

Humane Toxins: Advancing the Best of the Old and the New

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Introduction

- Many poisons for culling animal pests are considered inhumane.
- 1080 is under pressure.
- Second-generation anticoagulants, like brodifacoum, result in extensive wildlife contamination and non-target deaths.
- Hence our focus is on safer humane poisons and traps.

Best of the old

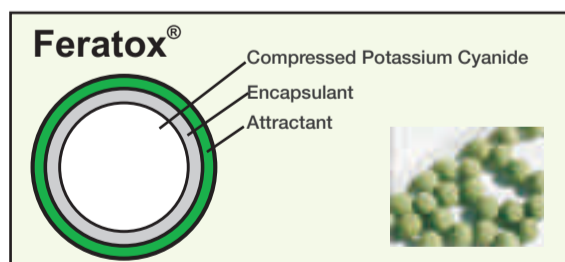
- A toxin welfare screening project was recently completed.
- Observation and critical analysis identified one humane poison (Eason et al 1996, 1997 and 1998; Gregory et al 1998; Littin et al 2002, 2003, 2004 a and b, 2008).
- The results from 5 papers that focused on the poisons most commonly used for killing possums are summarized below.
- A simplified set of welfare criteria are used. Poisons are ranked on a scale of high, moderate-poor or poor in terms of their performance.
- 1080 is moderate to poor when compared with cyanide. Brodifacoum is very poor in possums.
- New results for cyanide in wallabies are included.

Table 1 Welfare ranking of Cyanide (Feratox[®]), 1080 and Brodifacoum in possum.

Poison/author	Species	Onset of Symptoms	Duration of symptoms prior to unconsciousness	Time to death	Signs prior to unconsciousness	Welfare Rating
Cyanide Feratox [®] <i>Gregory et al 1998</i>	Possum	3 mins	3 mins	18 mins	Staggering	High
	Bennett's Wallaby	4 mins	9 mins	20 mins	Loss of Balance	High
	Dama Wallaby	2 mins	6 mins	14 mins		
1080 <i>Littin et al 2008</i>	Possum	1.5-2.5 Hours	9.5 Hours	11.5 hrs	Tremors, Spasms, Vomiting	Mod - Poor
Brodifacoum <i>Littin et al 2002</i>	Possum	Approx. 14 Days	6 - 13 Days	21 Days	External Bleeding, Abnormal Breathing, Trembling, Appetite Loss, Lame	Very Poor
	Norway Rats	4 Days	3 Days	7 Days	As Above With Paralysis of Hind Limbs	Poor

Cyanide is the only registered poison that is proven to be humane

- Feratox[®] was first approved for possum control in 1997.
- The pellet combines improved safety for handlers with low secondary poisoning risk.
- It has optimized dose for humaneness.
- It has strong community support as an alternative to 1080 and is used by hunters and trappers.
- Cyanide works by blocking uptake of oxygen and rapid depression of the central nervous system.
- In 2008 we have trials with cyanide pellets in Dama and Bennett's wallabies and ferrets - logically exploring the potential of cyanide for humane culling of pest species other than possums.



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The Ideal Poison

- Biodegradable
- Affordable
- Antidote available
- Humane
- Non-persistent in livestock
- Low chance of primary poisoning of non-targets
- Low chance of secondary poisoning
- Community acceptance



The new - PAPP

- Cyanide is not appropriate for all species.
- Para-aminopropiophenone (PAPP) is effective for control of stoats and feral cats with 95-100% mortality in cage trials.
- PAPP induces methaemoglobinaemia preventing oxygen from binding to red blood cells.
- By reducing oxygen supply to the brain, animals become lethargic, sleepy and unconscious prior to death in 1 to 2 hours.
- PAPP is delivered in a concentrated paste in a meat bait. A bolus aids uptake which is important for humaneness.
- First NZ field trials in 2008 show promising mortality in feral cats.



- A tunnel delivery system and sticky paste formula is being developed to improve target specificity.

- PAPP is advancing along the registration and approval process supported by chemistry and manufacturing, toxicology, efficacy, residue and environmental dossiers.

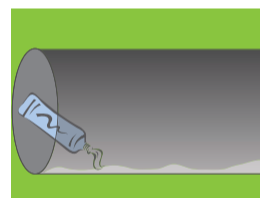


Table 2 Welfare rating of Para-aminopropiophenone in Feral Cats and Stoats.

Poison/author	Species	Onset of Symptoms	Duration of symptoms prior to unconsciousness	Time to death	Signs prior to unconsciousness	Welfare Rating
PAPP <i>Fisher et al 2005 by oral gavage</i>	Stoat	20 mins	Approx 15-20 mins	40 mins	Lack of co-ordination and lethargy	High
PAPP <i>Eason et al 2007 bolus in meat bait</i>	Stoat	17 mins	Approx 20-27 mins	44 mins	Lack of co-ordination and lethargy, sleep, no nausea or vomiting	High
PAPP <i>Fisher et al 2007 bolus in meat bait</i>	Cat	36 mins	Approx 40-46 mins	82 mins	Lack of co-ordination and lethargy, sleep, short period or retching in some animals 1 min duration - reduced by low fat bait	Poor

Conclusions

- Anticoagulants are extremely inhumane when used on species other than rodents, and should not be used on larger pest animals. Replacements are needed.
- In contrast cyanide is established as the most humane toxin.
- Delivery of cyanide and PAPP in an optimized bolus dose and tailored delivery system is critical for humaneness.
- Current research with Feratox[®] in wallabies and ferrets represents part of a concerted effort to advance more humane tools.
- Field trials in NZ with PAPP targeting feral cats are looking promising.
- Our goal for PAPP is to achieve improved stoat control by working with community groups on kiwi protection.
- PAPP could be the most significant advance in this field since the 1970's and it will be the only vertebrate toxic agent other than the new cyanide pellets (Feratox[®]) which clearly outstrips 1080, anticoagulants and other conventional poisons from a welfare perspective.

Acknowledgements

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