
Ecological similarity in tadpoles' communities (Amphibia, Anura): the role of historical (phylogenetic) and contemporary (ecological) components

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Abstract

A limitation in the studies in community ecology is just the interpretation of the processes based on contemporary mechanisms, as many patterns can be explained based on the community's evolutionary lineages. The objective of this study was to investigate the phylogenetic influence in the patterns of resource use (microhabitat and food) for two tadpoles' communities. The similarity in the microhabitat use and in the diet between tadpoles of two communities was determined. These tadpoles were sampled monthly, between October of 2003 and May of 2004, along the rainy season. For the elaboration of an evolutionary hypothesis among species, oral and chondrocranial morphology of tadpoles of 19 species from northwestern region of São Paulo state were analyzed by phylogenetic methodology. Tadpoles of Discoglossidae were used as outgroup. The historical analysis of the resource use was made contrasting these data with the cladogram that represent the evolutionary relationship among the species, and analyzed in a detailed and in a broad scales. The used scale for microhabitat use influenced the results. In a more detailed scale the intraspecific variation was highlighted and caused the two communities to differ in the general pattern of tadpoles' distribution, according to the pond size: tadpoles' occupied areas deeper and distant from the margin in the permanent pond, which could be related to the largest size of this pond. In a broad scale the "leptodactylids" at present study maintained the plesiomorphic pattern of Neobatrachia, indicating a conservative evolutionary history, while the "hylids" diverged in the microhabitat use. The groups formed by the similarity analysis were basically constituted for (1) species little abundant, allowing the coexistence of species with high niche superposition; (2) species of different ecomorphological guilds, that partitioned the position in the water column; and (3) leptodactylids species, considered specialists in the microhabitat use. The diet of tadpoles was composed mainly by microalgae. The tadpoles of all species ingested mainly diatoms and *Trachellomonas*, except for *Dendropsophus nanus* in the temporary pond that ingested *Spyrogira* in addition to diatoms and *Trachellomonas*, and for *Scinax fuscovarius* in the permanent pond that ingested mainly *Coelastrum* and *Dictyosphaerium*. In the temporary pond were found two groups: tadpoles that fed mainly diatoms and tadpoles that fed mainly *Trachellomonas*. In the permanent pond none group

was formed, since all species-pairs presented low similarity. The diet partitioning was quantitative instead of qualitative, and considered as important as the microhabitat share in the studied community structure. The 19 studied species formed a monophyletic clade: ((((*Elachistocleis bicolor* + *Elachistocleis* sp.) + *Dendropsophus nanus*) + *D. minutus*) + (((*Scinax* aff. *similis* + *S. fuscovarius*) + *S. fuscomarginatus*) + ((*Hypsiboas albopunctatus*+*H. raniceps*) + (*Trachycephalus venulosus* + (*Leptodactylus labyrinthicus* + (*L. fuscus* + (*Leptodactylus* cf. *ocellatus* + *L. podicipinus*)))))) + (*Bufo schneideri* + (*Eupemphix nattereri* + (*Physalaemus fuscomaculatus* + (*P. centralis* + *P. cuvieri*)))))). The phylogenetic analysis evidenced the paraphyletism of Hylidae and Leptodactylidae and the monophyletism of five of the six genera with more than one species, analyzed in the present study. The historical analysis of resource use show that the studied communities are constituted by species groups with different evolutionary histories: the resource use for the "leptodactylidae" maintains the plesiomorphic pattern for Neobatrachia, for microhabitat and for diet, indicating a conservative evolutionary history. The "hylids" already presented great diversification in resource use. However, the congeneric species of terminal clades were conservative in microhabitat use. Seemingly, close species and groups of species of different genera, suffered different evolutionary processes: species of same genera suffered conservative evolutionary history, but the diversification in resource use associated with the great morphological diversity of "hylid" tadpoles of different genera. However, because Hylidae was not monophyletic in the present study, two hypotheses can be proposed: Hylidae is monophyletic and presented great adaptative irradiation or in fact it is an artificial group, representing different evolutionary histories.

Key-words: Anura, tadpole, phylogeny, community ecology, resource partitioning, historical ecology

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