



Poisonous secret

The island of Queimada Grande off the coast of Brazil is home to more than 2,000 poisonous lance snakes – a nightmare for the fearful, a boon for science.

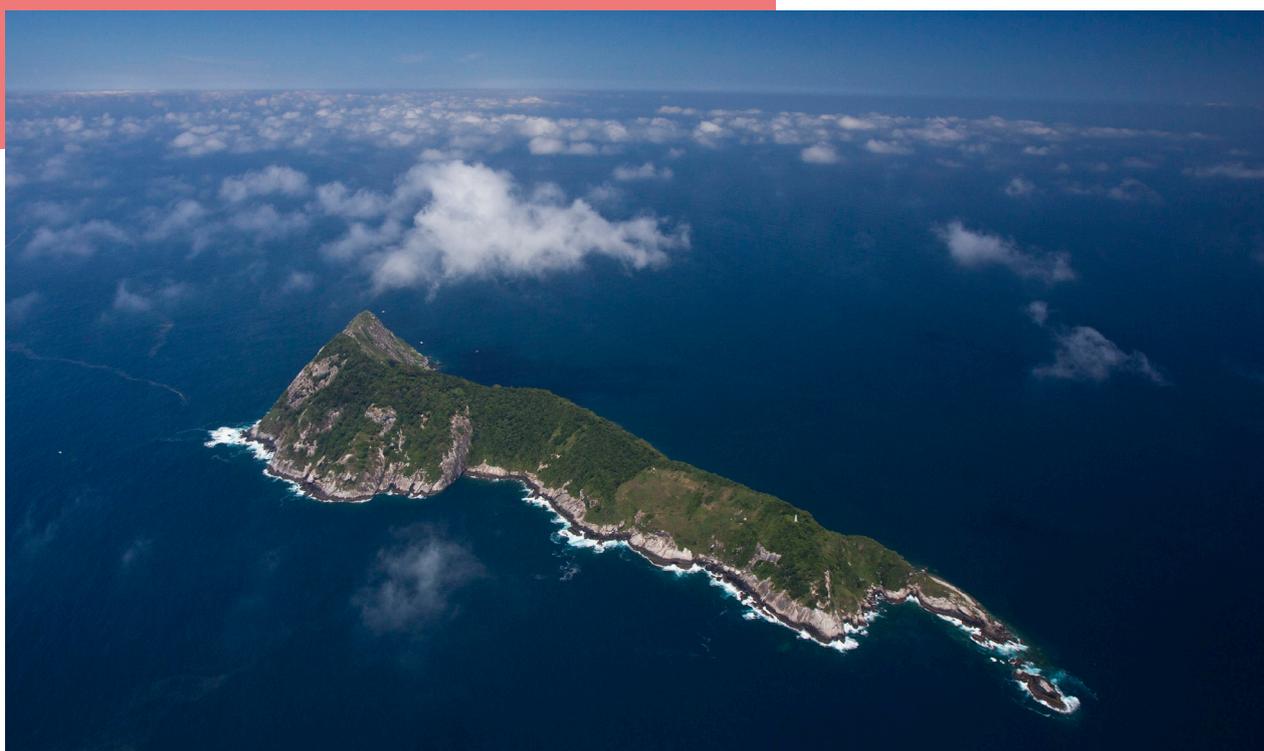
Words by Fabian von Poser

Photographs by João Marcos Rosa



“With about 45 snakes per hectare, Queimada Grande has the second densest snake population in the world.”





- | ABOVE: Ilha da Queimada Grande as seen from the air.
- | LEFT: A lance viper sits on a rocky outcrop, overlooking the ocean.
- | PREVIOUS PAGE: A lance viper strikes.

Brazilian wildlife photographer João Marcos Rosa has what are called strong nerves. He has climbed 35-metre-high giant trees in the Amazon basin to photograph harpies. They are among the largest birds of prey on earth. He was in Colombia in FARC rebel territory to track the last Andean bears. And he has travelled to photograph mountain gorillas on the border between Uganda and the Democratic Republic of Congo. But even for Rosa, this was something different: “These were the most complicated expeditions I’ve ever done – a 1.5-kilometre-long island in the middle of the Atlantic Ocean, no source of fresh water, and thousands of poisonous snakes.”

Rosa can nevertheless consider himself lucky. He is one of the few people who have ever set foot on Ilha da Queimada Grande. The island, 32 kilometres off the southern coast of Brazil, is a forbidden place, accessible only to the Brazilian military and a few selected biologists. No mammals, let alone humans, live on the 200-metre-high granite rock in the middle of the Atlantic. Even the lighthouse keepers, who once eked out a solitary existence here, left the island decades ago when the beacon was automated.

The rock rises abruptly from the water. The rough sea and the complicated landing make for quasi-perpetual isolation. Rosa has taken part in four expeditions to Queimada Grande: “There were difficulties on three of them,” he says, “and on one we couldn’t land at all

because of the bad weather.” Those who want to reach the island face two main problems: On the beach of the coastal town of Itanhaém, 100 kilometres south of São Paulo and barely two hours away by boat, a strong wind blows most of the year, making disembarkation difficult. And then there is the landing. “The sea has to be extremely calm because there are no beaches on Queimada Grande. You can only get to the island over rocks,” says the 43-year-old. That is dangerous, especially with so much equipment. But that is by no means all, because the island hides a secret, which is why the military visit less regularly, and biologists very regularly: Queimada Grande is home to a unique population of *Bothrops insularis*, a highly poisonous lance viper that can only be found here.

In the Atlas of Superlatives, which lists the “biggest, fastest, longest, hottest, strongest, most gigantic and most dangerous record holders in the world”, it says about Ilha da Queimada Grande: “Whoever goes ashore risks his life”. And that is exactly why the island has attracted scientists for decades. “With about 45 snakes per hectare, Queimada Grande has the second densest snake population in the world,” says Marcus Augusto Buononato. “This is only surpassed by Shedao Island in northeast China.” Buononato should know, he worked for 13 years at the government-run Butantan Institute in São Paulo, which researches what substances from nature medicine can harness, and took part in numerous

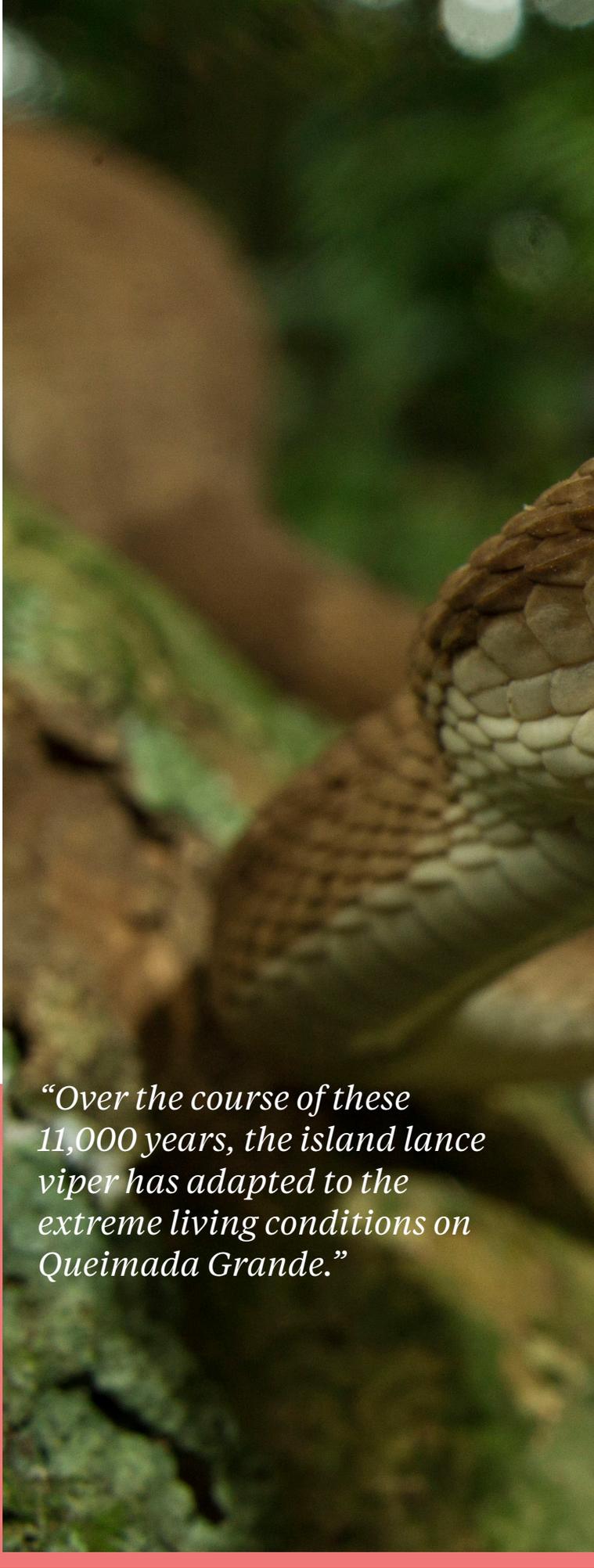
expeditions to the island. According to Buononato, about 2,000 snakes are said to live on the island, which covers only 43 hectares, or 0.43 square kilometres. According to other studies, there could be as many as 4,000.

But how did the animals manage to get here without being able to swim? “The snakes arrived at Queimada Grande about 11,000 years ago during the last ice age, when the island was still connected to the mainland,” says herpetologist Breno Damasceno, who has been studying the animals for 28 years. “When the ice age ended, the sea rose and what was once a mountain became an island. Since then, the snakes have been separated from their relatives on the mainland.”

Over the course of these 11,000 years, the island lance viper has adapted to the extreme living conditions on Queimada Grande. With its prehensile tail, it can climb trees, unlike its relatives from the mainland. There it often waits for days until a bird uses the island for resting or nesting. Oystercatchers, gulls, boobies, frigate birds all visit here. The snakes' venom has also changed over the millennia. Some researchers claim to have found that the venom of *Bothrops insularis* is hardly stronger than that of its mainland relatives. Other studies say that the venom is many times more deadly than that of its conspecifics. “In any case, it is highly effective in killing the prey animal immediately,” says Damasceno. In mice, the toxin takes less than two seconds to kill. A brilliant move by nature, because if it weren't so strong, a bird could still fly beyond the island's edges before it died, says the 45-year-old, the snake losing its prey to the sea. “That's why their venom kills instantly.”

The scientists' day starts early. At the camp in the lower part of the Atlantic island, they put bite protectors made of sturdy leather on their legs, which they call *perneras*, before each of their daily walks. If you are bitten, an adult has a maximum of six hours to inject an antidote. Then they march off in search of snakes. That usually doesn't take long. Once the scientists have found an animal, they first check with a reader whether it has already been fitted with a chip. Then they measure the animal, take venom and blood samples and remove ticks that could weaken the snake.

Rosa spent more than two weeks on his travels with the researchers on the island. “There is always a risk. When you arrive on the first day, you are excited. On the second or third day, you relax,” the photographer says. “And that's exactly the danger, because then you're no longer fully concentrated.” But that's not the only danger. Poisonous spiders inhabit the island too. Colloquially known as banana spiders, the animals of the *Phoneutria* genus are among the most poisonous spiders on earth – one bite can kill a healthy adult human.



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Only the military and selected biologists are permitted access to the island.





- | LEFT: Lance vipers have adapted to climb trees on the small island.
- | TOP: A biologist handles a viper.
- | MIDDLE: A viper, being studied.
- | BOTTOM: Leg protectors, called *perneras*, are worn during all island walks.



“Most of the time we were out all day,” Rosa says. During this time the snakes tended to not show any aggressive defensive behaviour. “At night in the tent, on the other hand – after we have returned to camp and had dinner – you do worry.” While the snakes cannot enter the tents, they can feel heat created by the campers, which is why individual animals regularly approach the campsite. “The tent walls are very thin. If you accidentally bump into the tent wall while sleeping, it’s dangerous.” Nevertheless, Rosa is fascinated by the animals. “The theories of the British naturalist Charles Darwin have always fascinated me. These snakes have adapted to a new environment in order to survive.”

Despite the enormous number of individual snakes on Queimada Grande, the ‘great burnt island’ as the name translates, *Bothrops insularis* is in danger. On the IUCN’s Red List of Threatened Species, the species is considered to be in danger of extinction. “The island’s ecosystem is complex and extremely vulnerable,” says biologist Buononato. There is never really enough food on Queimada Grande. “The lack of food such as frogs, toads, lizards and centipedes, especially during the dry season, leads to instances of cannibalism.” In addition, there is the low gene pool due to thousands of years of inbreeding, which makes many animals infertile hermaphrodites. Illegal trade is also an issue. On the black market, up to 25,000 euros are paid for a live island lance viper. This makes the animals highly sought after.

The snakes also play a major role for science, because the venom is invaluable to pharmaceutical companies for the development of drugs against high blood pressure, heart disease and cancer. This is another reason why scientists do everything they can to keep the number of animals stable. In addition, in order to be able to establish new snakes on the island in the event of a population collapse, animals are currently being bred in several laboratories. But the signs are not good. Besides 11,000 years of inbreeding and human intrusiveness, the recurring fires during the dry season are a constant danger. Will there still be snakes on Queimada Grande in 100 years? Damasceno has no illusions. The species could fall victim to the very thing that created its evolutionary splinter. At best, its extinction can be delayed. “Isolation created the species,” says the herpetologist. “It is quite possible that the animals will soon disappear from our planet because of this very isolation.” **1**