

Advances in Ecological Research Volume 50

Eco-Evolutionary Dynamics

This volume offers a fresh update on the field of eco-evolutionary dynamics, including the latest research of some of the major teams currently working in this growing field. Five of the papers include novel findings on the reverse effect of rapid evolution on ecological processes (eco-evolutionary feedbacks) in a variety of systems, ranging from simple aquatic food webs to complex soil food webs. The methods employed range from purely empirical to purely theoretical, with three papers using a combination of both. The last four papers of the volume focus around community genetics and phylogenetics, or how past evolution and standing genetic variation can affect ecological processes. The first paper in the volume shows how the evolution of fish phenotypes may shape stream ecosystem processes. Paper two extends a predator-prey intraguild predation system to include evolution of the shared prey and demonstrates intriguing complex patterns. Paper three offers a novel way to simulate eco-evolutionary dynamics in complex food webs across space. Paper four demonstrates how the evolution of male dimorphism may depend on eco-evolutionary feedbacks. Paper five offers evidence for an eco-evolutionary feedback loop in a harvesting experiment. Paper six shows how the evolution of prey preferences assuming learning capabilities can explain food web structure in terms of individual-based connectance. Paper seven illustrates how complex the competitive outcome may be depending on genetic variation on the resource, the competitors and whether competition is intra- or interspecific. Paper eight studies a hierarchy of genetically correlated responses in field gardens of plant hosts to their herbivores, which greatly helps understanding tree evolutionary responses to enemy attack. Finally, paper nine shows how complex relationships between plant productivity outcomes are related to evolutionary history (phylogeny) and range size under global change stressors.

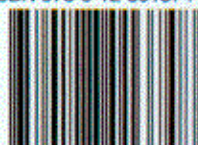
Cover image: A male and female Trinidadian guppy, *Poecilia reticulata*, swimming together in the Narango River in the Northern Range Mountains. The evolution of life histories in guppies reflects the dynamic feedback between ecological and evolutionary processes. Guppies that colonize upstream locations without predators initiate populations that grow rapidly and achieve very high densities. They alter their resource base and the invertebrate community in these streams, an alteration that in turn selects for different phenotypes than those that prevail in downstream locations where there are high densities of predators. Photo by Paul Bentzen, used with permission.



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