

# *Snake Island*

*The big lie*



Expedition on Queimada Grande Island  
By **Les Longs Courriers**  
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*On the Internet, it is said that the island of Queimada Grande has the largest concentration of poisonous snakes in the world*

According to some sources, there would be "one per square meter", which makes this island "one of the most dangerous places on Earth" for human beings. On other websites, it is even stated that "in case of bite, death is imminent within an hour and the flesh literally melts on the bones". Of course, access to the island is forbidden and the Brazilian Navy has now closer oversight of the area. Thousands of snakes swarming on the ground and the trees...  
What a nightmare!

We landed on the island with all our senses alert, avid to discover the terrifying wildlife of the Snake Island.

*Deaths, danger, number of snakes: our imagination exceeded by far reality. In reality, we had quite a lot of fun!*





## *The local folklore is rich in grisly tales*

In one story, a fisherman wanders onto the island to find some food. Bitten, he manages to return to his fishing boat. He is found two days later on the boat deck in a pool of blood.

Another one tells about the last lighthouse keeper, his wife and his young children. One night, snakes came in by a window - unfortunately let opened - and killed them all.

## *This unusual island is very intriguing and exciting...*

As everyone, we fear snakes, even when they appear to be harmless, so we did a quick research on Queimada Grande' snakes, named *jararaca-ilhoa* by scientists.

Black mamba, green mamba, russell viper, royal cobra... The list of venomous snakes is long and *jararaca-ilhoa* is part of it.

## *Is it reasonable to go there?*

The idea of being stung by a venomous snake and dying without assistance on a remote island is not something you want to put on your bucket list.

However, our appetite for risk, and the childish belief that such dramatic things cannot happen to us, drove away these dark thoughts. We rather tried to focus on how to implement this project. Who do we contact? How do we get an authorization? Should we bring an antidote or a sting kit?



8.30am

We plan an early-morning appointment in order to cross "*a barra*" at high tide. We meet the team of scientists at ICMBio's facilities in Itanhaém. Itanhaém is a small and peaceful village in the south of the state of São Paulo, and also a common holiday destination of paulistas. Waterproof bags packed, we embark on a 300-horsepower Zodiac.

The weather is mild and the sea is calm. Therefore, crossing "*a barra*" is easy for us on board of this over-motorized boat. It was not the case a few days back when we tried to cross with our sailing boat. The wind was much stronger and the breaking waves so powerful that we turned back. It was not possible for Anao (11 tons and "only" 50 horsepower) to remain manoeuvring in such situation.

At this point, we understood that we will not be able to lead the expedition on Anao. The disappointment is high because we want to experience all our adventures on board of our sailing boat. Hence, we are truly grateful to Marcio and his colleagues for having taken us to Queimada Grande on another boat.



### *We are six on board*

The Zodiac flies at full speed, packing our back as it slams into the waves. At a speed of 13 knots, we rode the 20 miles in less than two hours.

At the helm sits the captain. He will anchor off the island during the expedition. At the front, **Carlos Renato** (ICMBio), **Diego Mota** (Herpetology Laboratory of the Butantan Institute) and Jalil are seated. At the back, I share the bench with **Karina Banci** (also from Butantan) and **Marcio Martins**. Marcio teaches at the University of São Paulo, in the Department of Ecology.

We contacted him more than a year ago to present him our writing project on Queimada Grande. Interested in our adventure, he got the paperwork done easily right after we crossed the Atlantic. This will remain a mystery for us as we already experienced the complexity and the lengths of the Brazilian bureaucracy.



## *The island is beautiful*

It is covered with a dense forest as well as rocky areas with different shades of browns. But it has not always looked the same.

In the 1920s, Queimada Grande underwent a voluntary fire to clear the land and allow donkeys and goats to be introduced. That is why its name literally means "Great Burnt".

The disembarkation is difficult. There is no beach to land, only slippery rounded slabs. We methodically shift the material from the Zodiac to land in a small dinghy. Several times the dinghy almost capsizes, but we managed to be all safe.



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## *Desembarque proibido*

Behind us, a large warning sign is firmly embedded into the rock. Pointing at the sign, Marcio says: *"Before, there were a source [which is now exhausted] and a few makeshift huts. They had been built by the rowers. From 1909 to the 1920s, these poor buggers row back and forth to look after the lighthouse. They sometimes had to sleep on the island to rest or to wait for the sea to calm down before rowing to mainland"*.

Instructions completed, boots on, it's time to go. The climb will take about one hour. For Jalil and I, the adrenaline rises.





## *No one has come for eight months*

A machete in his hand, Carlos shows us the way by cutting down ferns, roots and creepers that have invaded the trail.

This trail leads to the top of the island where a former lighthouse was built. *"The legend of the lighthouse keeper and his wife found dead covered with bites, like all the legends of dead people on the island, is false"* says Karina. *"Nothing happened to them. Only their chickens were attacked by the snakes!"* The guard service ended in 1980 with the equipment of an automatic headlight.

The widespread fear of Queimada Grande among the local people is huge. *"Even fishermen who are used to anchor nearby are afraid. They would land for nothing in the world! It suits us, because it is the best way for the island to remain untouched in order to maintain ecological preservation programs"* concludes Karina.



*Before we start walking, Marcio reminds us that the snakes can be everywhere, on the ground, in the bushes and above our heads in the trees.*

To make things more complicated, those snakes are small and of a yellow mustard color, similar to a dry leaf to blend into the decor. Marcio tries not to worry us: *"The jararacas are very poisonous, but they are not aggressive and do not move a lot"*.

To avoid one of these charming creatures, I stayed close to Jalil and I only grabbed branches he touched himself. At this point, I blamed myself for forgetting to bring leather gloves. This walk was definitely the most stressful moment of the expedition.

*Hard to find back the trail within the dense vegetation*





## *There, a beautiful female !*

At the lighthouse, Marcio saw a snake at the top of a tree. Karina grabs her "catch-snake apparatus". With its long handle and an articulated clip at the end, it looks like a garbage grabber. Once the reptile is hold, she puts it skillfully in a transparent plastic tube. With one hand, she holds the tube and the tail of the snake to immobilize it. On the other hand, she feels the scales of the reptile.

## *Diego organizes an improvised outdoor-laboratory on a tarpaulin on the ground*

The mission of Butantan Institute' scientists is to better understand the biology of *jararaca-ilhoa*, which has not been studied for a long time, especially the genes responsible for its powerful venom and the applications that could be drawn from it\*. In addition, they implement measures to preserve the primary forest and restore areas degraded in the past. The aim is to maintain snakes' habitat as natural as possible. Finally, they anticipate the environmental disturbances that could occur on Queimada Grande in the future.

*\* For example, the venom of the Bothrops jararaca is employed in the manufacture of many drugs including Captopril (prescribed for high blood pressure) which generates a turnover of US\$ 5 billion to the American pharmaceutical laboratory Bristol-Myers Squibb.*







*An adult with strange green scales on its back is found dead*

## *We continue to learn more about these famous snakes*

There are 45 species of *jararacas* in the world, and the majority is from Brazil. Some species can also be found in Guyana and Central America, and the southern species live in the region of Valdes in Argentina.

The *jararaca-ilhoa* is unique in the world because it is endemic to the island of Queimada Grande: there is no similar snake anywhere else on Earth. Scientists explain their biological particularity (coloring, venom) and unusual behavior (diet, hunting technique) by insular isolation.

## *In the past, Queimada Grande was no more than a hill*

During the Quaternary\*, with the elevation of the sea, the hill has been surrounded by water and became an island. The snakes trapped in this territory had to adapt to their new environment and finally evolved in a different way from their continental cousins.

Instance, the continental *jararaca* mainly feeds on rodents, but with no small terrestrial mammals on Queimada Grande, the *jararaca-ilhoa* had to find other preys: migratory birds. Thus, unlike its continental cousin, which mainly remains on the ground and hunts mostly at night, the snake of Queimada Grande had become semi-arboreal (to better approach its winged prey), also its tail increased in length (to stay more stable in the branches of trees) and it is as active during the daily hours as during the night. The power of its venom is such that it can kill a bird instantly, without leaving it a chance to fly and escape. The continental *jararaca* does not need such venom because if a rodent escapes from it, it will track the prey thanks to its highly developed sense of smell.

The very high density of snakes on Queimada Grande is easy to explain: no predator and a lot of food available. The population of snakes is between 1,500 and 2,000 but it has been decreasing for several years. The team of scientists notices it once again with regret. So do we. We only met six snakes (including one dead) during this expedition. It is way less than expected. The cause could be that the migratory birds are fewer to stop at Queimada Grande.

\* *The last contact between the island and the continent would be 11,000 years old*



Karina continues to observe her captured snake: she weighs it in a bag, she measures it, she takes off a scale or two, she fills out its descriptive file. Meanwhile, Marcio - the elder of the team - takes the opportunity to tell us some stories. *"I have been twelve times here. One time, I was in a helicopter a television channel had rented to make aerial images! Before, we used to come for three or four nights and settled the camp up here. The snakes remained quietly in their place, in the trees or on the ground: they were found the next morning at the same spot".*

Marcio takes the tube with the snake in his hands. *"Be careful with these jararacas: it's easy to forget how dangerous they are because they are so calm. Once in the Amazon, I got bitten. I was chatting, as usual, and without paying attention I relieved the pressure on the tube. The snake came out and did not hesitate to attack me, but the bite did not hurt me strangely. I took my car and drove myself to the nearest hospital. The doctors took care of me right away. They gave me antihistamines. Nothing special to report, except that I had more and more trouble to breath, my throat was gradually tightening. Less than two hours passed between the bite and the medical care, so nothing serious could happen to me, but tracheotomy could have happened if I could not be cured on time".*

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### *The disappointment is huge*

The *jararaca-ilhoa* is therefore way less venomous than expected. *"An antidote exists, but we **never inject it right away because one in four people is allergic** and can succumb from a heart attack"* explains Marcio. Before giving the antidote, doctors assess the compatibility of the anti-venom and the patient. In the case of Queimada Grande, no death is possible *in situ* during a scientific mission because the continent can be reached in less than 2 hours in high speed boat. Therefore scientists do not carry the antidote with them and the presence of a doctor is not compulsory.



*"Once in the Amazon, I got bitten"*





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*Another particular feature of the jararaca-ilhoa: it can be pseudo-hermaphrodite*

Karina explains: "Some females possess a hemipenis\*, but small in size. However, they are real females despite the fact that they present different degrees of masculinization of the external genitalia.

*This sometimes happens on continental jararacas or other species of snakes, but it is much more common on Queimada Grande. We do not know yet whether this physical characteristic has an impact on them". The presence of such female snakes on the island may be due to genetic drift\*\*.*

There is a report of only one individual which was indeed hermaphrodite. Why such an evolution? No one knows for the moment. Ongoing studies are on the way.

*\*A hemipenis is one of a pair of organs of a male quamates (snakes, lizards...)*

*\*\* This phenomenon appears during frequent intercourse, within a small isolated population, between related individuals*



## *Now, it is time for experimentation*

Diego, with his syringe ready to use, performs a local anesthesia on the tail of the snake. Then, he catches a cotton bud and starts to gently massage the organ of its Guinea pig in small circular movements. *"It is the only way to collect sperm!"* he says with a laugh.

The massage has operated as if by magic. Diego carefully collects the white liquid. Two or three drops go into a test tube, tagged and sealed. The rest of sperm is placed between the slide and the slip cover of the microscope which works on battery.

It is how we observed, for the first and last time in our life!, some spermatozoa of *jararaca-ilhoa* through a microscope into the wild.

## *Explanations come quickly*

*"We check the quality of the spermatozoa, mostly physiognomy and mobility. The objective is to inseminate captive females in laboratory as we want to keep a population of these particular snakes outside their environment. Even though today the jararaca-ilhoa is not an endangered species, can you imagine the consequences of a giant fire on the island? All snakes could be decimated. That is why the jararaca-ilhoa is, however, a protected species".* This remark about fires is not trivial. In 2004, such an event occurred on the Alcatrazes islands a few miles further north. The reason? Some projectiles caught fire during military exercises.

## *Sadly, the only serious threat for jararaca-ilhoa remains the humans*

*"And this is without counting the illegal snakes!"* replies Karina.

We are taken aback. *"Absolutely, there are more and more illegal catches of snakes by poachers, the 'biopirates' as they are called. A jararaca would be sold between 10,000 and 30,000 US\$ on the black market of exotic animals".*

Who can pay that much money for a poisonous beast?

*"Animal collectors, pharmaceutical laboratories, unscrupulous zoos, mafia... who know? A venomous snake can suit to a lot of people and be useful for a lot of applications!"* concludes Marcio.

*Goodbye forever, Snake Island!*



## *10 steps to understand scientist' work*



*1) Tracking*



*2) Capture*



*3) Snake put in plastic tube*



*4) Fact sheet*



*5) If the snake already has a magnetic chip under the skin of its tail, it means it has already been captured in the past*



## *10 steps to understand scientist' work*



*6) Magnetic chip is put in place into the tail of one snake*



*7) Measurement*



*8) Weighing*



*9) Local anesthesia to collect sperm*



*10) Microscopic analysis*

## All about Queimada Grande

**Object:** uninhabited island, natural reserve

**Area:** 430 hectares

**Location:** 33 kilometers from São Paulo state coast

**Vegetation:** Atlantic primary forest (*mata atlântica*) on 24 hectares, rock, grass (for the areas burned by humans in the past). Nowadays, the island is left untouched in order it recovers its primary forest like before, but a complete restoration could take hundreds of years.

**Mammals:** 2 species of bats

**Other animals:** 2 species of amphibians, 3 species of lizards, 2 species of underground reptiles and 2 species of snakes (including *jararaca-ilhoa*)

**Birds:** 2 resident species (but they are not part of *jararaca-ilhoa* diet as they got used to their attacks) and about thirty migratory birds.



*Aerial photographs measure the impact of restoration programs  
Here, photo taken in May 2002*



## *All about jararaca-ilhoa*

**Discovery:** 1921 by the herpetologist Afrânio do Amaral

**Other name:** *Bothrops insularis*

**Size:** 70cm in average (up to 118 cm)

**Head:** very distinct from the rest of the body (like all snakes from *Bothrops* family)

**Tail:** longer than its closest cousin the *Bothrops jararaca* (physical adaptation due to the need to move easily in the trees)

**Color:** dark yellow to brown (in captivity, the color tends to darken). Belly is evenly light yellow (the tip of the tail is used to imitate a larva, prey loved by birds)

**Habitat:** Atlantic native forest and in the grass

**Adult feeding:** unlike *Bothrops jararaca*, which feeds on rodents, the *jararaca-ilhoa* diet focuses on birds.

**Young feeding:** Amphibians, lizards, centipedes

**Activity:** day and night

**Capture zone:** on the ground and in the trees

natural habitat as well as capturing snakes illegally

**Estimated population:** around 1500, in decrease for two reasons: migratory birds seem less numerous on Queimada Grande and the poaching has increased

**Density:** 50 to 70 per hectare, it is one of the highest in the world for snakes

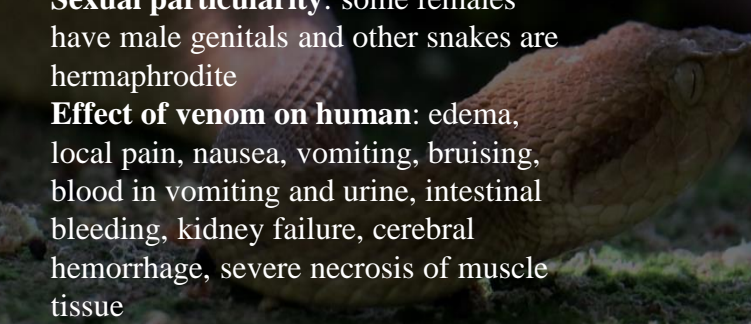
**Reproduction:** once a year. Mating takes place in autumn or early winter (March to July). The hatching of eggs takes place in the summer.

**Natality rate:** weak, no more than 10 small snakes per female (rather than 30 for the *Bothrops jararaca*)

**Sexual particularity:** some females have male genitals and other snakes are hermaphrodite

**Effect of venom on human:** edema, local pain, nausea, vomiting, bruising, blood in vomiting and urine, intestinal bleeding, kidney failure, cerebral hemorrhage, severe necrosis of muscle tissue

envenomation are rare because of the isolation of this snake. In case of bite, the mortality rate is 7% without treatment and 0.5 to 3% with treatment



## Thanks



We warmly thank Marcio Martins, our main contact, for expressing interest in our research, obtained the necessary permissions to take us to Queimada Grande and coordinated the entire expedition.



We thank Carlos Renato and the IMCBio team for having provided us with a boat, as well as Karina Banci and Diego Mota of the Butantan Institute for their meaningful explanations during the snake manipulations.

## About the authors



Claire Grimonprez and Jalil Schaffar are two young French sailors and writers.

Our goal is to reveal the astonishing diversity of islands on our planet. We decided to go sailing around the world and make documentaries on about thirty unusual islands.

Our chronicles are written from their boat Anao, docks or pontoons all around the world.

Visit: [www.leslongscourriers.fr](http://www.leslongscourriers.fr)

## Sources

- *A first estimate of the population size of the critically endangered lancehead, Bothrops insularis* SOUTH AMERICAN JOURNAL OF HERPETOLOGY, 3(2), 2008, 168-174 By Marcio R.C Martins, Ricardo J. Sawaya and Otavio A.V. Marques
- *The golden lancehead Bothrops insularis (Serpentes: Viperidae) relies on two seasonally plentiful bird species visiting its island habitat* JOURNAL OF NATURAL HISTORY, Vol. 46, Nos. 13–14, April 2012, 885–895 / By Otavio A. V. Marques, Marcio R.C Martins, Pedro F. Develey, Arthur Macarrão and Ivan Sazima
- *A jararaca da ilha da Queimada Grande* / CIÊNCIA HOJE, Volume 31, Nº186, Setembro 2002 / By Otavio A. V. Marques, Marcio R.C Martins and Ivan Sazima
- LIVRO VERMELHO DA FAUNA BRASILEIRA ACADEMIA DE EXTINÇÃO / By Ivan Sazima, Marcio R. C. Martins and Otavio A. V. Marques
- NATIONAL GEOGRAPHICS / National Geographic Film Crew: *Meets The Golden Killer!* 2000 / [www.nationalgeographic.com/fieldtales/snakeisland/](http://www.nationalgeographic.com/fieldtales/snakeisland/)
- ATLAS OBSCURA / Snake Island (Ilha da Queimada Grande) / [www.atlasobscura.com/](http://www.atlasobscura.com/)
- SMITHSONIANMAG / *This Terrifying Brazilian Island Has the Highest Concentration of Venomous Snakes Anywhere in the World* / [www.smithsonianmag.com/](http://www.smithsonianmag.com/)