Exploring the Mechanisms of Diversification in the Amazon Rainforest

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Recent studies of speciation processes have supported the importance of natural selection in producing adaptive variation and promoting speciation. Studies in environmental gradients in the tropics have provided important new data to explain the processes involved in population diversification. In South America, the gradient between the Amazon rainforest and the Cerrado (a vast tropical savanna in Brazil) provides an exceptional opportunity to explore the influence of divergent selection on phenotypic divergence that may promote speciation events. Between the Amazon and the Cerrado, there is a gradient of decreasing rainfall and humidity. This gradient is likely imposing selective pressures, particularly on frogs, because of the high desiccation risk conferred by their permeable skin.


Left: A typical tree found in the Cerrado region (Brazilian savanna). Right: Chapada dos Guimarães National Park, located in the Cerrado region of Mato Grosso State.

The goal of my research is to examine two frog populations (*Dendropsophus minutus* and *Hypsiboas raniceps*) along this gradient in order to investigate the processes responsible for intraspecific differentiation. I will be combining molecular genetic, phenotypic, and ecological data, as well as using satellite remote sensing techniques, to explore intraspecific variation in these species. The knowledge gained from these studies will help inform conservation planning projects in the Brazilian Amazon and Cerrado.


Left: A male Dedropsophus minutus *vocalizing to attract mates. Right: A male* Hypsiboas raniceps *from the Amazon region.*

I recently returned from my first field season in Brazil (Fall 2008). During the three months that I was there, I visited three frog collections located at the Museu de Zoologia da Universidade de São Paulo, the Universidade Estadual Paulista, and the Universidade Federal do Mato Grosso to collect morphometric data on my target species and get geographic coordinates for frog sampling sites. I was able to establish research collaborations with the laboratory of Dr. Célio Fernando Batista Haddad at the Universidade Estadual Paulista. I also received assistance from Dr. Christiane Strussmann and her students at the Universidade Federal do Mato Grosso, and from Fundação Cristalino (a non-governmental organization), and Ïnstituto Chico Mendes de Conservação à Biodiversidade (a government institute). Their support was essential to making my fieldwork possible.

I was able to collect 176 samples from my two target species with the assistance of two students from the Universidade Federal do Mato Grosso, two students from the Universidade Estatual do Mato Grosso, and two environmental analysts from Ïnstituto Chico Mendes. Working along the gradient between the Amazon rainforest and the Cerrado, we conducted surveys in private areas, federal reserves (Estação Ecológica Serra das Araras, Estação Ecológica do Iquê, and Parque Nacional da Chapada dos Guimarães), and at a Fundação Cristalino reserve located in the Alta Floresta municipality.

I plan to return to Brazil for a second field season in November 2009 to increase my sample size, to record more frog calls, and to find more sample sites in the Cerrado and the Amazon rainforest.

Left: Fieldwork along the Teles Pires river in the Amazon region. Right: Hilton Oyamaguchi searching for frogs and recording their calls.