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POSSUMS



*The Royal Society
of New Zealand*

The brushtail possum, *Trichosurus vulpecula*, is one of New Zealand's worst vertebrate pests

- **Possums** cause severe damage to some native trees, killing many, including pohutukawa trees along the coastline.
- **Possums** eat the eggs and kill the chicks of native birds.
- **Possums** are the most serious transmitters of bovine Tb (tuberculosis) to farmed cattle and deer.
- **Possums** compete with stock for pasture.
- **Possums** cause about \$8 million worth of damage a year to pine plantation trees.
- **Possums** damage or kill trees planted to stop soil erosion.
- **Possums** eat and damage over \$1 million of field and orchard crops each year.
- **Possums** ruin fruit crops and damage trees and shrubs, especially roses, in home and public gardens.
- **Possums** cost electricity authorities about \$2 million a year to repair or protect power lines and transmission equipment.

The introduction of the fur-bearing possum to New Zealand in the 1850s was one of the country's most costly mistakes. The possum has no natural predators or serious diseases in New Zealand and every year the national bill for possum control exceeds \$50 million. Expenditure by the Department of Conservation to control possums in reserves and national parks rose from \$3 million in 1990/91 to \$12 million in 1996/97, while Tb control and research was estimated to have cost \$33 million in 1991/92.



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Support the "Market Solution"

Brush-tail possums – this introduced species is now the biggest single threat to New Zealand's native forests and birds. You can help by supporting the "Market Solution".



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Possums are also a resource

- Their plucked fur has been blended with wool into a product that is used for clothing, particularly for the overseas and tourist market, and a new fabric (merino mink) has been developed.
- Pelts are used for luxury fur products: bedspreads and trims for clothing and accessories.
- Possum meat has potential as a delicacy on Asian menus and a meat trade is developing with Taiwan, South Korea and mainland China.
- Unmarked possum leather is being used for book binding and is suited for gloves and shoe uppers.

While hunting for commercial gain may not keep possum numbers low enough to protect conservation values or eradicate Tb, it can provide economic benefits.

These items, along with Timms Traps, are available from the Maruia Nature mail order catalogue. Freephone 0800 77 11 33
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The brushtail possum *Trichosurus vulpecula*: a New Zealand pest

Description

The brushtail possum is a nocturnal marsupial mammal a little under half a metre long from its snout to the base of its thick bushy tail. Though often seen on the ground, it is adapted for living in trees.

- It has powerful hind legs for leaping between branches and hand-like paws that are well suited for climbing and holding food.
- Its long sharp claws, which cannot be retracted like those of a cat, give the possum excellent grip when climbing, enabling it to run straight up a tree trunk.
- In the canopy, a possum's long prehensile tail (bare along the underside) can wrap tightly around a branch and support its whole weight as it reaches for food with its front legs.

A possum has very good night vision and its forward-facing eyes give it binocular vision for judging distance accurately. It also has long sensitive whiskers protruding from its snout for feeling close objects in the dark. These features allow it to move easily and safely amongst tree branches at night.

The possum has large ears and acute hearing for locating the “laughing cough” communication calls of other

possums and for an early warning of the approach of other animals. Possums have few natural enemies in New Zealand, but are alert to the approach of dogs and hunters.

The possum has a keen sense of smell over short distances. This helps it to locate ripening fruits and other tempting foods and to identify the smeared scent markings left on trees by other possums.

Possums become sexually mature at between 1 and 2 years old, and most adult females over 3 years old produce young every year. In New Zealand there are two breeding peaks, with most births in autumn (April/May) and another smaller peak in spring (October/November), though in northern areas a few births are recorded in every month of the year.

A single very small baby, or pouch young (less than 1 cm long and weighing only 0.2 g) is born 17 to 18 days after mating. It crawls up to the marsupial pouch where it remains for at least 3–4 months before emerging to cling to its mother's back. The young do not leave the pouch permanently until about 5 months old and may not become fully independent until 9 months old. (Twins have been recorded but are rare.)

Mortality can be high among young possums, but those that survive their first 2–3 years often live for another 5 years and a few may reach the age of 14 years—if they are not trapped, shot, poisoned or die of Tb.



R MORRIS, DOC



AGRESEARCH, WALLACEVILLE



R MORRIS, DOC

How did possums arrive in New Zealand?

Possums were introduced to support a proposed fur industry. The first animals introduced in 1837 did not survive and successful liberations may not have occurred until 1858. The possum was a protected animal until 1921 and its dispersal was assisted to encourage numbers to increase. For the next 25 years licensed harvesting was allowed for the fur trade. It was not until 1947 that people realised the possum was a browser out of control and it was reclassified as a pest.

Discovery that possums also killed and ate other animals, including native insects, snails and other invertebrates and the eggs and chicks of native birds, came much later. The possum is now recognised as a major culprit in causing birds, like the kokako, to have become endangered.

Why do animals become pests?

In their countries of origin, the populations of most animals are regulated by predators, diseases and competition for food, habitat and rest sites. Species newly introduced to New Zealand often have few or no natural controlling agents and there is less competition for food, space and breeding sites. Sometimes this allows the aliens to broaden their “ecological niche”, occupying habitats or taking food that would not normally be available to them. Their numbers may then increase rapidly, putting great pressure on native plants and animals.



COLIN WALKER

Ecological and commercial impacts of possums in New Zealand

The possum is a serious pest of native forests, exotic plantations, pastoral farms, orchards, nurseries, public parks and home gardens throughout New Zealand. It is now common in most parts of the North Island, South Island and Stewart Island. It is also found on the main Chatham Island and a few smaller islands around the coast of New Zealand.

The possum is one of the most costly nuisances ever introduced to New Zealand, causing trouble and expense wherever it has spread. There is probably little prospect of ever eradicating the pest, although eradication has been successful on Rangitoto, Motutapu and Kapiti Islands. However, with modern techniques it is possible to substantially reduce possum numbers in targeted areas to minimise their local impact on native species or on cattle, deer and crops.



POSSUM TRAP SITE, WAIPOUNA FOREST — LANDCARE RESEARCH



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POSSUM DAMAGE ON SWEDE CROP, MANAWATU — LANDCARE RESEARCH

Native-bush killers

- Possums eat foliage, flowers and fruit of many native trees. They devour massive amounts of native vegetation: an estimated 20000 tonnes every night throughout New Zealand. This is equivalent to about 4000 trucks full.
- Possum impacts are not uniform, but vary between plant species, populations, communities and ecosystems. Some plants are more vulnerable to possum damage, and other factors and pests are involved, but it is generally agreed that possums play a major role in changing vegetation.
- Possums actively target the developing flowers of particular native trees and this reduces or prevents seed production. The flowers of kohekohe, for example, which sprout directly from the trunks and branches rather than from shoot tips like most other plants, appear to be like peaches and ice cream to possums. Wherever there are possums, kohekohe seldom sets fruit. Consequently natural replacement of older trees by seedling trees ceases.
- Possum browsing is frequently concentrated on only a few trees, which may be heavily defoliated or killed while neighbouring trees of the same species remain largely unaffected. This is termed salt-and-pepper dieback. Gaunt grey skeletons of large dead trees scattered through remnants of forest are a testament to the destructive consequences of possum browsing.
- On those trees eaten by possums, it is the young foliage growing in the sun at the branch tips that they prefer. Frequently possums strip trees bare of new growth then move on to other trees. The stripped trees usually sprout fresh regrowth but, as soon as a good cover of new leaves form, the possums return and strip it again. Large trees that may be several hundred years old, such as pohutukawa and rata, are often being killed in just two or three years by this intensive repeated browsing.



R MORRIS, DOC



COLIN WALKER

Native-bird killers

- Possums compete with native animals for a wide range of foods. It is thought this can lead to a food shortage at critical times. Birds in poor condition will lay fewer eggs or none at all. Chicks may not be raised successfully unless there are abundant supplies of food available nearby. Poor breeding eventually leads to local extinction.
- Possums are also predators that eat or destroy both eggs and chicks of native and introduced birds. This has been discovered only in the last decade by using video cameras at night to photograph nest sites under infrared light.



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Native-invertebrate killers

- Possums have recently been implicated in the decline of New Zealand's large carnivorous snails that live on the forest floor. Possums bite through the thin shells to extract the soft-bodied animals inside. They also eat a range of native invertebrate animals including cicadas, weta, and stick insects (some of which may be endangered species).



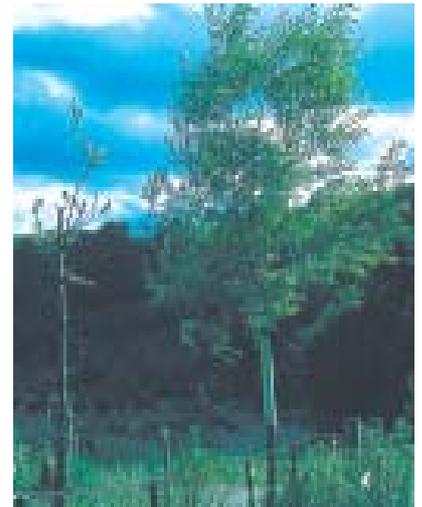
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Exotic-tree damagers

- The possum's diet is not limited to native trees; they also attack introduced trees in gardens, orchards, shelter belts and exotic plantation forests. In pine forests possums frequently chew off or break the tips of the trees. This prevents the trees from growing straight and makes them almost valueless for timber processing.

Orchard and garden robbers

- In commercial and domestic orchards possums devour fruit or ruin it with bite and claw marks. They also break tender young branches and chew off succulent new growth and flower buds, which reduces cropping potential for the following year. In residential areas they steal or spoil produce and damage ornamental plants, especially roses.



PROTECTIVE SLEEVE ON WILLOW POLE — LANDCARE RESEARCH

House invaders

- When looking for quiet retreats to rest up in during the daytime possums occasionally enter homes, often by the chimney. In their attempts to escape they damage furniture and drapes with their sharp, unretractable claws. More often they will nest in roof space, fouling this area and also the house interior with soot, urine and faeces.

Disease carriers—Tb transmitters

- Possums are a serious and costly menace to the farming industry because they carry bovine tuberculosis and pass it on to cattle and other farm stock. For export access to New Zealand's trading countries it is essential that our animal products, especially those from cattle and deer, are certified free of tuberculosis. As possums are carriers and vectors of Tb, they are a substantial and ongoing threat to the financial viability of our export meat and dairy industry.
- Infected possums living in forest blocks and interconnecting corridors of both native and exotic forest serve as reservoirs of the disease, which they transmit to cattle and deer when they feed out on pastures at night. It is thought that transmission occurs when terminally ill or dead possums are sniffed at and licked by stock.

Decline of forest diversity

Like all animals, possums have preferences for particular foods and eat first those they like best. They eat mainly foliage and select a mixed diet of three or four different plant species each night. They eat pasture and flowers and ripe fruit in season.

After possums have almost eaten out the species they prefer in an area, they concentrate on the next most acceptable, feeding on them until they have also been killed by repeated stripping. (Some species, like mahoe and kohekohe, appear to be able to sustain a reasonable level of browsing for long periods while others are more susceptible.) Possums then resort to less palatable vegetation. At each stage of this browsing pattern the character of the forest changes as its diversity decreases.

Superficially the degraded forest may still appear completely natural to a newcomer because 100% of the surviving trees in it are native. But if a number of important species are absent, having been eliminated by possums, the ecology of the forest may be critically altered.

For the forest to support a rich diversity of native bird, reptile and insect life it must produce sufficient supplies of food. Many creatures rely on year-round supplies of fruit or nectar and pollen such as exists in unmodified forests where different trees flower and fruit at different times.

Possum control options

There are many methods of controlling possums but most are best suited to particular situations. Local conditions often affect which control methods are most practical and cost-effective. Also, some techniques require the operators to be trained and licensed before being allowed to use them. Generally the methods can be grouped into those that kill and those that exclude or repel possums. In future, possum numbers may be reduced by methods that aim to prevent possum breeding.

From time to time public concern is raised that some control methods may be harmful or lethal to people, domestic animals and pets, and native wildlife. Concerns have been expressed that the risks to other creatures may outweigh the benefits that might be gained from killing possums. The humane treatment of pests is also a subject receiving more attention worldwide. Careful decisions must therefore be made when selecting the most suitable method(s) of control for each particular area.

Prior to control action being taken, some methods require the areas being targeted to be closed and signposted in order that people and domestic animals are not accidentally injured, poisoned or killed.

Merits of bounties

Offering a bounty for each possum killed has been proposed to encourage public effort, but paying bounties to control animals has never worked anywhere in the world. It often results in pests being removed from easily accessible country rather than the areas where pest control is most needed to protect conservation values or for Tb management.

Methods used to kill possums

Shooting; hunting with dogs; trapping: kill traps (usually by throttling e.g., “Timms” trap, cage traps, leg-hold traps; electrocution; poisoning: poisonous baits spread on the ground, refillable feeding stations containing poison bait, aerial sowing of poison bait.

Methods used to exclude or repel possums

Electric fences, repellents and deterrents.

Future control methods

Biological control, aimed at reducing possum breeding, could help reduce possum numbers in the future.

Costs of possum control

Possum control operations cost between \$6/ha and \$60/ha, depending on the control method selected. This will often be determined by the terrain, size and location of the area to be controlled.

- Aerial sowing of 1080 poison bait can be rapidly carried out over large remote areas for as little as \$10/ha.
- Using experienced ground operators to set lines of traps or poison trails can be effective where aerial sowing is not suitable. However, costs vary from being comparable to aerial sowing to being much higher, and more time is generally required to reduce the possum population to target densities.



BAIT STATION — LANDCARE RESEARCH



TRAPPED POSSUM — K. BROOME, DOC

- Where control is required close to human settlement, or where risks to non-target animals are likely, more costly types of poison bait in specialised bait stations, or traps, are used. Such methods may increase costs several times over.
- If lethal control methods are considered too risky (e.g., around a farm homestead), possums may be caught (for later humane killing) in cage or box traps, or deterred by use of chemical repellents applied to vulnerable plants. These methods are labour-intensive and usually involve costly equipment and materials.

Methods of laying poison bait effectively

Poisons are dispensed in various forms:

- in edible baits (e.g., diced carrot or cereal pellets) dropped from aircraft
- in edible baits (e.g., cereal pellets or gel) contained in fixed dispensers (bait stations)
- in paste placed on a rock or stick with a visibly attractive bait (e.g., flour and icing sugar)[e.g., cyanide paste] or applied to upturned earth spits [1080 apple paste]
- in capsules contained in a packet of bait mix stapled to a tree trunk.

Avoiding harm to other animals

Some of the poisons used can be toxic to other animals but the chances of them being poisoned can be greatly reduced by:

- selecting bait that is attractive to possums and less attractive to other animals
- colouring bait with bright green dye (and adding a repellent) to make it less attractive to birds
- cutting bait to a size that is easily seen and taken by possums but is too big to be swallowed by birds
- screening (sieving) bulk bait before dispersal to remove any small fragments that could be easily eaten by birds
- using custom-designed bait dispensers that possums can feed from easily but which prevent birds from taking bait
- using poisons that degrade naturally and rapidly into harmless breakdown products so they do not persist as poisons on the ground after the local possums have been killed.

Note: Despite all care and necessary precautions being taken, some dogs and livestock are killed by eating possum bait or poisoned carcasses. Some native animals are also killed but with little, if any, effect on total populations. The benefits of control measures far outweigh the few individual deaths.

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