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Study Reveals Role of Evolutionary Processes in Species Coexistence, Diversity

A team of researchers, addressing longstanding conflicts in ecology and evolutionary science, has provided key directions for the future of community ecology.

The team comprehensively synthesized emerging work that applies knowledge of evolutionary relationships among different species -- phylogenetics -- to understanding species interactions, ecosystems and biodiversity.

The work, published online this week in the journal *Ecology Letters*, was conducted by a subgroup of researchers participating in an interdisciplinary working group convened by the National Center for Ecological Analysis and Synthesis (NCEAS) at UC Santa Barbara. The research was supported by funding from NCEAS, the Long-Term Ecological Research Network Office, the National Science Foundation and the Natural Sciences and Engineering Research Council of Canada.

"For a long time, ecologists ignored the importance of evolutionary processes in understanding how species coexist and how diversity is maintained," said Jeannine Cavender-Bares, a professor at the University of Minnesota and lead author of the study. "But ecological processes we observe in the present are deeply influenced by evolutionary processes in the past. Thanks to the increasing availability of large DNA and phylogenetic databases, we now have the tools to bring an evolutionary

perspective into ecology."

Each year, NCEAS hosts hundreds of scientists who analyze vast amounts of existing information from numerous prior research studies, in order to look for patterns and make new discoveries.

In this newest instance, the researchers synthesized over 180 major studies from both fields, and developed a comprehensive overview of the forces driving community organization, and the role evolution plays in the assembly of these communities.

"What's truly exciting is how we are beginning to accumulate evidence that community structure and interactions through time can provide feedback to promote or constrain diversification of species," said Ken Kozak, also a professor at the University of Minnesota. "The blurring of boundaries between classical community ecology and biogeography has been key to recent progress in community ecology."

Cavender-Bares added:

"Essentially, we're going back to the perspective of early naturalists, but with a computational rigor that was never before possible. This basic understanding of the causes and consequences of community structure has never been more important."

In the face of increasing habitat destruction around the world, these tools will prove critical to managing and restoring Earth's flora and fauna, Cavender-Bares said.

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