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IN THE FIELD

The jungle of the NIGHT

Is being stuck in an unfamiliar jungle in the pitch darkness, surrounded by only the sounds of the forest your dream-come-true? It was for **ADRIÀ LÓPEZ BAUCCELLS** and his team. He tells us of his field experiences.
Photography by **ORIOL MASSANA**



A full-page photograph of two men in a rainforest at night. The man on the left is wearing a blue long-sleeved shirt, dark cargo pants, and a headlamp. He is looking off to the side. The man on the right is wearing a red long-sleeved shirt, dark cargo pants, and a headlamp. He is looking towards the camera. Both men are wearing backpacks. The background is dark with some green foliage visible. Rain is falling, creating a blurred effect in the foreground.

Exhausted, drenched in sweat and starving, we returned to our base camp, deep in the Brazilian Amazon, after another laborious night of fieldwork. Our bodies were crying out for some well-deserved rest under the relative safety of a corrugated metal roof. The jungle around us was pitch black, with the cacophony of civilization long left behind, replaced by the nighttime music of the jungle, echoing through a vast green blanket of countless trees. Despite my exhaustion, I felt fulfilled and gratified on that last night. The last night of almost three years during which, night after night, we navigated the same rainforest paths patrolled by jaguars, pumas and tapirs. The last in which we carried overweight backpacks, chock-full with field gear as we ventured in search of some of the most elusive creatures of the Amazonian night.

But let me start from the very beginning. It was three years before that day, on a standard autumn morning, when I opened my inbox to find an e-mail from Christoph Meyer, a young German tropical ecologist with broad experience in bat research. A few weeks ago I had applied for a research position on a project he had just started in Brazil. The e-mail was short but I could



no better news. *"Dear Adrià, I'm delighted to inform you that you've been selected for a research position in the project 'Spatio-temporal dynamics of Neotropical bat communities in fragmented landscapes,'"* said the opening line. With a mammoth-sized smile carved upon my face, I ran down the stairs to share the news with my colleagues *"Hey hey! Guess what?"* I said. *"I'm leaving for the Amazon!"*

This drastically changed the course of my life, and meant I was going to spend at least 3 years researching bat ecology in the most biodiverse ecosystem on Earth. No words

can describe the feelings of a field ecologist obsessed with bats who's been blessed with such a great opportunity.

Deforestation is seriously jeopardising the most biodiverse ecosystems of the planet, many of them in the tropics, and unfortunately, we are still struggling to understand how to deal with it. While some amazing species and paradisiacal habitats are erased every minute from the face of the Earth, both legal and illegal logging reduce our planet's lungs to relict patches so the wood can be utilised for human consumption. My mission was to understand how fragmentation of forest habitats was effecting aerial insectivorous bats that ate, slept and lived in its divided canopies.

Land and biodiversity management are still an anarchic chaos. Contributing with a small grain of sand to clarify how we should



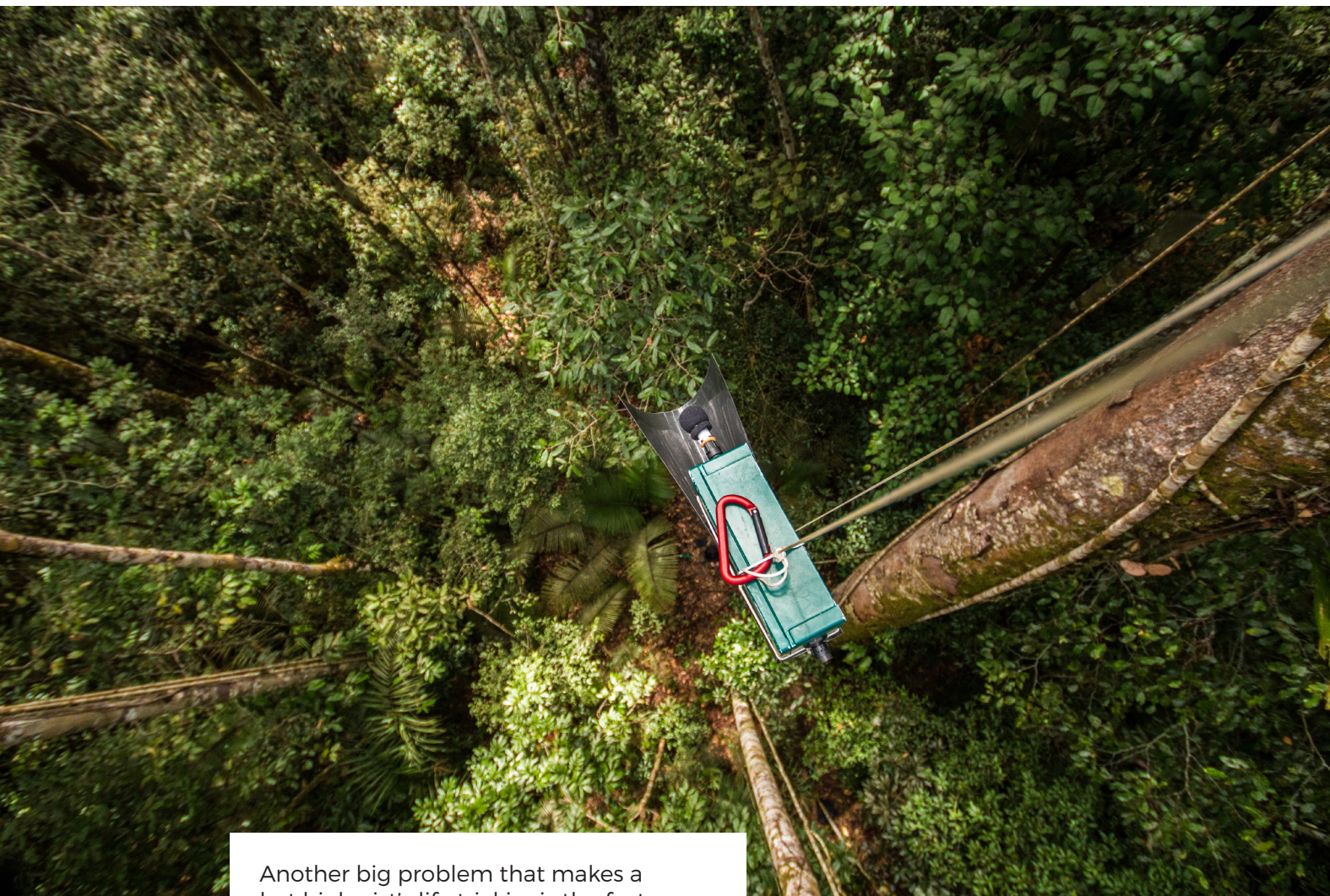
manage forest exploitation would be the best result of my doctoral project. But then, why bats? And why focus only on one group, aerial insectivorous bats? Not so long ago, when I started working at the Natural Science Museum of Granollers in Catalonia in 2005, Carles Flaquer, my first supervisor, confessed to me this would be the endless question that would persecute me during all my professional life.

In the Iberian Peninsula and Brazil bats are not the most loved animals, and they are often feared or even killed. But besides the common myths and prejudices, bats are amazing creatures, not only as a result of my fascination for them, but also because of their astonishing diversity, the multiple ecological services they provide that help humans to maintain ecosystem harmony, or their unique ability to fly with unbelievable maneuverability. Did you know they are the second most diverse group of mammals on the planet? Or have you ever thought that we must thank them for saving millions and millions of euros for the massive pest control services they provide? Tequila and many other drinks from Central America could never be prepared if bats did not pollinate certain flowers, and forests would take much longer to regenerate without seed dispersing bats. Not bad.

In my years of researching bats, I have often thought that if a forest ghost ever existed, it would be one of my aerial insectivorous bats. Just an elusive shadow in the darkness, these small creatures rely almost completely on their echolocation, mentally creating 3D images of their surroundings. This highly precise technique allows them to fly in the middle of a cluttered forest in complete darkness, dodge all obstacles and even hunt prey as tiny as mosquitoes. Bats are usually captured using large stationary mist-nets (pictured here) into which they fly, but with these aerial insectivorous bats it becomes trickier. They have much better, stronger and more precise echolocation abilities that allow them to avoid the mist-nets more often. Being unable to catch them means, information about their natural history and behavior is still scarce, especially for tropical species.







Above:
Acoustic
equipment
hangs
from the
trees.

Right: a
bat found
sheltering
in the leaf
of a plant.

Another big problem that makes a bat biologist's life trickier is the fact that my species roost inside hollow trees or between palm leaves. As you can imagine, although many species are in fact extremely abundant, we do not know much about them as they can hardly be detected, or even spotted. However, technological advances are helping field conservationists like myself, and I found myself using fancy, new, automatic ultrasound-detectors to passively and remotely survey for bats every night. Tens of devices were deliberately spread around the rainforest providing us with thousands of acoustic recordings that we will study to understand whether species become locally extinct in small forest fragments, or whether they were able to persist. This analysis is ahead of me, and I'm intrigued to unearth the information within my recordings.

On that final night in the Amazon we were

***"Our project
had acquired
an additional
purpose"***

all resting together under the hut's roof that had been our home during the last three years, celebrating the last of our sampling nights in the Amazon. When our research began, we trawled the literature for information on deforestation, the Amazon and the bats that lived here. Our planning stages were hampered by the lack of a field guide for Amazonian bats. The information we had existed only in scientific papers that were impractical to haul out into our field site. This black hole made fieldwork trickier. Instantly, the challenging yet attractive aim of writing the first illustrated guide for Amazonian bats crossed my mind. Such a tool, which would also include an acoustic key, illustrations and image examples, made freely available through the Internet, could greatly help bat conservation efforts in Brazil and beyond. Our project had acquired an additional





“Hundreds of metres of mist-nets were set floating above these black waters...”

purpose.

Working alongside my colleague Ricardo Rocha, a young and proactive conservation biologist, and Oriol Massana, a professional award-winning nature photographer, amongst others, we spent countless hours capturing as many species as possible to photograph them and record their ultrasounds. We captured them mostly in temporary lakes in our study area. These were full of murky flood-water - habitat loved by not just the bats but also anacondas and caimans. Hundreds of meters of mist-nets were set floating over these black waters, crossing trails, or suspended up to 40m in the canopy of the rainforest. Our efforts paid off, we caught more than 8000 bats of almost 100 different species.

The last day of our project was just like any other in many ways.





“I smelt the humid atmosphere, warm and dense, I listened to that paradoxical silence...”

We woke up early in the morning; some of us cooked whilst others repaired broken mist-nets, downloaded the ultrasound recordings or entered new data into the database. The camp was promptly left after lunch and after a few hours of walking on seemingly endless trails, crossing rivers and opening new shortcuts, we arrived at one of our favorite spots, deep inside the pristine forest. We worked separately in teams of two throughout the night. I remember my colleague Ricardo bid farewell to me with his typical words. “Catch something interesting for me, Adrià.”

While setting the mist-nets, I smelt the humid atmosphere, warm and dense, I listened to that paradoxical silence - lacking all human noise, but full of natural themes provided by exotic birds and other charismatic fauna. That night was peaceful. Once one got the rhythm, staying awake capturing bats becomes mentally relaxing. Surprisingly, we did not suffer any rain that night. Something you remember after a long period in the Amazon, apart from the calamitous amount of mosquitoes, is the rain. Weather rapidly changes and surprises you with sudden storms and heavy winds. This can quickly become



dangerous for the bats caught within the hundreds of metres of mist-nets, you have to work quickly..

Back at base-camp, struck by nostalgia for this place we were leaving, I thought of the things I would miss. My team-mates were integral to my experience. I will always remember Ricardo preparing coffee so strong that only he could drink it, and Oriol studying the pictures one time after another, complaining incessantly about small imperfections. Our most thrilling findings were made together. Such as the memorable day we captured a red bat, Tacarcunan Bat, only found twice before in South America, or the time we found one cryptic species of the common mustached bat, never before captured in the Brazilian Amazon. We were 4 individuals, surrounded by thousands upon thousands of kilometres of rainforest, dancing from happiness, illuminated by only four weak headlamps, excited by the capture of a rare bat, almost never caught before on a whole continent. After all these words, if you think you could feel our euphoria, if you could imagine the scene and be excited by these findings, it will be more than enough to give meaning to our work

Left: Base camp. Middle: Adrià examining and releasing a bat from a mist net. Right: Adrià in the depths of the jungle, placing his acoustic equipment.

Adrià and his team are currently revising their field guide, to include 100 species of bats, and will make it available online. The guide will be free for anyone who needs it, with the aim for it to be continuously improved and added to over time.

