FLAG #37

Virus Hunting: How Tropical Forests Can Prevent New Pandemics

SUMMARY

Dr. Paula Ribeiro Prist is the Principal Scientist for Conservation and Health at EcoHealth Alliance, United States. A biologist by training, Dr. Prist holds master's, doctorate, and post-doctorate degrees in landscape ecology from the University of São Paulo, with an interim period at Columbia University and the University of Queensland, Australia.

Paula carried WINGS Flag #37 to the Atlantic Forest in Brazil to capture small mammals in one of the selected landscapes of the ZooRest project. Collected samples were used for the extraction of viral community data to understand the viruses present, how forest restoration affects the presence of these viruses, and, consequently, the risk of transmission to human health.

THE EXPEDITION

Located along the East Coast of South America, the Brazilian Atlantic Forest has a high diversity and concentration of endemic species. Due to high rates of habitat loss, the Atlantic Forest is considered a hotspot for future emerging infectious diseases with outbreaks and epidemics of certain diseases occurring frequently in this region. Currently, only 32 million hectares (28%) of the original 112 million hectares of the landscape remain. However, after 2005, conservation actions accompanied by land abandonment and forest restoration reduced deforestation rates and increased natural regeneration.

In one of the 18 landscapes selected in this biome, Paula and her team installed 60 live traps and 45 pitfalls with the aim of capturing small mamifers. They sought to understand the forest cover at the beginning of restoration and how the spatial arrangement of these restored areas affect the return of biodiversity and the risk of disease transmission to humans.

The expedition received additional sponsorship from the NSF Biodiversity on a Changing Planet and FAPESP (The São Paulo Research Foundation). Paula was joined by postdoctoral researcher Matheus Mancini, veterinarian Gianmarco Bettoni, and virologists Mirela D´Arc and Marina Bueno.

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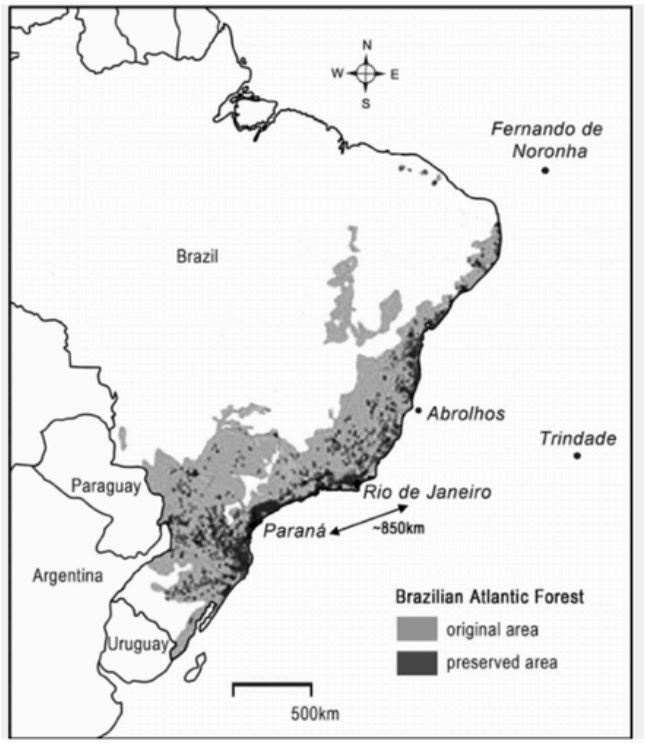

WHO: Dr. Paula Ribeiro Prist

WHAT: Data collection from small mammals of the ZooRest project in areas of different forest restoration.

WHEN: August 18 - 24, 2024

WHERE: Atlantic Forest, Brazil

WHY: To understand the viruses present among animals in the area, how forest restoration affects the presence of these viruses, and, consequently, the risk of transmission to human health.

EXPEDITION GOALS

The main objective of this expedition was to capture small mammals in one of the selected landscapes of the ZooRest project, which aims to understand how different forest restoration contexts affect the risk of zoonotic disease transmission. Paula and her team selected several landscapes throughout the Brazilian Atlantic Forest, with restored forest areas in different landscape contexts (low, medium and high forest cover).

Within each landscape, they collected data at three points: in old-growth forest, isolated restored forest, and restored forest connected to the old-growth forest fragment. At each of those points, they set up 20 live traps and 15 pitfall traps, and left the traps open for seven nights. They collected data on 80 individuals belonging to six species of small mammals, with the rodent Oligoryzomys nigripes being the most abundant. This species is a reservoir of Hantavirus, a virus that kills 50% of infected people and is transmitted by inhaling the aerosolized virus in the environment. Biological samples (rectal and oral swabs) were collected from each individual and are stored in RNALater, so their virus community can be analyzed in laboratories.

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CHALLENGES AND LESSONS LEARNED

One of the biggest challenges of this expedition was the weather. Cold and rain threatened the lives of the animals collected, so the team began their field work before sunset, ensuring that the animals were warmed up and fed before being released again. In addition, the collection areas are steep. Carrying backpacks with all the necessary equipment and traps, which total more than 15kg, for more than 2 kilometers from the easiest point of access makes the work tiring and physically challenging.

Because they are working with viruses and species that can transmit diseases, the safety of the team, as well as the animals, is also a challenge. To protect themselves, Paula and her team used safety equipment, such as double gloves, masks, aprons, goggles, etc. The working conditions in humid climates are also more difficult. But this difficult climate has led to the creation of more accurate protocols to ensure the well-being of all the individuals captured, and that of the team, with hydration kits now being included in the equipment.

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EXPEDITION RESULTS

The expedition achieved its goal of collecting 160 samples that are now being handed over to virologists for viral community analysis. Data from this project will contribute to a greater understanding of how we can propose solutions to the anthropogenic actions that have been threatening biodiversity and human well-being.

ABOUT THE FLAG CARRIER

Dr. Prist leads the IUCN thematic group of human health (300 - 1000 members) and is a Co-Lead Author of the next IPBES Nexus, a member of the International Program Officer for the Future Earth One Health group and part of the STAR-IDAZ & GloPID-R - One Health Working Group. Her line of research focuses on understanding how habitat loss and fragmentation, and the configuration of remaining native vegetation areas and climate change affect biodiversity and the provision of ecosystem services, including regulating services aimed at maintaining human health. Her long-term plan is to contribute to the development of high-quality research to understand how conservation can contribute to the maintenance of human health and how the management of tropical landscapes can be done to create landscapes with low risk of transmission of zoonotic diseases and high maintenance of human health.

CONTACT INFORMATION

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