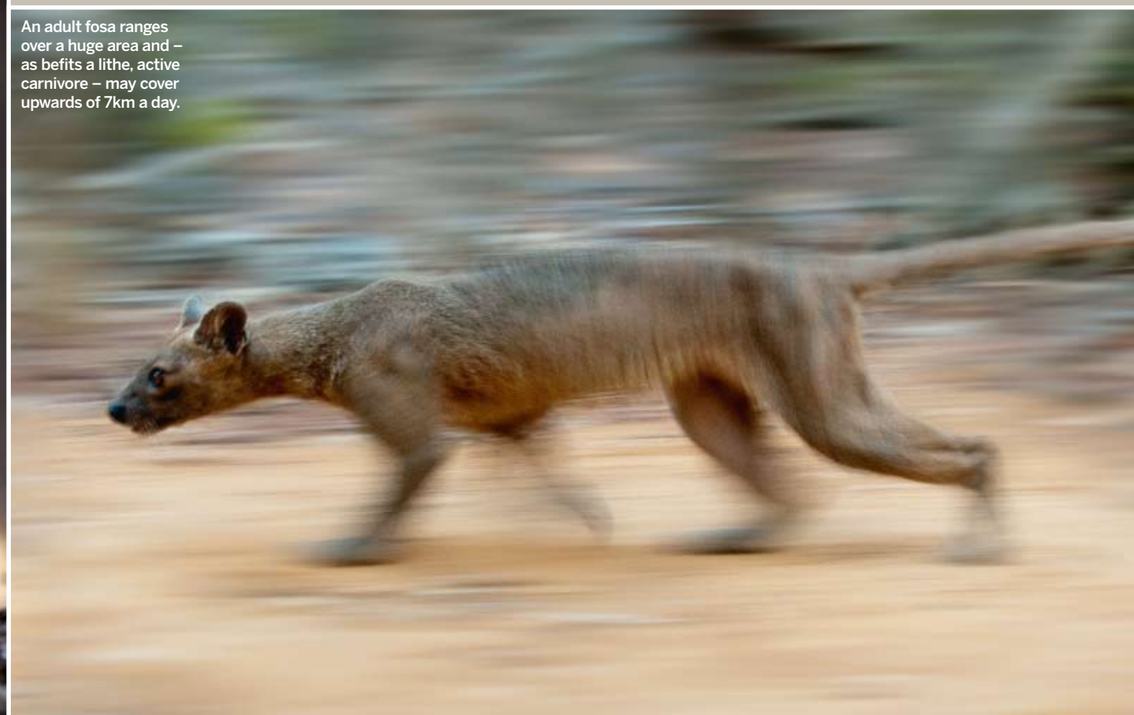
A mongoose in cat's clothing

Photos by **NICK GARBUTT**

It wails like a banshee, has an extraordinary sex life and even eats soap. NICK GARBUTT meets Madagascar's fosa, one of the strangest predatory mammals on the planet.

With 'teddy bear' ears and a unique blend of features reminiscent of cats, civets, genets and mongooses, the fosa baffles and charms in equal measure.



An adult fosa ranges over a huge area and – as befits a lithe, active carnivore – may cover upwards of 7km a day.

The persistent scratching outside my tent put paid to any chance of sleep. Finally, curiosity got the better of me and I unzipped the front flap to poke my head into the cool forest air. I came face to face with one of my boots – inside the mouth of a fosa. In barely 30 seconds it was shredded.

The fosa and I stared at each other. I wasn't sure what to do: retreat into my tent or try to scare it off? I admit to being a touch apprehensive – the creature had strong jaws and big teeth. But it seemed totally unfazed. After a brief stand-off, it padded into the forest, leaving me bemused (and without suitable footwear).

This eye-to-eye meeting in Kirindy Forest, western Madagascar, in November 1999 wasn't the first time I had seen a fosa, but it was certainly the closest I'd ever come. Despite being Madagascar's largest carnivore, the animal was smaller than I had expected – an adult male stands 30–35cm at the shoulder, compared with 35–45cm for a male red fox. Yet its lithe, muscular body oozed power, much of it concentrated in its forelimbs and paws.

Fosas (pronounced *foo-sah*) have a reputation for erratic, even inexplicable, behaviour. They have been known to curl up on the embers of camp fires, ransack unoccupied tents and eat bars of soap and malaria pills as well as boot leather. They are also renowned for their ferocity – in the animated film *Madagascar* they are caricatured as maniacal killers – yet their true nature remains largely unknown.

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The majority of sightings occur in the mating season, from mid-October to the end of November, when fosas are more active during the day and shed their inhibitions. But most are dissatisfyingly brief daytime encounters. Like so much wildlife in Madagascar, the species is an enigma.

Whenever I'm lucky enough to spot a fosa during my trips to the 'Red Island', I am invariably reminded of the unsettling feeling you get when you pass someone on the street who is vaguely familiar but you just can't place. It has suggestions of cat, hints of mongoose and intimations of stoat or even dog, yet is different to them all.

So what exactly *is* a fosa? In short, it's a kind of giant mongoose in cat's clothing. Fosas share a distant ancestry with African mongooses (see box, p48), but have become expert arboreal hunters, acquiring a number of feline traits. They are highly agile climbers, helped by one of their most peculiar adaptations – reversible ankles that enable them to grasp both sides of a tree trunk with their hind feet (several other Malagasy carnivores share this feature, as do palm civets and the binturong, margay and clouded leopards).

But, other than deciphering the species' evolutionary history, the scientific community has largely skirted around fosas. This is hardly surprising – solitary forest carnivores are notoriously difficult to study.

The first detailed research into fosas was carried out by Clare Hawkins of Aberdeen University over 10 years ago. She established key facts about the species' biology and ▶

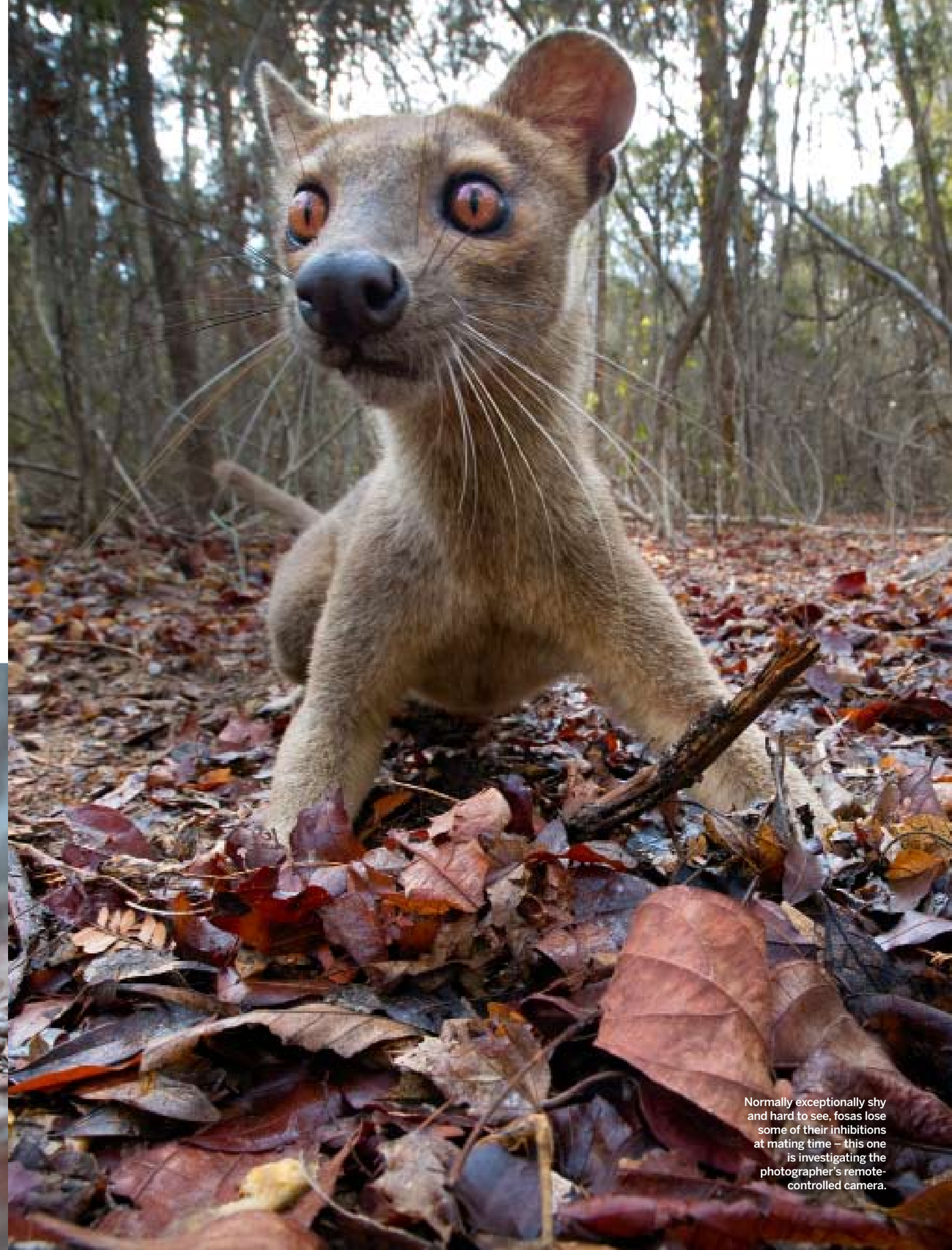
THE EXPERTS

NICK GARBUTT

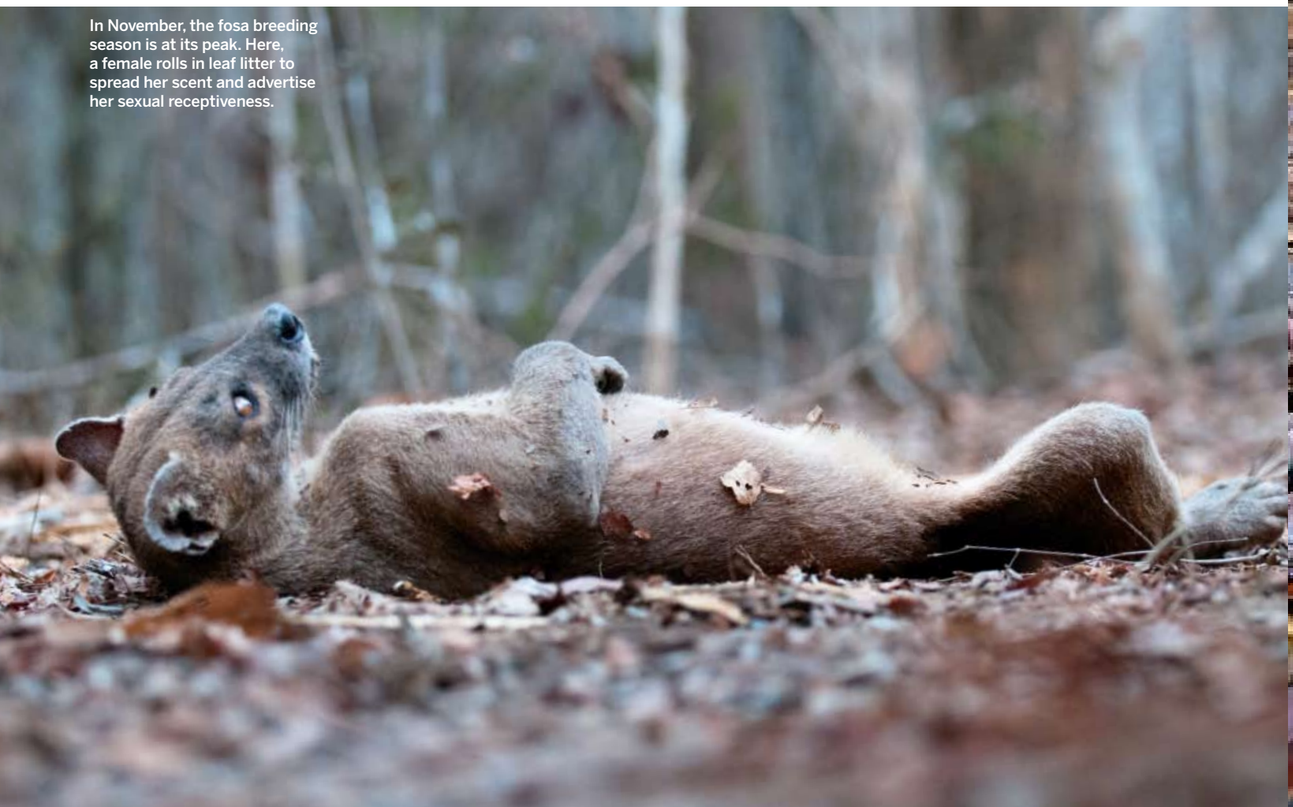
visited Kirindy Forest dozens of times during his mission to photograph the elusive fosa.

MIA-LANA LÜHRS

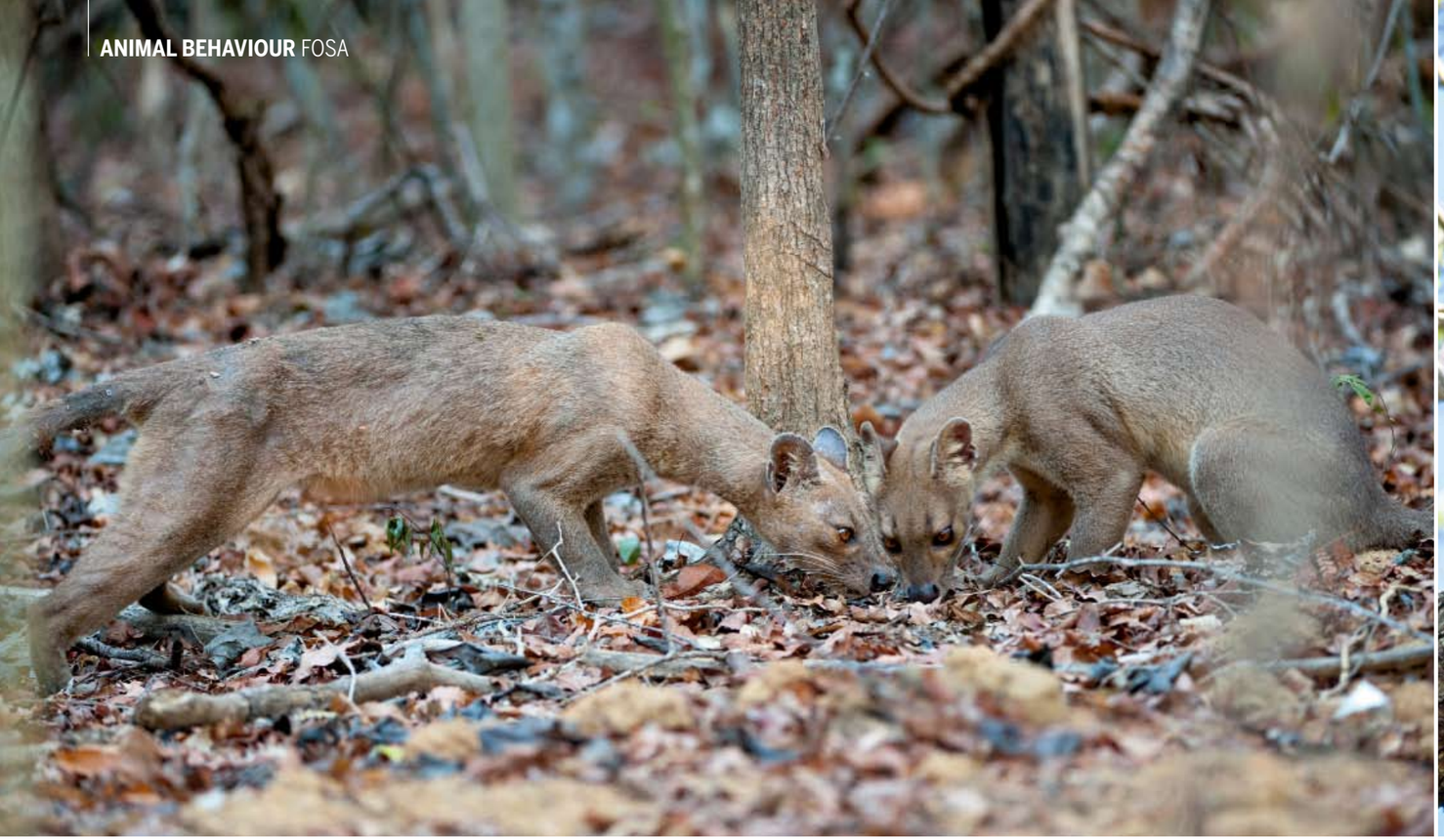
is a zoologist based at the University of Göttingen. She is one of the foremost authorities on fosas.



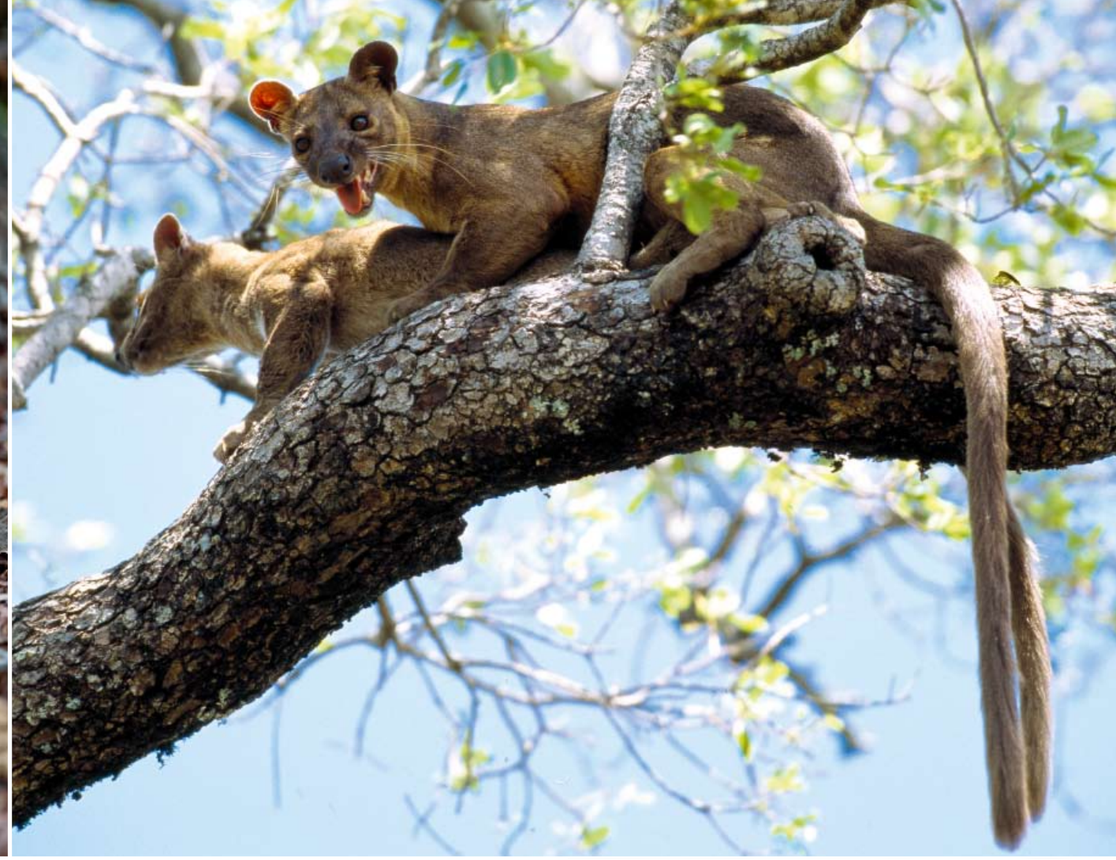
Normally exceptionally shy and hard to see, fosas lose some of their inhibitions at mating time – this one is investigating the photographer's remote-controlled camera.



In November, the fosa breeding season is at its peak. Here, a female rolls in leaf litter to spread her scent and advertise her sexual receptiveness.



Two adult females inspect the base of a tree before scent-marking it. Mia suspects that these two may be mother (left) and daughter.



Below from left: Nigel J Dennis/NHPA; Jouan & Rius/NPL; Nick Garbutt

behaviour. More recently, Mia-Lana Lührs of Göttingen University has made some startling discoveries that are painting these mysterious predators in a new light. For example, her GPS tracking data has shown that males range over 100km² and females cover up to 25km².

CALL OF NATURE

Mia's introduction to fosas was unorthodox, to say the least. "I saw my first one while on the loo!" she laughs. "I was in Kirindy to study mouse lemurs. One evening I went to the camp's WC (a hole in the ground) when suddenly something crashed through the forest." It made such a racket that Mia expected to see a big animal but instead, to her surprise, a small female fosa burst into view.

"I didn't dare move in case I frightened her away. But she seemed more interested in the smelly toilet. She sniffed my trousers, then bit my leg. It was love at first sight – I just knew that this was the animal I wanted to study." Mia later decided that the scent of mouse lemurs – popular fosa prey – on her clothes pricked the predator's interest.

Since that fateful call of nature, Mia has notched up over 500 hours in the company of fosas, mostly during the mating season. Their basic breeding biology is now reasonably well known. Receptive females hold court in a mating tree, luring several males to its branches. They remain in heat for just a week, during which time each female may mate with a number of different partners.

But why do female fosas mate up a tree, and how do they select their lofty boudoir? Initial studies suggested that height and proximity to water were major factors, but Mia's work has shown that females don't necessarily select the tallest trees – though they do pick

CARNIVORE CASTAWAY WHAT ARE THE FOSA'S RELATIVES?

First described by science in 1833, the fosa has puzzled zoologists ever since. The *crypto* (Greek for 'hidden') in *Cryptoprocta ferox* refers to an unusual excretory sac that hides its anus.

FROM CAT TO CIVET

Originally, the fosa was thought to be a cat due to facial similarities, its semi-retractile claws, and its ability to miaow and purr. Later, it was aligned with other carnivores, including African genets (*left*) and civets (family Viverridae).

MONGOOSE LINKS

Alternatively, authorities have often linked the fosa to the mongoose family, Herpestidae (which includes the yellow mongoose, *left*). Recent genetic analysis has indeed revealed distant shared connections with African mongooses.

A FAMILY OF ITS OWN

Madagascar's nine endemic carnivores, including the fosa and the ring-tailed mongoose (*right*), are now placed in the family Eupleridae. Their shared ancestor arrived some 20–25 million years ago.

"SHE SNIFFED MY TROUSERS, THEN BIT MY LEG. IT WAS LOVE AT FIRST SIGHT – THIS WAS THE ANIMAL I WANTED TO STUDY." MIA-LANA LÜHRS

ones with a good view. Whatever its magic ingredients, the same tree – even the same branch – will often appeal to several females.

For a female fosa, love in the treetops has two main advantages. From a high perch, her high-pitched, cat-like cries carry far and wide, attracting more males. And, when they arrive, she has greater control over their advances, since only one excited male at a time can crawl along the branch to approach her. If the potential suitor doesn't impress, the female simply moves to the thinner branches at the edge of the canopy, safely out of reach of the heavier male.

Unfortunately, male fosas don't always get the hint. Pumped up on testosterone, some of them disregard the fundamentals of gravity and continue to walk their flimsy tightrope – with predictable consequences.

LOVERS' TIFFS

During her nocturnal vigils at mating trees, Mia has seen males tumble to the ground many times. Sometimes, when male and female are engaged in a treetop lovers' tiff, the pair fall together. One night, there was a particularly rowdy encounter in the canopy.

"A branch cracked without warning," Mia remembers, "and the couple and the broken bough came crashing down. Both animals lay beside me, motionless." ▶

Top: a rare photo of a copulating pair, pictured *in flagrante delicto* in the treetops. Right: the fosa's very long hind feet and pads are adaptations for tree climbing.

Mia thought the animals were dead, and shed a tear. But then the male came round, got his bearings and approached the female anew. "He tugged at her fur, then mounted her. In a flash, the object of his desire regained consciousness and attacked him, sending him packing. Even more remarkably, she promptly climbed back up the tree and began mating with another male."

Fosas are famously promiscuous. During their seven days in oestrus, females may 'receive' as many as 10 males (though not simultaneously), and mate with each suitor up to 10 times. This may add up to 50 or more separate sex sessions and a total of 40 hours in the act; copulation lasts from several minutes to as long as six hours. Such extreme competition has led male fosas to evolve disproportionately large penises and produce copious quantities of semen. Like domestic cats, they also have sharp penile spines, which may maintain the coital union or induce ovulation.

Both sexes are highly vocal during copulation, producing a cacophony of weird screams and squeals that can sound rather too human for comfort. But one of the most fascinating aspects of fosa courtship is female dominance. Females may weigh only half as much as males but reinforce their status with aggression vocalisations. A single call from a disgruntled female can make a male break his union with her and beat a hasty retreat down

DURING THEIR SEVEN DAYS IN OESTRUS, FEMALES MAY 'RECEIVE' AS MANY AS 10 MALES AND MATE WITH EACH ONE UP TO 10 TIMES.

the tree. Females can also utter a piercing, blood-curdling yelp that Mia says instantly clears the tree of males.

Aggression between females is extremely rare, however. Even unrelated females seem to enjoy taking part in bouts of mutual grooming, sleeping nestled close together. They may also join forces to chase away unwanted males.

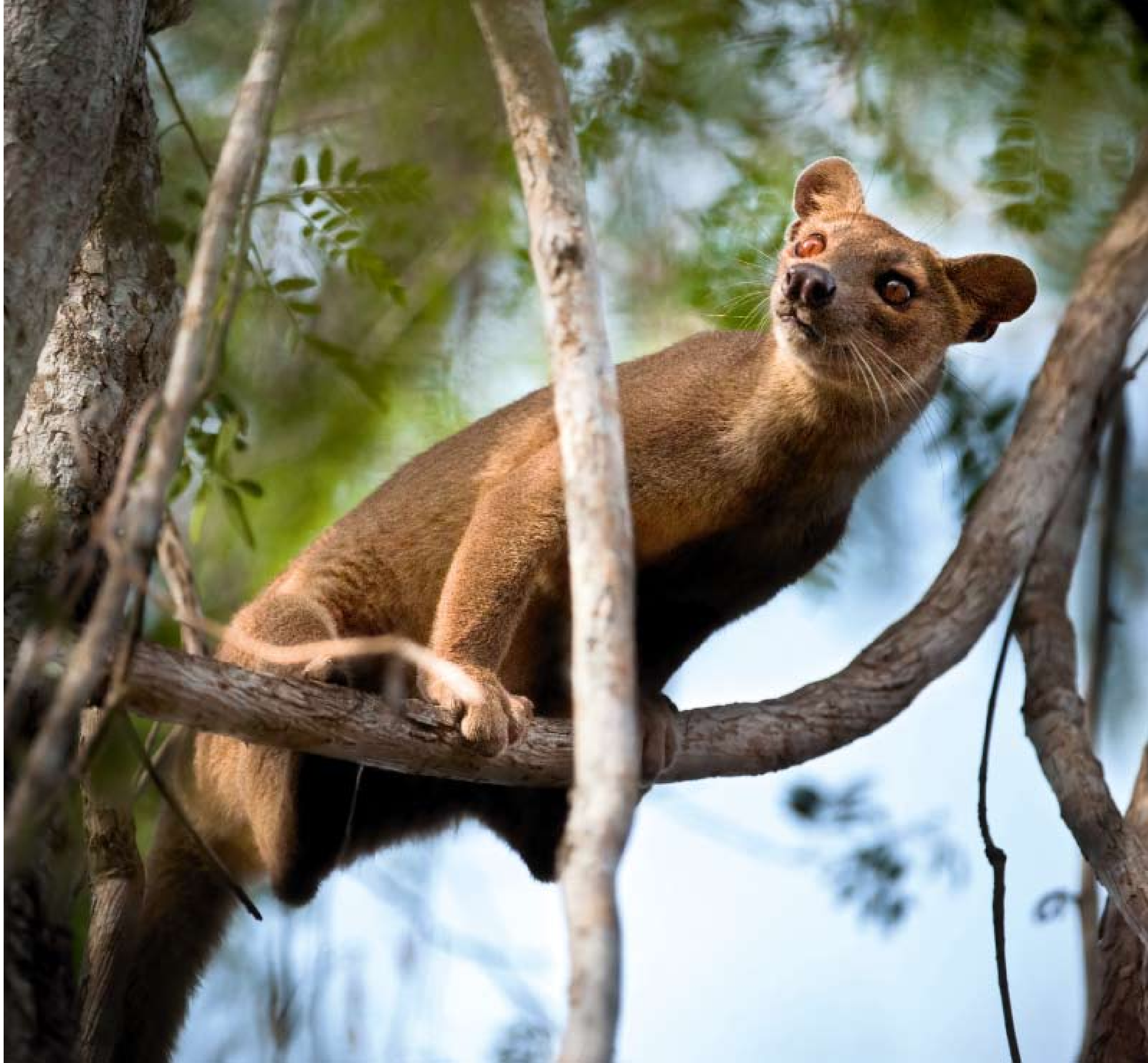
MALE BONDING

It was long thought that, outside the breeding season, fosas were loners. But Mia's observations prove that males *can* be social and sometimes hunt as a team (I myself have seen group-hunting behaviour), though she stresses that this is probably limited to brothers, especially litter mates.

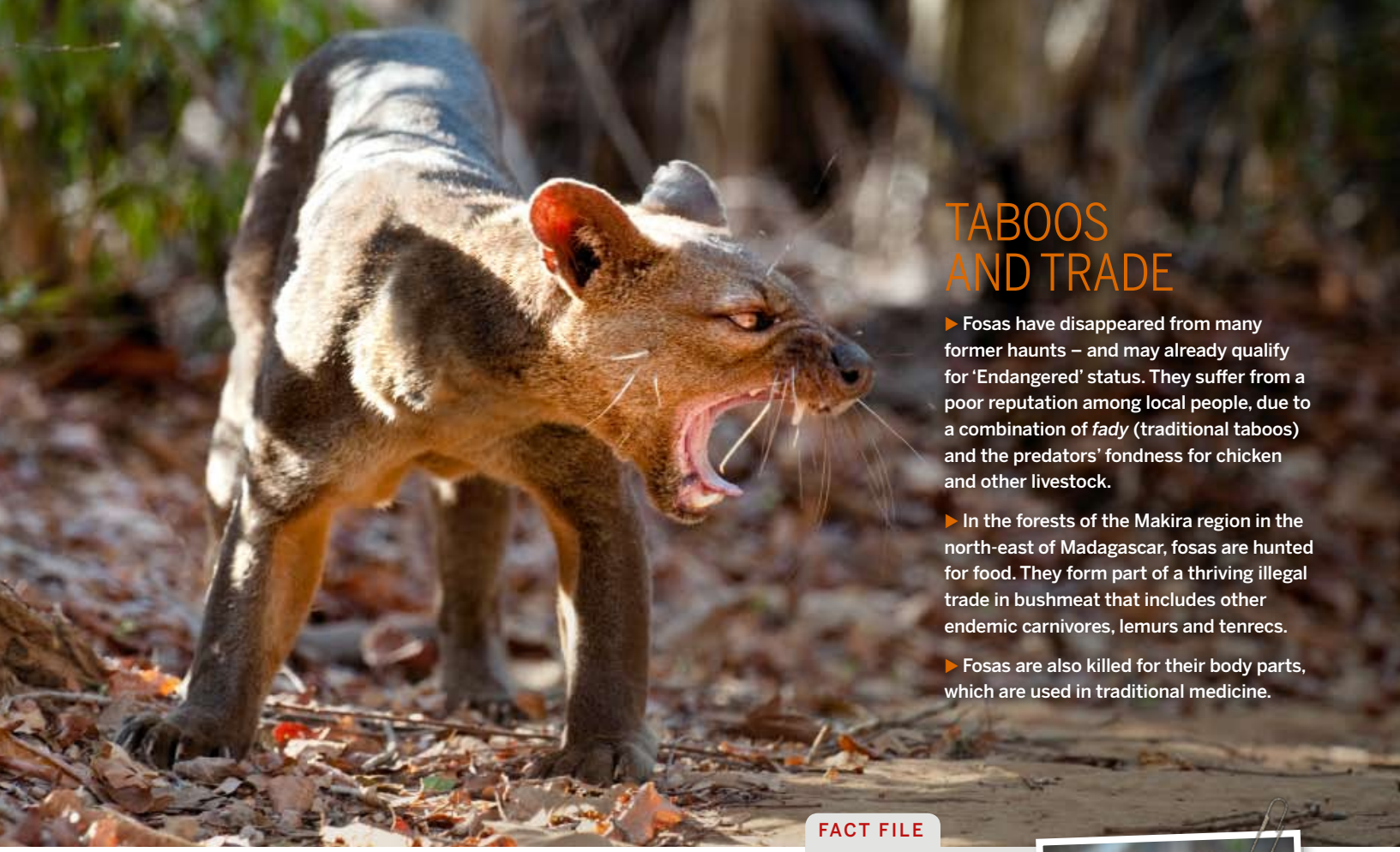
Once, Mia witnessed three males isolate a Verreaux's sifaka from the rest of its family, then chase it for over 45 minutes and exhaust it before finally moving in for the kill. "The males appeared to have a clear strategy, with each playing a different role. One would move in behind the lemur, another pursued it along the ground and the third would climb trees up ahead to intercept it."

The *coup de grâce* was swift. "Two of the males shot into the canopy, close enough for me to hear their excited vocalisations (possibly to co-ordinate the hunt). They were just out of sight when they caught the sifaka, but I could hear its final death throes." The three fosas shared the meal, though the dominant individual fed first.

Teamwork may confer a number of benefits. Since it increases hunting success, alliance members grow faster than solitary males. Being larger, they may also have an edge in confrontations with rivals and (like the male cheetahs that form coalitions) can call on back-up during fights. ▶



Fosas are superb arboreal acrobats, equipped with reversible ankles and long tails for balance. One of their hunting techniques is to ambush sleeping lemurs after dark.



TABOOS AND TRADE

▶ Fosas have disappeared from many former haunts – and may already qualify for 'Endangered' status. They suffer from a poor reputation among local people, due to a combination of *fady* (traditional taboos) and the predators' fondness for chicken and other livestock.

▶ In the forests of the Makira region in the north-east of Madagascar, fosas are hunted for food. They form part of a thriving illegal trade in bushmeat that includes other endemic carnivores, lemurs and tenrecs.

▶ Fosas are also killed for their body parts, which are used in traditional medicine.

A snarling male fosa shows off his powerful fore limbs and impressive canines, used to kill lemurs and other large prey.

Mia suspects that co-operation is an evolutionary throwback. "Madagascar was once home to an array of much larger prey, such as giant lemurs. Hunting in groups may have been the only way fosas could tackle this quarry."

Sadly, Mia's work has also highlighted the many threats facing this slinky, oddball carnivore. Most of Madagascar's wildlife is affected by the rampant deforestation and habitat fragmentation on the island, but the impact is particularly severe for fosas, which require large territories. The IUCN's latest Global Mammal Assessment estimates that fewer than 2,500 of them survive in the wild.

Fosas are even under pressure at Kirindy and nearby forests – considered a key stronghold – areas that have shrunk so much they may now cover less than 80,000ha. Fosa territories are becoming tightly packed; competition for prey is intensifying. In 2010, Mia recorded just 10 males in her study area, half the number she'd seen in previous years. She thinks that, at best, 100 individuals live in the Kirindy area today, but perhaps 30 (or even fewer) cling on here.

One of the main issues is persecution. "In the dry season, when prey is hard to find, fosas enter villages to steal chickens," Mia explains. "If they're caught, they're killed." Together with her colleague Moritz Rahlfs, she has recorded 12 such deaths at Kirindy in the past two years alone. With backing from the Durrell Wildlife Conservation Trust and Duisburg Zoo, Germany, Mia and Moritz are working with local communities to alleviate this conflict, and hope to establish the charismatic carnivore as a conservation emblem for the Kirindy area.

It's an ambitious goal; let's hope that they succeed. I for one would happily sacrifice many more boots (and sleepless nights) to help secure a future for a creature that, even by the standards of an island that defines the term, is utterly singular.

ON OUR WEBSITE

Read our fosa blog with Mia's recording of its amazing call, and find out more about Madagascar's endemic wildlife.

www.discoverwildlife.com/blog

FACT FILE

FOSA

Cryptoprocta ferox

▶ LENGTH
Head & body: 65–85cm; tail: 60–80cm.

▶ WEIGHT
Male: 6–11kg; female: 6–9kg.

▶ ID TIPS
Long, slender carnivore with a short muzzle, round ears, big eyes with vertical pupils and a very long tail. Smooth, sepia-coloured fur.

▶ DIET
Mostly lemurs; also hunts rodents, tenrecs and other vertebrates.

▶ LIFE-CYCLE
Mating occurs October–November. 1–4 young born after a 6–8 week gestation, and stay with their mother for at least 12 months.

▶ HABITAT
Dry deciduous forest and rainforest. Widespread, but found at very low densities.

▶ STATUS
Vulnerable; populations continue to decline.

WHERE IN THE WORLD