
Integrating online environmental data repositories and bioacoustic research: a study case on Amazonian frogs.

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Abstract

In Brazil, widespread changes in land use occur faster than the accumulation of data on native species and their associated behavioral diversity in response to environmental gradients. Information gaps are especially wide regarding clinal changes in forest structure and its associated biota and their effects on acoustic signals of highly vocal vertebrates. Intra-specific variation in acoustic signals of Amazonian anurans have been investigated, but studies generally focused on isolation by distance, vicariant barriers or reinforcement in mate selection, and did not test predictions of the Acoustic Adaptation Hypothesis (AAH). Here, we investigated the relationships between forest structure and the spectral and temporal properties of acoustic signals of an anuran species (*Allobates* sp.) to test the AAH. Additionally, we searched the acoustic environment across sampling plots for species that emitted signals that overlapped in bandwidth with those of the focal species. The study was conducted in 35 permanent sampling plots distributed in forests along a 600 km SW-NE transect of the interfluvium between two large southern tributaries of the Amazon River. Plots are used by several research groups and vegetation structure parameters and species composition in each plot were available in online repositories, allowing tests of associations between divergence in acoustic signals and fine-grained environmental gradients. The acoustic signals of *Allobates* sp. are shorter and emitted at lower frequencies in forests with higher tree densities and larger tree basal areas, as predicted by AAH. However, signal modulation was not affected by any environmental parameter. The presence of a congeneric species that emitted signals with overlapping frequency bandwidth was not associated with the variation of any acoustic trait of the focal species. In addition to the findings in relation to the focal species, our work highlights the importance of environmental and biodiversity data repositories in accelerating bioacoustic research.

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