

Cannibalism of the young allows individual fish to specialize

May 23 2007

Whitefish, Arctic char, threespine stickleback and some sunfishes display quite discrete groups living in the same lakes but utilizing different food resources in order to survive. The phenomenon is called "resource polymorphism." Why don't all species show this pattern? Early cannibalism is found in all species displaying resource polymorphism.

If you go fishing for Arctic char you may end up catching distinctly different-looking individuals although they were all caught in the same lake. Similarly, whitefish, threespine stickleback, and some sunfishes also display quite discrete groups living in the same lakes but utilizing different food resources in order to survive.

The phenomenon is called resource polymorphism and has been observed and documented as early as in the 18th century, but has continued to receive a lot of scientific interest since it gives us a chance to study ongoing evolution. However, not all species display resource polymorphism, and naturally, in order to gain deeper understanding of evolutionary facilitators, the question arises: Why do some species display resource polymorphism, whereas other don't?

In this study, a team of European researchers combines literature data and advanced ecological theory in order to look for species-specific life history patterns explaining the presence/absence of resource polymorphism in fish. Interestingly and not at all obvious, the study suggests that early cannibalism, which is found in all species displaying resource polymorphism, is a promoting factor. However, incorporating

recently explored and presented population dynamic theory, based upon the population's size distribution and the effect of the individual's size on its relative competitiveness, a logic explanation is given.

The effect of early cannibalism is twofold. First, it stabilizes the variation in the number of individuals over time, which in turn increases the benefit of specializing on any resource since the risk of being dependent on a vanishing resource decreases. Second, an early disappearance of small newborn individuals increases the abundance of their prey due to decreased consumption from the small ones, hence increasing the benefit for larger individuals to specialize on this specific prey (typically zooplankton). The team now plans to do new modeling exercises and practical experiments in order to further explore the suggested hypothesis.

Source: University of Chicago

Citation: Cannibalism of the young allows individual fish to specialize (2007, May 23) retrieved 8 April 2024 from <https://phys.org/news/2007-05-cannibalism-young-individual-fish-specialize.html>

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