CONNOVATION RESEARCH

CONNOVATION RESEARCH ANNUAL ACHIEVEMENTS. January 2008-January 2009.

HIGHLIGHTS

1. CHOLECALCIFEROL FOR MULTISPECIES CONTROL. Brodifacoum has been the only effective alternative to 1080 registered for possum and rodent control. This is no longer the case. Earlier in 2008 we submitted cage and field trial data to extend the registration of Feracol® our paste product containing cholecaliferol so that it is now approved for rodents as well as possums. We obtained product registration in July from the NZFSA.

2. ADVANCING PAPP FOR STOAT CONTROL. Exciting results have been obtained in the first large scale field trials of para-aminopropiophenone (PAPP) for stoat control at Waitutu with a > 80% kill in the first field trial in August. The 2nd major field trial of para-aminopropiophenone (PAPP) our new poison for stoat control in November was a resounding success. Department of Conservation field staff achieved a kill of 90% of stoats in an area of approximately 1,500 hectares in Waitutu adjacent to the site of the first successful trial. In parallel registration dossiers were submitted to NZFSA for Predastop® for stoat control. The chemistry and manufacturing dossiers for PAPP were filed in Australian APVMA with our Australian partners to support their registration for PAPP for fox control. Promising field trial was also completed in NZ with PAPP paste as a feral cat control agent. PAPP represents the first new active ingredient to be developed as a vertebrate pesticide for 30 years and the only one with humaneness as the primary consideration.

3. IN COLLABORATION WITH PESTTECH ZINC PHOSPHIDE REGISTRATION WITH THE NZFSA HAS ADVANCED VERY SIGNIFICANTLY AND NZFSA INTIAL EVALUATION HAS BEEN SUCCESSFULLY COMPLETED. Currently assessment by ERMA of a paste for possum control is underway. Zinc phosphide was first used as a rodenticide in 1911 in Italy. It was the most widely used rodenticide worldwide until the introduction of anticoagulant compounds. It remains the most popular vertebrate pesticide for field use and is a favoured rodenticide in the USA and Europe as well as in Australia. It has comparatively low risk of secondary poisoning of dogs following its field use when compared with strychnine or 1080.

4. Following submission of new grant applications in September we learnt in mid–December that our FRST bid, entitled “Pest control for the 21st Century” had been given a green light to proceed to the full application stage in the Ecosystems Portfolio 2008/09 funding round. We are part of a Lincoln University Consortium for this innovative programme which brings together exciting new research ideas. A second FRST bid which is

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collaboration between Landcare Research and the Lincoln University Consortium has also successfully navigated its way through the first screening phase. Our focus is on "thinking beyond 1080-more and better tools for humane pest control now". This result came on the back of an "Excellent grading" in an Audit of our current FRST pest control programme with Lincoln University entitled "Smart Pest Control" in September. Only 3 programmes out of 15 were ranked excellent and 2 of these were from Lincoln University. The remainder were ranked satisfactory or unsatisfactory.

5. We have completed experiments to test cyanide pellets in Dama and Bennett's wallabies and preliminary trials in ferrets – logically exploring the potential of cyanide for humane culling of pest species other than possums. Connovation has invested in this research with co-funding from the Department of Conservation (DoC) for the development of Feratox for Dama wallabies. DPIW, Tasmania are co-funding research on Bennett's wallabies. The Animal Health Board is supporting the development of Feratox for ferrets and feral pigs. We completed testing Feratox® in 16 Bennett's wallaby pen trials with unconsciousness and death similar to that previously reported in possum, consolidating results obtained with Dama wallabies. On the first day of these studies AEC veterinarians Dr Alex Familton and Dr Julie Brown were present alongside the research team. All observers were pleased when we achieved the same high welfare standard set by Feratox pellets in possums, and this was sustained in all subsequent testing in June. Field trials are now being scheduled. A Dama wallaby Feratox pen study completed in May with 17/18 wallabies humanely culled in a pen trial. The first stage of a field trial of Feratox® for the control of dama wallabies in NZ was completed in December with colleagues from DoC. Approximately 50% of a population of radio collared wallabies was killed. Follow-up is planned in 2009.

6. We continue to progress the registration of Feratox® in Australia as an alternative to 1080 for the more humane control of overabundant native species in plantation forestry. Prior to new field research in Tasmania pen trials have been undertaken to improve delivery of bait and safety. Preliminary results indicate that prefeeding with Feratox® placebo pellets will improve bait update and reduce spillage of toxin and non-target species exposure to the toxin.

7. Field trials on a possum specific bait called 215 which is not liked by rats were successfully completed as part of a research project undertaken with co- funding from the AHB. This confirmed earlier results obtained with laboratory rats.

8. ERMA approval was obtained for the first studies in NZ of sodium nitrite as a vertebrate pesticide. Our first scheduled studies were successfully completed. An encapsulated form of the toxicant was developed and tested and shown to overcome taste aversion.

9. During 2008 our research and development was discussed with government agencies, NGOs and with iwi. e.g. MAF Biosecurity, DoC, and new staff at ERMA, the RSPCA and Tuhoe. Their advice and feedback have steered the direction of our product development. Meetings were held and presentations given to Dr John Hellstrom Chair of the Possum Biocontrol Group, Dr John Sanson MAF Biosecurity, Carol West DoC, Bill Dyck Envirolink, Lynne Waterson a new Senior Toxicologist and manager at ERMA, also with Peter Mason and colleagues at the RSPCA, and with James Waiwai and Jim Doherty and other Tuhoe colleagues. In addition there were presentations in Whangarei, Akaroa and Invercargill to council staff, DoC and community groups. A briefing on new alternatives to 1080 was given to Paul Jensen, conservation advisor to Nick Smith. Meetings were held with MAF welfare scientists, Veterinary Association welfare experts and the Regional Councils' Biosecurity Managers in Auckland, Wellington and the South Island. At each meeting we received encouraging feedback, for example from the Biosecurity Managers meeting on the 5th September in Auckland. '*The research and development projects which you are currently operating have identified a range of new toxins and delivery systems which will, when they become available, provide valuable additions to our pest management arsenal. We note that these not only have the potential to have high efficacy but also may achieve high standards in terms of humaneness and environmental safety. These factors are very important to us.*

10. Charles Eason was an invited speaker at the New Zealand Biosecurity Instate NETS conference in Hamilton 23-25th July; and Steve Hix, Ray Henderson, Shaun Ogilvie Charles Eason and Lyn Nicholls were invited speakers at the New Zealand PestNET conference at Lincoln University on the 28-29th August.

11. A DEFRA UK grant with Profession Neville Gregory for new rodenticide research has successfully got through the first round and a full proposal has been requested.

12. Research has been completed to further clarify the clearance of diphacinone in cattle and pigs. Diphacinone is the key ingredient in RatAbate® we confirmed the rapid elimination of diphacinone in pig with liver concentrations on or close to the analytical limit after 4- 6 weeks.

13. Our Research Director was appointed as a Professor in Wildlife Management at Lincoln University (0.3FTE) in August 2008.

14. Prof Eason was an invited speaker and guest of the American Chemistry Society at the 4th Pan Pacific Conference on Pesticide Science, June 1-5 2008 in Hawaii. He presented on the pharmacokinetics of vertebrate pesticides and low residue baits.

15. Prof Eason received an ISAT Science and Technology linkage award from the Royal Society of NZ to attend a workshop at the National

Wildlife Research Centre (NWRC), Fort Collins, USA 5h – 9th March 2008. This workshop focused on defining the registration database for new vertebrate pesticide products in NZ, Australia and the USA, to reduce impediments for improved products. A key outcome was a critical review paper for publication in a peer reviewed journal to help facilitate product registration of safer pest control tools.

1. Professor Eason contributed to an Invasive Animals-Cooperative Research Centre Review on management options for camels in Australia led by Dr Steven Lapidge that was completed in June. Lapidge, S.J., Eason, C.T. and Humphrys, S.T. (2008). A review of chemical, biological and fertility control options for the camel in Australia. Invasive Animals CRC, Adelaide pp 51.

Other Research Outputs

Journal publications

Murphy, E.C.; Eason, C.T.; Hix, S.: MacMorran, D.B. 2007 Developing a new toxin for potential control of feral cats, stoats and wild dogs in New Zealand. In *Managing Vertebrate Invasive Species: Proceedings of an International Symposium (G.W.Witmer, W.C.Pitt, K.A.Fagerstone, Eds).* USDA/APHIS/WS, National Wildlife Research centre, Fort Collins, CO pp 469-473

Charles Eason; Shaun Ogilvie; Aroha Miller; Ray Henderson; Lee Shapiro; Steve Hix, and Duncan MacMorran (2008) Smarter Pest Control Tools with Low-Residue and Humane Toxins. *Proceedings. 23rd Vertebrate. Pest Conference. (R. M. Timm and M. B. Madon, Eds.)Published at Univ. of Calif., Davis. 2008. . in press.*

Gooneratne S. R., Eason C.T., Milne L., Arthur D.G., Cook C., Wickstrom M. (2008) Acute and long-term effects of exposure to sodium monofluoroacetate (1080) in sheep. *Onderstepoort Journal of Veterinary Research,* 75:127–139 (2008)

Charles T. Eason, Kathleen A. Fagerstone, John D. Eisemann, Simon Humphrys, Jeanette R. O'Hare and Steven J. Lapidge "A review of terrestrial vertebrate pesticides with a rationale for linking use patterns to registration requirements". *International Journal of Pest Management* (submitted Dec 2008).

Eason, C.T.; Murphy, E.C. Hix, S.; Henderson, R.J. and MacMorran, D. " Susceptibility of four bird species to para-aminopropiophenone *Science for Conservation.* (submitted Dec 2008).

An article entitled "The Tool Available: Poisons and Trends". Charles T. Eason and Shaun Ogilvie was drafted for inclusion in an Ornithological Society publication " the State of New Zealand's birds".

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Conference presentations

14th Australasian Vertebrate Pest Conference – Darwin 2008:-
Charles Eason, Mick Statham, Lee Shapiro, Steve Hix, Duncan MacMorran, Penny Fisher, Steve Boot, John McIlroy, Helen Statham, John Dawson. *1080 Alternatives for Tasmania.*

Elaine Murphy, Charles Eason, Steve Hix, Lee Shapiro, Duncan MacMorran. *Developing a New Toxin for the Control of Feral Cats and Stoats in New Zealand*

Charles Eason, Elaine Murphy, Steve Hix, Lee Shapiro, Duncan MacMorran. *New Approaches to Developing Humane Toxins: Our Rationale, Questions and Answers*

Shaun Ogilvie, Aroha Miller, Charlie Eason. *Minimising the Impacts of Vertebrate Pesticides on Non-Target Species*

ABSTRACTS and can be downloaded on the web:

http://www.invasiveanimals.com/downloads/Final-proceedings-with-cover.pdf

Charles Eason and Shaun Ogilvie. (2008). "The Comparative Pharmacokinetics of Rodenticides and Vertebrate Pesticides and the Link between Metabolism and Excretion and Non-Target Impacts"- *4th Pan Pacific Conference on Pesticide Science June 1-5 2008, in Hawaii.* Page 34.

Charles Eason, Shaun Ogilvie and Elaine Murphy. (2008). "Diphacinone Persistence in Rodents and Livestock and its Implications for Bioaccumulation" *4th Pan Pacific Conference on Pesticide Science June 1-5 2008, in Hawaii.* Page 19.

Penny Fisher, Shaun Ogilvie, and Charles Eason (2008). Sublethal Exposure, "Residual Tissue Concentrations and Elimination of Brodifacoum and Diphacinone: Evaluating Secondary Hazard of Anticoagulant Rodenticides to Non-Target Species" *4th Pan Pacific Conference on Pesticide Science June 1-5 2008, in Hawaii.*

Charles Eason (2008) "Diphacinone Persistence in Rodents and Livestock and its Implications for Bioaccumulation" *4th Pan Pacific Conference on Pesticide Science June 1-5 2008, in Hawaii.*

Penny Fisher, Charles Eason, Shaun Ogilvie, and Adrian Paterson (2008). "Residual Brodifacoum Concentrations in Chicken Tissues following Sublethal Oral Exposure" *4th Pan Pacific Conference on Pesticide Science June 1-5 2008, in Hawaii.*

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Charles Eason, Shaun Ogilvie, Duncan MacMorran, Steve Hix, Lee Shapiro Ray Henderson, Aroha Miller and Elaine Murphy. (2008). "Extending the use of humane, low residue, multispecies control tools". *New Zealand Biosecurity Institute - National Educational Training Seminar (NETS) 23-25th July 2008, Hamilton NZ*

Charles Eason, Elaine Murphy, Shaun Ogilvie, Steve Hix, Lee Shapiro, Ivan Summut and Duncan MacMorran. (2008). "New approaches to developing humane toxins" *PESTECH NZ Technology Conference, Lincoln University 28-29 August 2008, Lincoln, NZ.*

Ray Henderson. (2008). "Zinc phosphide for possum and rodent control - advancing safety and efficacy data and registration processes" *PESTECH NZ Technology Conference, Lincoln University 28-29 August 2008, Lincoln, NZ.*

Steve Hix. (2008). "Existing and new tools for community based control" *PESTECH NZ Technology Conference, Lincoln University 28-29 August 2008, Lincoln, NZ.*

Shaun Ogilvie, Aroha Miller and Charles Eason. (2008). "Minimising the Impacts of Vertebrate Pesticides on Non-Target Species" In Saunders, G. and Lane, C (eds) *14th Australasian Vertebrate Pest Conference, Darwin, June 2008*. Page 168.

Shaun Ogilvie, Aroha Miller and Charles Eason. (2008) "Multi-species pest control". *PESTECH NZ Technology Conference, Lincoln University 28-29 August 2008, Lincoln, NZ.*

Mariana Vargas, Rob Cruickshank, James Ross, Adrian Paterson and Shaun Ogilvie (2008) "Non- invasive recovery of brushtail possum (*Trichosurus vulpecula*) DNA from bait interference devices." In Saunders, G. and Lane, C (eds) *Proceedings of the 14th Australasian Vertebrate Pest Conference, Darwin, June 2008.* Page 78.

NPCA Conference presentations 26-27th November, Wellington
Our team and the Lincoln University Research Consortium had a high profile for their research and product development during the last month. A total of 9 oral and 6 poster presentations were presented at the annual NPCA conference in Wellington in November. Their focus was predominantly on "thinking beyond 1080-more and better tools now".

Watercress and puha field trial-fate of 1080 (Dr Aroha Miller).
Inducing a conditioned food aversion to make dogs "possum shy" (Ray Henderson)
Field control of stoats and feral cats and registration status of para-aminopropiophenone/"PAPP" (Steve Hix). Feratox for wallabies, pigs and ferrets (Steve Hix)
Smart Pest Control Programme – Multi-species baits for ground and aerial control (Charles Eason)

Registration of Zinc Phosphide (Ray Henderson)
Thinking beyond 1080 (Charles Eason)
Sustained control of possums along forest/pasture margins using a new bait delivery system (Ray Henderson)
Prof Eason chaired a session at the conference called" Taking it to the market".

A media item in the Christchurch Press profiled our research. " *NZ scientists help develop new poison to target pests"* and a follow-up article is expected in January.

Posters

Posters prepared for PESTECH NZ Technology Conference, Lincoln University 28-29 August 2008, Lincoln, NZ and NPCA, Wellington in November.

Ogilvie, SC, Ataria, JM, Waiwai, J. Doherty, J. Eason, CT, Ross, J (2008). Novel approaches to risk management: helping stakeholder communities in assessing vertebrate pesticide risk..

Eason CT; Shapiro L, Hix S, MacMorran D. (2008). Toxicity of cholecaciferol to rats in multi-species baits.

Eason CT; Henderson R; Ogilvie S; Miller A; Shapiro L, Hix S, MacMorran D. (2008). Multispecies baits for improved ecological outcomes.

Henderson R; Eason CT, Ogilvie S; Shapiro L, Hix S, MacMorran D. (2008). Toxicity of zinc phosphide in paste baits to mice, rats, and possums.

Henderson R; Eason CT, Ogilvie S; Shapiro L, Hix S, MacMorran D. (2008). Developing alternatives to brodifacoum baits - why and how?

Eason CT; Shapiro L, Hix S, MacMorran D. (2008). Humane toxins the best of the old and the new.

Technical Reports

Connovation Newsletter (June 2008) RatAbate irresistible to rats P.2 www.connovation.co.nz

Shapiro L, Hix S, MacMorran D B, Eason C. T. (2008). Bait delivery cage trials on Dama wallabies. *Connovation Research Report* pp 6.

Hix S., Henderson R.J., Eason C.T. MacMorran D.B. (2008) Cage testing PAPP paste for non-target effects in weka. *Connovation Research Report pp 9.*

Steve Hix, Lee Shapiro, Duncan MacMorran, Charles Eason (2008) Bait palatability and effectiveness of Feratox® in cage trials on Bennett's wallabies. Connovation Research Report pp 15.

Steve Hix, Lee Shapiro, Duncan MacMorran,Charles Eason (2008) Risk analysis based on PAPP residue concentrations on weka at post mortem. Connovation Research Report pp 3.

FRST Terminating Contract (2009) Evidence Portfolio Smart Large Scale Multiple-Species Vertebrate Pest Control pp 28.

Lapidge, S.J., Eason, C.T. and Humphrys, S.T. (2008). A review of chemical, biological and fertility control options for the camel in Australia. Invasive Animals CRC, Adelaide pp 51.

Lee Shapiro, Steve Hix, Duncan MacMorran, Paul Aylett, Charles Eason. Final Herbivore Repellent Report Connovation Report pp 13.

Steve Hix, Lee Shapiro, Duncan MacMorran, Paul Aylett, Don Arthur, Charles Eason. (2008) Cyanide pen trials in pigs Connovation Report pp 15

Lee Shapiro, Steve Hix, Duncan MacMorran, Paul Aylett, Charles Eason (2008) Feratox® cage trails on ferrets. Connovation Report pp 14

Charles Eason (2008) Sodium nitrite synergists. Connovation Report pp 15