

## Playing the GAME in Brazil

by Dennis Brennecke

Now the second half of our stay in Brazil had already begun. The first three months just flew by, because of all the new impressions and experiences. With regard to our scientific work, they were mainly characterized by tests, experimentations and especially by improvisation. We, Team Brazil, are Erica Ferreira, an enthusiastic bodyboard-surfer and mother of a young daughter, and Dennis Brennecke, Kiele student and the first male Game participant in this country.



Team Brazil in the lab (not in a kitchen)

Brazil is very diverse and has many unique features due to its history of colonisation and due to its enormous size. Impressive rain forest meet mega- metropolises, which are often located near beautiful palm-lined beaches.



Brazil what you expect it to look like. We incubate a part of our plastic material in this bay north of Rio.

However, Brazil - and especially Rio de Janeiro - also has a different face. It is terrifying to see how closely poverty and richness can coexist in this country. It is common to see that

slums, called Favelas here, are in direct neighbourhood to fenced-in luxurious houses. Another sad topic is the enormous environmental pollution, which also affects the beaches and the Atlantic ocean. One single glance on the Guanabara Bay is enough to see the need for action.



Beached plastic litter in the Bay of Guanabara.

However, Brazil also stands for development and innovations. The Universidade Federal Fluminense, UFF, which lies on the south-side of Guanabara Bay, makes a contribution to this with more than 50,000 students. The university is located in Rio's little neighbouring town, Niterói, which is around 5 km away from the capital and which is connected to it by a long bridge and by ferries. Compared to Rio, Niterói is less touristic and with almost 500,000 inhabitants much smaller than it. It is famous for the Niemeyer-buildings (by the Brazilian architect Oscar Niemeyer), which are the landmark of the city. Additionally, Niterói also allows a stunning view on Rio, especially during sunset.



Study site with a view: Rio de Janeiro as seen from Niterói.

Worth seeing are also the Atlantic beaches in the east of the city, where I am living. First, I stayed in a hostel in Itacoatiara for 2 months. After that, Erica's best friend offered me a

place to stay. Besides the beautiful landscape, Itacoatiara is also very safe, where I feel as snug as a bug in a rug. The small village is nestled between rocks, lagoons, the ocean and forests and is perfect for discovering the flora and fauna above and below the ocean surface.

Unfortunately, from here the university and Rio can only be reached via long bus trips. During the daily rush-hour, a one-hour bus trip can easily last 2-3 hours. The bad infrastructure was one of the main reasons for numerous strikes in the past weeks. After an increase in the ticket prices for public transport, dissatisfied Brazilians went on the streets by thousands. In the beginning, the protests were only against overpriced transport fees, but quickly also against corruption and politicians. The latter are considered responsible for the bad life quality and the non-participation of large parts of the society in the economic boom. A further big problem is the education system. Only rich people earn enough money to pay for a good education of their children on private schools. Teachers at public schools, for instance, do not receive a good payment what results in low motivation and most often forces them to have other jobs in parallel to finance their living.

With the protests, Brazilians also criticize their politicians for acquiring mega-events like the confederation-cup, World Youth Day, the football world cup and the olympic games. 40 million euros were just spend only for the visit of the pope and at the moment additional investments seem not acceptable for many people.

So far, I was not involved in the demonstrations, because many people advised me not to participate. Nevertheless, these days are very exciting. Almost all students support the protest movement. They are highly motivated and join the demonstrations often with selfmade banners. Even the university closed their gates during the main protests to allow the students to participate. I once came into a protest march accidentally, when I was sitting in the bus. Protesters were coming from all sides and suddenly we were fully surrounded and the bus could not pass. Police helicopters were above us with searchlights.

Ok, now back to our experiments:

Not only Brazil has changed in the past months. We also changed our laboratory a lot before we could start with the experiments. Some weeks went for re-organizing the lab, although it has been renovated before our arrival. We put some shelves up, removed and replaced old aquaria and installed a recycling seawater-system. This was not easy, because it has to be

stable and reliable for the rest of the project phase. Fortunately, some students and our supervisor Bernardo da Gama helped us with that. Since we have no direct access to seawater in our lab, we had to use our muscular strength to bring almost 2 tons of seawater to our little lab to fill the system.



Preparing the lab and the experimental set-up.

After finishing the preparations, we started to search for a suitable test organism. Our first and very promising choice was *Uca rapax*, the fiddler crab, which is living on beaches and in mangroves and which is an omnivorous animal in tropical regions worldwide. This species seemed perfect to us for testing if microplastic has a negative effect on marine benthic organisms. We could prove very fast, that *Uca* is indeed ingesting sediment in search for food. However, we could not prove, that *Uca* is ingesting the plastic beads we use. That is why we decided to focus on another species: the sea urchin *Lytechinus variegatus*. In the beginning, *Lytechinus* was really promising, but in the lab the urchins refused to ingest anything and were not resistant against diseases. Further alternatives could not be spotted. Consequently, we decided to use *Uca* again for a pilot study with shredded plastic beads. Fortunately, we could now observe and document the ingestion of the smaller microplastic beads what allowed us to start our main experiment with a small delay.



The fiddler crab *Uca rapax*.

At the moment, we provide our crabs plastic-polluted sediment every week and constantly control our water cycle system and the quality of the seawater. Additionally, we will start to analyse sediment samples soon to see how plasticized the marine environments around us actually is. These results and the results of the other teams will be used for obtaining a global picture about the abundance of microplastic particles along coastlines.