



Rosemarie Müller

Vanishing geckos

Mt Cook jewelled gecko

Facing threats that range from wasps to poachers, our *Naultinus* geckos are in serious trouble. Tony Jewell reports on efforts to better understand – and thus protect – these fascinating reptiles.

THE first *Naultinus* geckos I saw in the wild were on Otago Peninsula in 1994. Department of Conservation officer and Forest & Bird member Graeme Loh showed me the site one sunny morning and we saw a number of vivid-green geckos, decorated with rows of brilliant white diamond markings or yellow stripes, lazing about, soaking up the solar warmth.

Most of the world's 2000-odd species of gecko are grey or brown, strictly nocturnal, live just a few years, and reproduce by laying pairs of small white eggs which must incubate and hatch in tropical or subtropical warmth.

In stark contrast, New Zealand's *Naultinus* geckos are often bright green, are active by day, can live 30 years or more, and give birth directly to fully formed babies.

With large eyes, grasping toes and a prehensile tail from which they can hang, *Naultinus* scramble through sun-lit shrubs like miniature monkeys, licking their lips as they eat fruit, lap nectar and snap up passing insects.

Back in 1994 I was too inexperienced to appreciate just what a privileged experience I was given that morning on Otago Peninsula. But returning repeatedly to the same site in recent years, I find the same shrubs devoid of any reptilian life. Here, as in many places, our *Naultinus* geckos are vanishing.

Most *Naultinus* are bright leaf-green, often with gem-like patches of white, yellow or pink, but variation is tremendous. Background colours can also be white, grey, brown, blue, yellow or olive. Markings can be absent, simple rows of spots or stripes, or intricate patterns resembling a Persian rug.

The inside of the mouth, which may be revealed in a vigorous threat display, is deep blue, orange, pink or red. The broad, fleshy tongue, used to lick the lidless eyes clean, adds further colour: red, yellow, orange, pink or black.

Historically, *Naultinus* lived throughout the length of New Zealand, and from the coast to at least 1400 metres above sea level.

Defining what constitutes a species among *Naultinus* has always been problematic – and remains contentious. Genetic evidence suggests that the nine “species” share a very recent common ancestry and that hybridization is commonplace. None are distinctive enough to be able to co-exist without interbreeding in the wild, leading some experts to

conclude that they are simply local “races” of a single widespread species.

Yet where populations of these different races meet up there is an abrupt and clear switchover. Neighboring races often have different mating seasons and habits, which explain how they maintain their differences despite strong reproductive compatibility – leading many herpetologists to feel that each race is best classified as a distinct species.

Historically there has been an overwhelming lack of attention paid to wild *Naultinus* populations – until the 1990s, the only real exception were studies by Rod Hitchmough of Gray's geckos (*Naultinus grayi*) near Kaitaia, and manuka gecko (*Naultinus manukanus*) on Stephens Island.

Part of the problem is that *Naultinus* can be difficult to find. Whole populations can appear to vanish and no amount of searching will turn them up – until the weather becomes more favorable and they reappear. Such disappearing acts have meant the permanent disappearance of whole populations has often been overlooked – dismissed as temporary “lying low.”

One gecko you would think should be easy to find is a gecko that barks. The barking gecko (*Naultinus punctatus*) is a large and pugnacious species that ranges along the south-eastern North Island from East Cape to Wellington. Its name derives from its habit of startling predators by gaping its mouth to display the bright blue interior



Elegant gecko

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sheltering in low, dense vegetation on a cold winter day is an easy snack for a hungry mouse.

Exotic birds are also potentially significant *Naultinus* predators. In his 1970s study of Gray's gecko near Kaitaia, Rod Hitchmough repeatedly observed mynas plucking geckos from the vegetation canopy. On Otago Peninsula Rod Morris has watched magpies searching through the canopy of shrubs at jewelled gecko sites.

Other introduced birds such as starlings and blackbirds also prey on lizards. An experiment on Banks Peninsula, in which green Plasticine geckos were placed in shrubs, was aborted when the models were slashed apart by an unknown bird before monitoring cameras were activated to identify the culprit – which did not return, having quickly wised up to the hoax.

Searches for *Naultinus* are often inconclusive because they sometimes simply avoid detection. Search methods and monitoring could also be greatly refined through further research, allowing us to count population numbers in a robust statistical manner and provide convincing evidence of genuine declines.

Some new ideas mooted to improve detection include pheromone lures, recording ultrasonic calls, and small clear plastic “roofs” to provide enticing basking sites – the latter technique being trialed by student Rosie Müller who, with funding assistance from Forest & Bird, is studying jewelled geckos on Otago Peninsula.

Despite the determined efforts of a few dedicated people, *Naultinus* may pose a much bigger conservation challenge than previously thought. The range of very different possible threats, and our lack of knowledge, may create a highly complex long-term problem.

We need to make a fundamental shift in the way we approach the conservation of *Naultinus* geckos. We can't just sit around waiting for every population to go the way of the Southland and Wellington geckos, before we decide that they weren't just hiding – they were disappearing, forever.



Otago jewelled gecko and young

Rod Morris

Rod Morris

dropping in numbers. Marieke Lettink, a local student studying the geckos, is convinced that poaching is a problem on the peninsula, and she has been approached several times by people of dubious intent seeking precise locality data. Poaching is likely to be an ongoing problem, as jewelled geckos fetch as much as US \$9000 each on the overseas black market.

Lettink is beginning a two-year project looking at distribution of jewelled geckos on the peninsula, and providing advice to landowners who wish to protect geckos on their properties. The study is seeking information about any recent or historic sightings of geckos in Canterbury (Marieke can be contacted at marieke_kakariki@clear.net.nz.)

Given how poorly we understand what is happening to the jewelled gecko, it is not surprising that efforts to directly address their decline have been limited.

One of the first serious attempts to protect a population was Forest & Bird's Every Reserve on Otago Peninsula, where an experimental predator-proof fence was built in 1994. This pioneering initiative backfired tragically when poachers targeted the site following the publicity it received, taking most of the geckos. The population has yet to recover, and the fence now stands derelict.

More recently Orokonui Sanctuary Trust has initiated moves to transfer geckos from the peninsula to its 307-hectare mammal-free sanctuary north of Dunedin. If approval is granted, a carefully controlled release plan will introduce a founder population which it is hoped will expand into the extensive surrounding kanuka forest.

The Southland *Naultinus* may also benefit from the 1998 removal of kiore from Codfish Island, but it not yet determined whether a recovery is actually taking place, or if other factors are still keeping numbers down.

Naultinus are in dire need of research, particularly into the factors that are causing their apparent decline.

While much attention has been given to the impact of larger mammals, such as rats, cats and stoats, on New Zealand lizards, the smaller mice and weasels could have an even worse effect. After mice were removed from Mana Island, lizard numbers skyrocketed, demonstrating that these tiny rodents do cause serious harm.

Mice can squeeze into much tinier hiding places and thus take a greater range of lizards than larger predators. They are also better adapted to cold and don't hibernate, so they forage year-round, however cold it gets. In temperatures below about 5°C lizards become torpid and can't defend themselves against attack. A *Naultinus*



Jewelled gecko (*Naultinus gemmeus*) eating a blowfly.

and issuing a surprisingly loud barking noise.

Barking geckos were common in shrublands all around the Wellington region as recently as the 1960s and 70s, but local herpetologists such as Mike Meads have since witnessed numbers fall dramatically.

Attempts by the Department of Conservation to establish a population of barking geckos on Mana Island off Kapiti Coast have been hindered by a lack of suitable populations from which to source them. They have instead had to rely on barking geckos salvaged by Wellington residents from the jaws of their pet cats, and captive-bred stock. The first batch of 12 was liberated on Mana in 1998-99 but none were ever seen again. A natural population on nearby Kapiti Island has failed to thrive even following the removal of rats in 1996.

Exactly why barking geckos have declined so dramatically and have seemingly failed to rebound even in rodent-free habitats is not clear. Meads suggests the introduced vespid wasps could be responsible, as he has seen the wasps preying on baby geckos and even killing adults, as well as competing for food resources of nectar and invertebrates.

Barking geckos are the nearest thing we have to a documented decline in *Naultinus*, but something is amiss among *Naultinus* in general. Throughout New Zealand observers say they are much harder to find and have noticeably declined at many sites.

No herpetologist has ever been able to find a *Naultinus* on the Southland mainland, nor have any been collected or photographed. We know that they were here thanks to reports by members of the public of uniformly vivid green geckos (like no other New Zealand lizard). Rare sightings suggest *Naultinus* do linger on the Southland mainland, but they are very few.

I have spent hundreds of hours searching Southland sites, most supporting classic *Naultinus* habitat, and some where the geckos have previously been reported. I have never seen any evidence of *Naultinus* here, not even the usual sloughed skins that are left when a population lies low, nor heard the rustling of an alarmed specimen retreating before it can be sighted. In contrast my searches in Otago and Canterbury found them within minutes.

Far from being just hard to find, I believe the *Naultinus* of Southland have suffered a catastrophic decline and may be critically endangered, if not already functionally extinct.

In neighbouring Otago the jewelled gecko is only slightly better off. Reports from the 1960s and 70s record populations that are no longer detectable. Populations are known to survive in just six areas of Otago: Nugget Point, the Lammerlaw Range, Otago Peninsula, Kakanui Mountains, Mt Buster



Rod Morris

Elegant gecko (Naultinus elegans) in flowering manuka

in the Ida Range, and in the Hunter Valley north of Lake Hawea.

Regular observations are made only on the Otago Peninsula and the persistence of viable populations at the five other sites is for now uncertain. Given the terrible status of *Naultinus* in Southland and most of the rest of Otago, the few surviving jewelled gecko populations may also face the same fate.

There are a handful of seemingly good populations on Otago Peninsula, yet even here there are problems. Peninsula resident Rod Morris has witnessed three populations crash in the last decade.

In two cases intense collecting by poachers is the likely cause; in the other

suburban encroachment is destroying habitat and boosting local cat and rodent numbers. Whatever the cause, we can't afford to continue losing them at this rate.

The jewelled gecko is not much better off in Canterbury, where a few well-known populations persist, but most historical sites go unchecked or succumb one by one to development and other unknown factors.

A population near Hakataramea Pass east of Twizel, which displayed unusual coloration and genetic profile, was destroyed when its habitat went under the blade of a bulldozer.

Even on Banks Peninsula, a reputed stronghold for the species, residents report that their local jewelled geckos are slowly

Starred gecko (Naultinus stellatus) St Arnaud, Nelson Lakes



Rod Morris