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Department of Marine Sciences
Presents a Seminar by

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UConn Ecology and Evolutionary Biology

A co-evolutionary pyrrhic victory, adaptive evolutionary gain and loss of a costly immune response in fish

Most organisms are unwilling hosts to a variety of parasites. Because parasites typically undermine host survival or fecundity, hosts with ecological or immunological traits that reduce infection rates are favored by selection. Yet, avoidance and resistance also come with costs, such as harmful auto-immune side effects or lost energy. Consequently, the optimal investment in immunity is expected to be optimized to suit local ecological conditions. As a corollary, we expect different populations to evolve different levels of resistance to shared parasites. In the course of studying host-parasite ecology of threespine stickleback and their cestode parasite *Schistocephalus solidus*, we have identified populations that vary in both ecological risk and genetic immunity to *S. solidus*. Populations with successful immune response control the parasite both by reducing infection rates, and suppressing cestode growth after infection. Yet, this successful multi-tiered defense comes with a dramatic cost in the form of reduced fecundity by the host, which may therefore favor a cost-free tolerance strategy in some populations. Using genetic mapping, transcriptomics, and genomic analyses of selection we identify the genes underlying the evolution of resistance variation, and find evidence consistent with a history of initial evolution of resistance, followed by the evolution of tolerance in some populations. The stickleback can thus achieve a Pyrrhic victory over the parasite, successfully blocking cestode growth but at a sometimes untenable cost leading to secondary loss of immunity.

Host: Evan Ward

Time & Date: 11:00 am, Friday, March 24, 2023

Place: Lowell Weicker Building, Seminar Room 103 (or WebEx)

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