

New Tricks

The more we learn about possums, the more reason there is to worry. They were first caught eating birds' eggs. Then chicks. And now native snails are disappearing.

As a respected scientist, Kath Walker can hardly bring herself to go there, but it just might be that possums are exhibiting learning behaviour.

She remembers when it started, back in the 1970s. Trudging up to her snail study plots high in the montane forests of North-West Nelson, now Kahurangi National Park. She was expecting to meet up with some old friends, snails she'd painstakingly located on previous study trips; measured and marked for future reference.

"We turned up at our study plot to find half our snails dead," she recalls. "Hundreds of them." They all bore the same fatal wound; a hole, torn in the side of the shell just along from the opening. Rats were already known predators of snails – but aren't normally an issue above around 600 metres. There was a new predator on the scene.

A list of suspects was drawn up, but none seemed to fit the profile. After years of blind alleys, Walker took a drastic step. She started offering live snails to a variety of potential predators.

"We tried feeding them to kea and kaka," she recalls, "but they just sat there and looked at them."

Then, more out of desperation than anything, she decided to put a snail in front of some possums.

Eureka. They went straight to work, leaving exactly the kind of marks that had puzzled Walker for so long. Nearly a decade after the crime was discovered, she had her villain.

"We'd discounted possums early in the piece," she recalls.

"Because the characteristic shell damage was only found in a few montane forests where possums were in low numbers."

As always with hindsight, it makes perfect sense now. Walker says possums were relative latecomers to the far west of Kahurangi National Park (they didn't appear at Kahurangi Point until 1959), so although they'd been around for a decade, they probably didn't hit peak numbers until the end of the 70s.

"And that was when we started finding huge numbers of broken shells," she recalls.

She says snails, particularly our giant *Powelliphanta* species, are a great source of protein, so it shouldn't be surprising that possums will seek them out, particularly in the high, less fertile montane forest where sustenance is harder to come by.

Perhaps, too, possums have been driven to foraging on the ground more often in places where they've already destroyed the canopy of trees such as rata.

Whatever the reason, she says, "It's obviously well worth the possum's investment in energy to go hunting down snails."

Her theory that possums had learnt to open snail shells, she remembers, was met with "howls of disbelief."

Traditionally, learning ability had been accepted only in a few select intellectual giants: chimpanzees, crows, parrots, and dolphins.

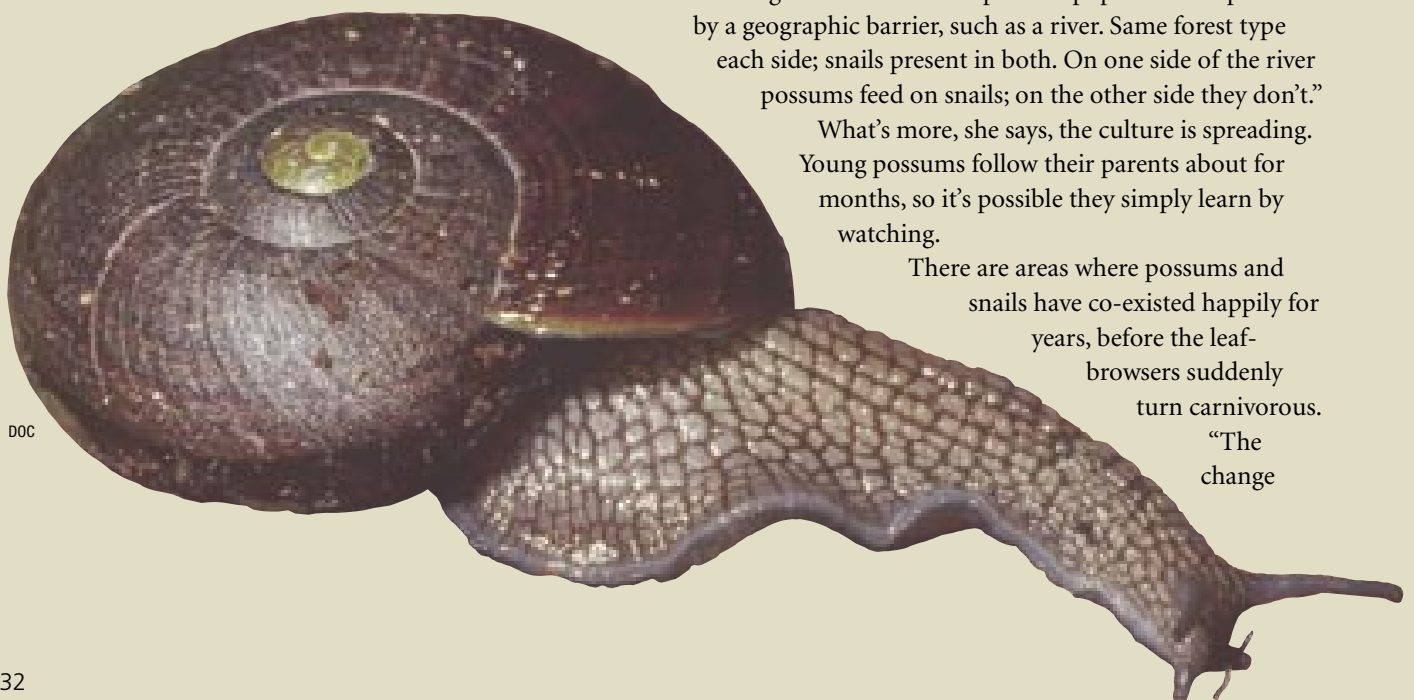
But possums?

Strange but true, says Walker. "There's enough information now to show that there is an element of learning. You can have two possum populations separated by a geographic barrier, such as a river. Same forest type each side; snails present in both. On one side of the river possums feed on snails; on the other side they don't."

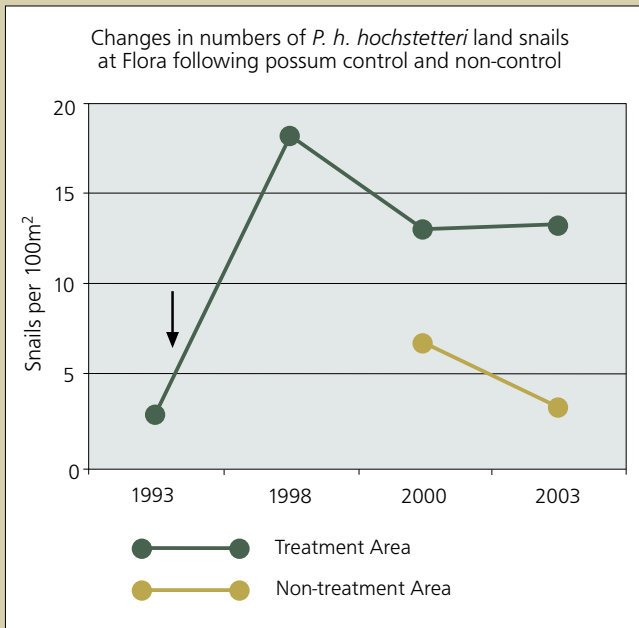
What's more, she says, the culture is spreading. Young possums follow their parents about for months, so it's possible they simply learn by watching.

There are areas where possums and snails have co-existed happily for years, before the leaf-browsers suddenly turn carnivorous.

"The change



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could be triggered by the arrival of a snail-wise possum,” she says.

Whatever the scenario, one thing is clear – the snails can’t survive possum predation indefinitely. Walker says their breeding rate simply can’t keep up with even low levels of predation. Then, “when numbers fall too low, it’s difficult for the snails even to meet and mate.”

Like so many of New Zealand’s native creatures, the snails were hopelessly ill prepared for an invasion of mammalian predators. They reproduce painfully slowly – laying just four to ten eggs a year. And many youngsters die anyway, from natural hazards like dehydration, exacerbated when forests are opened up to the sunlight by browsing animals like goats and deer.

Walker says we still have no idea of their survival rates.

“They’re not like a typical invertebrate. In fact, they’re more like a kakapo really; low productivity, long life, defenceless.”

So in 1994, the Department of Conservation started controlling possums around those snail populations deemed most at risk.

“We went for the remote montane forest sites,” recalls Walker, “the cot cases really – those species that were already at desperately low numbers.”

The programme immediately struck problems. Ground control simply wasn’t getting possum numbers low enough.

“We eventually went for aerial 1080, because it was the only conceivable option given the scale, the remoteness, and the terrain,” says Walker.

Aerial operations have become a regular feature of the snail recovery programme, backed up with annual ground treatment where necessary, but Walker says populations at some study sites have taken forever to start increasing. It seems to need a critical mass.

“A team of four could search all day and find one snail. We couldn’t even get enough numbers to define a trend.”

However, the programme is getting good results in other areas, places like Kahurangi Point that still had good numbers of snails to start with.

“We got a really good aerial 1080 drop over a large area; something like a 99 per cent kill,” she says. “Within 2 years snail numbers just rocketed. In one plot we went from 54 snails to 147.”

Walker says 1080 is doing the job, but “aerial operations are expensive and it takes a long time to get funding. We can’t always respond as quickly as we’d like.”

She says research has shown that drops shouldn’t be left any longer than five years apart, but she’d like to see them come round more frequently. “I’d like to see annual operations; we’ve got to get possum numbers lower, and somehow keep them there.”

And she says there’s more scope – in the easier country at least – for ground-based operations, which can be mounted more quickly once a ravaged population of snails has been discovered. That would help suppress possum numbers between aerial knockdowns.

It’s unthinkable for Walker that we might lose these precious relics. “They’re a huge part of the biodiversity of New Zealand.” But saving them will be tricky. Already widely scattered in often-tiny populations, they’re very specific about where they can live.

“We don’t have any suitable offshore islands for them,” she says. “They’ve got to be managed in situ.”

She produces a chart she’s been labouring over. It’s a *Powelliphanta* family tree, or our best approximation of it. There’s a lot about their relationships that we still don’t understand.

Many of the names still end in spp., which in science-speak means we haven’t yet described them properly; don’t know whether they’re a separate species.

But Walker’s confident that the vast bulk will indeed turn out to be animals new to the New Zealand list.

At least, she says, there’s no problem getting public support, once people realise that these aren’t the same animals as the pests eating their lettuces. Even though many people have never seen a native snail, Walker says they’re “the acceptable face of invertebrates. People think they’re pretty; they have much less trouble with snails than spiders.”



The ravaged shell of a giant land snail, *Powelliphanta* spp., lies on the forest floor after an attack by a brushtailed possum in a case of applied learning.