Testing hypotheses about the evolution of parental care and in ray-finned fishes

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Abstract

Actinopterygian fishes (subclass Actinopterygii) display considerable diversity regarding forms of parental behaviors and types of carer sex. Contrary to caregiver sex, parental behaviors were not traced at the subclass level. In order to understand the evolutionary history of parental care in the ray-finned fishes, parental care states were mapped upon an existing supertree using parsimony ancestral state reconstruction. We investigated the evolution of substrate guarding, mouthbrooding, external egg carrying and internal gestation. We aimed to test the general hypothesis, according to which, more advanced forms of care were always preceded by simpler ones. We show that, in this subclass, parental care traits evolved from ancestors devoid of parental care. The transition from the ancestral state of no care to substrate guarding was the most frequent, whereas the other transitions recorded low scores. The data supported the evolution of mouthbrooding from substrate guarding, whilst external egg carrying arose from both substrate guarding and the ancestral state, which might suggest independent evolutionary routes of external egg carrying. Consequently, our results did not fully corroborate the general hypothesis mentioned above. Internal gestation evolved both in clades devoid of parental care and in clades descendant from substrate guarders ancestors.

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