Scientists demonstrate importance of niche differences in biodiversity

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Jonathan Levine conducting his biodiversity research. Credit: George Foulsham, Office of Public Affairs, UCSB

Scientists at UC Santa Barbara have found strong evidence that niche differences are critical to biodiversity. Their findings are published online in this week's issue of the journal *Nature.*

"Ecologists have long assumed that species differences in how they use the environment are key to explaining the large number of species we see all around us, but the importance of such niches have never been field tested," said first author Jonathan M. Levine, associate professor in UCSB's Department of Ecology, Evolution, and Marine Biology.

Levine and his co-author Janneke HilleRisLambers, a former postdoctoral fellow at UCSB, who is now an assistant professor at the University of Washington, did field testing of small plants. These plants were found in northern Santa Barbara County on rocky outcrops, where diversity is very high. They used a combination of mathematical techniques, as well as experimental approaches, to remove niche differences from these experimental communities.

"Our work is important because it resolves a century-old biodiversity puzzle," said Levine. "Why doesn't the single best competitor exclude all others in the community?"

Ecological theory has posed two possible answers to the coexistence conundrum. "The classic argument is that niche differences allow species to divide up the environment, much like different products cater to consumers of different tastes or incomes," he said. "The alternative is that competitors are so evenly matched that no single species can win -- as occurs when different airlines offer the same route for the same price."

Conflict between these hypotheses has formed the single greatest controversy in ecology over the last decade. The new study provides the first strong evidence that species' differences are responsible for their coexistence.

Although the study's primary importance is in advancing pure ecological science, understanding how biodiversity works is critical. It is in those communities in which niche differences maintain diversity that species loss has the greatest impact on plant production, and other ecosystem services to mankind -- from economic to aesthetic.

Source: University of California - Santa Barbara (news : web)