Mapping a tree: testing hypotheses about the evolution of parental care and parenting in ray-finned fishes

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Abstract

Actinopterygian fishes display considerable diversity of parental behaviors and forms of parenting. In order to understand the evolutionary history in the ray-finned fishes, both characters were mapped, using parsimony ancestral state reconstruction upon an existing supertree. According to the data, in this subclass, parental care and parenting traits evolved from ancestors devoid of parental care or parenting. The transition from the ancestral state to substrate guarding, and that from the ancestral state to uniparental male care were the most observed ones, whereas the remaining transitions recorded low scores. Concerning the evolution of parental care, the data supported the evolution of mouthbrooding from substrate guarding, whilst external egg carrying arose from both substrate guarding and the ancestral state, which suggested the lack of a unique evolutionary pattern. Regarding the evolution of caregiver sex, the data did not support the stepping-stone model since the complete predicted sequence was not observed. In addition, the evolution of carer sex showed higher diversity of transitions among states than recorded in the evolution of parental care, suggesting the absence of a unique evolutionary pattern fitting the entire subclass.

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