., Pierce, R.J. and Eason, C.T. Experimental eradication of feral cats (*Felis catus*) from Matakohe (Limestone) Island, Whangarei Harbour. Department of Conservation, Wellington. *Science and Research Series No. 54*.

1993. Eason, C.T., Gooneratne, R., Wright, G.R., Pierce, R.J., Frampton, C.M. The fate of sodium monofluoroacetate (1080) in water, mammals and invertebrates. *Proceedings of the 46th New Zealand Plant Protection Society Conference*: 297-301.

1993. Pierce, R.J. Ecology of the kukupa in Taitokerau: problems and some solutions. *Ecological Management* 1: 44-48.

1993. Pierce, R.J., Atkinson, R. and Smith, E. Changes in bird numbers in six Northland forests. *Notornis* 40: 285-93.

1993. Parrish, G.R. and Pierce, R.J. Reptiles of Motuopao Island, Northland, New Zealand. *Tane* 34: 53-58.

1993. Pierce, R.J. and Parrish, G.R. Birds of Motuopao Island, Northland, New Zealand. *Tane* 34: 59-67.

1994. Pierce, R.J. and Moorhouse, R. Survival of kaka following aerial poisoning with Talon on Whatupuke Island. *Conservation Advisory Science Notes No.87*. Department of Conservation, Wellington. 5 p.

1995. Clout, M.N., Karl, B.J., Pierce, R.J. and Robertson, H.A. Breeding and survival of New Zealand pigeons *Hemiphaga novaeseelandiae*. *Ibis* 137: 264-71.

1995. Miller, P.J. and Pierce, R.J. Distribution and decline of the North Island brown kiwi (*Apteryx australis*

CAS PROFILE!

mantelli) in Northland. *Notornis* 42: 203-11.

1995. Pierce, R.J. and Graham, P.J. Ecology and breeding biology of kukupa (*Hemiphaga novaeseelandiae*) in Northland. Department of Conservation, Wellington. *Science and Research Series No. 91.*

1996. Pierce R J. Ecology and management of the black stilt *Himantopus novaezelandiae. Bird Conservation International* 6: 81-88.

1996. Pierce R J. Family Recurvirostridae (stilts and avocets). Pp. 332-347 in del Hoyo, Elliot, A. and Sargatal, J. (Eds). Handbook of the birds of the world. Vol. 3. Hoatzin to Auks. Lynx Edicions, Barcelona.

1996. Morgan, D.R., Wright, G.R., Ogilvie, S.C., Pierce, R., Thomson, P. Assessment of the environmental impact of brodifacoum during rodent eradication operations in New Zealand. *Proceedings 17th Vertebrate Pest Conference.* R.M. Timm and A.C. Crabb (Eds). Univ of California, Davis.

1996. Clapperton, B.K., Tilley, J.A.V. and Pierce, R.J. Distribuiton and abundance of Asian paper wasps (*Polistes chinensis antennalis*) Pérez and Australian paper wasps (*P. humilis*) (Fab.) (*Hymenoptera: Vespidae*) in various habitats in New Zealand. *NZ Journal of Zoology* 23: 19-25.

In press. Pierce, R.J. and Sporle, W. Causes of mortality of North Island brown kiwi in Northland. *Conservation Advisory Science notes.* Department of Conservation, Wellington.

In press. Robertson, H.A., Colbourne, R.M., Graham, P., Miller, P.J., Pierce, R.J. Survival of brown kiwi exposed to 1080 poison used for possum control in Northland, New Zealand. *Wildlife Research.*

In press. Ogilvie, S.C., Pierce, R.J., Wright, G.R.G., Booth, L.H., Eason, C.T. Brodifacoum residue analysis in water, soil, invertebrates and birds after a large-scale rat eradication operation. *NZ Journal of Zoology.*

KIWI RECOVERY PROGRAMME
BANK OF NEW ZEALAND

Frogs in Brazil

Readers may remember Mandy Tocher, our herpetologist in Dunedin who worked on tropical frogs in Brazil.

Listed below for your interest are some of Mandy Tocher's publications this year from her project on Brazilian frogs:

Tocher, M.D., C. Gascon and B. Zimmerman 1997. The effects of deforestation on a central Amazonian frog community. in: Tropical Forest Remnants: Ecology, Management, and Conservation of Fragmented Communities. William F. Laurance and Richard O. Bierregaard, Jr. (editors). University of Chicago Press.

R.O. Bierregaard, Jr., W.F. Laurance, J.W. Sites, A.J. Lynam, R. Didham,M. Andersen,, M.D. Tocher, A.P.Smith, Virg Edlio M. Viana, , T.E. Lovejoy, K. Sieving, E. Kramer, C. Restrepo and C. Moritz 1997. Key priorities for the study of fragmented tropical ecosystems. in: Tropical Forest Remnants: Ecology, Management, and Conservation of Fragmented Communities. William F. Laurance and Richard O. Bierregaard, Jr. (editors). University of Chicago Press.

W.F. Laurance, R.O. Bierregaard, Jr., C. Gascon, R. Didham, A.P.Smith, A.J. Lynam, Virg Edlio M. Viana, T.E. Lovejoy, K. Sieving, J.W. Sites, M. Andersen, M.D. Tocher, E. Kramer, C. Restrepo and C. Moritz 1997. Tropical forest fragmentation; synthesis of a diverse and dynamic discipline. in: Tropical Forest Remnants: Ecology, Management, and Conservation of Fragmented Communities. William F. Laurance and Richard O. Bierregaard, Jr. (editors). University of Chicago Press.

Award for fossil age discovery

From the NZ Herald of 12 June 1997

WELLINGTON. A senior conservation officer, Bruce Dix, has received the Harold Wellman Prize for a significant fossil discovery at Turakirae Head, at the Wellington end of Palliser Bay.

His 1991 discovery of sub-fossils of intertidal marine creatures has revised thinking about two big Wairarapa earthquakes.

Mr Dix was sneaking up on seals when he had the find that showed a ridge rock, which scientists thought was thrown up by the Hauwhenua uplift in the Middle Ages, was from the 1855 earthquake.

Further, it showed the height of the 1855 uplift was from 6 to 6.5 m instead of 2.5 m.

A zoologist by training, who works for the Department of Conservation's Wellington Conservancy, Mr Dix found the subfossils of tubeworms, barnacles and chitons cemented to the rocks between two of Turakirae's five raised beach ridges.

The sub-fossils would have been noticeably more weathered had they been thrown up in the Middle Ages, so he concluded they must be from 1855.

In 1992 a report from the Institute of Geological and Nuclear Sciences geologist Dr John Begg independently corroborated his theory.

Dr Begg took samples at Turakirae for radio carbon dating, which confirmed the more recent age of the ridge.

Phil Proof!

Phil Thomson is a Conservation Officer in the Waikato Conservancy, who had a 'good' idea that turned into a small business. This is the trap for everyone who dislikes killing!

"I had the idea for the "upside down" bait station as a result of work at mapara where the efficiency of our possum/rat control operations was being affected by bait stations which either allowed rainwater in, turning the bait to porridge, or blocked up with bait as it expanded after taking in water. When these blockages occurred the bait was not available to possums to eat.

So I came up with a design for a bait station which unlike all others before it, had no lid at the top through

which rain could enter, which had a generous overhang to protect the bait in the feeder hole from rain and which avoided most problems other stations had with blockages forming. I also had to make the station stackable to allow many to be carried into the bush at one time. It took nearly a year of trial and error before I was happy with the design. In that time I made several dozen prototypes which I would test out on possums at home and in the field. Often I would have a good idea at 4 in the morning and not wanting to lose the momentum would be down in the garage from 4-7 putting together another version incorporating new ideas.

Anyway the result is that I've come up with a design of bait station which seems to meet the approval of most of the DoC people who've used it and which is very versatile. It has been used to feed rats, possums, wallabies, cats and rabbits. In the case of the last three species, the station is modified slightly by cutting away plastic to enlarge the feeding hole. The bait station can also be modified to prevent access by non target species by pop-rivetting aluminium over the feeding hole to restrict the hole size to allow rat access only, for instance.

Even the unmodified station is shaped in such a way that small passerines, which have been seen feeding from the mouths of other models of bait stations, arn't able to see the bait from above.

For more information and the brochure, contact: Philproof Feeders, Bankier Road, R.D. 1 Taupiri. Tel/fax 07-829-4712

CHOICE OF POISONS

(NB Please read the manufacturers directions on the poison container)

This bait station can be used for a variety of non-toxic feed and poison baits for possums, rats and rabbits.

Talon Possum Bait

Fill the station with 1.5kg of Talon bait every 14-21days. It takes this length of time for a possum to die after it has eaten a lethal dose. If you refill more frequently, you may be wasting bait on possums that already have had a lethal dose.

Using large wax blocks.

The use of weather-resistant baits, such as Talon 50WB may be appropriate in areas of high humidity, or where possum and rat populations are low. In such humid conditions, standard Talon possum bait will absorb atmospheric moisture and deteriate, so only place 300 - 400 grams of possum bait into the station when refilling or change to Talon 50WB,once bait- take starts to slow. Possums and rats can be killed by both Talon possum bait and Talon 50WB rat baits. However, 50WB is twice the price of possum bait.

Campaign Baits

When used, possums will stop feeding after consuming about 15grams of bait, which is a lethal dose. May not be as effective for rat control as Talon.

Flour and cyanide use

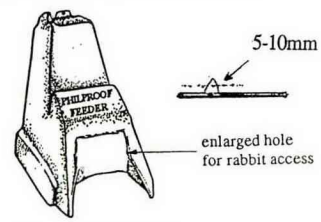
If the possum population is very high, it may be more economical to initially use cyanide. You can then use Talon to "mop up" any possums that may be cyanide-shy. Place flour, cinnamon and icing sugar prefeed in station. When possum activity around the station is high, place flour mix and cyanide on the ground or in "cut-down milk bottle" stations nearby.

1080 Ground Operation

Currently the cheapest way (apart from aerial) of reducing high possum densities . Place 1.5 kg of non -toxic prefeed in the stationsand refill weekly for 2-3 weeks. Then place 750-1000 gms of 1080 (using the same type of pellets and lure as in prefeed) in station for 2-3 weeks before replacing with Talon to kill any possums that won't eat the 1080.

Rabbit Control

For rabbit control use a white bait station with the feeder hole enlarged by 2cm (see diagram below), trimming 5-10mm off the floor ridge will also allow easier access for rabbits. Attach the bait station to a post, 20cm above ground level, where rabbit sign is most common. Place Pindone rabbit bait in the station and drop a few pellets on the ground directly under the station.



Other Philproof products for sale

Removeable attachment for bait station
Ferret/stoat trap covers
Two trap ferret/stoat covers
Ferret/stoat traps (Fenn)

SPREAD THE WORD

If you are happy with the performance of the bait station, please let others know. If you have any problems or can suggest further improvements, please write to the address below.

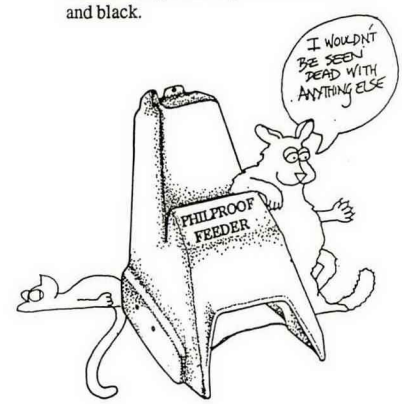
For further information contact:

Phil Thomson
Philproof Feeders
Bankier Road
RD 1, TAUPIRI.
Tel/fax 07-829-4712

PHIL PROOF
BAIT STATION

PHIL PROOF
BAIT STATION

- ☺ Winner of 1995 National Fieldays prototype award
- ☺ Totally Rainproof
- ☺ Easy to use
- ☺ Almost indestructable
- ☺ Suitable for most bait types
- ☺ Minimal bait clogging
- ☺ Stackable
- ☺ Holds up to 1.7kg of bait
- ☺ Made from recycled plastic
- ☺ Tried and proven (more than 10,000 stations now being used by the Department of Conservation and Regional Councils).
- ☺ Available in most colours(subject to min order of 400), currently available in white and black.



NEW BOOKS FROM MANAAKI WHENUA PRESS

Soil Organic Matter in the South Island High Country

Landcare Research Science Series No. 18.

By A.E. Hewitt & P.D. McIntosh.

Soil organic matter has received increased attention in recent years, as it has become widely recognised as a critical and relevant soil component for sustainable management of soils. This book aims to increase the understanding of soil organic matter in high country soils, and to provide a sound basis for land management and monitoring of land use impacts. It is not a detailed text book on soil organic matter, and should be regarded as an introduction to facilitate further informed enquiry. Although the scope of the book is restricted to the high country tussock grasslands and herb fields that are, or have been, used for grazing, the principles of soil organic management are more widely applicable.

1996, Colour photos, 34pp. 297x210mm, softback, $25.00

ISBN 0-478-09304-7

Resource Monitoring by Hawke's Bay Farmers

Landcare Research Science Series No. 16.

By Roger Wilkinson, Manaaki Whenua-Landcare Research, Lincoln.

Farmers have for years monitored the condition of their farms and their stock in an informal way. However, they are coming under increased pressure from consumers, policy-makers and environmentalists to monitor the condition of their resources more, and more formally. This book reports on a study of farmers' monitoring behaviour and the beliefs they hold about monitoring. It is based on a survey of 115 mixed livestock farmers in the hill country of Hawke's Bay, New Zealand. The book describes what farmers are monitoring and how they are doing it, and analyses how they are using the monitoring information in their farm management decision making. The results and conclusions of this work will be of interest to policy makers, resource managers, farmers, and people interested in landcare.

1996, 43pp. 297x210mm, softback, $25.00

ISBN 0-478-09305-5

Checklist of the Mosses of Banks Peninsula, New Zealand

Landcare Research Science Series No. 17.

By B.H. Macmillan, Manaaki Whenua-Landcare Research, Lincoln.

This is the first checklist published on the mosses of Banks Peninsula, and pulls together previous research by many other botanists. It is a useful guide for the moss flora of most of the eastern South Island area, but also has applicability to mosses in New Zealand generally. It records 234 moss species - nearly half the moss flora of New Zealand - known to be growing on the Banks Peninsula, and includes those which have been noted in the early literature from the Peninsula area. Discussion of physical features, climate, and vegetation of the Peninsula is provided. Herbarium voucher numbers are given, and reference is made to the earliest published record for each species. A comprehensive bibliography and an index of family and Latin names are included.

1996, some B&W photos, 80pp. 210x148mm, softback, $25.00

ISBN 0-478-09302-0

Manaaki Whenua Press: PO Box 40
Lincoln 8152
NEW ZEALAND

Insects of Macraes Ecological District

By Brian H. Patrick
February 1997
An entomological survey of the Macraes Ecological District, Lammerlaw Ecological Region, found 367 species of insect in 12 orders, of which the vast majority are native species. The ecological district has a distinctive mix of insect species including several species at the geographical limit of their distribution.
Otago Conservancy Miscellaneous Series No.30.
Contains 6 colour plates. ISSN 0114-7455 ISBN 0-478-01876-2
Price $27.00 Available from:
Department of Conservation, PO Box 5244, Dunedin.

New Zealand Subantarctic Islands

Book produced by DoC to support New Zealand's application for their inclusion in the World Heritage List.

59 colour pictures,
9 colour maps.

Retail price $30.00,
Staff price $15.00.

Available from:
Science publications,
P.O. Box 10420,
Wellington.

Nomination of the New Zealand Subantarctic Islands by the Government of New Zealand for inclusion in the World Heritage List

Department of Conservation
Te Papa Atawhai

RESEARCH IN PROGRESS

Research Update

New experimental chemical application technique to control invasive weeds

Many introduced plant species have become invasive weeds in New Zealand. Examples are Old Man's Beard (*Clematis vitalba*), heather (*Calluna vulgaris*) and willow (*Salix* spp.). Infestations of these plants can be found inhibiting the establishment and growth of native plants in areas of high ecological value, National Parks or native reserves under Department of Conservation management.

Traditional techniques to kill or eradicate these invasive weeds have been to spray the foliage, cut and spray stems or stumps, or pulling out of the plants. These techniques are appropriate in many cases but have limitations. Overspray can affect adjacent or understorey plants while pulling out plants can lead to roots remaining in the soil from which it can readily regrow. A new experimental technique under development by HortResearch allows herbicides to be applied as gels to cut stems simultaneously as the stems are cut. This technique should ultimately provide an alternative management tool for controlling and eradicating target plants without affecting surrounding or neighbouring plant species.

Old Man's Beard was chosen as the first plant species to trial the technology. This plant is extremely fast growing and is widespread in the Taihape area growing over the canopy of trees smothering and strangling host native tree species. Initial trials were carried out on a steeply sloping site at Mangaweka and concentrated on cutting and treating stems growing up individual trees (Figure 1). These stems were easily identified and readily accessible to cut and treat. The treatments were applied during the growth period of the vine in late spring or in late winter during vine dormancy. Treatment assessment involved tracing the treated stems back to ground level to determine if any new shoots had grown, the length of stem die back and the amount of root decay at one and two seasons after treatment. Results were extremely promising regardless of treatment application time with many vines being killed to ground level within a year. By the end of the second season after treatment, the roots of many of the treated stems had clearly rotted away. There also appear to be no effects of the herbicides on the host or neighbouring plants.

These trials involved high herbicide rates. In order to progress towards more economic rates the better systemic herbicides identified in the trials were reformulated and tested at significantly lower rates. Current trials include the application of these new formulations on single and multi-stem Old Man's Beard vines.

Initial assessments of these trials indicate that some of the treatments on single stem vines are very effective. On the multi-stem vines though, translocation of the herbicide between treated and untreated stems has not occurred as dieback on the treated stems has only gone back as far as the crown from where all the stems originate. This may mean for multi-stem vines all or most of the stems will need to be treated to effectively kill the vine. However as some of these herbicides have long half lives when in contact with plant tissue and can be active within the plant for at least two seasons, the final effi-

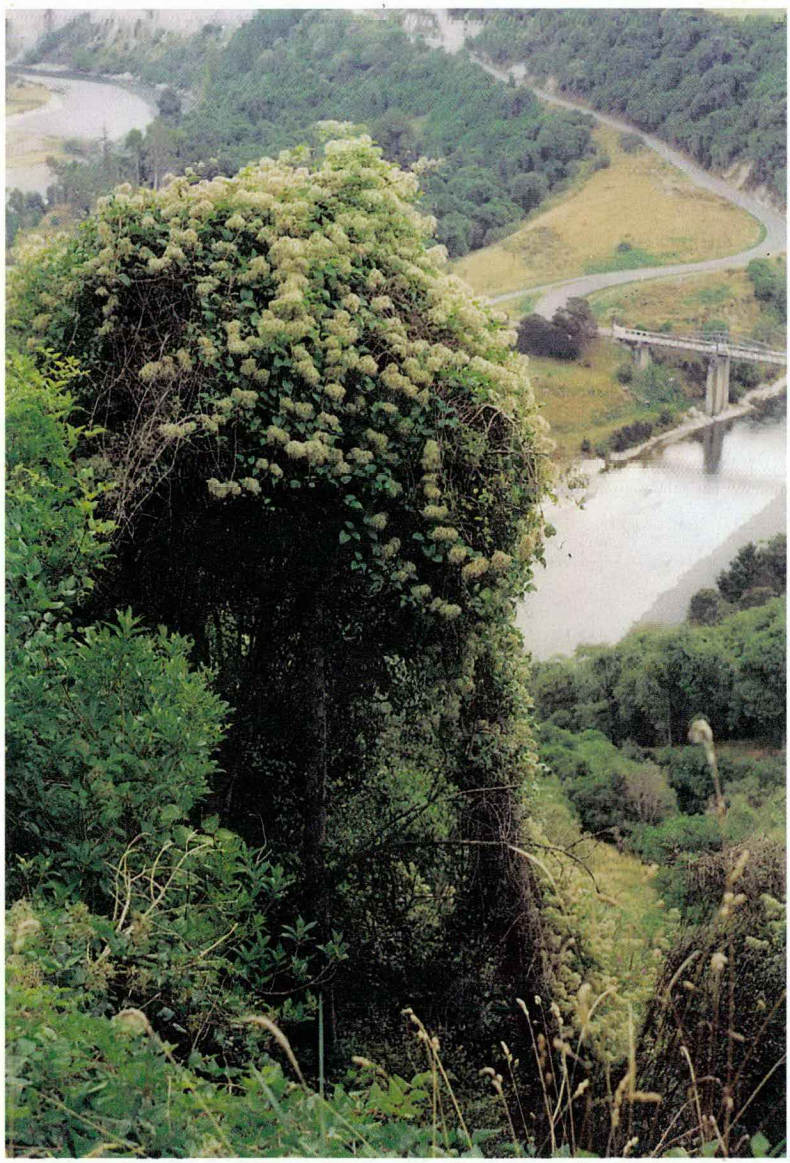


Figure 1 *Clematis vitalba* (Old Man's Beard) smothering an isolated tree at the Mangaweka trial site.

cacy of the treatments won't be known until after the 1997/98 growing season.

While this new chemical application system is showing great potential for controlling Old Man's Beard it clearly is not the complete solution. In densely infested areas where the vine is smothering small shrubs or pasture, the vine would be best treated using foliar spray techniques. The real potential for the technology is on vines suspended from the canopy of trees, on isolated plants, on regrowths as a follow-up treatment after foliar application or on plants in areas inaccessible for foliar applications.

The technology could also be ideal for controlling or eradicating any plant (e.g., vine or small tree) in areas of high ecological value where the adjacent or understorey plants want to be preserved. The technology is therefore also being trialed for controlling and eradicating Japanese honeysuckle and Climbing spindleberry vines, Pussy willow saplings and heather plants in areas of high value to Department of Conservation.

B.G. Ward and R.F. Henzell
HortResearch,
Ruakura Research Centre,
Private Bag 3123, Hamilton.

NEW PUBLICATIONS

New Books from Science and Research Division

SCIENCE AND RESEARCH SERIES

Towns, David and Stephens, Theo 1997. **Island management and commercial sponsorship: the Mercury Islands experience.** *Science & Research Series No. 103.* 25 p. $12.50 (incl. G.S.T.)

A history of the sponsorship agreement between the Dept. of Conservation and ICI Crop Care Division for the extermination of introduced mammals; covers implementation and results.

Shepherd, M.J., McFadgen, B.G., Betts, H.D., and Sutton, D.G. 1997. **Formation, landforms, and palaeoenvironment of Matakana Island and implications for archaeology.** *Science & Research Series No. 102.* 102 p. $23.65 (incl. G.S.T.)

The geological formation and modification of the Holocene sand barrier over the last 6,000 years has been very dynamic. Future management decisions should take this into account.

Moore, P.J., Scott, J.J., Joyce, L.J., and Peart, M. 1997. **Southern Royal Albatross *Diomedea epomorpha epomorpha* census on Campbell Island, 4 January – 6 February 1996, and a reveiw of population figures.** *Science & Research Series No. 101.* 27 p. $18-00 (incl. G.S.T.)

Count was 23% higher than in 1995. Number of nests have increased since the first census in Jan.-Feb. 1958. Accurate counts at study areas (1988-1996) show that numbers are currently increasing.

Moore, P.J., Waugh, S.M., West, C., and Mitchell, G. 1997. **Preliminary results of a Southern Royal Albatross *Diomedea epomorpha epomorpha* census, Campbell Island, 12 January – 10 February 1995.** *Science & Research Series No. 100.* 17 p. $12-50 (incl. G.S.T.)

Census of breeding counted 6308 nests. Comparisons of different census techniques, and rate of egg loss suggest 6900-7300 pairs were nesting in 1995.

SCIENCE FOR CONSERVATION

Fraser, K.W. and Speedy, C.J. 1997. **Hunting pressure, deer populations, and vegetation impacts in the Kaimanawa Recreational Hunting Area.** *Science for Conservation: 47.* 47 p. $18.00 (incl. G.S.T.)

There were distinct gradients in hunting pressure, density, and deer condition, related to access. Condition decreased with increases in density, altitude, and a decrease in palatable forage. Ecological costs are summarised, and a range of management options presented.

Davis, A. and Aikman, H. 1997. **Establishment of shore plover (*Thinornis novaeseelandiae*) on Motuora Island.** *Science for Conservation: 46.* 53 p. $18.00 (incl. G.S.T.)

Parts 1 and 2 on the second and third releases of captive-bred birds on the island. Predation by moreporks and site-fidelity were two major problems. Monitoring and fate of birds is discussed.

Atkinson, I.A.E. 1997. **Problem weeds on New Zealand islands.** *Science for Conservation: 45.* 58 p. $18.00 (incl. G.S.T.)

Data (from published and unpublished sources) on the distribution of alien plant species established on offshore islands, that are, or could become problem weeds, (with recommendations).

Allen, Rob and Allan, Cathy 1997. **Mountain beech forest dynamics in the Kaweka Range and the influence of browsing animals.** *Science for Conservation: 44.* 23 p $12.50 (incl. G.S.T.)

Assesses the impact of browsing deer on the regeneration of mountain beech, including changes over 15 years to forest structure, and evaluation of canopy replacement.

Spurr, E.B., Harris, R.J., and Drew, K.W. 1996. **Improved bait for wasp control.** *Science for Conservation: 43.* 15 p. $12.50 (incl. G.S.T.)

Alternatives to freezing as a method of storing bait for wasp control. Shelf-life, attractiveness, palatability, and toxicity, after recanning, bottling, vacuum-packing, irradiation, or the use of preservatives, were investigated.

Jamieson, C.D. 1997. **The grasshopper *Sigaus minutus* in Central Otago: a pilot study.** *Science for Conservation: 42.* 21 p. $12.50 (incl. G.S.T.)

Distribution, abundance, and ecology of this endangered grasshopper are discussed.

Very isolated populations of less than 100 individuals are restricted to remnant patches of mostly native habitat.

INTERNAL REPORTS

Green, Kaye (Comp.) 1997. **DOC ongoing Science Project summaries — 1995/1996.** *S & R Internal Report No. 158.* 280 p. $29.25 (incl. G.S.T.)

Executive summaries of ongoing science projects for the financial year, arranged by key outputs, and indexed by locality and researcher.

Cessford, Gordon 1997. **Impacts of visitors on natural and historic resources of conservation significance. Part 2 — Research and information needs.** *S & R Internal Report No. 157.* 29 p. $18-00 (incl. G.S.T.)

A synthesis of research and information needs derived from a workshop on impacts of visitors on natural and historic resources. A basis for developing a research action plan for addressing visitor impacts.

Cessford, G.R. and Dingwall, P.R. (Editors) 1997. **Impacts of visitors on natural and historic resources of conservation significance. Part 1—Workshop proceedings.** *S & R Internal Report No. 156.* 109 p. $23.65 (incl. G.S.T.).

Agenda, participants, and a summary of proceedings of a workshop convened by Science and Research Division and Visitors Services Division of the Department of Conservation, in Wellington, 2-4 July 1996.

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