

Listed in June 2006 as vulnerable, the Tasmanian devil is finally receiving worldwide support in its gruelling fight for survival.



AUSTRALIAN GEOGRAPHIC SOCIETY PROJECT





devil

COAST

STORY BY IAN CONNELLAN

PHOTOGRAPHY BY JASON EDWARDS

In the desperate race to stop a new cancer from wiping out Tasmanian devils, an expedition financed by an Australian Geographic Society fundraiser has found cause for hope on a remote, windswept coast.

‘SKINNY BOY’ IS BACK. The three-year-old Tasmanian devil is a serial offender. Thin and hungry, he’d been among the first devils trapped last March during the Tasmanian Museum and Art Gallery’s (TMAG) field trip to the remote coast south of Cape Sorell, halfway up Tasmania’s west coast. And here he is the very next day, again at the wrong end of a metre-long PVC tube trap.

“He has this big open wound, from under his chin right down his chest,” says scientific officer Billie Lazenby, as she peers down at Skinny Boy in the upended trap while wriggling her hands into disposable latex gloves. “Yesterday it had this yucky flap of skin hanging off it. He’d most likely have gotten it fighting.”

With help from fellow researcher Brian Looker, Billie slides Skinny Boy into a fresh hessian bag, which she carries to where veterinarian Jemma Bergfeld is pulling on her disposable gloves. Brian, meanwhile, wanders away with the empty trap and dons his elbow-length rubber gloves and starts thoroughly cleaning the trap with water, brushes and an industrial-strength disinfectant named Virkon. ▶



A healthy juvenile hits the ground running from Billie Lazenby's grasp. After nine months of dependence on their mother for food, devils become solitary, coming together only to breed and feed.

All these gloves and cleanliness hint at the reason the TMAG team is here, on this rarely visited stretch of coast. The devils here have never been studied, but mere zoological curiosity wouldn't have got the helicopter flying here. It was Devil Facial Tumour Disease (DFTD). This deadly, transmissible cancer – responsible for rapidly wiping out three-quarters of devils in areas where it's found – has invaded about two-thirds of Tasmania. But, it seems, it isn't here. Not yet. None of the devils trapped so far on this trip has shown signs of the disease.

Softly spoken and reassuringly gentle with her marsupial charge, Billie settles down on the sandy track beside Jemma, who is preparing her tools of trade – needles and phials for collecting blood samples. Billie positions Skinny Boy so that Jemma can extract her samples. He isn't the first devil recaptured on the 10 km long line of 40 traps, and won't be the last, according to team leader David 'Doozie' Pemberton.

"A lot of animals are incredibly wary of traps," Doozie says. "Some just can't be trapped. Devils, however... they're probably the most trap-happy animals I've studied."

Once Billie and Jemma have the blood samples they start examining Skinny Boy's wound, a fist-sized patch of raw flesh on his chest. "There's no sign of infection," Jemma says. "For such a big wound it looks really good. I reckon he'll be fine."

Billie shuffles to the side of the track and releases Skinny Boy, who darts into the dense heath. "It's great to hear Jemma say he'll probably be okay," she says. "Yesterday, when the wound looked much nastier, I was thinking what a nice change it was to be looking at a devil that had a normal problem."

DEATH BY STARVATION

DEVIL FACIAL TUMOUR DISEASE has changed most people's ideas of what's 'normal' for devils. For most of the past 200 years devils have generally been reviled rather than revered. Like thylacines, they were inaccurately thought to be destroyers of livestock, indiscriminately savage, satanically fierce... Over time, myths such as these took root and flourished into 'they say' truths (AG 70).

It's certainly normal for devils to have wounds. They sometimes bite during fights over food, and when mating the male holds the female's neck in his jaws. While unpleasant, this behaviour, and its inevitable sores and scars, was always considered nothing to worry about. Then, a decade ago, when the Tasmanian devil population was said to be at a historical high point of perhaps 150,000 animals, Dutch wildlife photographer Christo Baars took several pictures of devils with grotesquely disfigured faces at Mount William National Park, in Tasmania's north-east. Christo later took the shots to zoologist Nick Mooney, of the Tasmanian Government's Nature Conservation ►

CONTAGIOUS CANCER

GROUND-BREAKING AUSTRALIAN RESEARCH has revealed that Devil Facial Tumour Disease (DFTD, pictured) is one of only two known contagious cancers in the world. In a remarkable twist of fortune, it was the arrival of a single devil named Errol that led to the breakthrough. "Finding Errol was a 'eureka' moment for me," says Launceston-based cytogeneticist (cell genetics researcher) Anne-Maree Pearse. "This animal, more than anything else, confirmed my thinking."

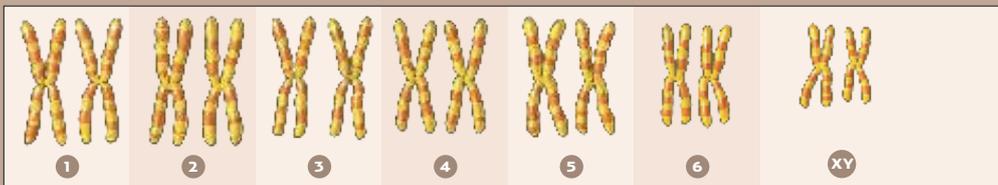
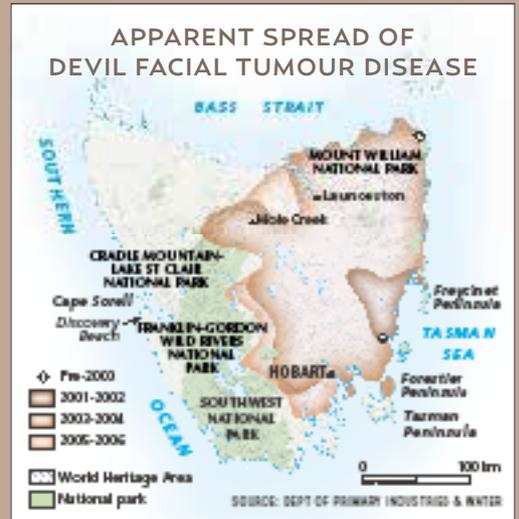
Earlier research in the lab had led Anne-Maree and her assistant Kate Swift to suspect that the facial tumour was infectious. Not only was the chromosomal arrangement of the cancer cells markedly different from a 'conventional' cancer cell, but the DFTD cells were exactly the same in every devil studied – no matter where the devil had been found or what the size and stage of tumour development. "When you see something like this in a cancer, you start to think about infectious cell lines," says Anne-Maree.

Enter Errol. Errol had been born with a harmless anomaly to one of his chromosomes 5 (see illustration). In DFTD cells, chromosomes 5 are among the few pairs of chromosomes that remain unchanged by the disease. But Errol had two normal 5s in his cancer (just like all other DFTD tumours studied). "This meant the cancer could not have spontaneously developed from Errol's own tissues, as they contained the chromosomes 5 anomaly," says Anne-Maree. The cancer had to have been transmitted.



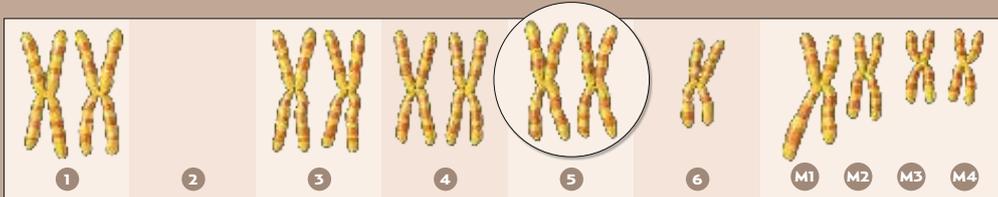
ADAM PRETTY / GETTY IMAGES

Researchers now know that the infectious DFTD cell line is passed between devils through their feeding and biting behaviour, especially during the breeding season. Direct transmission of cancer cells isn't known among human cancers, but one other tumour – Canine Transmissible Venereal Sarcoma (CTVS) – is transmitted between dogs. According to Anne-Maree, what's known about CTVS is potentially good news for devils. "The dog's immune system can overcome CTVS, and it regresses," she says. "So far the devil's immune system isn't doing this, but over time DFTD might evolve into a non-fatal disease, as happened with CTVS – provided there's enough time and space for this evolution to occur."



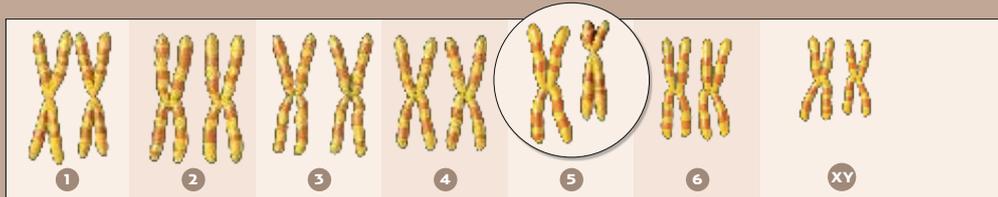
NORMAL CELL

A healthy male devil's cell consists of six pairs of identical chromosomes and an X and Y chromosome. A healthy female devil would have two X chromosomes.



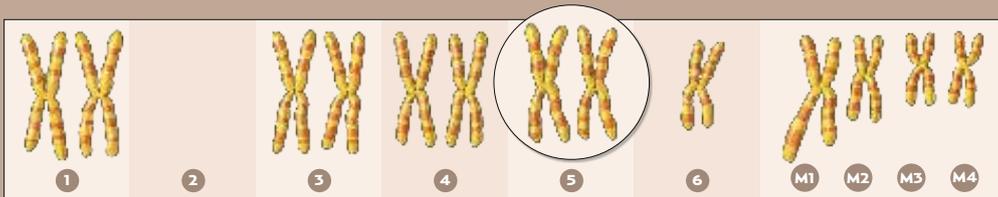
DFTD CELL

The chromosomes in every tumour cell are even more mixed up in structure and arrangement than this stylised illustration can show, but chromosomes 5 remain unaffected.



ERROL'S NORMAL CELL

The chromosomes in Errol's normal cells are identical to any other devil except for a harmless anomaly, called a pericentric inversion, to one of Errol's chromosomes 5.



ERROL'S DFTD CELL

Errol's DFTD cells revealed a normal pair of chromosomes 5. DFTD must therefore have been transmitted rather than developing spontaneously in Errol's tissues.

“The possibility of species extinction is bad enough, but people must realise that the ecology of the Tasmanian bush is changing as the disease spreads.” **DAVID ‘DOOZIE’ PEMBERTON, TEAM LEADER.**

Branch, who showed them to various other wildlife specialists. No-one had seen anything like it. Since then the devil population at Mount William has been estimated to have plummeted by 80 per cent.

Over subsequent years, similarly disfigured animals began turning up in other parts of Tasmania. In 2000, the first case of DFTD was formally recognised, and by late 2003 the Tasmanian Government – its awareness heightened through the efforts of Nick and others – was sufficiently concerned to provide \$1.8 million for a three-year DFTD program. The Federal Government has pledged a further \$2 million over two years. This should keep research rolling until 2009.

The disease is ugly and the animals it afflicts die suffering. Devils with DFTD develop malignant tumours on their mouths and faces that inhibit their ability to feed, and they usually die within 3–8 months of showing the first symptoms. Animals with DFTD continue to behave normally – they bite other devils, and are bitten. Researchers suspected that DFTD might be

spread by this behaviour and, early this year, groundbreaking genetic research confirmed their awful suspicions (see “Contagious cancer”, page 109). Unlike nearly every other cancer, DFTD is spread through contact.

DEVIL HEAVEN

DEEP IN THE HEART of every wild little devil there’s a patch of earth just like this. Stretching south from Discovery Beach, where Billie is crouched holding a male devil about five years old, the west coast of Tasmania provides a barely adequate bulwark against the Southern Ocean, which regularly rises and rages like some bad-mannered house guest. A light mist of salty air hangs over the steep, wave-cut dune. A damp onshore breeze has researchers’ fleeces zipped to the chin.

“Devils love the coast because there’s lots of food on the beach – washed-up seabirds mainly,” Doozie says. “So heading for the beach is a good strategy if you’re devil trapping. It’s ideal here because there’s a wide corridor of heath and scrub between the dunes and beach and the button grass plains further inland.”

The TMAG team has set traps in each of these areas. They’ll check them every day for a week. It’s only the second day of the study, but already there’s cause for a smile. “It’s so nice to be working in an area where there are older animals,” Billie says. Devils normally live to about five or six, but in areas where the disease occurs they rarely reach three. They seem to get DFTD at about two and are dead in under a year. “On what we’ve seen so far, this area appears to have a ‘normal’ population,” Doozie says. “There’s a mix of ages – older animals having progressively more trouble making a living, thinner-looking young ones and some nice healthy specimens in the mid range.”

His words resonate as the team works its way northwards, clearing traps throughout the morning. A delicate juvenile female is taken from one, a robust 7 kg male from another. Animals trapped for the first time are subjected to an extensive examination of teeth, ears and limbs. A microchip – of the sort used to tag domestic pets – is implanted and blood taken.

There’s some bycatch, too. Mid-morning, Billie clears a beautiful little eastern quoll from a trap. “We try to map everything that’s going on in a study area while seeking the disease,” Doozie says. “The possibility of species extinction is bad enough, but people must realise that the ecology of the Tasmanian bush is changing as the disease spreads. At Mount William, where DFTD has been known to be present for the longest period, the lack of devils has led to a boom in eastern quolls and feral cats. With the thylacine gone, devils became the dominant predator and if they go, it’ll be something else.”

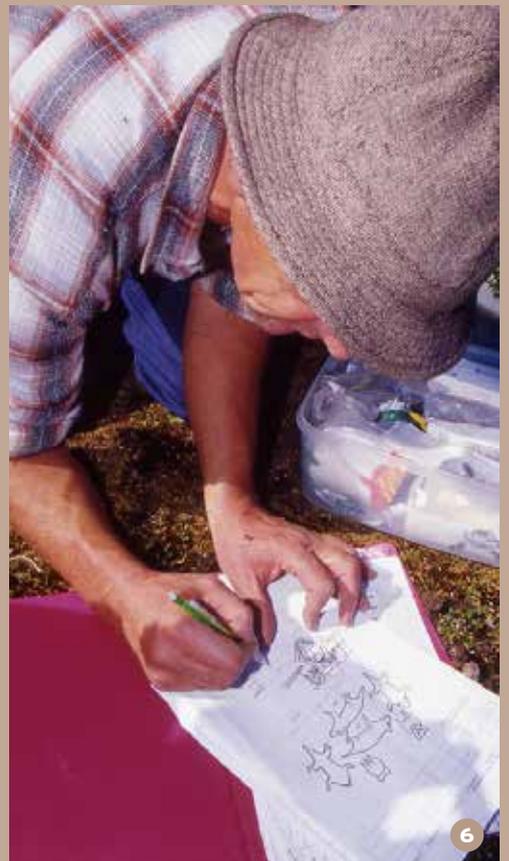
BETTER THE DEVIL YOU KNOW

A COUPLE OF DAYS spent observing Tasmanian devils is enough to convince anyone of the importance of efforts to preserve these tough, determined survivors. Up close they’re handsome and engaging, bright-eyed and alert. ▶

The perfect health retreat. Not one of the 25 devils studied here has been affected by DFTD. This remote west coast habitat has great potential as a devil reserve, and may well become one if the disease continues its insidious advance across Tasmania.



THE DETAILS IN THE DEVIL



When a devil is caught for the first time, scientists place a small tag **1** under its skin to enable future identification. Recaptured devils have their tag number recorded via a scan, and are immediately released. A small ear biopsy **2** and tissue sample **3** are taken from first-timers for molecular study. By measuring tooth wear, scarring and size of canines **4**, scientists can make an estimate of each devil's age. Veterinary officer Jemma Bergfeld

then takes a blood sample **5** for genetic research. Every detail is meticulously recorded by zoologist Nick Mooney **6**. Such rigorous scientific scrutiny is necessary to prove there are sufficient numbers of healthy devils thriving on this particular stretch of coast to support a viable population, should a managed reserve become necessary. "This coastline is a small outpost of hope," says expedition team leader Doozie Pemberton.

One of the last devils cleared from a trap this day is another older male. He has a gaping, matchbox-sized wound near his right hip, which Jemma declares unlikely to cause any lasting harm. "Devils are so incredibly resilient," she says. "Provided the right conditions, they'll recover from most traumas and diseases." She adds mention of devils being prone – like most marsupial carnivores – to a wide variety of cancers, most of which they survive. "I recently did a biopsy on a devil that had four different types of tumour," she says.

"Including facial tumours?" asks Billie.

"No."

"So what killed it?"

"A car."

These tough animals won't be shuffling into the long, dark night of extinction any time soon. DFTD is better understood all the time, and plans to protect devils are progressing on several fronts, including continued monitoring, captive breeding and the establishment of disease-free reserves.

But Doozie is realistic about the devil's long-term prospects in the wild. "This species is already out on a limb," he says. "It's isolated on an island – never a good sign – and the chances are that, if DFTD doesn't get it, something else eventually will." 🐾

Moment of paws. An eastern quoll (below) unwittingly finds itself in a trap intended for devils. Quolls and devils share membership of the dasyurid family of marsupials and compete for live prey and carrion. Dense coastal heath (right) is ideal habitat for devils, as it's dry underneath, enabling them to den without burrowing.



Dasyurus viverrinus

MARY'S LITTLE DEVILS

THE WORLD'S MOST FAMOUS flesh-and-blood Tasmanian devils owe their renown to Denmark's Tasmanian-born Crown Princess Mary. The Tasmanian Government gave four devils to Denmark as a gift on the birth of Prince Christian, Princess Mary and Crown Prince Frederik's son, born on 15 October last year. Remarkably, they're the only devils in captivity outside Australia. The man who selected and delivered them to Copenhagen is Trowunna Wildlife Sanctuary owner Androo Kelly.

Androo has run the Trowunna sanctuary, near Mole Creek in Tasmania's north-west, for more than 20 years. Although not a scientist, he's an acknowledged expert on devil behaviour and husbandry. In February, Androo hosted the Australian Geographic documentary crew, who were making our *Tasmanian Wilderness* DVD (page 34). "My background's in education, and that's what I've always seen as my main role," Androo says. "I set out to change community attitudes to devils and I think I've done okay."

Since taking over Trowunna in 1986, Androo's been a tireless advocate for devils, which are such furtive customers in the wild that they're rarely seen, even by those who study them. Few Tasmanian visitors have the time (or patience) to try to see wild devils, so Androo's captive animals are popular attractions.

Trowunna's captive breeding program for devils is one of the most successful around. "We've bred about 150 devils here, almost 60 of them in just the past three years," Androo says.



Although not the safest pets for baby Prince Christian, the four devils given to new mother Crown Princess Mary (right) are now proud citizens of Denmark, having been lovingly raised by Androo Kelly (far right).

The animals are bred under the Australasian Species Management Program guidelines of the Australasian Regional Association of Zoological Parks and Aquaria. There's a "devil stud book", which zoos use to keep track of their animals to ensure genetic diversity.

PHOTOS: GETTY IMAGES

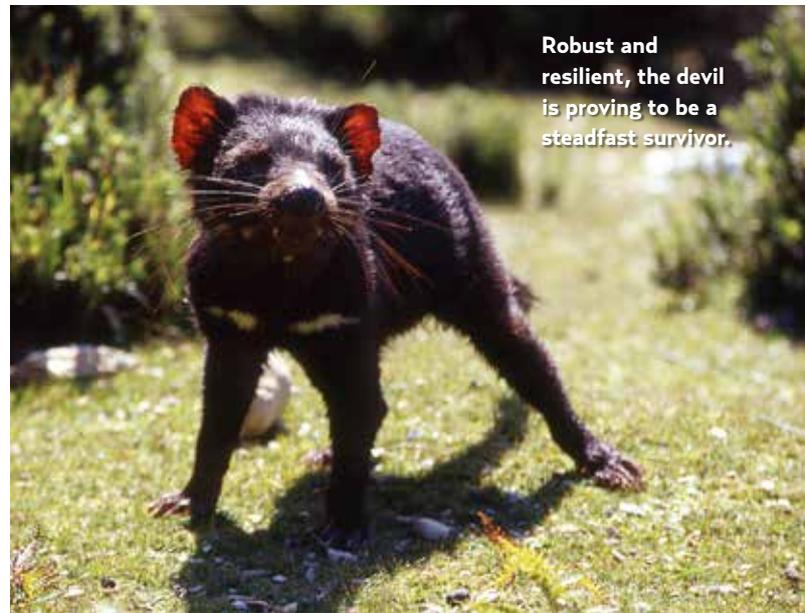


It was no easy matter to get Denmark's devils – which Androo delivered to Copenhagen Zoo in April – out of Australia. "Devils are one of five species – the others are the koala, wombat, echidna and platypus – the Commonwealth calls iconic animals of Australia," Androo explains. "You can't just give one of these animals to a foreign zoo. There had to be specific agreements, including a diplomatic agreement, in place. And they also had to be part of a regional plan endorsed by the European zoo community, which means there should eventually be a sustainable breeding population of devils in Europe."

To give that population a good start, Androo took a "social group" of four devils – three-year-old male Morten, female Maydena, 2, and

one-year-olds Maria and Montague. "I had to stay in Copenhagen for 17 days with them," Androo says. "All the facilities were in place, but I had to get them through half of the quarantine period and get them settled for their 'debut' for the media and the prince and princess."

Denmark's future king and his wife seemed mightily pleased on the day. Danish newspapers reported the pair laughing and trying to emulate devil noises; Prince Frederik kneeled and tried to get the newcomers' attention through the glass that fronts their enclosure. "You wouldn't believe it," Androo says. "One of them walked straight up to the glass and practically bowed to the prince and princess. Anyone would think they'd been trained."



Robust and resilient, the devil is proving to be a steadfast survivor.

AUSTRALIAN GEOGRAPHIC thanks Kathryn Medlock, David Pemberton, Nick Mooney and Menna Jones for their help with this article. The AG Society and TMAG thank those who supported AG's 2005 Tasmanian devil campaign. The \$17,500 raised enabled TMAG to organise helicopter and logistical support for this expedition.

FURTHER READING: *Tasmanian devil: A unique and threatened animal* – David Pemberton, David Owen, 2005, Allen & Unwin. For updates on DFTD: www.dpiw.tas.gov.au/inter.nsf/WebPages/JCOK-65X2Y6?open