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PRIVATE LANDOWNERS' GUIDE TO POSSUM CONTROL

CONTROL TOOLS AND TECHNIQUES

PRODUCED BY



National Pest
Control Agencies

ABOUT NPCA AND BIONET

This document was published by NPCA (National Pest Control Agencies) which, until part way through 2018, provided a co-ordinating forum for agencies and stakeholders to address vertebrate animal pest control in New Zealand. In 2018 its role was transferred to the Ministry for Primary Industries under its Bionet brand.

PUBLICATIONS

Most of NPCA's publications on animal pest control were partially updated in April 2018 and transferred to the library section of the Ministry for Primary Industries' 'Bionet' online portal. The updates reflect the transfer and also acknowledge the change in the regulatory regime during 2017 and 2018, while not fully incorporating these changes in the interim, pending further reviews of the publications. Written by experienced practitioners, the main titles cover:

- best practice guidelines on controlling and monitoring vertebrate pests; and
- information about relevant regulations.

The transferred publications can be found at www.bionet.nz/library

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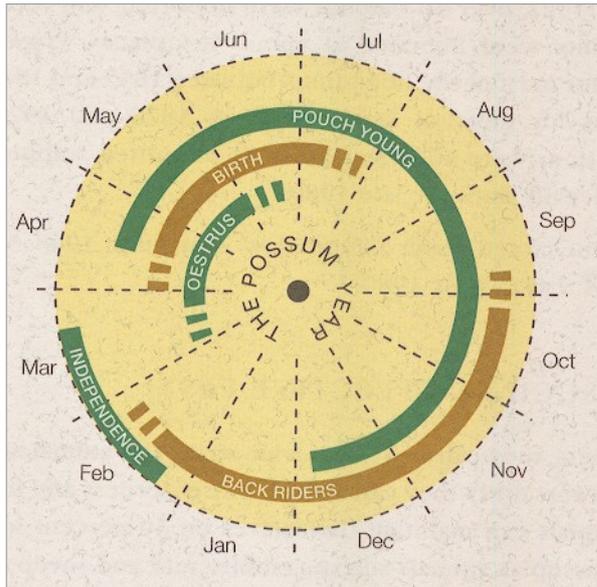
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PART 1. ABOUT POSSUMS

The brushtail possum (*Trichosurus vulpecula*) was first introduced to New Zealand from Australia in 1837 to establish a fur trade. Today, they number about 30 million, spread across all of the mainland.

Possums can live for more than 12 years. Females usually breed after their first year and typically bear one offspring per year in the autumn (March-May). If abundant food is available they may give birth again in spring (September-November).



Typically possum young are born in autumn, carried in the mother's pouch and then on her back until they become independent in late summer.

Diagram courtesy Department of Conservation

Possums are largely solitary and have defined home ranges, but they can share all or part of their range with other possums. The young remain with their mothers for 5-8 months, after which males, and to a lesser extent females, may disperse up to 20 km away.

Possums are omnivores, meaning they eat both plants and meat. Their highly varied diet includes leaves, ferns, fruit, seeds, bark, flowers and flower buds, invertebrates, bird eggs and chicks.

Their ability to eat a wide range of food helps them survive in diverse habitats and when some foods become scarce or disappear. Their ability to breed more often food supply increases and to disperse widely also enables them to spread into new areas and to rebound quickly after control operations. They can survive in a wide range of habitats but reach their highest numbers (as many as 25 / hectare) in podocarp-broadleaf forests and along the margins between native forest and pasture.

PART 2. THE POSSUM PROBLEM

Like landowners all over New Zealand, you may want to control possums on your property.

This booklet provides practical guidance to help you choose the possum control method(s) that will suit you best, together with simple 'how to' instructions for getting started..

2.1 Why are possums such a problem?

Possums are among the most damaging pest animals in New Zealand - spreading Tb, damaging gardens and crops, and threatening our native ecosystems.

2.1.1 Bovine tuberculosis

Possums pose an economic threat to New Zealand farmers, because they carry and spread Bovine tuberculosis (Tb), a bacterial disease that can affect humans (although it is very rare now that dairy products are pasteurised), as well as cattle, deer, pigs, ferrets and cats. New Zealand could be prevented from exporting beef, venison and dairy products to prime markets if Tb is not controlled to required standards.

Bovine Tb is spread to cattle by possums by direct contact; probably when cattle lick or sniff sores on sick possums. The disease is passed easily amongst possums, providing a self-sustaining reservoir of the disease. However, where possum populations are reduced and maintained at sufficiently low numbers, the disease dies out. Reliant on this successful approach, 2.73 million hectares were declared Tb free to the end of 2020 by OSPRI.

! Safety tip

Possums with Tb may have small sores under the front and hind legs and around the groin area. The sores may have green, yellowish pus. If you find a dead possum that you suspect has Tb, place it in a plastic bag and store it in a cool place until you can contact your nearest Ministry of Primary Industries (MPI) office.

Remember that you can become infected by handling the possum, so always disinfect any clothing that may have been contaminated and wash your hands and other exposed skin thoroughly.

2.1.2 Damage to agriculture, horticulture and forestry

Possums feed on pasture plants, especially clover and herbs, and they may travel up to 1.5 km each night to feed in pasture. Although small on a national scale, pasture losses to individual farmers can be quite substantial.

Possums will also feed on a wide range of exotic plant material and have seasonal preferences, such as spring leaf growth on willow or poplar trees, and autumn fruit and crops. Favourite possum food in the garden includes:

- *Fruits*: apples, citrus fruit, peaches, plums
- *Vegetables*: carrots, parsnips, cabbages, beans, parsley, turnips, corn, swedes, potatoes, peas and silver beet
- *Flowers*: roses, carnations, polyanthus, godetia, cyclamen and gladioli
- *Exotic trees*: willows, poplars, oaks, pines and walnuts.

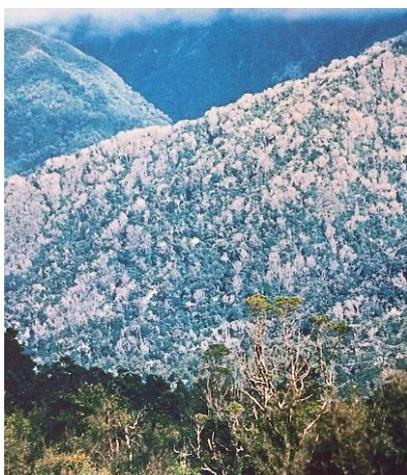
Possums frequently damage shelterbelts, forestry and erosion control plantings. Damage to

pine forests is greatest in young stands, when possums browse the shoots and strip the bark, occasionally killing up to half of the trees.

2.1.3 Damage to natural ecosystems

Possums threaten natural ecosystems by eating leaves, flowers, leaf buds, fruit, eggs, birds, insects and snails.. They have strong preferences for certain plants such as rata, fivefinger, fuchsia, kamahi and kohekohe. They eat these preferred plants first until those species gradually disappear from the area. In this way, they can change the species composition of native forests and even cause the total collapse of the forest canopy in places where preferred species were abundant.

Possums also threaten the survival of native birds by competing for food, especially flowers and fruits; competing with birds such as kiwi for den sites; and preying on the eggs and chicks of native birds, including such rare species as the North Island kokako.



Forest damage caused by possum browse (left) and the rare North Island kokako (right) which is vulnerable to possum predation of eggs and chicks. The image on the right is from a short time lapse video showing a possum raiding a kokako nest. That video can be seen here <https://teara.govt.nz/en/video/16899/possum-eating-a-chick>



Possum bark biting on a fivefinger tree.

PART 3. ARE POSSUMS A PROBLEM ON YOUR PROPERTY?

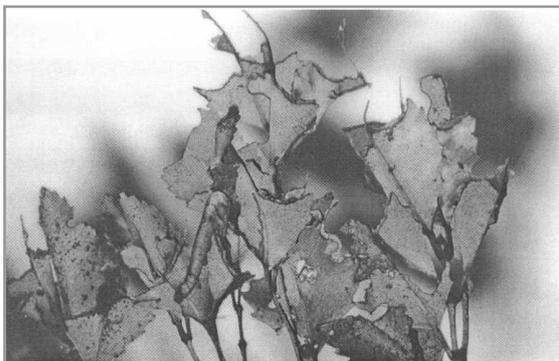
3.1 How do I know if possums are on my property?

You are unlikely to see possums because they are nocturnal and sleep during the day BUT you can learn to recognise signs that they are present.

- **Trails:** possums follow regular trails (often called “possum pads” or “runs”) into crops. Look for narrow tracks of flattened grass through paddocks, or narrow trails off ridges through forest.
- **Trees:** bark may be worn smooth and claw marks seen on the bark or around the base of preferred trees. Look also for territorial “bite-marks” on the base of trees.
- **Droppings:** droppings are small, rounded pellets about the size of jelly beans, generally dark green in colour. In pine forest, when the catkins turn yellow, look for yellow possum droppings.
- **Foraging damage:** possums often bite the new buds off fruit trees and the new growth of roses. They may also eat the peel of lemon or other citrus fruit and bite or entirely consume vegetables. Possums often leave jagged leaf stumps when they tear the leaves from plants.



Possum trail or run (left) and possum droppings (right).



Possum browse on leaves and bark biting (right)



Possum browse on a wheki, tree fern (left) and unbrowsed fern (right)

More information on identifying possum sign is available online at

<https://www.pestdetective.org.nz/>

3.2 How can I minimise possum damage on my property?

The best way to prevent possum damage is to get rid of the possums! However, there are some other things you can do to protect your garden and trees.

- **Eliminate favoured nesting sites** such as in roofs, under floors, in holes and crevices of trees and stumps, in dry holes in banks and underneath tree roots, flax and dense vegetation. Repair loose weatherboards and block other potential entryways into buildings. Remove dense vegetation and piles of logs and tree stumps.
- **Protect preferred trees** using a metal or plastic band wrapped around the tree trunk. This will only work, though, if the tree's canopy is not linked with other trees. Protect tree seedlings and shrubs with covers or cages.



Metal and plastic sleeves used to prevent possums damaging trees. Photo courtesy Pest Control Research Ltd

- **Spray plants with repellent** to deter possums. Purchase commercial brands such as Plantskydd® or Treepel™. Alternatively, make your own mixture.

<i>Possum repellent recipe 1</i>	<i>Possum repellent recipe 2</i>
5 fresh eggs	→ 10 parts melted mutton fat
600 ml of water	→ 1 part kerosene.
150 ml acrylic paint	Mix well and allow mixture to set. Then
Stir the mixture well and spray 20 ml per tree.	wipe each tree with lightly greased gloves or a cloth.

PART 4. CONTROLLING POSSUMS

4.1 What method of control should I use?

There are three main options for controlling possums on your land.

1. **Shooting:** Shooting possums at night by spotlight can be an effective control method in small orchards and stands of trees surrounded by pasture. As it more labour-intensive, it is usually significantly more expensive than poisoning and trapping and is not economic for larger areas. When used in a larger rural context as an initial knockdown method, it always needs to be followed up with additional methods.

! **REMEMBER:** shooting is only an option in rural areas and anyone using a firearm is legally required to hold a current firearms license.

2. **Trapping:** In urban areas or close to houses, kill traps are a good option for possum control, since neither shooting nor poisons are appropriate. The use of leg-hold traps in urban areas is prohibited. Trapping is a good option in rural areas where leg-hold or kill traps can be used although you must have permission from the householder of any house within 150m to be able to use a leg-hold trap – check with your neighbours. By law, leg-hold and any other live capture traps must be checked within 12 hours of sunrise, preferably as soon as possible. Kill traps can be checked when necessary.
3. **Poisoning:** Using poison baits is generally less labour intensive than trapping so it can be a feasible option for rural properties. Typically, some form of poisoning will be part of a long term possum maintenance control regime.

Combine control methods strategically. It is usually a good idea to mix and match a range of techniques. This can be tailored to any situation dependent mainly on property size and possum density. What is being done on adjacent properties will also make a difference, with collaborative effort among neighbours obviously ideal. Some example scenarios;

Large rural property

Initial knockdown of high populations using an intensive leg-hold trapping and feratox strategy. Although labour intensive, this approach is well proven. Traps will need to be checked daily, and as a license is required to obtain and use Feratox (encapsulated cyanide). It may be efficient to engage a professional contractor for this initial stage. Night-shooting in the early stages given good visibility/bare trees can be useful, but shooting is insufficient on its own

Once numbers are down, a permanent bait station grid spaced at 100-150 metres in suitable habitat can be deployed using PestOff brodifacoum bait or Double Tap. Perhaps alternating toxin types over time. The number of annual applications may be one or more depending on the amount of immigration. The pulse baiting approach will further benefit from a supporting network of permanently active kill traps, such as the Warrior, AT220, Possum Master or Flippin Timmy.

Smaller rural property

Due to smaller property size and hence fewer total possum numbers, a bait station/kill trap grid can be employed from the start. Initially Cholecalciferol or Double Tap can be used in bait station, with brodifacoum suitable once consumption levels have dropped off. None of these baits require a license to use. Some night-shooting may be appropriate in the initial stages, as is deployment of some leghold traps. Leghold traps have an excellent catch efficiency and are

always useful for targeting those possums that will not interact with kill traps or have become bait shy. Remember, neighbour's permission is required to leg-hold trap within 150m of their dwellings, or anywhere there is risk of catching their pets.

Urban property

Kill or cage traps are suitable in urban settings, using fruit baits not attractive to cats. Brodifacoum bait is also an option, as long as the bait stations are kept out of reach of dogs and children.

PART 5. TRAPPING POSSUMS

5.1 What type of trap should I use?

Possum traps come in three main categories of possum traps: kill traps, live traps and leg-hold traps. In choosing which category of trap to use you should consider the following questions.

- **Ease of use.** Do I have the expertise to set a trap effectively? Do I have enough time to check the traps after I have set them? Am I prepared to kill the possum once I have captured it?
- **Effectiveness.** How effective is the trap at catching possums?
- **Risk to non-target species.** Will pets, stock and native birds be at risk?
- **Cost.** How large an area will I want to cover? How many traps will I need to use?
- **Animal welfare.** How humane is the trap at capturing or killing possums? Has the trap passed NAWAC (National Animal Welfare Advisory Committee) welfare testing?

See the following sections for more detailed information on the types and use of traps for each category.

5.2 Kill traps

Kill traps are a cost-effective method of capturing and humanely killing possums. They do not need to be checked daily.

Kill traps can pose a risk to pet animals and ground birds such as kiwi and weka. The Department of Conservation recommends kill traps be raised to a height of at least 1.3 metres if ground dwelling birds may be present. Traps can be attached directly to a tree or post, or set on a leaning board to achieve the recommended height of 1.3m. Leaning boards should be placed at an angle of at least 55 degrees.

Other non target species may include pest and children. Minimise risk by raising the trap above ground level, and baiting with fruit or vegetable baits.

Commonly available kill traps are described below;

5.2.2 Types of kill traps

The Timms Trap	
Materials:	Tough polyethylene plastic with internal metal components.
Size & weight:	Bulky, approximately 1.25 kg
Animal welfare:	This trap has not met the NAWAC guidelines because one possum escaped and those guidelines stipulates an escape is unacceptable. The trap is legal to use in New Zealand.
Set-up:	Use stakes provided to hold trap firmly on the ground. Alternatively raise the set on a tree or post, or using a leaning board. No setting tools required.
Suitability:	Suitable for gardens and around houses, to keep a small number of possums from the area.
Non-target risk:	Risk to non-target species. This can be reduced by using a raised set and using only fruit or vegetable baits. Where native ground birds may be present DOC recommends kill traps be raised 1.3m, and leaning boards on at least 55 degree angle. Otherwise see manufacturer instructions.
Availability and instruction:	For more information on this trap see www.stallion.co.nz/timms-possum-trap



Possum killed in a Timms trap. Photo courtesy Wellington Regional Council

Flippin Timmy (a modified version of the Timms Trap)	
Materials:	Tough polyethylene plastic with internal metal components.
Size & weight:	Bulky, approx. 1.25 kg
Animal welfare:	This trap has met the NAWAC guidelines.
Set-up:	Raised set on a tree or post, or using a leaning board. No setting tools required.
Suitability:	Suitable for bush fringes, gardens and around houses.
Non-target risk:	Where native ground birds may be present DOC recommends kill traps be raised 1.3m, and leaning boards on at least 55 degree angle. Otherwise see manufacturer instructions.
Availability and instruction:	For more information on this trap see www.envirottools.co.nz



Flippin Timmy. Photo courtesy www.envirottools.co.nz

The Sentinel Trap	
Materials:	Metal spring with plastic cover
Size & weight:	Compact, lightweight (550 gms)
Animal welfare:	This trap has met the NAWAC guidelines.
Set up:	Raised set on a tree or post, or using a leaning board. No setting tools required.
Suitability:	Suitable for remote areas as compact & lightweight.
Non-target risk:	Where native ground birds may be present DOC recommends kill traps be raised 1.3m, and leaning boards on at least 55 degree angle. Otherwise see manufacturer instructions.
Availability and instruction:	For more information on this trap see www.traps.co.nz



Sentinel kill-trap and trap cover (left), possum killed in a Sentinel trap (right). Photo courtesy Pest Control Research Ltd

The Warrior Trap	
Materials:	All metal trap
Size & weight:	Compact, 890 gms
Animal welfare:	This trap has met the NAWAC guidelines.
Set up:	Raised set on a tree or post, or using a leaning board. A setting tool is required, and is a critical safety device to hold the trap open while baiting or adjusting the trap.
Suitability:	Suitable for remote areas because of compact design.
Non-target risk:	Where native ground birds may be present DoC recommends kill traps be raised 1.3m, and leaning boards on at least 55 degree angle. Otherwise see manufacturer instructions.
Availability and instruction:	For more information see www.combinedindustries.co.nz

! WARNING This is a powerful trap with “by-pass” jaws. Children **MUST** be prevented from interfering with traps. Do not set in places where inquisitive adults or children are likely to be. If caught they will not be able to free themselves.



The Warrior Trap. Photos courtesy of Greater Wellington Regional Council.

The Possum Master Trap	
Materials:	Plastic with metal components
Size & weight:	Lightweight (approx. 500 grams)
Animal welfare:	This trap has not met the NAWAC guidelines. It is legal to use in New Zealand.
Set up:	Raised set on a tree or post, or using a leaning board. No setting tools required.
Suitability:	Suitable for remote areas because of lightweight and stackable design.
Non-target risk:	Where native ground birds may be present DOC recommends kill traps be raised 1.3m, and leaning boards on at least 55 degree angle. Otherwise see manufacturer instructions.
Availability and instruction:	For more information see www.connovation.co.nz



The Possum Master trap, raised sets (photos courtesy of Greater Wellington Regional Council).

Trapinator	
Materials:	Plastic with metal components
Size & weight:	Lightweight. They are stackable, fitting into each other for ease of use in the field.
Animal welfare:	This trap has met the NAWAC guidelines.
Set up:	Raised set on a tree or post, or using a leaning board. No setting tools required.
Suitability:	Suitable for remote areas given light weight and stackable covers.
Non-target risk:	Where native ground birds may be present DOC recommends kill traps be raised 1.3m, and leaning boards on at least 55 degree angle. Otherwise see manufacturer instructions.
Availability and instruction:	For more information see www.traps.co.nz



Image from www.traps.co.nz



Image provided Greater Wellington Regional Council

SA2 kat trap	
Materials:	Robust metal spring trap.
Size & weight:	Moderate weight, for long term deployment in one place.
Animal welfare:	This trap has passed testing to the NAWAC guidelines.
Set up:	Raised set on a tree or post, or using a leaning board. No setting tools required.
Suitability:	Suitable for low density possum control.
Non-target risk:	Where native ground birds may be present DoC recommends kill traps be raised 1.3m, and leaning boards on at least 55 degree angle. Otherwise see manufacturer instructions.
Availability and instruction:	For more information see www.deadrat.co.nz



SA2 kat trap Image by www.deadrat.co.nz

AT220	
Materials:	Metal and wood construction. A self-resetting and rebaiting trap by a rechargeable battery powered electric motor.
Size & weight:	A moderately bulky trap intended for long term deployment in one place.
Animal welfare:	This trap has passed testing to the NAWAC guidelines. It is legal to use in New Zealand.
Set up:	Raised set on a tree or post, or using a leaning board. No setting tools required.
Suitability:	Suitable for low density possum control
Non-target risk:	Where native ground birds may be present DOC recommends kill traps be raised 1.3m, and leaning boards on at least 55 degree angle. Otherwise see manufacturer instructions.
Availability and instruction:	For more information see https://nzautotraps.com/



AT220 trap Image by NZ auto traps

5.2.3 How do I use kill traps?

Where and when to place the traps

- Place on the ground or on trees and set the mechanism as appropriate to the trap type. In suitable possum habitat spacing should be 100-150 metres.
- Locate near possum dens, trails or favourite food sources. Possums will avoid travelling through wet long grass and thick weeds. If possums are living under your roof, try placing traps on the ceiling rafters.
- Cats and dogs are less likely to be attracted to kill traps if they are baited correctly (see below). However, if you fear that children might interfere with the trap, un-set the trap each morning and re-set it in the evening.

Baiting the traps

- **Fruit and vege baits.** Use apple, citrus, kiwifruit or carrots. These are especially good in Timms traps. Cut into 25-mm chunks (quarters for apples and oranges). If the baits are too small or too large, the possum will not set off the trigger when it takes the bait.

Some similar baits can be placed around the trap to get possums attracted to the bait, and so encourage them to then also try the bait in the trap.

If you do not catch any possums, replace the bait every 2-3 days. Try varying the bait from time to time, including something different from their usual food. For example, if they love your apple tree, try tempting them with citrus or kiwifruit. Do not use meat baits attractive to cats.

- **Long-life baits.** These are ideal for all kill traps especially the traps where the possums need to pull on the bait to trigger the trap. They do not require checking as frequently as fruit and vege baits. Examples include: peanut butter pushed into grooves on a rat-resistant bait clip (e.g. Sentinel Kill Trap) or long-life cereal baits (called polymer baits) that are specifically designed for kill traps that contain lures, such as cinnamon, aniseed or raspberry. Some other commercially available long life baits include Connovations smooth lure, NARA lures, as well as various options from trap manufacturers. However

be aware that some long life paste baits may be attractive to cats.

- **Lures.** Sprinkling a lure (such as almond or vanilla essence, curry, jelly crystals, cinnamon or aniseed) on the bait can attract possums. Alternatively, mix the lure with 1/4 cup flour and sprinkle this mixture in front of the trap entrance.

! **PRECAUTIONS:**

- **REMEMBER:** Where ground birds such as kiwi or weka are present, Department of Conservation recommends kill traps be raised at least 1.3 metres above the ground.
- Keep the traps out of reach of children and pets.
- Do not bait traps with meat or bread and jam because it may attract cats. If fruit baits are used, it is less likely that cats or small dogs will be attracted to the traps.

Checking the traps

- Kill traps should be checked regularly. There is no scientific evidence to show that dead possums in or near traps will deter possums from being captured.

5.2.4 How to dispose of dead possums

- Check for young possums, which may be in the mother's pouch. Humane methods of killing young possums is to crush their skull with a sturdy bar or stick, or decapitate them.
- Dead possums can be buried, perhaps at the base of a young tree.

- !** **REMEMBER:** Always wash your hands thoroughly after handling possums, as they carry parasites and diseases such as giardia and Tb.

More information

See Bionet booklet "*Kill traps: a guideline to trap possums, ferrets, stoats and feral cats using kill traps*" for more detailed information. See www.bionet.nz

Predator Free 2050 has also published a useful booklet on trapping <https://www.doc.govt.nz/globalassets/documents/conservation/threats-and-impacts/pf2050/pf2050-trapping-guide.pdf>

5.3 Live capture traps

Live capture traps can be divided into two categories – Cage/box type traps, or leg-hold traps. A disadvantage of all types of live capture traps is that they must be checked daily. And the user must be willing and competent to kill the possum. You must have a plan of action for to kill any possums caught. It is illegal to release pest animals.

Cage/box traps are designed to capture possums alive without hurting them. They can be used close to houses and in urban areas. While other animals may be caught they can be released unharmed. Pets are less likely to be attracted to a fruit bait, and deterrents such as a curry/pepper and flour mix around the cage entrance may also help deter inquisitive cats.

Leg-hold traps restrain animals with a clamping force on the leg, and therefore have restrictions on use to prevent non-target animals such as birds of pet cats being caught. They must to be set away from public areas where children or domestic pets are present. Permission is needed to set a leg-hold trap within 150m of any dwelling, or where a risk of catching companion animals exists. Their advantages include that they are lighter and smaller than cage (or kill) traps and easier to place in the field. This makes leg-hold traps suitable to use in remote areas that have difficult access. Ground set leg-hold traps are considered to be

more effective at catching possums than all other trapping methods.

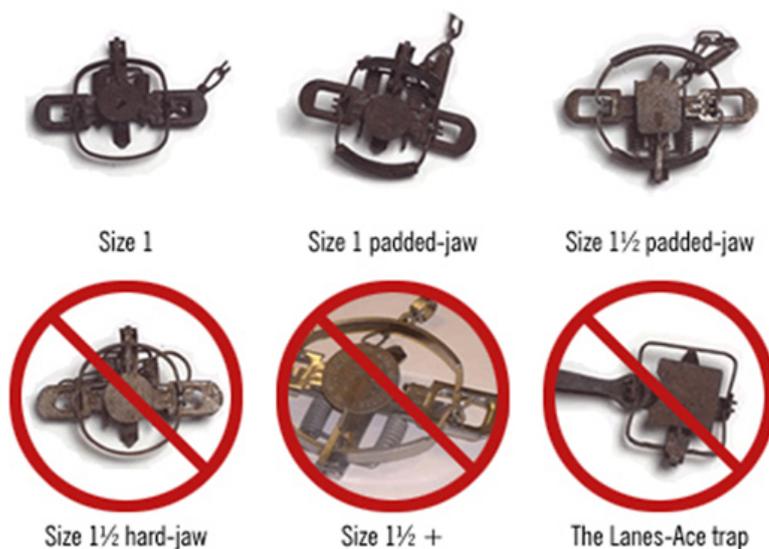
- ! **IMPORTANT NOTE:** The Animal Welfare Act 1999 requires all live capture traps to be checked daily within 12 hours of sunrise (refer section 36 of the Act where remote trap monitoring devices are used).

The Animal Welfare (leg-hold traps) Order 2007 prohibits certain traps, and prescribes conditions of use. The following advice is taken from the Ministry for Primary Industries website www.mpi.govt.nz (accessed March 2021). Leg hold traps may not be used within 150 metres of a dwelling without the express permission of the occupier or in any area where there is a probable risk of catching a pet animal.

Double-coil traps

Only size 1 and size 1-and-a-half double-coil traps may be sold or used. Double-coil traps larger than size 1-and-a-half are prohibited.

Size 1-and-a-half double-coil traps must be padded. They must be manufactured with padding on the jaws – they cannot be modified to make them padded.



For effectiveness, the preferred leg-hold trap is the No.1 unpadded trap. Padded traps can be used to reduce injuries to trapped animals but tend to have higher escape rates.

5.3.1 How to use a cage or box trap

- Set the cage on a known possum “pad run” - a track used by possums - or set at the base of a tree showing possum scratch marks up the bark. Make sure it is in a shady spot by day to protect the possum from the sun the next morning.
- A firm quarter of apple, kiwifruit or orange is a good bait. A coating of cinnamon and flour, and a little of this sprinkled around the cage entrance acts as a lure.
- Change untouched bait every couple of days.

- When you discover a possum has been caught, cover the cage with a sack or cloth until it can be destroyed. It will help stop the animal from becoming distressed. Keep pets and children away



Baiting a cage trap. Photo courtesy Auckland Regional Council

5.3.2 How to use leg-hold traps

! REMEMBER:

- Leg-hold traps cannot be legally used in urban areas.
- Avoid using them where stock, pets or children could be caught in the traps.
- If kiwi or weka are present in the trapping area raise the traps above the ground (70 cm for kiwi, 100 cm for weka), either on a platform or bracket, or where a leaning board is used, at an angle of at least 55 degrees.
- Place traps in areas where you know possums visit, such as near food sources, along possum pads or close to dens. If you are controlling possums over a large area, place traps at evenly-spaced intervals (about 50m) throughout the area in an approximate grid pattern.
- Clearly mark the location of each trap with flagging tape or similar marker so the trap can be found later.



Leg-hold traps raised above ground level to prevent the capture of ground birds such as kiwi and weka. Note the chain is attached near the ground so that the captured possum can reach the ground when caught. Photos courtesy Pest Control Research Ltd.

- Secure the trap to a tree or log, using a staple or tying cord, to ensure that the trap cannot be removed.
- For ground sets, place the trap about a hand width's distance in front of the tree.
- Clear the trap site of any vines or saplings that might entangle possums. Do not cover the trap with sticks or rocks.
- Encourage possums to visit the leg-hold traps by smearing a mixture of 5 parts flour and 1 part icing sugar to make a blaze on the tree or log to which the trap is attached. Make a blaze 10-50 cm above the ground, this will act as a visual attractant to the possum.
- Check each trap within 12 hours of sunrise on the day after it was set.

5.3.3 How to kill live captured possums

The requirement for acceptable euthanasia is to render the animal irreversibly unconscious as quickly and painlessly as possible. Killing a possum in an acceptably safe and humane manner requires some skill, as does removing a live animal from a trap safely (in the case of cage traps) so it can be killed. Drowning of animals is a prosecutable offence under the Animal Welfare Act (1999) due to the prolonged suffering caused. Three acceptable euthanising options are described below.

Shooting

A humane method of destroying a possum is by shooting, as – done properly – it is quick. It has the advantage that the live animal does not need to be removed from the trap. However, be aware of the following legal requirements and usage considerations,

- Shooting is not an option in urban areas or settlements
- All users of firearms must be licensed or must operate under the direct supervision of a licensed person. Although a licence is not required to legally use air rifles and pistols (provided the user is over 18 years of age), most air pistols deliver muzzle velocities less than 120 m/sec, which are insufficient to kill possums or feral cats with a single shot.
- To achieve a humane kill it is important the firearm user knows where to place the shot to achieve maximum effectiveness. The possums head (between the ears) is the most effective place.
- Using firearms at close range or in an area with hard surfaces can pose risks from bullet ricochet to the user or observer, and caution must be observed at all times.

Blow to the head

This involves striking the animal on the head with a hammer, bar or stout wooden stick. If the animal is likely to move before or as it is struck, restrain it first by holding the tail or using a net or forked stick. Operators must be confident and strong enough to ensure the blow(s) stuns the animal immediately and/or kills it. Strikes should crush the skull between the ears to be effective. If there is any doubt about whether the stunned animal is dead from blows to the head, the throat should be cut to ensure it dies quickly from blood loss.

This method is quick and humane if done properly, and a practical option for leg-hold traps. For

cage or box traps however, it requires the operator to first remove the live animal from the trap – this requires considerable skill.

Put down by vet

Alternatively, take the caged animal to the vet for euthanising. However, the time transporting in the cage will cause the animal additional distress. Taking a possum caught in a leg-hold trap to a vet is not a practical option.

Make sure you have checked with a local vet that they are able and willing to perform this service at short notice before setting any traps.

- ! **REMEMBER:** Many possums may be trapped either with a pouch young or a back-rider, and it is important that these are killed humanely either by crushing the skull of larger back-riders, or decapitation of pouch young.

5.3.4 Disposing of possum carcasses

Dead possums can be buried, perhaps at the base of a young tree.

- ! **REMEMBER:** Always wash your hands thoroughly after handling possums, as they can carry parasites and diseases such as giardia and Tb.

More information

See Bionet booklet '*Leghold traps: a guideline for trapping possums, ferrets and feral cats using leghold traps*' available at www.bionet.nz

PART 6. POISONING POSSUMS

Like all poisonous substances, poison baits for controlling possums are dangerous to humans and animals and must be treated with care to prevent accidental poisoning. Poison baits can be easier than traps to use in the field because they are lighter and don't need to be checked daily. However, as with traps, they can kill non-target animals such as pets, stock and native birds and they can persist in the environment.

Information is provided in the following section about the main poisons used for possum control to assist you:

- compare and weigh up the advantages and disadvantages of each poison.
- learn how to use each type
- learn how to use bait stations.

6.1 Safety aspects of using poisons

When using any of the poisons described in this guide, you should **MUST** follow the LABEL instructions.

READ THE LABEL – FOLLOW LABEL INSTRUCTIONS

For more information regarding accidental poisoning

- Ring the National Poisons Centre at 0800 764 766
- Call 111 in case of emergency

6.2 What type of poison should I use?

Poisons the public can use without a license

Various poisons are currently available to the public for possum control without any licence requirements:

- Brodifacoum (anticoagulant poison)
- Pindone (anticoagulant poison)
- Cholecalciferol
- Sodium Nitrite
- Double-Tap (a “combo” bait containing both cholecalciferol and diphacinone).

Poisons requiring a licence

Cyanide poisons are also widely used for possum control on private land, but operators must hold a controlled substance license (CSL).

Zinc phosphide and 1080 are other toxins requiring a CSL, but they are not intended or available

for private use. Therefore these toxins are not further considered in this document.

To obtain a controlled substances License you will need to undergo training and meet various other requirements. For more information see: www.worksafe.govt.nz

Which poison bait(s) to use?

In choosing which poison bait to use, consider the following questions.

- **Licence requirements.** Is a controlled substance licence required, and is the licencing cost justified?
- **Effectiveness.** How effective is the poison at killing possums? For what types of possum populations is the poison appropriate (e.g. low, high, bait-shy populations)?
- **Cost.** How cost-effective is the poison, given the population density?
- **Risk to non-target species.** What are the potential risks to humans? What are the risks for stock, pets and native birds?
- **Environmental factors:** Are there environmental risks to consider?

These considerations are summarised in the following table and more detailed information about each of the poisons listed is then provided in the following section.

More information

For more detailed information on use of toxins, refer Bionet guide "*B2 Vertebrate Toxic Agents – minimum requirements for safe use and handling*" available at <https://www.bionet.nz/assets/Uploads/B2-Vertebrate-Toxic-Agents-Guidelines-2018-04-LR.pdf>

	Brodifacoum (Pestoff®)	Pindone (Pindone Possum Pellets)	Cholecalciferol (FeraCol®, Decal)	Diphacinone and Cholecalciferol (Double tap)	Sodium Nitrite (Bait Rite)	Cyanide paste (Trappers cyanide)	Encapsulated cyanide (Feratox®)
License needed?	No	No	No	No	No	Yes	Yes
Effectiveness	Effective against possums that have developed bait shyness or when possum numbers are low	Questionable effectiveness for possum control	Effective for reducing medium to high possum populations to low levels	Effective for reducing medium to high possum populations to low levels	Effective for reducing medium to high possum populations to low levels	Any sub-lethal poisoning leads to bait shyness and decreased catches	Effective for reducing medium to high possum populations to low levels. Encapsulation solves the bait shyness issue c.f. cyanide paste
Cost	Expensive if possum numbers are high.	Possums must eat large amounts of bait to be killed.	More expensive than some other baits, prefeeding can make it cost-effective	More expensive than some other baits, prefeeding can make it cost-effective	More expensive than some other baits, prefeeding can make it cost-effective	Low cost of bait, though licensing costs apply	Relatively low cost of bait, and licensing costs apply
Non-target risk	Risk of secondary poisoning	Lower risk of secondary poisoning cf. brodifacoum	Low risk of secondary poisoning	Lower risk of secondary poisoning cf. brodifacoum	Low risk of secondary poisoning	Risk of poisoning ground birds such as kiwi and weka. Low secondary poisoning risk	Risk of poisoning ground birds such as kiwi and weka. Low secondary poisoning risk
Environmental factors	Persistent in the food chain, risk of wildlife and game contamination	Less persistent in the environment than brodifacoum	Does not persist in soil or water.	Less persistent in the environment than brodifacoum	Does not persist in soil or water	Low environmental persistence	Low environmental persistence (once capsule is broken)
Animal Welfare	Possums take 2-4 weeks to die. Possum die from internal bleeding	Possums take 2-4 weeks to die. Possum die from internal bleeding	Possums take about seven days to die, usually a heart attack.	Possums take about 5-7 days to die from tissue calcification and internal bleeding	Possums take 2 hours to die as oxygen carrying ability of the blood is compromised	Fast acting, animals are unconscious within minutes, thus the most humane toxin available	Fast acting, animals are unconscious within minutes, thus the most humane toxin available

6.3 Do these poisons persist in the environment?

- *Brodifacoum* is insoluble and is unlikely to contaminate streams or groundwater. It is persistent in soils, which can be minimised by always using bait stations. Brodifacoum is persistent in animal tissue and can remain in possum liver for up to 8 months.
- *Pindone* is insoluble and is unlikely to contaminate streams or groundwater. It is persistent in soils, which can be minimised by always using bait stations. Pindone is less persistent in possum tissue compared to brodifacoum.
- *Cholecalciferol* will not easily enter surface water because of its low solubility. Restricting it to bait stations also minimises its spread into waterways. No published information is available for its persistence in soils, although its chemical characteristics suggest that only minimal leaching is likely.
- *Diphacinone* (available for possum control in “Double Tap” a combo bait which also contains cholecalciferol). Diphacinone is a first generation anti-coagulant with a relatively low risk profile similar to Pindone. Diphacinone is less persistent in possum tissue compared to brodifacoum.
- *Cyanide* paste is rapidly degraded by moisture and does not persist for long in the environment.
- *Feratox*® encapsulated cyanide may persist in the environment for 2-3 months but it is unlikely to contaminate waterways if it is used in bait stations. Once the capsule is broken it will degrade as quickly as cyanide paste bait.
- *Sodium Nitrite* Biodegradable with no persistent residues and no risk of secondary poisoning.

6.4 Should I pre-feed before poisoning?

If you are planning to use poison baits to control possums, you may need to pre-feed with non-toxic bait to encourage possums to take the bait before switching to the toxic bait.

When possums are presented with a new food, they often eat small amounts of the food at first until they get used to it. If the possums eat small amounts of toxic bait, it may only be enough to make them sick rather than killing them. These animals will develop what is called “bait shyness”, making them difficult to kill with the same or other poisons.

Pre-feeding reduces bait shyness, because possums will eat more when the toxic bait is placed out – usually enough to kill them rather than simply making them sick. However, pre-feeding is only necessary with relatively rapid-acting poisons, such as cyanide and cholecalciferol and sodium nitrite. It is not necessary to pre-feed when using slow-acting poisons such as brodifacoum.

Pre-feeding should generally be undertaken for about 3-14 days before you begin poisoning. You should use the similar bait type that you will use to deliver the poison. Check the sections below for specific recommendations on pre-feeding with each poison.

6.5 About anticoagulant poisons – Brodifacoum and Pindone

READ THE LABEL – FOLLOW LABEL INSTRUCTIONS

Anticoagulant poisons work by reducing the blood's clotting ability, thereby causing internal bleeding.

Brodifacoum is a 2nd generation slow acting toxin, and pindone is a 1st generation anticoagulant.

While 1st generation anticoagulants are less environmentally persistent, they are also less effective for possum control than the 2nd generation brodifacoum. A recent research publication (Eason et.al. 2019) notes;

“Brodifacoum is the most widely used slow-acting rodenticide worldwide and is highly effective for controlling both rodents and possums..... first-generation anticoagulants like pindone or diphacinone are not effective against possums at current bait concentrations..... Additionally, very large amounts of baits containing first-generation anticoagulants alone have to be eaten by possums compared with rats for baits to be effective which is costly, and combined with their questionable effectiveness the only anticoagulant effective for controlling possums is brodifacoum.”¹

The commercially available baits that contain anticoagulants are:

- Pestoff® (brodifacoum bait <https://pestoff.co.nz/>)
- Pindone Pellets for Possums and Rats
- Double-Tap, a bait containing the anticoagulant diphacinone as well as cholecalciferol. For more information on Double-Tap refer section 6.8.

These are all cereal-based pelleted baits. Pestoff® is available with a wax coating that will prolong the life of the bait in wet climates.



Commercially available anticoagulant bait types.

¹ Journal article available online at https://www.researchgate.net/publication/335469880_Diphacinone_with_cholecalciferol_for_controlling_possums_and_ship_rats

6.6 About Cholecalciferol poisons

READ THE LABEL – FOLLOW LABEL INSTRUCTIONS

Cholecalciferol is vitamin D₃; it poisons animals by raising calcium levels in their blood and causing a heart attack within 2-6 days. Possums and rodents have a low tolerance to calcium, which makes them particularly sensitive to cholecalciferol.

Three commercially available baits contain cholecalciferol.

- Feracol®, a paste bait.
- Decal, a cereal pellet.
- Double Tap, which also contains the anticoagulant diphacinone to enhance effectiveness.



Connovation
Ltd range of
FeraCol baits
containing
cholecalciferol.

www.connovation.co.nz



PestOff baits containing cholecalciferol.

<https://pestoff.co.nz/>

6.7 About Cyanide poisons

READ THE LABEL – FOLLOW LABEL INSTRUCTIONS

You must hold a Controlled Substance License (CSL) to use any type of cyanide bait.

Cyanide paste bait may cause significant levels of bait shyness in the surviving population, encapsulated cyanide was successfully developed to overcome this problem.

As users of cyanide poisons will be formally trained and licensed, so no further information is provided here.

6.8 About “combo” poisons (diphacinone + cholecalciferol)

READ THE LABEL – FOLLOW LABEL INSTRUCTIONS

“Double Tap” is a recently available possum bait which combines the anticoagulant diphacinone, and cholecalciferol.

Pre-feeding is strongly recommended. Use according to label instructions.



Contact www.connovation.co.nz

6.9 About Sodium Nitrite poisons (Bait-Rite)

READ THE LABEL – FOLLOW LABEL INSTRUCTIONS

A recently available new toxin for possum control. Biodegradable with no persistent residues and no risk of secondary poisoning. To use for possum control, roll the Bait-Rite Paste into balls of 20g. Place balls into a bait station.

Pre-feeding is strongly recommended. Use according to label instructions.

Contact www.connovation.co.nz

PART 7. USING BAIT STATIONS AND BAIT BAGS

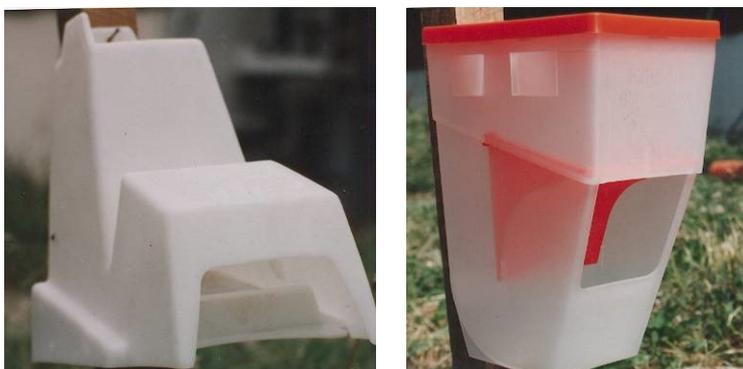
All but one of the poisons described in this guide should be used in bait stations or bait bags (only cyanide pastes can be placed on stones or wood on the ground). Bait stations/bags shelter bait from rain and dew so the baits will last longer. Non-target species such as stock, pets and birds are also at less risk because they have more difficulty accessing the baits.

A good bait station:

- allows possums easy access;
- protects the bait from wind and rain;
- is easy to attach to trees or fences; and
- prevents access by stock, pets, birds, and children.

Bait stations are plastic containers filled with 0.2 - 2 kg of bait, or custom made bags. They are usually attached to trees or fence posts 100-150m apart in suitable possum habitat, and left for some time to allow possums to feed on the bait. The most commonly

used bait stations are the Philproof, which holds 1.5 kg of bait, and the Kilmore which holds 2 kg of bait. The Sentry, Romark and KK bait stations are the more popular smaller bait stations and hold less than half a kg of bait. The Sentry Plus holds up to 600 grams.



Philproof (left) and Kilmore (right) bait stations. Photo courtesy Pest Management Services Ltd

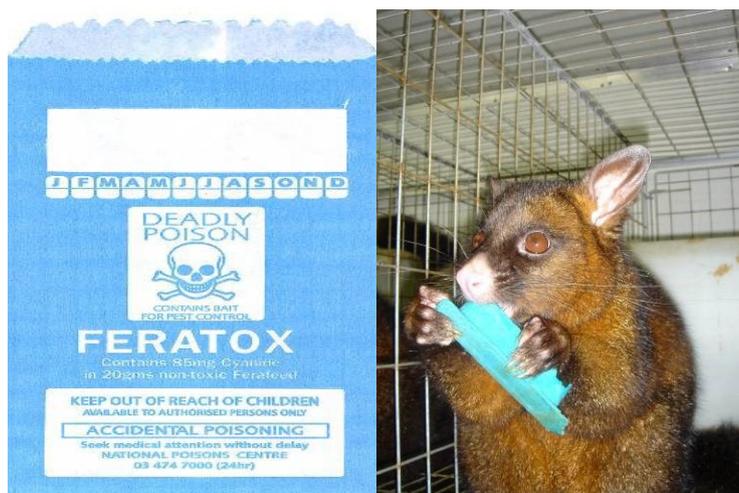


Left to right: the smaller Sentry, Romark and KK bait stations. Photo courtesy Pest Management Services Ltd

Biodegradable bait bags and “Strikers” are small and lightweight single use devices suitable for rapid deployment over larger areas.

When securing bait bags or strikers, staple the bag or striker so it hangs vertically on the tree or post. Ensure the warning label is visible. Expect possums or rats to tear bait bags and strikers off trees, and then shred them.

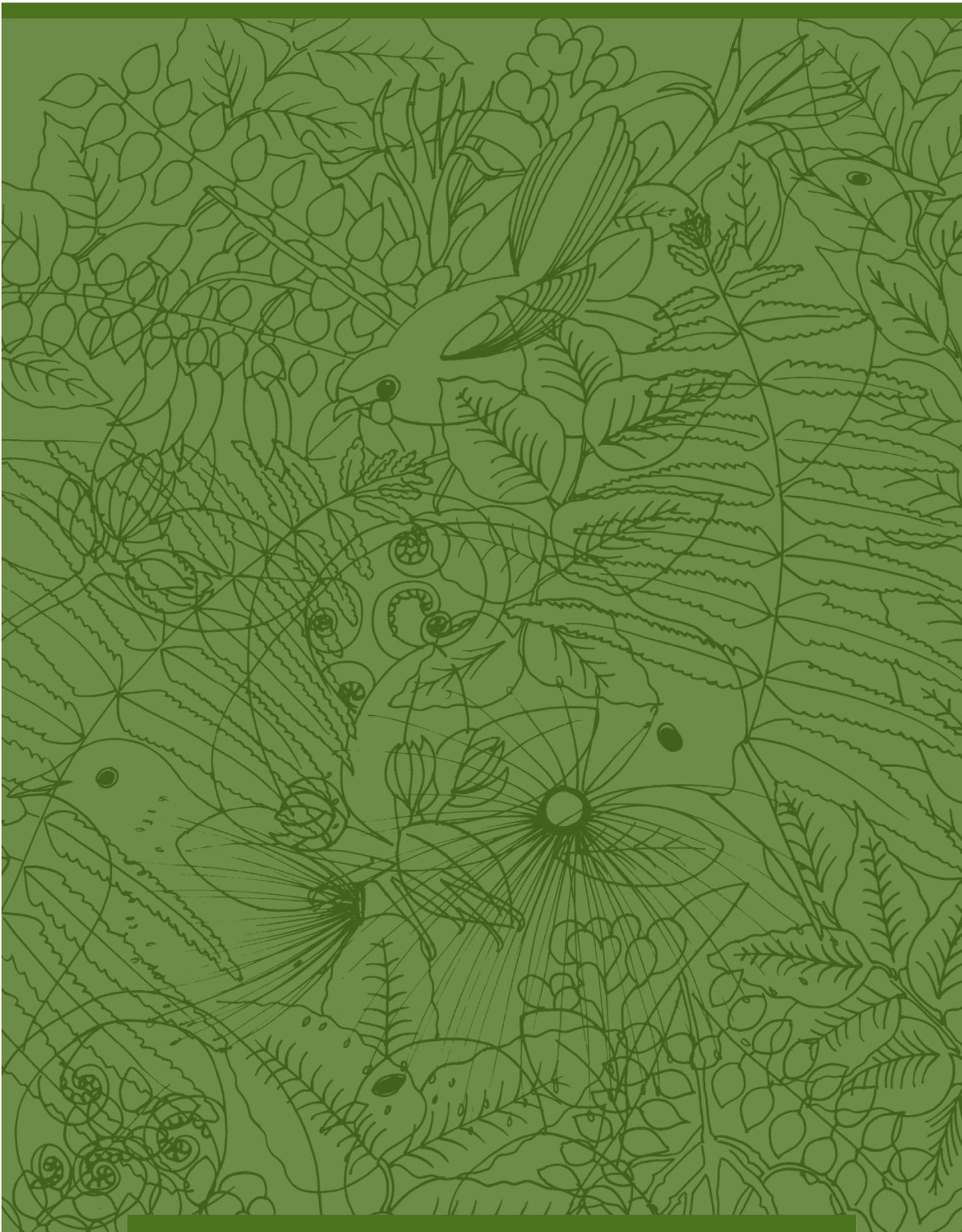
- Pre-feed for two weeks with 50g pre-feed pellets only (optional).
- Lure the bag/striker and tree from the ground up to the bag/striker.
- Check after 7 days and re-bait if required. Cereal pellet feeds in bags will last 5-6 days in dry conditions, 2-3 days if wet.
- Where stock may have access, place the bags/strikers out of reach.
- Remove remaining bags/strikers at end of operation. Do not re-use.



Example of a bait bag (left) and a possum eating a Striker (right).
Photos courtesy Pest Control Research Ltd

More information

See Bionet booklet '*Responsible use of Bait Stations – an operators guide*' for more detailed information, see <https://www.bionet.nz/assets/Uploads/A13-Bait-Station-minor-revision-2020.pdf>



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