

**the science  
behind**

# THE NEWS

THE GAMMA SERIES OF THE ROYAL SOCIETY OF NEW ZEALAND

## 1080 Who's taking the bait?

**1080 is a poison used in New Zealand to kill possums. From time to time, protests against its use receive quite extensive media attention. However advocates of 1080 say that many of the protestors' objections are unfounded and those that do have substance, are a small price to pay for the benefits that 1080 brings.**

Few people would deny that New Zealand has a major possum problem. Australian brush-tailed possums were first introduced to this country in 1837 but did not survive. Successful liberations may not have occurred until 1858 (Alpha 107 – Possums). Released to be hunted for fur, conditions here were better than in Australia; there was more food, less competition and humans were their only predators. Possum populations boomed!

Today there are believed to be over 70 million possums in this country, eating around seven million tonnes of vegetation a year. In some areas they have eaten whole canopies of native bush, and they have

consumed so much of our native mistletoe that this plant is threatened with extinction.

Possums compete for food with native birds such as kaka, and they eat the eggs of kiwi, kokako, kereru and others – devastating bird populations

They also eat New Zealand's unique giant land snails. In addition they can spread a sometimes-fatal disease called bovine tuberculosis, which infects livestock, and can affect humans.

1080 poison is one of several possum control methods used throughout New Zealand. So far, it has proved the most effective. It is used by the Department of Conservation (DOC) and by many regional councils working on behalf of the Animal Health Board.

Possums infected with this highly contagious disease often stagger into open areas or paddocks to die. This causes problems if they end up in a paddock of cows or deer which, being curious animals, (young cattle and deer particularly) will come up to investigate the dying animal. They may even nuzzle or lick it, putting themselves at enormous risk of infection.

### What is 1080?

1080 is the poisonous chemical sodium fluoroacetate. It is found naturally in the leaves of certain plants that grow in South Africa, South America, and Australia, and



### How do possums spread bovine tuberculosis (TB)?

Possums living in the bush which borders farmland often forage on pasture, fruit and nut trees and other crops. They are therefore, in close contact with both feral and farmed deer and with cattle, sharing common watering and feeding areas. This allows contaminative and airborne transmission of TB to take place.





is believed to have evolved as part of the plants' natural defence against animals trying to eat them.

Sodium fluoroacetate was first synthesised in Europe in 1896. It was developed as a pesticide in the U.S. during the 1940s, and introduced to New Zealand in 1954 to control rabbits. These days we use it mainly to cull possums.

Different species of animal react differently to 1080 poisoning. Depending on the animal, 1080 can cause heart failure, central nervous system dysfunction, or a combination of both.

In New Zealand, 1080 baits are spread by hand, or dropped from planes in what

are called 'aerial drops'. The baits are about the thickness of an adult's thumb. They weigh 7–12 grams – too big for most birds to eat, but the right size for possums. These baits are flavoured with cinnamon, which is repellent to birds but attractive to possums. As an added deterrent to birds, the baits are dyed green (birds are usually attracted to things that are coloured more like seeds and berries.).

1080 drops are often carried out in winter, when the least amount of natural food is available for possums. This makes the pellets extra appealing to them.

## New Zealand – the biggest 1080 user in the world

1080 is used in parts of Australia, Mexico, Japan, the United States, and Israel. However, New Zealand uses more than all those countries put together. We use around 80% of the world's total consumption.

1080 is uniquely suited to our situation as it targets and kills ground-dwelling mammals rather than birds, and can be spread by aerial sowing over remote areas of almost inaccessible bush. 1080 isn't widely used in most areas of the world because precious native mammals could eat it. However, New Zealand is unusual in that it has few native mammals – just two species of bat, whose populations appear to be unaffected by 1080 operations.

In New Zealand, a number of wild mammals other than possums do end up being killed by 1080, but these are mainly introduced pests such as stoats, weasels, rabbits, and wild deer, which are themselves robust breeders, and destructive to the environment.

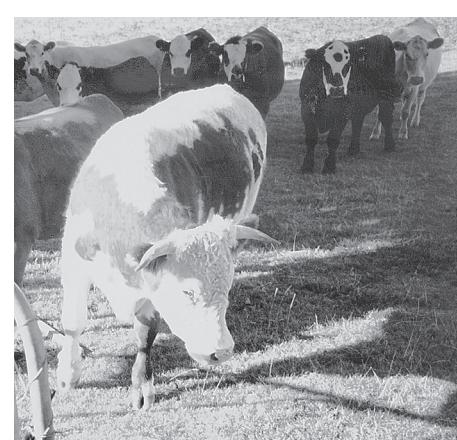
Opponents of 1080 argue that the pesticide sometimes kills native birds. Although this is true, research shows that the damaging effects on a few individual birds are offset by a major drop in predation and competition by possums and other animals. Bird populations increase after 1080 is used.

1080 can, however, be lethal to livestock and pets, so, during a 1080 operation, precautions have to be taken to ensure these animals are not at risk of consuming any baits.

## The danger to dogs and cats

Dogs are more sensitive to 1080 poison than almost any other mammals. A large dog can die from eating just one toxic bait, or from eating parts of a 1080-poisoned carcass. Especially dangerous to dogs are the guts and intestines of 1080-poisoned rabbits or possums, which are sometimes exposed by being pulled from their carcasses by predators such as hawks. These parts of the carcass are highly toxic and dogs can gobble them down quickly.

Dogs should never be taken into any area treated with 1080 poison, and they need to be muzzled if poisoned carcasses could be around. In dogs, signs of 1080 poisoning (including salivation and vomiting) may not show up until 2–8 hours after consuming the toxin. Dogs that might have eaten 1080 should be taken to a vet immediately, preferably before signs appear. The sooner they are taken, the greater the chance that



they can be effectively treated, and their lives saved.

Cats are almost as sensitive to 1080 as dogs, but are not at so much risk because they don't generally eat 1080 baits, and are not nearly as likely to scavenge meat from dead animals.

## Is 1080 dangerous to humans?

An average-sized four-year-old would need to consume around four 1080 baits to endanger their life. An adult could die from eating about a cupful. Adults are unlikely to eat baits but children should always be supervised closely when any poisons are around.

Some people are concerned that 1080 use could permanently contaminate the environment, or that 1080 could become a part of the food chain. Actually, it seems there is no danger of 1080 accumulating in the ecosystem. If an animal is poisoned, but not killed, by 1080, it will excrete the poison within 3–5 days. 1080 is biodegradable, breaking down into harmless by-products in a matter of weeks and it is water soluble, so rain speeds up the process. Because of this, 1080 baits are usually laid at times of year when the climate is wet.

While some people have worried about waterways becoming polluted by 1080 if baits are accidentally dropped into them, research has shown this risk to be practically non-existent. Traces of the poison may be found in water soon after contact with 1080, but because running water dilutes 1080 very fast, these amounts soon disperse to levels so low that they can't be measured.

## How is public safety ensured?

Under the Pesticides Act, only licensed operators can use 1080. Strict Ministry of Health conditions must also be met before permits can be obtained for 1080 operations. The public must be notified of a 1080 drop through the media, and warning signs must be put up around the area where the drop is taking place.

As a precaution against water contamination, hand-laid baits are not allowed to be placed within 20 metres of water supply intakes, and aerial baits must not be dropped within 50 metres of identifiable streams used for public or private water supply.



## How safe is 'safe'?

There are also regulations to make sure meat is not contaminated. Under the Meat (Residues) Regulations, farmers must not send animals for slaughter if they contain chemical residues above certain limits. In the case of poisons, including 1080, any detectable residue at all is unacceptable. Also, hunters are not permitted to sell game meat taken from any area where 1080 has been laid during the previous four months. (Because 1080 is so water soluble, if 100 mm of rain has fallen in the area, the period of time hunters must wait is reduced to two months.)

Even knowing that the risk from 1080 to the food chain, to the environment, and to public health is tiny, a number of people have concerns about 1080. Despite the fact that New Zealand has good rules and regulations governing 1080 use, they say that accidents can always happen and people have not forgotten that a number of pesticides that were initially said to be safe turned out to have disastrous long-term effects.

Some also believe that New Zealand's high use of 1080 may threaten its 'clean, green' image overseas, affecting meat sales especially. New Zealand's stringent



regulations seem to mean that the real risk of meat being contaminated by 1080 is tiny. But those who are worried by 1080 use say that, even if the risk is low, there is a general unease about pesticide use among many members of the public, and this feeling may be enough to damage our country's meat export industry.

## An antidote to 1080?

An antidote for 1080 has been developed by scientists at HortResearch from trials that began in 1998, in conjunction with Landcare Research. So far, the antidote has been successfully tested on chickens, rats, rabbits and sheep, but it is not yet available commercially.

## Alternatives to 1080

1080 is not the only way to get rid of possums. Trapping works in some areas, but in many places the terrain and vegetation make it dangerous or impractical. Trapping is tough, labour-intensive work and at present there are not enough people interested in doing it for it to make a huge impact. A further drawback is that poor trapping techniques can harm ground-dwelling native birds such as kiwi and weka.

Cyanide is sometimes used to poison possums, but it can be lethal to some ground-dwelling native birds, as it is difficult to place it in a way that is not accessible to those birds. Secondly, the cyanide emits hydrogen cyanide gas, which can be dangerous to hunters and people working



with it. Thirdly, the poison is so fast acting, that if a person or animal were to accidentally consume a fatal dose, they would have little or no chance of survival.

Some people have suggested that possums could be sterilised to control their breeding. This would have to be achieved through genetic engineering. At the moment, a solution like this is a long way off, and it might not be acceptable anyway.

1080 may not be the perfect solution to the possum problem, but it seems to be the best available at the moment. New Zealand's forests are protected under law for their indigenous biodiversity and we have international obligations to protect our remaining native plants and animals. 1080 advocates say that this has to be a priority.

## More information

**Alpha 107 – Possums** – order from the Royal Society of New Zealand PO Box 598 Wellington Tel: 04 472 7421 fax: 473 1841 email sales@rsnz.org Or order online at <http://www.rsnz.org>

## Websites:

- <http://www.doc.govt.nz/Conservation/002~Animal-Pests/Poossums/index.asp>
- [http://www.doc.govt.nz/Conservation/002~Animal-Pests/Poossums/Poosum-Control-\(Facts-About-1080\).asp](http://www.doc.govt.nz/Conservation/002~Animal-Pests/Poossums/Poosum-Control-(Facts-About-1080).asp)
- <http://www.wrc.govt.nz/lm/poison.htm>
- <http://www.piopio.school.nz/possmngt.htm>

## Articles and reports:

Department of Conservation, Report to the IUCN on the use of 1080 vertebrate pesticide in Te Wāhipounamu *World Heritage Area*, 19 June 2002

Mike Gould, 'Poisoning fears could force New Zealand's hand on 1080', *Evening Post*, April 22, 2002, page 7

John McLaren, 'Treatment of 1080 Poisoning in Dogs', *Vetscript*, March 1999, page 3

## Acknowledgements

Author: Johanna Mary, Wellington

Editors: Colin Walker and Ruth Munro

Thanks for information and comments from: Geoff Keey, Biosecurity/Awareness Officer, Royal Forest and Bird Protection Society of New Zealand, Inc

Mike Gould, Chairman, Possum New Zealand Inc.

Wayne O'Donnell, Manager Biosecurity, Wellington Regional Council

Photos C. Walker

Thanks for review from Bruce Hicks, PhD (Lond.) and Ian McIvor, M.Sc., Dip. Ed., Admin., Palmerston North

**THE SCIENCE BEHIND THE NEWS;** the GAMMA series of **The Royal Society of New Zealand** is produced to bring you accurate, up-to-the-minute information on science issues in the news. Future issues are obtainable on subscription which will bring you such information as soon as possible after news items appear. Annual subscription is \$25.00, payable to The Royal Society of New Zealand, P O Box 598, Wellington. Fax (04) 473 1841. Email: [sales@rsnz.org](mailto:sales@rsnz.org) Other issues in the GAMMA series are:

- Genetically modified foods
- BSE – Mad Cow Disease
- Rabbit Calicivirus
- The invasion of the moths
- Hello Dolly – cloning
- Superbugs
- Cell phone towers and health
- Cutting through the hype on vaccinations
- El Niño
- Mercury fillings
- Sun, skin and cancer
- Cosmic collisions
- Asian tiger mosquito
- Water, water everywhere
- Asthma
- Tattoos and body piercing
- Diabetes
- Arthritis
- Drugs in sport
- Genetically modified food 2
- Genetic technology in health

- Environmental aspects of genetic engineering
- Genetic engineering off the field
- Genetic engineering and ethics
- Foot and mouth disease
- The promise of stem cell research
- How now mad cow
- Food labelling
- Organic food
- Anthrax
- Weight of the world – Obesity
- Eating disorders

FIRST ESTABLISHED IN 1867, The Royal Society of New Zealand has a long and proud history of representing scientists and fostering scientific endeavour in New Zealand. It is an independent, national academy of sciences, and a constituency of scientific and technological societies. It is also an association for the advancement of science and technology which includes the promotion of science and technology within New Zealand, and the fostering of international scientific contact and co-operation. Its membership currently comprises 215 elected Fellows, 9 regional branches, 76 constituent scientific and technological societies, and nearly 20,000 scientists, technologists, technicians and lay members.

