

Eawag Seminar Invitation

Genes Propose and Environments Dispose: Ecological Genomics and the Genetics of Adaptation in Fishes

Speaker **Prof. Sean M. Rogers**
University of Calgary, Canada

When **April 7, 11.00 – 12.00 a.m.**

Where **Forum Chriesbach C20, Eawag Dübendorf**

Abstract Understanding how the source of genetic variation affects adaptation is integral for predicting how populations will respond to changing environments. The form and pace of adaptation to new environments may depend on the amount of standing genetic variation present in a population prior to adaptation. Threespine stickleback (*Gasterosteus aculeatus*) have repeatedly and independently colonized freshwater lakes from the ocean and represent one of the most common examples of adaptation from standing genetic variation. Yet, it is often assumed that the marine form of stickleback along the Pacific coast of North America constitute a single, large population. If true, then parallel evolution of freshwater forms may be due to colonizing stickleback carrying similar levels of standing genetic variation. However, if marine stickleback evolutionary history has influenced standing genetic variation, then selection in freshwater may vary with different colonizing populations. In this talk, I will present data from 3D morphometrics and Genotype-by-Sequencing that explored phenotypic and genetic variation in marine populations of threespine stickleback extending from central California to Alaska. We discovered that several marine populations were phenotypically distinct, with Californian populations exhibiting less variation than populations from Oregon to Alaska. Lateral armour phenotypes associated with standing genetic variation at the *ectodysplasin* (*Eda*) gene varied strongly, from 100% fully plated individuals to populations with mostly low and partially plated phenotypes. Genetic clustering revealed strong evidence for five populations, with Washington to Alaska notably constituting a single genetic cluster. Morphology of this clade was consistent with migratory behaviour. Overall, these results reinforce that evolutionary and demographic history of marine threespine stickleback may affect the availability of adaptive standing genetic variation and influence the evolutionary trajectories of freshwater stickleback that relied on this genetic variation as a substrate for rapid adaptive change.