Syracuse University

coevolution

molecular phylogenetics

mutualism

plant-insect interactions

plant polyploidy

population genetics

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Kari Segraves is an expert in evolutionary ecology. She seeks to understand the role that interspecific interactions play in creating diversity. Segraves directs a research group that applies a broad combination of approaches, including experimental evolution of yeast communities, field-based experiments using plants and insects, and molecular phylogenetics and population genetics studies of plants and insects. Her work has important implications for species diversification and the development and parameterization of theoretical models of mutualism.

Education:

2003 Ph.D., biology, Vanderbilt University

1998 M.S., botany, Washington State University

1995 B.S., biology, Washington State University

Recent Research Projects:

Ecological dynamics of multi-mutualist communities. National Science Foundation. PI: Segraves, K.A. Co-PIs: Althoff, D.M, C. Moore, D.M. Rivers. Collaborator: Ritchie, M.E.

The goal of this research is to examine the properties of complex mutualism communities that contribute to their persistence. Experiments will assess how changes in species richness and partner redundancy influence persistence by experimentally manipulating community structure in lab-based yeast mutualist communities. The research also tests how the presence of exploiters influences community persistence and will use the experimental results to develop new theory to identify the key factors in mutualism dynamics. The work will have important implications for understanding how mutualisms persist when species simultaneously interact with a number of different species.

The role of species interactions and coevolution in speciation. National Science Foundation. PI: Althoff, D.M. Co-PI: Segraves, K.A.

This project evaluates the role of mutualism and antagonism in determining speciation in obligate interactions between yuccas and their pollinator moths. This interaction is used as a textbook example of mutualism, coevolution, and species radiations. Embedded in this mutualism, however, is the fact that the pollinator moths are also antagonists, as they lay eggs into flowers and the larvae feed on a subset of yucca seeds. Although there is a plethora of data and studies on the evolutionary divergence of egg-laying morphologies and behaviors, there are no data on the patterns of evolutionary divergence in moth mutualistic traits—the novel mouthparts used to actively pollinate yucca flowers and pollination behavior. Furthermore, there are no studies relating changes in either mutualistic or antagonistic traits to reproductive isolation among moth species. This project tests the role of variation in mutualistic and antagonistic traits in generating specialization in host use and reproductive isolation among pollinator species by using a series of morphological surveys, phylogenetic comparative methods, and manipulative behavioral experiments.

Recent Scholarship:

Segraves K.A. **"Tansley Review: The effects of genome duplications in a community context,"** *New Phytologist*, vol. 215, pp. 57-69. June 2017.

Althoff D.M., K.A. Segraves, M.T. Johnson **"Testing for coevolutionary diversification: linking pattern with process,"** *Trends in Ecology and Evolution*, vol. 29, pp. 82-89. Feb. 2014.

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