Speciation as a process: integration of ecology, genetics and development

Skúli Skúlason
Co-author: Bjarni K. Kristjánsson
Hólar University College, Iceland

The field of speciation research is in an exciting phase of rapid development. Currently, the importance of ecology as a driver in divergent evolution and speciation has largely been accepted, and in general there is greater appreciation for the overlap of ecological and evolutionary processes. This has refocused our thinking towards a more integrated view of ecological and adaptive speciation. Thus, instead of studying various ecological, genetic and environmental factors separately, a more combined approach is becoming apparent, both in theoretical and empirical studies of divergence. Such integrative approach has recently been put further into context by examining more carefully how mechanisms and events interact temporally and spatially in processes of speciation, replacing, or adding to, a more static or pattern-orientated view of speciation. The process approach embraces the complexity of the issue, but at the same time allows for meaningful, simple and constructive research questions potentially promoting useful and comprehensive speciation models. An overview of the above mentioned integrative and process oriented approach will be provided, using examples from studies of polymorphic freshwater fish, found at different stages of divergence, providing good study models for ecologically driven divergent evolution and ecological speciation. The importance of phenotypic plasticity and maternal effects will specifically be examined. Implications of the process view of divergent evolution and speciation for the general understanding of the world we live in, e.g. regarding management and conservation programs, will be reflected on.