

DIVERSITY AND ECOLOGY OF TADPOLES FROM CENTRAL AMAZONIA

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Figure 1. From left to right, clockwise: 1) stream and 2) streamside pond, both inside a solid ground forest; 3) floodplain lake with a flooded forest in the background and floating meadows in the first plan; 4) tadpole of the foam nesting frog *Leptodactylus knudseni* found in an isolated pond inside the solid ground forest

The Neotropical region presents the richest fauna of anurans amphibians (frogs, toads and treefrogs) in the world. Especially diverse faunas occur in warm and moist tropical locations, as in the Amazon Basin: about 600 species are known from this region, but several studies indicate that these numbers are clearly underestimated. A question of central interest for community ecologists is how is possible the coexistence of species, in particular in 'biodiversity hotspots' such as tropical rainforests. Ecological and evolutionary processes operating at different temporal and spatial scales influence community structure and species distribution. However, relatively few are the studies on Amazonian anuran communities, and many of them are restricted to breeding site choice and breeding phenology based on male calling activity. The larval phase (tadpoles), recognized in many species as the period in the life cycle when most of

mortality occurs and thus important in the regulation of adult populations, has been comparatively neglected in field and taxonomic studies. Recent research projects are increasing our knowledge about tadpole assemblages in the Neotropics, including Central Amazonia, where aspects of taxonomy, morphology, natural history and ecology have been investigated. However, they answer only a small fraction of the interesting questions about tadpoles and their life histories. This project focuses on the species composition, habitat use, natural history and ecology of the tadpole communities of "terra firme" forests and floodplain lakes in Central Amazonia, which present high diversity of species, reproductive modes, and larval eco-morphotypes. Special attention is given to morphological characteristics, development and the patterns in resource utilization; moreover, the effects of biotic (predation) and abiotic factors (habitat structure and water quality) that contribute to current community structure were determined.

SUMMARY OF RESULTS TO DATE AND PERSPECTIVES

This research project began in 2011 with the title “Tadpoles of Atlantic Forest, Amazonia, Pantanal, Cerrado (Brazilian Savannah) and Transition Zones: Morphological Characteristics, Spatial Distribution and Diversity Patterns” (SISBIOTA Program, CNPq 563075/2010-4; FAPESP 10/52321-7). In the Central Amazonia, the team collected tadpoles of 68 anuran species belonging to 8 families and 23 genera. The most common developmental site was free water, including lentic (ponds and phytotelms) or lotic (streams). Of the 68 species for which enough data are available, 19 species occur in isolated forest ponds, 25 in streamside ponds, eight in streams inside forest, three in phytotelms, 21 in lentic or lotic water bodies in forest edge, 16 in the várzea lake, and six species present a complete endotrophic development or terrestrial development (away from water in the leaf litter, burrows, or subterranean chambers). These latter tadpoles have different degrees of reduction of structures associated with feeding, swimming and respiration. Tadpoles exhibited great morphological diversity, from tadpoles with generalized morphology to highly specialized, such as the species found in the streams. Much of this morphological variation involves differences in body shape, size and shape of the fins and structures of oral disc, some of them directly associated with the use of the available resources. A great variety of organisms was found preying upon the tadpoles, including invertebrates (belostomatids, dragonfly naiads) as well as Vertebrates (fish, tadpoles). The community structure of tadpoles occurring at streamside ponds was determined by characteristics of the habitat, such as number of ponds, floodplain width, and quality of the water and also by the abundance of predators (invertebrates and vertebrates). On the other hand, the tadpole communities in the várzea lake were structured by characteristics of the water and by spatial factors. These results indicates that the tadpole communities of the principal habitat types of the Amazonia (“terra firme” forests and “várzea” floodplains) were determined by different processes (niche-based and spatial), possibly demanding different actions to conservation of the anuran diversity in these habitats.



Figure 2. From left to right: 1) tadpole school of the treefrog *Hypsiboas geographicus* in a streamside pond; 2) lateral view, dorsal view and oral disc of the tadpole of *Leptodactylus rhodomystax*

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