

Q&A

Species seeker



During his PhD at the University of Minnesota in Minneapolis, Juan Fernando Díaz Nieto was part of an expedition that trekked across the tropics

of South America and discovered a new species of mouse opossum (*R. S. Voss et al. Am. Mus. Novit.* 3778, 1–27; 2013). He's since returned to his native Colombia, where he is a professor of biology at EAFIT University in Medellín.

What do you study?

I work with marsupials, rodents and bats. I've always been interested in fieldwork — being able to go to unexplored regions that have a high potential for diversity. I also work in museums and use genetic techniques to investigate diversity.

What's it like to do fieldwork in Colombia?

For decades Colombia had zones that were too dangerous to go into. The 2016 peace accord with the FARC, which ended the long civil war here, helped give access to large regions of the country. It's still complicated: to access these areas, one must be careful, work out the logistics and sometimes ask permission — and not just of the government. Many areas have been taken over by other armed groups.

Tell us about a project you recently led.

In July, I and colleagues led a biodiversity project in the Anorí region in Colombia, which is United Nations-backed and involved ex-combatants from the FARC. They weren't serving as guides but as co-investigators. We planned the project with them. After the fieldwork they came to our laboratories in Medellín, working alongside us.

What's the future for science in Colombia?

There's a lot of altruism among researchers here. One person might go into a difficult zone and end up giving the world access to a valuable sample. There are lots of social issues in our country that we have to face. But we are willing — our passion will guide us. ■

INTERVIEW BY ALESZU BAJAK

This interview has been edited for length and clarity.

► America to be bordered by both the Caribbean Sea and the Atlantic Ocean, is a mosaic of ecosystems, including mountain ranges, deep jungle, rugged coasts and expansive savannah. It is the second most biodiverse nation in the world (behind neighbouring Brazil) and, thanks in part to this natural laboratory, the country of 49 million people has dozens of universities and institutes working on home-grown science, ranging from the International Center for Tropical Agriculture in Cauca Valley to the natural and physical science laboratories of Bogotá's largest universities (the city has more than 100 tertiary education institutes).

But the key question being asked by Colombian scientists is whether science will find support in the country's post-war economy. For years, their outlook has been pessimistic in the face of strained budgets, meagre resources and red tape that stymie the scientific process, explains Andrew Crawford, a US biologist who, over the course of nine years at Bogotá's Los Andes University, says he has developed a sense of the possibilities and challenges of doing science in Colombia.

A reagent order that could be delivered in a day in the United States or Europe, for example, can take three months in Colombia, says Fiorentino. Monoclonal antibodies, she says, have sat for weeks without refrigeration in customs, useless by the time they reached the lab.

"If we do not improve these administrative problems," Fiorentino stresses, "Colombia will never, never be competitive."

MEAGRE SUPPORT

Many of these problems, researchers point out, are rooted in the government's low financial support for science. Colombia currently invests only 0.67% of its gross domestic product in science and technology, compared with 2.8% in the United States.

Despite this, the country produces on average more than 200 high-quality scientific studies a year on everything from physics to Earth and environmental sciences to the life sciences, according to the Nature Index, which tracks publication in high-quality scientific journals. Recent Colombian papers have made advances in research on dark matter, urban lizards and forest fragmentation. But that output trails behind that of other countries in the region, such as Brazil and Argentina, which until recently invested a lot more in research. Colombia's spending was only one-fifth of Argentina's in 2015, for example. Today, however, uncertain political and economic conditions in those two countries might offer Colombia a chance to catch up.

Last year, 13 Nobel laureates from around the world wrote to then-president Juan Manuel Santos, urging him to raise the government's investment. "The Colombian budget for science and technology for 2018 continues to be extremely low," they wrote, adding: "The consequences will be

devastating and irreversible, because science and education are long-term efforts that must be supported consistently."

The letter summarized the growing disenchantment among Colombian researchers about the future of science there. As Enrique Forero, president of the Colombian Academy of Exact, Physical and Natural Sciences in Bogotá, points out, federal funding is decreasing further. "Support from the government is not very acceptable. It's very, very, very low and it seems to be going down every year," he says.

BRAIN DRAIN

Catalina Pimiento is one Colombian scientist who left and never returned. After graduating from the Pontifical Xavierian University with a degree in biology, she moved first to Mexico, then Panama, the United States, Switzerland, Germany and now Wales, where she has a postdoctoral fellowship at the University of Swansea, investigating mass extinctions like the one that took out the giant shark *Carcharocles megalodon*. As much as it pains her, she won't return to her country of birth.

"Because of my experiences and the career opportunities I've had abroad, I decided to have nothing to do with Colombia," she says. "Colombia does not invest in science. It's that simple."

That's not to say that researchers in Colombia can't make a living — or new discoveries — in the current climate. Juan Fernando Díaz Nieto, a biologist at EAFIT University in Medellín, has a successful career identifying new opossums, rodents and bats in the country's hinterlands that had for decades been inaccessible because of the violence and threat of kidnapping associated with the civil war (see 'Species seeker').

"The peace accord helped with access to large regions of the country," says Díaz Nieto, who recently discovered two new marsupial species along the river of Colombia's Magdalena basin, in the northwest of the country. "We described two new species of mouse opossum that are endemic to Colombia, which we found on either side of the Magdalena River," he explains.

Díaz Nieto, who gained his PhD at the University of Minnesota in Minneapolis, says he was able to make the discoveries because "in lieu of large budgets, we relied on the cooperation of colleagues at other Colombian institutions and cobbled together many small grants from the National Science Foundation, the University of Minnesota and the American Society of Mammalogists."

SCIENCE TAX

The Colombian government is trying to get better at funding science, however. A law passed in 2012 diverted 10% of royalties from natural-resource extraction into a science and technology fund that was allocated across Colombia's 32 government departments. The initiative was designed to help stimulate science by sponsoring research projects and