Researchers find evidence that island biodiversity really is different from mainland

August 9 2012, by Bob Yirka

A small Fijian island. Image: Wikipedia.

(Phys.org) -- Sometimes in science, despite what might seem obvious, researchers still need to perform studies to prove what everyone seems to know is true, because sometimes it's not. In the case of island biodiversity, however, what has been believed to be true, appears to be so. A combined team of British and American researchers has undertaken a study of the turnover rate of two animal species that live on both Caribbean islands and mainland Central and South America, and have found, as they report in their paper published in the *Proceedings of the Royal Society B*, that the rate does appear to be higher for the island group.

In the study, turnover was defined as the number of animals of the same species that live in different areas. They chose *Anolis* lizards and *Terrarana* frogs, because both have common ancestors that have radiated to virtually all of the Caribbean islands as well as to the mainland and because both are part of a large species group that has evolved different traits in different areas; 400 for *Anolis* and 850 for

Terrarana.

To analyze the lizards and frogs and their turnover rates, the team randomly divided mainland areas into virtual islands of territory to allow for comparison with islands. They then turned to the historical record to determine how many of which kinds of the lizards and frogs live in which areas, and used that information to come up with turnover rates for each.

In posting their results, they showed three kinds of turnover comparison rates, mainland to mainland (M-M), mainland to island (M-I), and island to island (I-I). They found that the turnover rates for M-I were greater than for M-M, but that I-I were the greatest of all. This shows, albeit in a limited fashion, that turnover rates of island animals does appear to be something that is truly special as has often been observed by visitors and offers at least some degree of proof that the distinctive animals that are endemic to such places as Madagascar, the Caribbean islands and Hawaii, truly are unique and different due to their isolation over long periods of time.

More information: The island–mainland species turnover relationship, *Proceedings of the Royal Society B*, Published online before print August 8, 2012, doi: 10.1098/rspb.2012.0816

Abstract
Many oceanic islands are notable for their high endemism, suggesting that islands may promote unique assembly processes. However, mainland assemblages sometimes harbour comparable levels of endemism, suggesting that island biotas may not be as unique as is often assumed. Here, we test the uniqueness of island biotic assembly by comparing the rate of species turnover among islands and the mainland, after accounting for distance decay and environmental gradients. We modelled species turnover as a function of geographical and

environmental distance for mainland (M–M) communities of Anolis lizards and Terrarana frogs, two clades that have diversified extensively on Caribbean islands and the mainland Neotropics. We compared mainland–island (M–I) and island–island (I–I) species turnover with predictions of the M–M model. If island assembly is not unique, then the M–M model should successfully predict M–I and I–I turnover, given geographical and environmental distance. We found that M–I turnover and, to a lesser extent, I–I turnover were significantly higher than predicted for both clades. Thus, in the first quantitative comparison of mainland–island species turnover, we confirm the long-held but untested assumption that island assemblages accumulate biodiversity differently than their mainland counterparts.