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Abstract

I studied anatomy, gut content, and the relationship among these traits in a set of anuran tadpoles. Larval stages (mainly Gosner stages 31–36) of nineteen species from various lentic environments were selected. Morphological characters from the skeleton, musculature, oral apparatus and buccopharyngeal cavity were recorded, and a gut content analysis was performed, with emphasis on food size distribution. Ordination techniques were applied in order to find patterns of similarity in morphology and gut content. Canonical ordination methods were used to investigate the relationship among gut content, morphology, and phylogeny in the species considered. The results show that several skeletal, muscular, and buccal characters are relatively maintained within genera. Other features, which have appeared independently in different lineages, reflect convergence phenomena in some cases related to ecological aspects. The configuration of the hyobranchial skeleton, the development of the buccal floor depressor and levator muscles, and mouth gape width correlate with prey size. In some species, morphology is clearly related with feeding. Tadpoles that ingest large food particles relative to their body length present morphological traits attributable to macrophagy. Taxonomically unrelated tadpoles of *Dendropsophus nanus, D. microcephalus* and *Ceratophrys cranwelli* possess hyobranchial skeletons with robust, rostrocaudally long ceratohyals and reduced branchial baskets with short ceratobranchials devoid of lateral projections and spicules. *Lepidobatrachus llanensis* tadpoles have laterally extended ceratohyals which, along with the lateral extension of the jaws, result in a very wide oral apparatus and an ample buccopharyngeal cavity that allows the tadpole to ingest large and whole prey; the branchial basket, although its ceratobranchials lack lateral projections and spicules, is slightly reduced in area. The four species mentioned have a noticeable development of the buccal floor depressor muscles, and buccal cavities with scarce filtering and entrapping structures. In *Elachistocleis bicolor, Dermatonotus muelleri, Chiasmocleis panamensis*, and *Xenopus laevis* tadpoles, the branchial basket occupies >70% of the total hyobranchial skeleton area, and the hypobranchial plates are highly reduced; the buccal floor levator muscles are well-developed, with an increased site of attachment on the ventral expansion of the lateral process of the ceratohyal; the scarcity of the filtering structures in the buccopharyngeal cavity are balanced with the great development of the branchial filters and secretory zones; all these features relate to a diet based on small particles not significantly different from those of most other species; however, experimental studies show that species with similar hyobranchial apparatus and muscles are the most efficient when retaining minute particles. Finally, a large group of species present generalized morphological characters, such as a branchial basket occupying about 50% of the total hyobranchial apparatus, intermediate values of mouth gape width and buccal floor levator / depressor muscles ratio, and abundant filtering structures in the buccopharyngeal cavity; these species feed frequently on food particles between 1–30% of the tadpole body length; however, in some of the species, macrophagous diets are also reported in the literature, indicating that this morphology is flexible in more ample prey size ranges.

Key words: tadpoles; chondrocranium; hyobranchial skeleton; musculature; oral apparatus; buccopharyngeal cavity; gut content; interspecific variation; ecomorphology

Introduction

Morphological diversity in anuran larvae and its relationship with spatial and trophic features lead to convergence phenomena, and this allowed researchers to group some species according to morphological and eco-