

CONNOVATION'S QUARTERLY RESEARCH REPORT- July-September 2009

HIGHLIGHTS AND CHIEVEMENTS:

1. We learnt in August that our application to extend the use of Feratox® to dama wallabies as well as possums was approved by the NZFSA authority. This extends the initial 1997 Feratox® registration for possum control.
2. Following a meeting with ERMA in August we are maintaining momentum with regard to the registration of microencapsulated zinc phosphide (MZP) for possum control. Responses were developed for ERMA to:- i) public submissions made after "publicly notifiable stage" of the ERMA zinc phosphate assessment ii) requests for additional technical information in response to the filing of our HS1 dossiers. Zinc phosphide has not been registered in New Zealand before but is widely registered around the world.
3. HS1 registration dossiers for PAPP the new predacide for stoat control have been revamped and re-submitted in September following ERMA feedback at the pre-screening obtained at the end of July. Good progress has also been made in advancing the manufacture of prototype stoat tunnels for dispensing PAPP and planning for further trap and tunnel testing.
4. Our joint FRST programme "Smart Pest Control" with Lincoln University ended on the 30th September with new multispecies bait products well advanced down the registration pathway. Connovation is committed to completing the registration of new multispecies baits containing 1080 alternatives, and registration activities will continue through 2010.

Complimentary feedback was provided by FRST when Lincoln University submitted their final reports.

5. There has been further testing of low dose (0.4%) multispecies cholecacliferol paste and solid bait in both cage and field trials to support the registration of two new products. Good results were obtained in Coromandel on rats and on Bank's Peninsula on mice.

6. Significant progress has been made in planning the completion of exploratory studies with sodium nitrite pen and field trials. Confirmatory studies with sodium nitrite were undertaken with penned possums and pigs using a new enteric coated formulation. The enteric coating performed as well if not better than the more expensive lipid coated formulation tested earlier in the year.

7. A small contract for the Animal Health Board has been completed to investigate the toxicity of theobromine and caffeine, the active ingredients in chocolate with possums. Unfortunately possums showed no special sensitivity to these compounds and more promising alternatives to 1080 are being pursued.

8. We were notified in July that a new FRST research grant application with Lincoln University entitled "Pest Control for the 21st Century" has been funded for 6 years. This programme involves the University of Auckland, Otago University and Plant and Food and Connovation Ltd as commercial partners and provides a solid platform for delivery of new products. The programme starts on the 1st October 2009 with a focus on new research and advancing new technologies along with recruitments of PhD students.

9. A new joint DEFRA UK grant application with the Royal Veterinary College London was approved and research arrangements have been consolidated with a view to starting complementary research on new tools for pest control in the UK in January 2009.

10. Ray Henderson and Duncan MacMorran met with Tb researchers in the UK to discuss research on baits for TB vaccination of badgers. Bait preference study in wild badgers at Woodchester Park, UK showed our NZ baits were more palatable to badgers and had less non-target uptake than alternatives.

11. Poster presentations were given at the 5th International M.bovis conference organised by the Animal Health Board at Te Papa 26-28th August.

12. Four abstracts were accepted for 3 poster presentations and a keynote address at the NETS conference in Queenstown in October'09.

13. A presentation within a welfare section of the International Society of Applied Ethology Conference in Cairns was given alongside complementary presentations by Kate Littin (MAF), Glen Saunders (IA_CRC) and Bidda Jone (RSPCA). Our focus was an update on the development of humane poisons for pest control.

14. On behalf of the research team Charles Eason presented a 30 minute Keynote Lecture on "Trends in vertebrate pesticide use and new developments: New Zealand perspective and international implications" at the European Vertebrate Pest

Conference in Lyon 7-11th September and was co-author on a paper presented by Simon Humphrys for the IA-CRC. James Ross also presented a paper. A number of invitations resulted from attendance at the VPC: - i) Jo Pelz invited Eason to be on the organising committee of the next EVPC in Berlin in 2011 or 2012 ii) Alan Buckle invited Eason to co-author a chapter in a new rodenticide book iii) and a German EPA invitation was received to facilitate a workshop on new alternatives to anticoagulant rodenticides.

15. Judy Chan completed the PhD thesis at the University of Auckland entitled "Delayed release of diphacinone "
16. Collaboration with David Heath has resulted in him submitting a co-authored abstract on PAPP for presentation at a conference in South America

REPORTS, PUBLICATIONS & PRESENTATIONS:

Publications

Published

Eason C.T.; Ogilvie S (2009) A re-evaluation of potential rodenticides for aerial control of rodents. Science for Conservation DOC Research and Development Series 312: 33 p

Accepted

Charles Eason; Elaine Murphy, Steve Hix, and Duncan MacMorran (accepted June 2009). The development of a new humane toxin for predator control in New Zealand. *Proceedings of EVPC*.

Beasley M, Fisher P, O'Connor C, Eason C.T (2009) Sodium Fluoroacetate (1080): Assessment of Occupational Exposures and

Selection of a Provisional Biological Exposure Index. NZ Medical Journal "in press"

Littin K.E.; Gregory N.G.; Airey A.T.; Eason C.T.; Mellor D.J (2009) Behaviour and time to unconsciousness of brushtail possums (*Trichosurus vulpecula*) after a lethal or sublethal dose of 1080. Wildlife Research "in press".

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 "in press".

European Vertebrate Pest Conference in Lyon 7-11th September presentations

i) Charles Eason, Shaun Ogilvie, James Ross, Elaine Murphy, Ray Henderson⁴ and Duncan MacMorran.

Trends in vertebrate pesticide use and new developments: New Zealand perspectives and international implications.

ii) Simon Humphrys, Charles Eason, Steven Lapidge.

Humane pest management tools the next generation.

iii) James Ross Cost effectiveness and efficacy of multispecies pest control in New Zealand.

Presentation at the Annual Ethology Conference, Darwin July 2009:

New Approaches to Developing Humane Toxins

Charles Eason, Elaine Murphy, Steve Hix, Lee Shapiro, Duncan MacMorran

ii) Two Posters were presented at the end of August on Tb in Wellington organised by the AHB.

Improvements in Control of Tb Vectors and other animal pests

Authors: Charles Eason, Shaun Ogilvie, E. Murphy, Lee Shapiro, Steve Hix
Duncan MacMorran

Advancing PAPP Products for Predator Control

Authors: Lee Shapiro, Peter Dilks Charles Eason, Steve Hix, Duncan MacMorran and Elaine Murphy

ABSTRACT ACCEPTED FOR

**XXIII WORLD CONGRESS OF
HYDATIDOSIS
URUGUAY December 10 – 12**

Colonia de Sacramento –

PAPP FOR HUMANE REMOVAL OF UNWANTED DOGS

Humphrys S¹, Murphy E², Lapidge S¹, Staples L³, Eason C.T, MacMorran D⁴, Heath DD⁴.

1. Invasive Animals Cooperative Research Centre, Australia; 2. Department of Conservation; 3. Animal Control Technologies, Australia; 4. Connovation Research, PO Box 58613, Auckland, New Zealand.

An integral part of a Hydatid control program is the removal of unwanted dogs. Because unwanted dogs are difficult to catch, control has usually been by shooting or poisoning. Sodium fluoroacetate (1080) has been the main poison after Strychnine, and often also the supertoxin Aldicarb is illegally used. These poisons cause intense suffering and there are no antidotes. They can also cause secondary poisoning if the dead animal is eaten by another animal. PAPP (para-aminopropiophenone) is a humane effective alternative to conventional poisons. It causes animals to fall into a deep sleep and then die. It will not cause secondary poisoning. Carnivores are more susceptible than birds or humans. PAPP combines with haemoglobin in the blood to induce methaemoglobin, which cannot carry Oxygen. PAPP has been used for more than 60 years to counteract radiation sickness in humans. There is also a simple antidote if the wrong animal ingests the poison. Pen trials on captive dogs in New Zealand and Australia have shown that if an animal ingests the correct amount of PAPP it will appear lethargic in about 30 minutes, will be asleep or unconscious in 90 minutes and will be usually dead within 120 minutes, although some dogs may take longer to die. A test on 22 unwanted dogs in China showed that 19/22 died without any symptoms of distress. The other three recovered from their deep sleep and appeared normal.

Field studies for registration are being conducted in New Zealand on feral cats and mustelids, and in Australia on the European red fox and on Dingos and wild dogs. Connovation in New Zealand can supply PAPP in a formulation suitable for including in baits for dogs. Trials of PAPP formulation should have Ethics Approval and preferably the Registration Authorities should be notified so that the results can be included in a future registration package. To obtain PAPP ready for use in dogs or foxes, please contact Connovation through david.heath@xtreme.net.nz

Abstracts

accepted for poster presentations at NETS October 09.

Pro and cons of 1080 and other existing and new tools for animal pest control.

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SUMMARY

The chemicals used for controlling vertebrate pests are classified as (i) anticoagulants, which include, pindone, diphacinone and brodifacoum, or (ii) non-anticoagulants, which include any substance which does not fall in the former category, such as cyanide, sodium fluoroacetate (1080) and cholecalciferol. The risk to non-target wildlife from baits containing vertebrate pesticides will be determined in part by properties of the poisons but also by how they are used. Since the 1990's some 1080 users have switched to brodifacoum which can result in persistent residues. The advantages and limitations and risks inherent with the current vertebrate toxins like 1080 and brodifacoum will be discussed. Difficulties with the existing tool-box provide a stimulus for more and better tools to address the pressures imposed on biodiversity and production values by vertebrate pests. Experience gained in the 1990s with the introduction of cholecalciferol (Feracol®) and a cyanide pellet (Feratox®) which both kill possums without secondary poisoning,

underpin a new development pipeline. Registration processes are being completed in 2009/10 for zinc phosphide containing products for possum and rodent control. Registration documents are also being prepared for a combination of cholecalciferol and coumatetralyl to provide a slow acting alternative to brodifacoum for the field control of possums, rodents and rabbits with low risk of bio-accumulation. In parallel we are pursuing the registration of para-aminopropiophenone (PAPP) – for humane control of stoats and feral cats that predate kiwi and other ground dwelling birds and a series of related compounds for other pest species. We seek to advance best practice with our traditional tools and introduce new tools which combine “low-residue” characteristics with humaneness, enabling better more acceptable control of possums, wallabies, mustelids, rodents, feral cats and rabbits.

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Feratox® for wallabies

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In 1997 Feratox® was approved for possum control in NZ and has proven humaneness for possum control and we are now increasing the intensity of our efforts to complete the development of cyanide pellets for new species. In a pen trial 18/20 individually housed Dama wallabies presented with at least one Feratox® died. The mean time from cracking a Feratox® to unconsciousness was 7.7 minutes and to death was 13.5 minutes. In a field trial collared dama wallabies were captured at Craters Farm and released at the study site: a 32 hectare block of degraded native forest 20km South East of Rotorua. Two weeks of pre-feeding with non toxic baits was followed by the presentation of Feratox® baits using the best matrix and delivery system as established from previous pen trials. Of the 12 radio collared wallabies at the study site, where

toxic baits were laid, 11 of these were killed with Feratox[®]. A total of 20 uncollared resident wallabies were also killed. Based on spotlight counts and daytime sightings before and after the trial, we estimated that 93% of the resident wallaby population were killed. Feratox[®] clearly has the potential to provide an additional tool in the arsenal for the control of dama wallabies. A new registration package was submitted to NZFSA in May 2009 following the completion of successful pen and field trials in Dama wallabies. We hope to extend this registration to Bennett's wallabies assuming we can build on the promising pen trial data in the field trials we hope to complete in 2009.

Advancing para-aminopropiophenone (PAPP) products for humane predator control.

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Stoat (*Mustela erminea*) and feral cat (*Felis catus*) control is conducted in New Zealand to protect a number of threatened species, including kiwi, from predation. Para-aminopropiophenone (PAPP) has been proven to be humane for culling predators. Initial research to test humaneness was undertaken in cage experiments. Fifteen individually housed stoats were presented with 5-10 grams of meat with PAPP (12.8 mg) added in the form a 40% PAPP paste. PAPP impregnated meat was palatable and eaten by stoats. All 15 stoats died after eating bait. Onset of symptoms occurred on average after 17 minutes and death occurred after a short period of lethargy and unconsciousness in an average time of 44 minutes. Symptoms demonstrated PAPP to be humane and effective. Subsequent field trials, in 2008 over two adjacent 1,500 hectare blocks of native bush in Southland achieved > 80% and a 90% kill of stoats. A complementary field trial with 20 radio-collar feral cats was completed in June 2009, in the central North Island and nearly 90% of population of 20 radiocollared cats were killed. PAPP represents one compound from a new class of active ingredients, which we are calling red blood cell toxins (RBTs). These vertebrate pesticides have humaneness with low secondary and non-target poisoning risks as their primary consideration. The dose is optimised to be effective in the field and reduces oxygen supply to the brain such that animals become lethargic, sleepy and unconscious prior to death within 1 hour. Results from these pen and field trials in stoats and feral cats, together with chemistry and manufacturing, toxicology, and ecotoxicology dossiers have

been generated for NZ registration authorities assessment in 2008 and 2009. In parallel meetings with community groups to discuss the use of PAPP for predator control have had favourable outcomes.

Improvements in control tools for
Tb vectors and other animal pests.

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Sodium fluoroacetate (1080) has been used for vertebrate pest control for several decades. Since the 1990's some 1080 users have switched to brodifacoum which can result in persistent residues. We seek to increasingly combine "low-residue" characteristics with humaneness, enabling better more acceptable control of possums, wallabies, mustelids, rodents, feral cats and rabbits. Experience gained in the 1990s with the introduction of cholecalciferol (Feracol®) and a cyanide pellet (Feratox®) which both kill possums without secondary poisoning, underpins the extension of Feratox® for Dama and Bennett's wallabies in 2009, subject to New Zealand Food Safety Authority (NZFSA) approval. Zinc phosphide has low secondary poisoning risk, low cost and is accepted for field use for pest control throughout the world. Registration dossiers have initial approval from the NZFSA and are currently being assessed by the Environmental Risk Management Authority (ERMA) for zinc phosphide. Further registration documents are now being prepared for a combination of cholecalciferol and coumatetralyl to provide an additional alternative to brodifacoum for effective possum, rodent and rabbit control. Anticipated timelines for product availability are 2010 (zinc phosphide) and 2011-13 (cholecalciferol and coumatetralyl) subject to ERMA and NZFSA approvals. Research on less expensive cholecalciferol baits is also advancing. In parallel we are pursuing the registration of para-aminopropiophenone (PAPP) – a novel poison for humane control of stoats and feral cats. PAPP research and development has been completed for stoat control; registration dossiers have been vetted by NZFSA and were submitted to ERMA in May 2009. PAPP products should be available in 2010 subject to ERMA approvals.

On the platform of proof of concept with PAPP, alternative red blood cell toxicants, including sodium nitrite, are being advanced for feral pigs, possums and rodents.