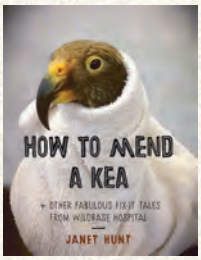
THREE KIWI TALES

MORE FABULOUS FIX-IT STORIES
FROM WILDBASE HOSPITAL

JANET HUNT

MASSEY UNIVERSITY PRESS

This is a companion book to *How to Mend a Kea*
+ Other Fabulous Fix-it Tales from Wildbase Hospital



MASSEY UNIVERSITY PRESS

First published in 2019 by Massey University Press
Private Bag 102904, North Shore Mail Centre, Auckland 0745, New Zealand
www.masseypress.ac.nz

A catalogue record for this book is available from the National Library of New Zealand

Printed and bound in China by 1010 Printing International Ltd
ISBN: 978-0-9951001-4-5

CONTENTS

NGĀ MIHI

JUST AS IT IS in the endless task of caring for wildlife, writing a book is a team effort. *Three Kiwi Tales* would not have happened without the contributions of many people.

Top of the list are Pauline Nijman, Wildbase Hospital and Recovery Supervisor, and Emma Bean, Husbandry Manager at the National Kiwi Hatchery Aotearoa at Rainbow Springs in Rotorua. Pauline and Emma not only star in the stories, they have also been unstinting with time and assistance. What amazing, knowledgeable, caring, cheerful people they are. I'm in awe of their hard work on behalf of our endangered kiwi. Thank you so much, Pauline and Emma!

Many others have answered queries no matter how small, and helped with stories, contacts and photographs. In no particular order, my huge appreciation and thanks to Kerry Oates, Jacinda Amey, Sian Reynolds, Kimberley Revelly, Sorrel Hoskin, Riki Dallas, Philip Marsh, George Gibbs, Jo Russell, Michelle Bird, Kevin Stokes and the Taranaki Kiwi Trust.

Special thanks also to Brett Gartrell, Megan Jolly and the rest of the team of veterinarians and technicians at Wildbase Hospital, who allowed me to peer over their shoulders, listen in at meetings and generally get in the way.

Thanks, too, to the MUP publishing team of Tracey Borgfeldt, Nicola Legat and Anna Bowbyes for their support and encouragement.

And, as ever, a big thank you to Peter Haines and my family, friends, neighbours and fellow Taranaki conservationists. This is where it all begins.

INTRODUCTION

THIS BOOK IS ABOUT three kiwi: little Latitude, lovely Raratoka and Piwi the pioneer. It's also about two worlds. The worlds are extreme opposites, but there are times when they meet and overlap.

The first is the world of kiwi. It's a night-time place of dark, leafiness, the forest floor, burrows, worms, grubs, spiders and insects. It's the seemingly simple world to which, over millions of years, its kiwi inhabitants have become superbly adapted. They spend their days holed up, sleeping underground, and their nights out, roaming and feeding in defined territories, often in pairs. It's a natural world, but make no mistake, it is under attack, threatened by habitat loss and by an army of introduced kiwi-killers such as stoats, rats, cats and dogs.

The human world of Wildbase Hospital at Massey University could scarcely be more different. It's a sophisticated, high-tech, daytime place, shiny-bright, white-and-light, full of astonishing machines such as X-ray (radiograph) and ultrasound scanners and all the analysers, instruments, tools and trappings of modern medicine. This world is populated by wildlife veterinarians, technicians, scientists, students, administrators and helpers.

Beyond those worlds but tying them together is a web of other humans. They come from the Department of Conservation, bird rescue centres, wildlife sanctuaries and kiwi hatcheries around the country. They monitor kiwi, gather eggs and chicks, check traplines, drive the birds to places of safety . . . and to Wildbase. For many, it's their job. Countless others are unpaid volunteers. They all do it because it's their passion.

They know that *every kiwi counts.*

THE NOT-BIRD BIRD

KIWI ARE SO VERY WEIRD that when a kiwi skin was taken to England in 1812, a lot of people thought it was a giant hoax. It was as if a prankster had glued a whole lot of parts together for a laugh. After all, it didn't have much in the way of wings, it didn't have tail feathers, it had fluff instead of flight feathers, a ridiculously long bill, and legs like small tree trunks. *How could it be a bird?* Some thought it was a species of penguin; others thought it was a kind of dodo, a large, flightless, trusting bird that once lived on the island of Mauritius but was last seen in 1662.

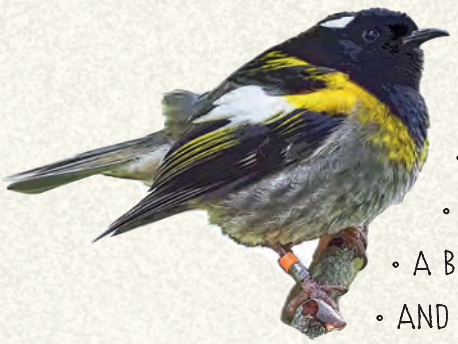
The kiwi is a bird, all right, but it is indeed the strangest in the world. It's not surprising that it seemed like a joke.

THE HIHI, A TYPICAL BIRD

HIHI ARE DIURNAL. THEY LIVE IN THE DAY AND ARE CREATURES OF THE AIR AND SKY. ALMOST EVERYTHING ABOUT THEM EXISTS BECAUSE THEY HAVE EVOLVED FOR FLIGHT.

THEY LAY MANY EGGS, HAVE HELPLESS CHICKS THAT MUST BE FED BY THEIR PARENTS, AND LIVE IN HIGH PLACES WHERE THEY NEST AND ROOST. THEY HAVE:

- KEEN EYESIGHT
- A RUBBISH SENSE OF SMELL
- POOR HEARING
- NOSTRILS AT THE TOP OF THEIR BILLS
- FLIGHT FEATHERS
- WINGS AND A TAIL
- A KEEL ON THE BREASTBONE, WHERE THEIR WINGS ARE ATTACHED
- LIGHT, HOLLOW BONES
- THIN, DELICATE SKIN
- A BODY TEMPERATURE OF 39–42°C
- AND ONE OVARY.



- KIWI ARE RATITES, LIKE OSTRICHES AND EMUS. THEY DON'T HAVE WINGS, SO THEY HAVE NO KEEL FOR FLIGHT MUSCLES. INSTEAD, THEY HAVE A FLAT BREASTBONE AND WEAK CHEST MUSCLES. THAT'S WHY DOGS ARE SUCH A THREAT — ONE BITE CAN INSTANTLY KILL A KIWI
- AT 38°C, A KIWI'S BODY TEMPERATURE IS MORE LIKE A MAMMAL'S THAN A BIRD'S (HUMANS = 37°C)
- KIWI HAVE TWO OVARIES AND LAY MASSIVE EGGS
- KIWI CHICKS ARE PRECOCIAL — THEY ARE PERFECTLY FORMED COPIES OF ADULT KIWI FROM THE MOMENT THEY HATCH

SCIENTISTS DEVELOP NEW THEORIES all the time. Right now, they believe that prehistoric ancestors of kiwi very likely flew to New Zealand so long ago that we cannot imagine it — between 60,000,000 and 80,000,000 years ago. Those ancestor-kiwi would have had wings, feathers and a tail, and who knows what colour they were, or what size and shape their legs and bill were? What did they eat? We'll never know for sure, because there is no fossil evidence from way back then to tell us.

In the millions of years that followed, the ancestor-kiwi and all the plants, birds and other living creatures had New Zealand to themselves. Their world was a giant time capsule, a kingdom of birds that remained largely unchanged as the rest of the globe moved on. It was unlike any other place on Earth.

Safe on their islands, the ancestor-kiwi slowly changed, and changed again, until they became the species we know today.

LIKE MANY OTHER NEW ZEALAND BIRDS, ancestor-kiwi lost the power of flight. Flying requires immense amounts of energy to get off the ground and stay there. That is why flying birds are so streamlined, with no unnecessary weighty parts. But if there is no need to fly . . . you don't.

Kiwi wings became smaller until all that remained was a tiny limb, like a bent matchstick with a claw on the end. *No use at all!*

Kiwi feathers became dull, for better camouflage in the forest, and because they were not needed for flight, the feathers lost their rigid structures and became soft and hair-like instead, for warmth.

And as they traded in their wings, kiwi developed heavy bones and great strong legs for getting around, for running, kicking, digging and scratching.

They became nocturnal, going out at night and sleeping through the day. That way they could avoid hunting birds such as the terrifying Haast's eagle and birds of prey like harrier hawks and falcons. Night-time was also better for finding food. Kiwi kai — beetles, moths, wētā, cockroaches, millipedes, worms and other invertebrates, including those that live underground — is more plentiful and easier to catch after dark.

Adjusting to night living meant that kiwi eyes grew smaller and weaker at the same time as their hearing and senses of smell and touch grew stronger.

Altogether, kiwi became more like a mammal than a bird . . . and that is a great irony, because the greatest threats to kiwi are from mammals!

THE FIRST MAMMALS to arrive in New Zealand were the Polynesian voyagers and settlers who hauled their waka up the beaches around 800 years ago, along with their smaller companions, kiore (bush rats) and kurī (dogs).

The arrival of this trio was as much a disaster for native wildlife as if a giant meteor had exploded in the skies over the land. The humans hunted birds for food and feathers, and burned their living places, while kiore and kurī chomped their way into the forests.

One way or another, over the next centuries 34 bird species became extinct along with numerous amphibians, fish, reptiles, one bat and countless invertebrates.

Worse followed. About 500 years later, when new settlers

arrived from Europe, they transformed the land, felling trees to make farms, draining wetlands, and building towns, roads and cities. They also hunted and fished.

And they brought with them a whole new mob of invaders: cats, dogs, rabbits, possums, stoats, weasels, ferrets, mice, two more kinds of rat, hedgehogs, pigs, goats, deer, sheep and cows, and more. Some of those animals eat the same food as native wildlife, and others eat the wildlife itself.

New Zealand birds and other creatures were helpless, especially against the fiercer members of that gang. Like kiwi, many birds nest on or near the ground, making it easy for hunters like dogs, cats, possums, stoats and rats to kill nesting adults, steal and devour eggs, and slaughter chicks. Kiwi's strong musky smell is like an flashing neon advertisement to mammals, with their sensitive noses — *Look! Over here! Here I am!*

Another 16 species of bird disappeared forever.

Shriek! This young kiwi had no chance against the stoat.

THE KIWI WHO'S WHO

THERE ARE FIVE KIWI SPECIES in Aotearoa New Zealand. They belong to the genus *Apteryx,* which is a Latin word for 'no wing', because when they were named in London in 1812 by Dr George Shaw, he hadn't noticed their tiny wings. The wings appear to be of no use at all, but sometimes, when the birds sleep, they tuck their long bill comically under the barely existent limb.

Perhaps they dream of times long ago when they had larger wings and took to the air to soar effortlessly over ocean and forest . . .

BROWN KIWI *Apteryx mantelli*

Brown kiwi occur naturally in the wild in the North Island. Their slightly reddish feathers have dark edges, making them look streaked with brown and black. There are four distinct groups, each a little different genetically: the Coromandel brown kiwi, the Northland brown kiwi, the eastern brown kiwi and the western brown kiwi.

Length: 40 cm **Weight**: 2.2 kg (male), 2.8 kg (female)

Threat level: At risk–declining

GREAT SPOTTED KIWI / ROROA *Apteryx haastii*

As the 'great' in their English name tells us, great spotted kiwi, or roroa, are the giants of the kiwi world; they have pearl-grey feathers flecked with bands of darker grey. They live in the hills and mountain ranges, forests and tussock grasslands of the upper South Island.

Length: 50 cm **Weight**: 2.6 kg (male), 3.3 kg (female)

Threat level: Threatened–nationally vulnerable

LITTLE SPOTTED KIWI / KIWI PUKUPUKU *Apteryx owenii*

Little spotted is clearly the tiniest kiwi species. Their feathers are soft brownish-grey over white, which makes them seem spotted. They have whitish legs and long pale bills. They were once widespread throughout the country, but are now extinct in the wild on the mainland, surviving only on offshore islands and in sanctuaries.

Length: 30 cm **Weight**: 1.1 kg (male), 1.3 kg (female)

Threat level: At risk–recovering

ŌKĀRITO BROWN KIWI / ROWI *Apteryx rowi*

Rowi are the rarest of all kiwi species, numbering about 500. They are found in the Ōkārito and south Westland forests. They are similar in size to brown kiwi but have soft, greyish feathers streaked with brown and black, and sometimes white around their heads. Unlike other kiwi species, they have strong family ties, with young kiwi sometimes remaining in the family group for years.

Length: 40 cm **Weight**: 1.9 kg (male), 2.6 kg (female)

Threat level: Threatened–nationally vulnerable

TOKOEKA / SOUTHERN BROWN KIWI *Apteryx australis*

Ngāi Tahu's name for this large southern brown kiwi is 'tokoeka', which translates as 'weka with a walking stick'. *Totally right!* That's exactly how they appear as they walk along tapping their bills on the ground.

Tokoeka are similar to Ōkārito rowi. They have reddish-dark brown soft feathers streaked with brown and black, a long, pale bill, and short, whitish legs and toes.

There are three sub-groups. The first, Rakiura/Stewart Island tokoeka (threatened–nationally critical) are unusual because they sometimes go beachcombing in daylight, looking in seaweed for invertebrates to eat.

The other two sub-groups, Fiordland tokoeka (threatened–nationally vulnerable) and the rare Haast tokoeka (threatened–nationally critical), like to live in the mountains, which makes them tricky to find and care for.

Length: 45 cm **Weight**: 2.4 kg (male), 3.1 kg (female)

The length measurement is for females, which are larger than their mates, and is taken from bill to bottom.

Read more and see some great photos at NZ Birds online, kiwisforkiwi or the Department of Conservation websites.

See page 46 for how to read threat levels.

Three tokoeka sub-groups. [**1**] Rakiura/Stewart Island tokoeka, [**2**] Fiordland tokoeka and [**3**] a seven-month-old Haast tokoeka.

LATITUDE'S TALE

THEY CALLED HIM LATITUDE . . . but not at first. In the beginning, he was simply an egg named 'Mn.Arp5'. Even then, he was something out of the ordinary.

Mn.Arp5 came from Manunui Forest, in the rugged hill country halfway between Tongariro National Park and the Whanganui River. His father was Arapeta, a western brown kiwi. Mn.Arp5's mother was a very large brown kiwi named Mrs Peta.

[1] This is Arapeta's nest. Can you spot Mn.Arp5?

[2] Delia, one of Kerry's helpers, holds Arapeta while Kerry retrieves Mn.Arp5.

IT WAS FRIDAY afternoon, 2 November 2018. Manunui Project Manager Kerry Oates was in the forest doing his kiwi rounds. He had lifted an egg from Arapeta in October, so it was too soon to expect another. Instead, he was giving Arapeta a six-monthly health check and, at the same time, was going to switch the kiwi's radio transmitter to a new one and put it on his other leg.

It's Mrs Peta's job to lay eggs — two, sometimes three, clutches, or times, a year. Mostly she lays two eggs in each, but they are so huge — six times larger than you might expect, taking up 20 per cent of her body weight — that she lays them about two weeks apart. It takes a week for her to form an egg. It's a massive task.

After that, she is free to go and the job passes to Arapeta. He develops a brood patch on his tummy, which has no feathers, and blood vessels close to the skin, to keep the eggs warm. As the eggs grow older, he stays with them more and more, sitting on them and turning them, keeping them toasty and safe.

The transmitter on Arapeta's leg tells Kerry what the kiwi is up to. When there are no eggs, he spends most of the night outside. The transmitter detects that he is on the move and sends the information to Kerry's antenna.

But if Arapeta is in the nest on an egg (or eggs, if there is a second one), the transmitter switches to incubation mode and tells Kerry that, too.

Not this time!

There was only one egg and, because it was not very old, Arapeta was out of the nest a lot of the time. The transmitter didn't signal that the egg was there.

Imagine Kerry's astonishment when he lifted the kiwi from his burrow and saw the large, pearly-white shape partly buried under leaves and moss in the bottom of the nest.

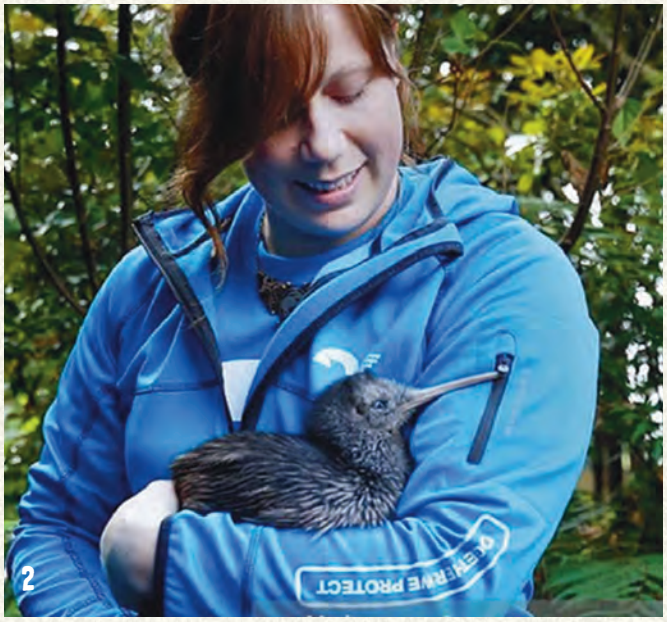
It's not usual to take newly laid eggs, but once he had disturbed Arapeta, Kerry had no choice — *if in doubt, bring it out* is the motto. Whatever Kerry did, Arapeta would have run away and not come back. The egg would have died.

Kerry didn't have his egg-gathering box with him. He candled the egg, which means he shone his torch through its thin shell so he could see inside. There was a small air cell at one end. It was important to know its location because the air cell must be upward when an egg is carried. He drew on the shell in pencil, marking the top of the egg and writing its name.

He tucked the egg into a fleece and carried it back to his ute. Then he wrapped it in a towel and placed it cross-wise in the space between the front seats. Off he went, trying his best not to shake or damage the egg.

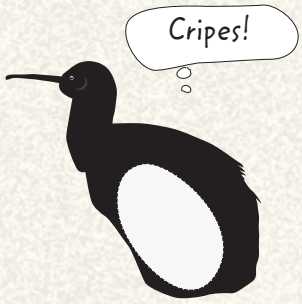
Three and a half hours later, Kerry handed Mn.Arp5 over to Emma Bean. Emma is the Husbandry Manager at the National Kiwi Hatchery Aotearoa at Rainbow Springs in Rotorua. Mn.Arp5 weighed 450.3 grams and was 124.9 millimetres long by 80.5 millimetres wide.

The egg was dirty and it was cracked at one end.



[1] A helper holds a parka so Kerry is in darkness while he candles the egg.

[2] In safe hands! Emma from the National Kiwi Hatchery cradles a young brown kiwi.



OPERATION NEST EGG

[1] On the outside, there's a delicate calcium carbonate shell with tiny pores that allow the egg to 'breathe': oxygen enters and water vapour and carbon dioxide leaves. Just inside the shell, there are two semi-transparent protein membranes, like very thin skin, that defend the egg from bacteria.

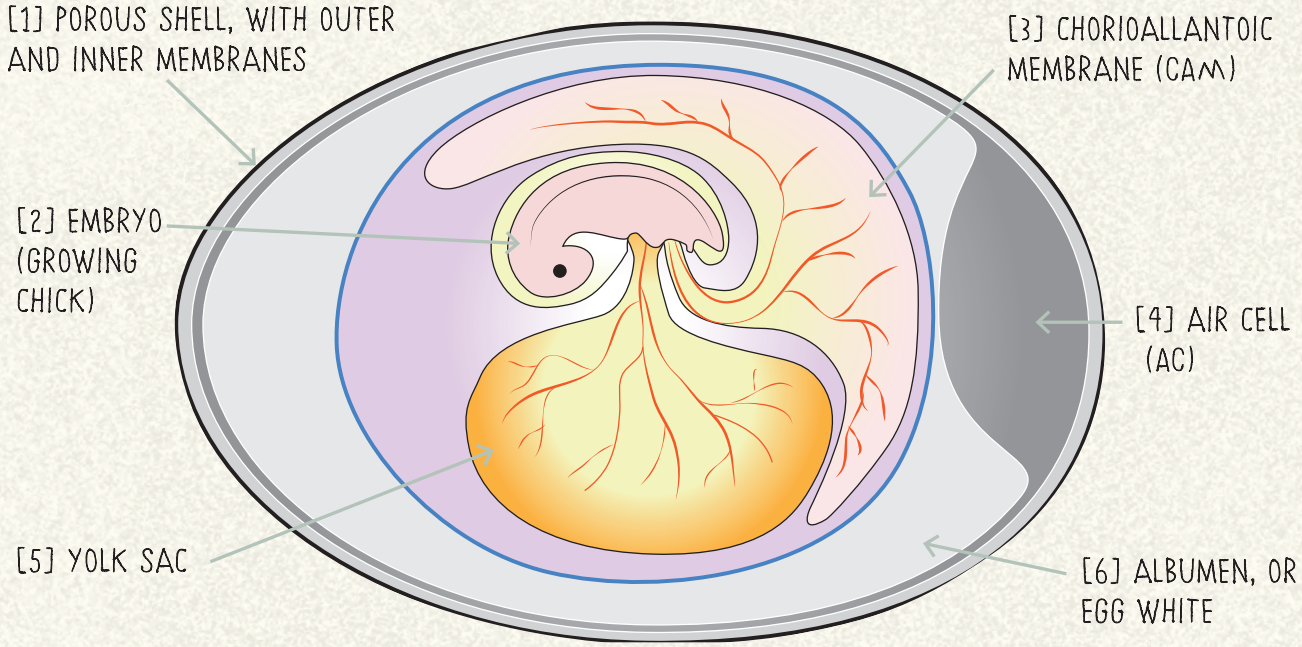
[2] The embryo. It starts as a tiny group of cells that you can hardly see and grows larger as organs form and it becomes more like a chick. By the time it hatches, it fills the whole egg.

[3] A special temporary membrane called the CAM or chorioallantoic membrane. The CAM has a network of veins that carry oxygen, food and waste to and from the growing embryo. It's like the placenta in mammals.

[4] The air cell (AC) at one end is a space between the outer membrane and the inner membrane. It's the gap at the blunt end of a boiled chicken egg when you peel it. The air cell provides oxygen to the chick just before it hatches, once the veins inside the CAM can no longer get enough oxygen through the pores of the shell. The AC enlarges as the egg gets older, whether there is an embryo or not, and is a sign of the age of the egg — that's why you can do a float test with supermarket eggs to find out how old they are! By hatching day, the AC occupies almost one third of the egg.

[5] Inside there is a large amount of yolk in a sac. It feeds the embryo as it grows and after it hatches. It fills up to 60 per cent of the space in the egg — much more than most birds. Emma says it's as if Kiwi Mum has packed lunch for her chick!

[6] The albumen, or egg white, contains proteins and water. It protects the yolk and provides additional nutrition.



(THIS EGG IS ACTUAL SIZE, BUT THE PROPORTIONS INSIDE ALTER AS THE EGG GROWS)

ARAPETA AND HIS EGG, Mn.Arp5, were part of an an undertaking called Operation Nest Egg (O.N.E.).

Kiwi have lived in New Zealand forests for millions of years. They belong here and only here. There used to be hundreds of thousands of them, whistling and calling, snorting and pottering around doing kiwi things in the bush after dark.

But by the end of the twentieth century, that had changed. Because of habitat loss and because of predators, many forests were silent and empty while others had hardly any kiwi at all.

Not enough kiwi were growing up. *Ninety-five* young kiwi out of 100 eggs hatched were dying. No adults means no more eggs, no more chicks and no more kiwi. Without help, all kiwi were in danger of disappearing forever.

Dogs, cats, rats and pigs and other hunting mammals are all a threat to kiwi, but worst by far, and the trigger that tipped kiwi populations into a nose-dive, are stoats.

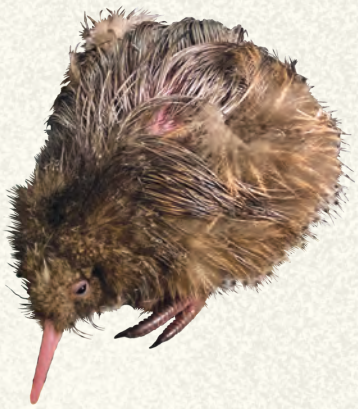
Stoats are mustelids, belonging to the same family as ferrets and weasels. They are superb hunters, they climb and they swim, they are fearless, they breed rapidly and they are everywhere.

And they are hungry: they eat eggs, they eat chicks, they eat young kiwi . . .

It was a crisis, but there was a glimmer of hope.

STOATS ARE RELUCTANT to attack large kiwi because of their mighty kicks and sharp claws. What was needed was some way to get young kiwi to the 'large kiwi' safe place, a bridge to carry them across that scary, dangerous time from egghood to adulthood. Operation Nest Egg was one very clever answer. It began in 1994.

Brown kiwi males sit on their eggs for an average of 78 days. In that time a fully formed Mini-Me kiwi chick develops, small but ready to look after itself from the moment it hatches. Operation Nest Egg succeeds because of this very thing: kiwi chicks know all they ever need to know right from the start. Kiwi parents *never* feed their chicks. Some species stay in family groups for a year or so, but not brown kiwi. After about five days getting up strength in the nest, the chick is off. *See you around, Dad!*



Under Operation Nest Egg, kiwi eggs are lifted from nests in the forest around day 60 and, like Mn.Arp5, they are taken to hatcheries around the country.

At the hatchery the egg is placed in an incubator. Great care is taken to ensure that the egg is warm and does not dry out. It is closely monitored and notes are kept to track its progress.

After the chick hatches, it is put into a specially warm, humidity-controlled box called a brooder, often with another chick for company.

Once it's feeding and growing as it should, it is moved to an outside area where people still keep an eye on it. Sometimes it goes to a kiwi crèche on an island or to another safe place such as a mainland sanctuary.

The little kiwi returns to the forest only when it is large enough to fend off stoats. By then it weighs over one kilogram and is usually over six months old.

It's been in the forest before — but at that time it was just an egg!

Welcome home, little kiwi.

MN.ARP5 WAS SO NEW when Kerry found it that, apart from the air cell, there was no sign of life. Emma guessed that the egg was about nine days old. *It might not make it.*

First, she mended the crack with nail varnish. Then she gently cleaned, weighed and measured Mn.Arp5, and placed it in an incubator. For 60 days the incubator kept the air humid and the egg warm. Mn.Arp5 was turned four times a day, first by hand and later in an automatic incubator. Emma and others in the team took turns to weigh and candle it twice a week.

By the end of December they could make out the outline of a small chick inside. When Emma whistled to the egg, it wobbled, jiggled and twitched as the chick responded. But it was not as lively as it should have been. They were concerned, so Emma sent the egg to the vet in Rotorua for an X-ray.

1

2