Alternatives to Brodifacoum for Possums and Rodents - How & Why?

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Background

- Brodifacoum is a 2nd generation rodenticide used worldwide for commensal rodent control.
- Used to eradicate rodents from islands.
- Possums are susceptible to brodifacoum baits but not to 1st generation anticoagulants.
- It has been the only alternative to 1080 that effectively targets both possums and rodents.

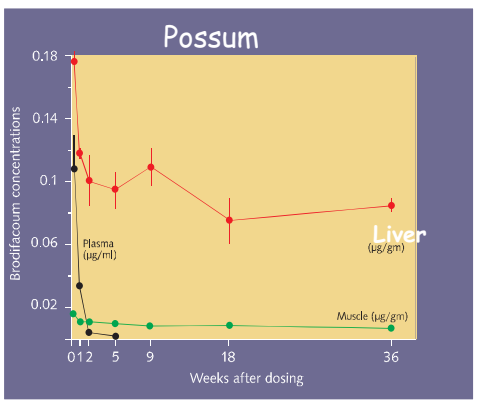

Figure 1. Typical persistence profile after sub-lethal dosing (0.1 mg/kg) brodifacoum which would be similar in game or birds. (Adapted from Eason et al. 1996).

Why Seek to Improve?

- Brodifacoum has an unusual persistence (Fig. 1).
- Persistent organic compounds (POC's) e.g. DDT and brodifacoum, bioaccumulate along terrestrial food chains.
- Repeated field use of POC's, including 2nd generation anticoagulants, is unwise and discouraged (see US EPA rodenticide mitigation – decision May 2008).
- Brodifacoum residues have been found in pigs, weka, morepork, harrier, pukeko, grey duck, robin and saddleback many months after possum control.
- Bioaccumulation to lethal concentrations occurs in non-targets on repeated use.

Criteria and Goals for Baits Containing Alternatives to Brodifacoum

- Ideally a single bait will be capable of killing possums, rats and mice.
- Baits must include toxins that have relatively low persistence (Table 1).
- Different types of toxic baits should include either fast or slower acting poisons.

Provision of Low Residue Alternatives (Table 2)

- Feratox® has provided a low residue humane alternative for >10 years for possum control for licensed professionals.
- Cholecalciferol paste (Feracol®) was registered in July 2008 for rodents as well as possums.
- A product license application was filed (June 2008) for zinc phosphide paste for possum control. New data is being generated to extend this registration to rodents and possums.
- Registration dossiers on low dose cholecalciferol with coumatetralyl as a slow acting alternative are being finalised for submission.

Table 1. Summary vertebrate pesticides half-lives and expectation for persistence of residues in sub-lethally exposed target or non-target species (adapted from Eason et al. 2008).

Key: + no published value but likely to be <12 hours.

Compound	Half-life values in tissue or blood	Likely persistence of residues after sub-lethal exposure
Cyanide	+	12 – 24 hours
Zinc phosphide	+	12 – 24 hours
1080	<11 hours	7 days
Pindone	2.1 days	4 weeks
Diphacinone	3 days	6 weeks
Cholecalciferol	10 – 69 days	12 weeks
Coumatetralyl	50 – 70 days	12 – 16 weeks
Brodifacoum	130 – 300 days	24 months or longer
Bromodiolone	170 days	24 months or longer
Flocoumafen	220 days	24 months or longer

Conclusions

- Brodifacoum has been the only alternative to 1080 registered for both rodents and possums.
- This is no longer the case.
- Alternatives are being registered which will be effective against both rodents and possums.
- There are no "silver bullets" and different tools have different advantages and disadvantages.
- Traditional and alternative baits and traps should be integrated to meet site-specific needs to achieve eradication or sustained control.

Table 2. A summary of key characteristics of low residue alternatives to Brodifacoum.

Key: p + possums; r = rodents; w = wallabies

	Species	Fast or slow in onset	Persistence	Relative humaneness vs brodifacoum	Comment
Cyanide pellets Feratox®	p+w	Fast	Low	High	Most humane
Zinc phosphide	p+r	Fast	Low	Moderate	Fast acting. Product registration filed June 2008
Cholecalciferol Feracol®	p+r	Moderate	Moderate	Moderate	Registered for rodents and possums
Low dose cholecalciferol +coumatetralyl	p+r	Slow	Moderate	Moderate	Dossiers in preparation for registration
Diphacinone	r	Slow	Low	Moderate	Least persistent anticoagulant
Brodifacoum	p+r	Very slow (in possums)	Extreme	Poor	Very effective but not intended for repeated field use

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