Causes and consequences of habitat selection in lake-stream stickleback

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Adaptive population divergence is commonly ascribed to selection favoring different individuals in different habitats. Random migration between habitats, and hence gene flow between populations, should thus counteract adaptive divergence. Yet, population divergence could also occur from different individuals selecting different habitats. In case of such individual habitat selection, gene flow between habitats would not be random and could help maintain or even promote population divergence. In this project, we evaluate this overall idea by testing for the causes and consequences of habitat selection using a pair of directly adjacent but phenotypically distinct populations of lake and stream threespine stickleback. A mark-transplant-recapture experiment using wild-caught stickleback reveals phenotype-dependent native habitat selection. To test for a genetic basis of habitat selection, and to find traits and genomic regions associated with habitat selection, we then gave laboratory-raised purebred stickleback (from lake-lake and stream-stream crosses) and lake-stream F2 hybrids the choice between the same natural lake and stream habitats. Purebred stickleback showed increased preference for the native habitat of their parents, indicating a genetic basis to lake-stream habitat selection. In this talk, I will present first results from the analysis of 800 lake-stream F2 hybrids that either selected the lake or stream habitat. Furthermore, I will present our results from a follow-up fitness enclosure experiment conducted with a subset of these hybrids, in which we asked whether the selection of a certain habitat by an individual is associated with increased fitness in that habitat.