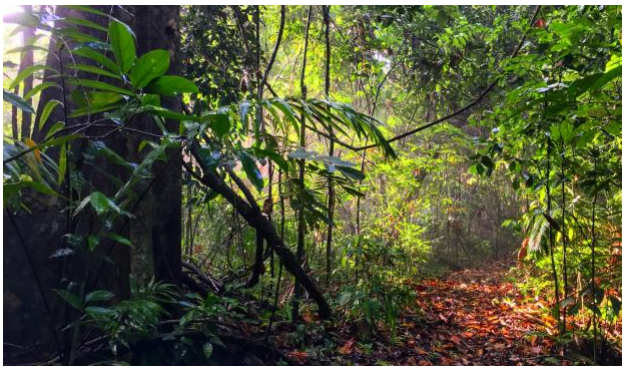


LEFT: A muddy trial on Barro Colorado Island, Panama in the afternoon, right after the rain. RIGHT: The boat ride to enter the island (on the left), and a big ship on the right, whose waves our little boat needs to dodge.

Tropical Biology, and ships

Animal behavior research with background whistles

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I'm walking in a tropical rainforest on a small island in central Panama. The sound of suction my muddy boots make with every step mixes with the sounds of raindrops hitting the tree canopy, and toucans singing, and monkeys howling in the distance, my constant companions as I make my way up another hill. That is the typical midafternoon symphony around here. Suddenly, those noises are interrupted by the loudest and longest ship whistle I have ever heard. On the top of the hill, through a break in the trees I see it: a big transoceanic ship approximately 3 miles away, moving slowly through the Panama Canal. On its hull I can read "MONROVIA" (the capital of Liberia in West Africa). Such daily sightings are a constant reminder of the non-stop human activity literally surrounding this small tropical island.

Tropical biologists expect study organism and field sites to be as pristine, protected, and isolated from human intervention as possible. Those expectations do not necessarily hold true here, in Barro Colorado Island, a 1 500 ha island of protected rainforest that serves as a research station and mecca for tropical biologists. There is a small caveat: this island is in

The sign welcoming us to Barro Colorado Island, administered by the Smithsonian Tropical Research Institute.

the middle of the Panama Canal, with around 40 vessels passing every day carrying oil, cars, produce and every other imaginable product. Their passage through the canal is a shortcut, a way to circumvent the southernmost tip of South America, and get from the Pacific Ocean to the Caribbean Sea more quickly. Thus, the history of Barro Colorado Island is perhaps as interesting as the organisms I study for my dissertation here.

Before the Panama Canal, the place where I stand today was not an island, but a large forest. When the Chagres River was dammed and the Gatún Lake flooded in the early 1900s, the water level rose and Barro Colorado *Island* was created. The US established the Canal Zone, increasing the need to protect forest and the watershed around it. In 1923 Barro Colorado Island was officially protected and the few inhabitants with leases on this land were expropriated. Thus, the oldest biological station in the world was born, and most of what the world knows about the tropical rainforests is derived from research conducted on this tiny island. Botanists, ecologists, geographers, taxonomists, and sociologists have come from the US, Europe, Asia, and Latin America to study this isolated patch of rainforest.

This 2016 summer I joined the long-standing tradition of tropical biology research at Barro Colorado Island. I am a *short-term fellow* at the Smithsonian Tropical Research Institute (STRI), conducting evolutionary biology and animal behavior research for my dissertation. With funding from STRI, a Tinker Grant from the Center of Latin American Studies and the Pre-dissertation Grant from the Institute of International Studies at UC Berkeley, I am able to spend part of my summer on this Panamanian island. I am conducting an in-depth field survey of arachnids (spiders and daddy long-legs), and working to understand how evolution has shaped these animals to respond to pressures from predators, parasites and food scarcity.

ABOVE: looking for Daddy long-legs in the leaf litter. MIDDLE: my study organisms, daddy long-legs and spiders, respectively. BELOW: field gear while collecting data.

My days start and end the same way. I have breakfast in a cafeteria with Panamanian, Latin American, European and American researchers, professors, students and interns. Broken English and broken Spanish (and occasionally some *Portuñol* – the improvised mixture of Portuguese and Spanish) are frequent heard at the table, and I proudly become part of these engaging multi-language conversations. My breakfast companions come from a myriad of backgrounds, with research interests and career paths that contribute to yet another level of diversity to appreciate in this island. After breakfast I hike into the forest

with a tripod on my shoulder and a camera in my backpack, ready to film short high-speed videos of spiders shaking their webs. I also search for daddy long-legs under rocks, rotting logs, and in deep in the leaf litter – which happens to be one of the preferred habitats for many arachnids. By recording the defensive behavior of these arachnids in these field experiments, and noting when they are found in particular microhabitats will contribute to our understanding of the variety of defensive strategies animals have.

Meal time punctuates each day, and my morning arachnid search is interrupted by lunch. I head back into the forest for a few more hours before dinner and I run experiments in the pitch black forest every night. The rhythm of each day is accompanied by the sounds of ships' horns, such a constant part of the forest in this part of the world that it may no longer startles the animals, though it still startles the newly minted biologists who come to this island to study a pristine forest. Consequently, the sound of ships moving through the canal are an ever-present reminder that I am not far from civilization.

Doing research on Barro Colorado Island is an interesting irony. This island is a field station where the forest is protected from *direct* human intervention. However, the forest was protected thanks to the early 19th Century trade industry, mostly from developed countries. The result is a good reminder of the world we live in. This by portraying a dialectic relationship between protecting the watershed to operate the canal and, in the process, establishing a mecca of knowledge on tropical ecology, all while developing a heavy trade route through the heart of Panama.

Barro Colorado Island's situation begs the question of *can development and environmental protection coexist?* I ponder this question and its implications while hiking on these muddy trails. With this in mind I continue my search for arachnids, feeling lucky that this place exists and motivated to work to unravel nature's complex processes, one video at the time.

LEFT: Frequent trees in the forest. MIDDLE: Hydro-meteorological station on BCI, "necessary equipment for the conservation of the Canal watershed". RIGHT: A typical view from the BCI laboratory: The Panama Canal and a big ship crossing it.