Passive acoustic monitoring as a tool for amphibian conservation on tropical islands

 # community ecology # biodiversity assessment

Pristimantis tuprinorum © Renoir J Auguste

STUDENT
Renoir Auguste

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Trinidad & Tobago

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CONTACT
renguste@gmail.com

Context

Amphibians are the most threatened group of terrestrial vertebrates. Improving conservation actions is thus required. A key action used to improve amphibian conservation efforts is monitoring. Among the various sampling methods, passive acoustic monitoring (PAM) has emerged as an innovative technique used to survey biodiversity across wide spatial and temporal scales and as such has improved conservation and management of species. However, the global application of this method is biased towards countries with greater wealth and land masses (for example North America, Europe, Australia). Gaps remain in small tropical islands like the Caribbean which has limited resources allocated to biodiversity monitoring.

Given that tropical islands host multiple endemic and threatened species and are under sampled, PAM can be used to effectively improve conservation efforts there with global implications for amphibian conservation.

Objectives

The overall aim is to show the broad application of passive acoustic monitoring as a tool to inform amphibian conservation in tropical islands.

The goals include:
- its effectiveness at detecting species richness and community composition,
- exploring the effects of environmental temperature on calling behaviour,
- improving our understanding of interspecific competition among species,
- filling gaps on data deficient species.

Methods

- Compare passive acoustic monitoring using autonomous recorders (Wildlife Acoustics) with in-person visual encounter surveys.
- Deploy acoustic recorders across high and low elevations with a range in air temperatures.
- Deploy acoustic recorders across a range of sites with various habitats and elevations.

Results

- PAM will show it captures greater species richness and overall community composition compared to in-person searches with implications for biodiversity monitoring and conservation management.
- Environmental temperature will have an impact on calling behaviour with implications for reproductive success and climate change conservation.
- Acoustic niche partitioning will be found showing how sympatric species can coexist with implications for interspecific competition, niche separation, and biodiversity conservation.
- Passive acoustic monitoring can be used to gather ecological data on data deficient species with implications for conservation and management.

Pristimantis charlottevillensis © Renoir J Auguste

The student and his team

Renoir is a PhD candidate at The University of the West Indies, St. Augustine Campus, Trinidad and Tobago (UWI). He became affiliated with the Caribaea Initiative programme through the collaboration established between his co-supervisor and the organization.

His doctoral research is supervised by Dr. Mark Hulme (UWI). He is co-supervised by Dr. Amy Deacon (UWI), and benefits from the guidance of Dr. Martha Muñoz (Yale University) as an external advisory committee member. He has also received valuable advice and support from Dr. Luke Rostant (UWI).

Scientific publications

Auguste, R. J., Deacon, A. E., & Hulme, M. F. (2025). Are tropical oceanic islands overlooked? Knowledge gaps regarding the vulnerability of amphibians to global anthropogenic threats. Oryx 59(2), 166-175.

Auguste, R. J., Deacon, A. E., & Hulme, M. F. (2026). Evaluating the effectiveness of passive acoustic monitoring at detecting anurans in Caribbean tropical forests. Ichthyology & Herpetology. (In Press).