



Holding up the mirror: as Eduardo Sampaio observed during his dives off Cape Verde, octopuses respond to their own reflections, rapidly changing color and eventually attacking their “opponent.”

72 Researchers from the Max Planck Society are currently collaborating with partners in over 120 countries. In this article, they write about their personal experiences and impressions. Researcher Eduardo Sampaio of the Max Planck Institute of Animal Behavior in Constance sailed around the Cape Verde coast aboard the *Captain Darwin*, almost 200 years after Charles Darwin visited the West African islands. In this article, he talks about a diverse but endangered underwater world, the mating behavior of octopuses, and how it is also possible to play a game of cat and mouse with fish.

An outbreak of cholera was the reason for Charles Darwin’s visit to the Cape Verde Islands in January 1832, shortly after the young naturalist had embarked upon his circumnavigation of the globe aboard the *HMS Beagle*. When the ship was denied permission to dock in Tenerife as originally planned for fear that the crew would introduce that disease, Captain Robert FitzRoy sailed on to Cape Verde. Darwin found octopus living in the coastal tidal pools, which he observed with great interest and immortalized in his book *The Voyage of the Beagle*.

190 years later, I spent ten days as a guest aboard the *Captain Darwin*, a 12-meter sailboat that set sail in September

2021 on a four-year voyage following the original route taken by the *HMS Beagle*. The initiator of the project is the French filmmaker Victor Rault, who wants to find out how ecosystems around the world have changed since Darwin’s time and, where possible, catch a glimpse of the future: where are we heading in the face of worsening climate change? Victor meets up with researchers at various stops along the way, who are there to study the same organisms as Darwin once did. He is documenting the entire voyage in a series of YouTube videos.

The octopuses were my ticket to this exclusive sailing trip. Besides our captain Victor, the other crew members

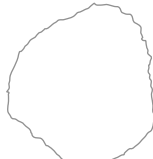
were Martin, an experienced sailor, and Nico, an experienced diver. The sea was rough on the first day and my stomach caused me some problems, but by the second day I had already become used to the rocking of the waves. We cruised off the uninhabited Ilhas Desertas, an archipelago that lies in a marine reserve where I planned to study the hunting behavior of the common octopus (*Octopus vulgaris*). In other locations, I had previously observed the astonishing cooperation between an octopus and several fish that join forces to hunt: the fish locate the prey, after which the octopus uses its arms to extract these prey items from even the tightest nooks and crannies. However, the hunters don’t always agree when it comes to sharing their communal meal and the octopus sometimes has to fend off the greedy fish with targeted blows from one of its long arms.



CAPE VERDE



73



We had diving tanks and a compressor on board and Nico and I did two to three dives a day. But as so often happens in field work, everything went differently than planned: we didn't get to see any hunting octopus, as they were in the mood to mate. I quickly changed my plans and set up some underwater cameras to film the previously under-researched reproductive behavior of the octopus. While we did so, we managed to make some exciting observations of fish as well. For example, we found that mullet respond to the rapid movements of a laser pointer, so it didn't take long for a wild game of underwater cat and mouse to ensue.

The mood aboard the *Captain Darwin* was laid back, and there was plenty of laughter. I was always thrilled to see the sun come up over the sea as I sat on the deck with a cup of coffee at six

every morning. After finishing our work for the day, we would view the day's video footage or discuss world events over a beer out on the vast ocean. I spent my free time reading Darwin's book *On the Origin of Species*, in which he set out his findings from the voyage on the *Beagle*. Darwin would have been amazed had he had scuba diving gear back then because, whereas the islands are barren and desolate, the underwater world is vibrant and diverse. It appears intact at first glance, but it has changed profoundly since Darwin's time. Huge fishing fleets from Europe and China have decimated fish stocks off the West African coast to an alarming degree and global warming is also having an impact on marine life. What will it look like here in 200 years? That will all depend on whether we manage to regulate fishing and get greenhouse gas emissions under control.



PHOTO: PRIVATE

Eduardo Sampaio

33, studied biology at the University of Lisbon. During his studies there, he developed a soft spot for cephalopods. As a guest scientist at the Max Planck Institute of Animal Behavior in Constance, he conducts research into the decision-making and social behavior of these intelligent marine animals. After earning his doctorate, he intends to continue his studies as a postdoc at the Department of Collective Behaviour.