

Bamboozled!



Wildlife photographer and author **Nick Garbutt** has never had any trouble coming across greater bamboo lemurs in Madagascar's Ranomafana National Park. That is, of course, until he purposefully tried to find them. But, as he discovered, the lemurs' unexpected elusiveness wasn't just his bad luck, it was a sign that – as usual in Madagascar – all was not as it seemed. ▶

TEXT & PHOTOGRAPHS BY NICK GARBUTT



ABOVE With powerful jaws and strong teeth, the greater bamboo lemur is able to tear open the tough stems of giant bamboo.

RIGHT Decimated plants provide conclusive evidence that greater bamboo lemurs are in the vicinity.

PREVIOUS SPREAD Madagascar's answer to the giant panda, the greater bamboo lemur tucks into giant bamboo, which provides 95 per cent of its dietary needs.



The first inkling that we were getting close was not a fleeting glimpse, a bouncing branch in the canopy, tell-tale vocalisations or even a faint rustle in the foliage. It was the remains of a recent meal. There aren't too many primates that can be identified instantly by their dinner leftovers, but then the greater bamboo lemur *Prolemur simus* – one of the world's most endangered primates – is different in so many ways.

In this instance, the recent meal was the stems of giant bamboo *Catharostachys madagascariensis*, which grows in impressive, sometimes dense, tangled stands on the steep slope we were climbing. Most of the stems were extremely tall, some more than 20 metres high, with their hard shiny exteriors intact, but in strategic places they had been ripped, quite literally, to shreds. No other animal has the inclination or ability to do this to giant bamboo.

I was in Ranomafana National Park in south-eastern Madagascar and had been tracking the species for three days but, even with the help of expert local guide Stephane, the bamboo lemurs had thus far eluded us. It highlighted how hit-and-miss finding this particular lemur can be. I'd been to Ranomafana numerous times and had often encountered them, sometimes without a great deal of effort.

But, it is not surprising that finding greater bamboo lemurs can prove problematic. They move in groups that cover extremely large home ranges, up to one square kilometre, which is far larger than those of other lemurs of similar size. They are, however, known to spend extended periods in more confined areas centred on good feeding. Find their favourite food and there's a good chance of finding them.

This time, we knew we were close as the evidence was obviously fresh – the inner pith of the bamboo was still very moist and there were recent droppings on the forest floor. We continued up the slope, moving into areas where the stands of giant bamboo became increasingly dense. Low down, their tall pole-like stems crisscrossed one another in a mad tangle resembling piles of discarded scaffolding, while at their tips, shoots and leaves reached eagerly for gaps in the rainforest canopy where chinks of vital light penetrated.

It was in a particularly thick clump of bamboo that we finally found the lemurs. Almost at the same time, Stephane spotted one high up, moving

along a pole, and I saw another feeding near the base of a stem. We edged closer carefully. I knew there was little danger of spooking these particular animals, as they had become tolerant and habituated through long-term research. Nonetheless, manoeuvring cumbersome camera gear so as not to disturb them required caution.

After a few minutes of quiet observation, I had counted six bamboo lemurs in the group, including a mother with a very young infant. The animal closest to the ground was a male and I watched intently as he fed. His technique was intriguing. Working from just above a node in the mature giant bamboo pole, he would crack through the exceedingly tough stalk with his teeth, then rip upwards, peeling off a sliver of bamboo often more than 30 centimetres long. There would be a pause, while he manipulated the stalk and began eating it from one end to the other.

He would then return to the broken node, bite into the bamboo pole once again and rip off another sliver. Gradually, he worked his way around

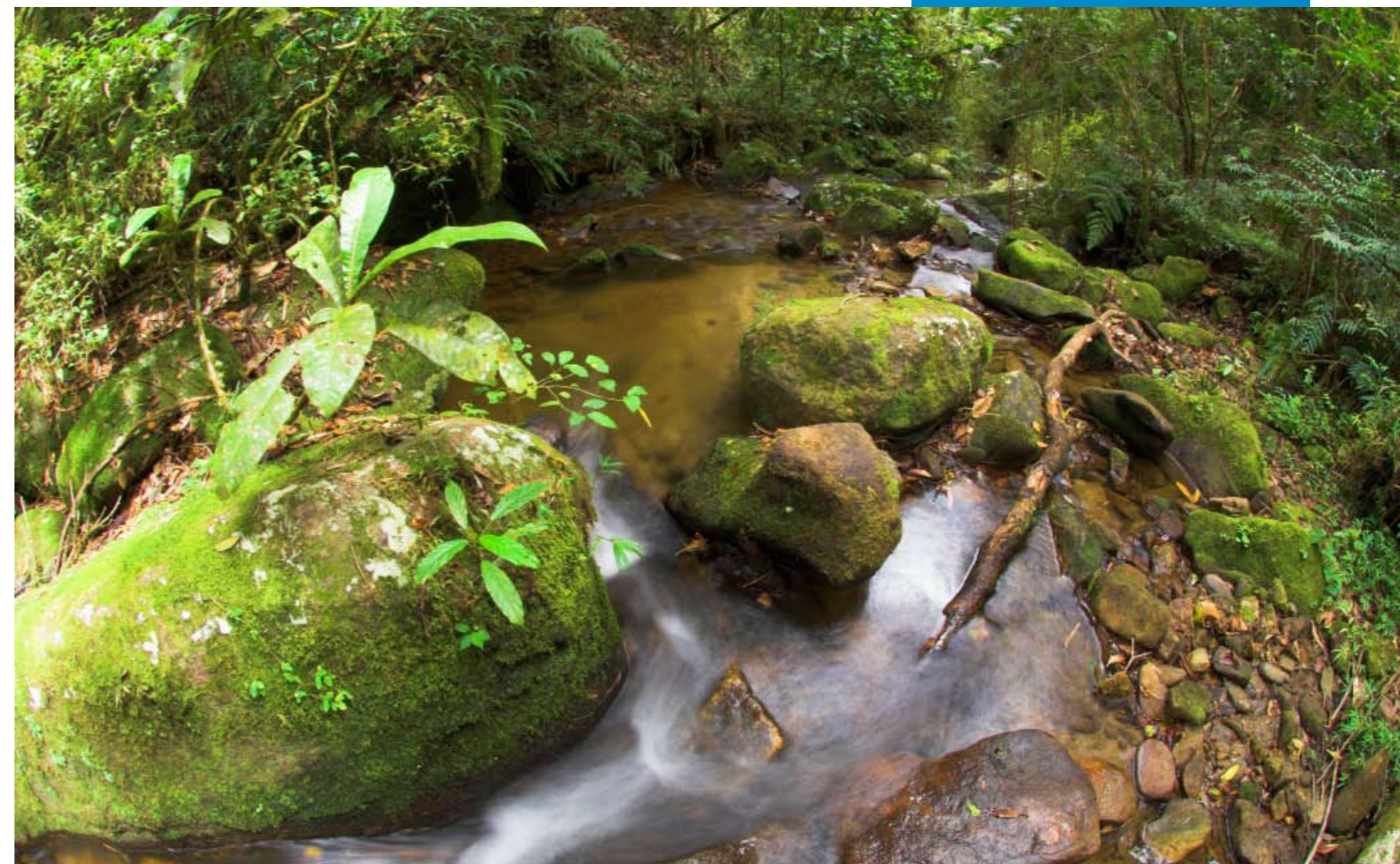
the node, stripping off piece after piece, until the thick pole (approximately 10 centimetres in diameter) was completely severed.

Looking around, I could see a good number of similarly broken poles in the immediate vicinity, where the other members of the group had also been feeding. Yet this short-term destruction seemed to have little long-term impact on the giant bamboo, which was clearly thriving. One reason is that nothing else feeds on the plant in this way: greater bamboo lemurs have effectively cornered the market. Another is that, after a period of time, the lemurs move on to other patches, leaving the quick-growing bamboo to recover.

Greater bamboo lemurs have evolved to epitomise specialisation, as they eat almost nothing but giant bamboo (about 95 per cent of their diet), although they do vary the parts that they target. They are the largest of the bamboo lemurs and the only ones with jaws and teeth powerful enough to crack open the bamboo's tough stems. ▶

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BELOW Rainforest streams, like this one in Ranomafana National Park, provide giant bamboo lemurs with a permanent source of water. This vital requirement may be a factor in the species' highly restricted range and territory.



THE A TO Z OF BAMBOO LEMURS

Bamboo lemurs (Subfamily Hapalemurinae) Bamboo lemurs are the smallest of the diurnal lemurs and, as their name indicates, they all have a dietary preference for bamboo, a trait unique amongst primates. Because of their engaging appearance, they are sometimes called 'gentle lemurs'. In evolutionary terms, they are sufficiently closely related to the 'true' lemurs (Subfamily Lemurinae) – especially the ring-tailed lemur *Lemur catta* – to be included in the same family, Lemuridae, yet different enough to warrant being placed in their own subfamily. Six species are currently recognised, five in the genus *Hapalemur* and one in the genus *Prolemur*. All are social and live in small groups that average four to six individuals.

The most widespread are the three species of grey bamboo lemur (sometimes called lesser bamboo lemurs) – the eastern *H. griseus* from the eastern rainforest belt; the

southern *H. meridionalis* from south-eastern rainforests; and the western *H. occidentalis*, which is restricted to patches of deciduous forest in western Madagascar. All weigh between 0.7 and 1.1 kilograms, have rounded grey faces and are grizzled grey-brown in colour. They have the broadest diets of the bamboo lemurs – 80 per cent is bamboo (young leaves, branch shoots and ground shoots), but the remaining 20 per cent comprises non-bamboo foliage, fruits, flowers, grass stems and fungi.

The Lac Alaotra bamboo lemur *H. alaotrensis* is very similar in appearance, but slightly heavier (up to 1.4 kilograms) than the grey bamboo lemurs. It is extremely endangered and is the only primate in the world that lives in reedbeds. Between 2 500 and 5 000 individuals are found in the threatened marshes that surround Lac Alaotra in central Madagascar, where they feed on papyrus, reeds, stems and grasses.



Eastern grey bamboo lemur

The golden bamboo lemur *H. aureus* shot to attention when the species was discovered in Ranomafana National Park in 1985. It has subsequently also been found in Andringitra National Park and within the forest corridor that connects these two protected areas. As its name implies, this species is more golden-brown in colour, especially the underparts and cheeks, while the upperparts are mainly olive-chestnut. It weighs on average between 1.25 and 1.65 kilograms and its diet is dominated by the young leaves and shoots of giant bamboo.

and is considered to be sufficiently taxonomically distinct to be given its own genus. Other than its size, it is distinguished by prominent pale-grey to white ear-tufts.



Golden bamboo lemur

Weighing up to 2.5 kilograms, the greater bamboo lemur *Prolemur simus* is by far the largest of the bamboo lemurs



Ring-tailed lemur

their territories are therefore confined to areas with both an abundance of bamboo and permanent sources of water

During the rainy season (mid-November to March), they concentrate on the sprouting ground shoots. After March, when the abundance of these shoots declines, their diet shifts towards leaves and branch shoots, and from July to November they rely heavily on the inner pith and stems. It is then that the lemurs cause the most destruction to bamboo.

Ranomafana is home to two of their closest relatives, which between them illustrate the merits of targeting different resources. The eastern grey bamboo lemur *Hapalemur griseus* is the most common species and is a relative generalist, focusing on the shoots and young leaves of several bamboo species. It also consumes non-bamboo foliage, fruits, flowers and grass stems. In contrast, the golden bamboo lemur *H. aureus*, like its larger cousin, is an extreme specialist and the only lemur to eat the young, protein-rich shoots of giant bamboo, which contain levels of cyanide that are lethal to other species.

Of course, extreme specialisation has its pros and cons. It reduces potential competition for food and, as long as resources remain plentiful, all is well. Should conditions change and the food's abundance diminish, then competition within the species becomes increasingly prevalent. In the most severe cases, when food disappears completely, the specialised species is doomed.

But, are its rather peculiar habitat and dietary requirements sufficient to explain the greater bamboo lemur's extreme rarity? According to subfossils (remains in which the fossilisation process is incomplete) that have been unearthed in various parts of northern, central and eastern Madagascar, greater bamboo lemurs were probably once widespread and common. Even as late as the 19th century, expeditions collected specimens from widely dispersed sites in the east, suggesting that their range might have covered much of the rainforest belt.

And yet, until recently, the species was thought to be restricted to a small number of disparate sites in Madagascar's south-east, the two most important being Ranomafana and Andringitra national parks. Although

no accurate overall population figures were available, numbers were thought to be a few hundred at best and, in 2005, Conservation International listed the lemur as one of the World's 25 Most Endangered Primates.

Undoubtedly, much of the bamboo lemur's decline (and similar declines experienced by countless other species) has been linked to Madagascar's catastrophic levels of deforestation. It is estimated that barely 10 per cent of the island's original forest cover remains. There may, however, be other factors to consider.

In Ranomafana, visitors to the main trail network at Talatakelly have a reasonable chance of seeing the same greater bamboo lemurs that I observed, in the extensive stands of giant bamboo that flourish there. But, what about elsewhere in the park? In the past, it was assumed that other areas with a similar abundance of giant bamboo would also support groups of greater bamboo lemurs. Not so, according to a recent survey.

After exhaustive studies of a large proportion of the 440-square-kilometre national park, primatologist Patricia Wright and her colleagues came to the staggering conclusion that the greater bamboo lemurs at Talatakelly, together with two other fragmented groups on the opposite side of the road, constituted the entire population of the park. This amounted to a total of no more than 20 individuals! Add this to the handfuls of animals at the other known, isolated localities in the south-east, and the total population of the species may have numbered as little as 60 animals. This would make it arguably the single most endangered primate in the entire African region (if not the world).

It seems strange that in Ranomafana and elsewhere, there are areas of forest where the habitat appears to be suitable and giant bamboo thrives, yet greater bamboo lemurs are absent. One reason may be that drinking water – or lack of it – is a limiting factor. During drier periods in Ranomafana, greater bamboo lemurs are the only lemurs that frequently visit streams to drink. (Other species get their liquid requirements from food, or rainwater on foliage and in hollow trees.) Their territories are ►



Although primarily diurnal feeders, greater bamboo lemurs also feed at night throughout the year.

LOOKING FORWARD

Association Mitsinjo, which means 'looking forward' in Malagasy, is a local NGO based in Andasibe in central-eastern Madagascar and was created in 1999 as an association of local guides. Today, Mitsinjo manages more than 100 square kilometres of land for the conservation of biodiversity within two protected areas near Andasibe-Mantadia National Park: the Torotorofotsy Marsh Ramsar site and Analamazaotra Forest Station. The association's projects include forest restoration, ecological monitoring, ecotourism and local community work.

A number of studies focusing on biodiversity and wildlife are currently under way and deal directly with rare flagship species such as the indri, diademed sifaka, aye-aye and golden mantella frog. One of the most exciting developments is the discovery of an additional population of greater bamboo lemurs. These animals are monitored and tracked daily by Mitsinjo staff to assess home ranges and the ecological requirements of this population.

The field study is supported by Conservation International and the Margot Marsh Biodiversity Foundation, while genetic studies are carried out in collaboration with the Henry Doorly Zoo in the US. Mitsinjo funds its other conservation and development efforts through visitor fees and the sale of local produce and crafts.



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There may also be other, as yet speculative, reasons for their rarity. Perhaps we are witnessing a species in natural decline? Anthropogenic influence on the lemur's environment has without doubt accelerated this trend, but some observers have suggested that competition with the slightly more prolific golden bamboo lemur may be significant. This, despite the notion that their respective dietary specialisation and niche separation have evolved to reduce competition.

So, is the greater bamboo lemur doomed – trapped by its own acute specialisation, unable to adapt and ultimately consigned to the evolutionary scrap heap?

Recently, there has been a glimmer of hope. In the past year, a confirmed discovery of a hitherto unknown population of greater bamboo lemurs has been made at a location far removed from the others. What's more, this location lies adjacent to one of Madagascar's most popular ecotourist sites, Andasibe-Mantadia National Park. The presence of greater bamboo lemurs was first suspected in forests close to Totorofotsy Marsh three years ago, when scientists from the local conservation organisation Association Mitsinjo found ravaged stems of giant bamboo. However, it took a further two years for them to see and finally radio-collar the animals.

So far, nine individuals have been identified and there are indications of at least four groups – two near Totorofotsy Marsh, the others in forest patches on the western side of the national park. Efforts are now being concentrated to safeguard these precious animals and it is hoped that extensive searches in adjacent areas will reveal more groups. Whether this ultimately influences the long-term fate of the species remains to be seen, but, if nothing else, it underlines Madagascar's seemingly endless capacity to surprise. ■

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If feeding is good, a group of greater bamboo lemurs may remain in an area for up to two weeks before moving on.