Diversity estimation technique offers fresh perspective on coral biodiversity

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Video Abstract

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Abstract

Biodiversity keeps our planet stable. Each species, no matter how small, plays an important role in this global balancing act. That's why the current pace of biodiversity loss is so alarming. Unfortunately, slowing that pace is extremely difficult. Scientists must first take on the virtually impossible task of measuring the richness and variety of all life on earth—the tools for which are prone to error. Now, researchers have applied a technique that promises estimates that more closely reflect true biodiversity. Proven insightful for stony coral species found throughout the world, the approach could potentially be extended to other animals and plants. Researchers typically use two types of methods to measure biodiversity: by consulting occurrence datasets, which describe points where species have been physically counted, or by combining maps describing geographical ranges where a species is predicted to occur. Each has its own drawbacks. Occurrence datasets tend to be incomplete. Naturally, scientists can't count species in areas that are inaccessible or where a lack of resources prevents exploration. Species range maps, on the other hand, tend to overpredict species richness. Stacking maps one on top of the other might hint at biodiversity hotspots that don't actually exist. To address these shortcomings, researchers have developed a framework that accounts for the pitfalls commonly encountered in estimating biodiversity. That framework connects occurrence records, sampling completeness, and the reliability of diversity estimates to more closely reflect true biodiversity. Deployed on sample data for the stony coral species *Scleractinia*, the method provided a new perspective on the biodiversity of this widespread marine creature. Specifically, researchers observed distinct peaks in biodiversity across latitudes and longitudes not previously signaled by range maps. One prominent peak, for example, occurred in the western Indian Ocean. This data suggests that coral species diversity in this area, especially around Madagascar, is higher than in the region to the east known as the Coral Triangle, which is reported to be the "global center of marine biodiversity". Unfortunately, persistent estimation errors and the lack of complete datasets prevent drawing any definitive conclusions. But these types of patterns could enable researchers to identify areas where conservation efforts should be focused. Incorporating more than the two databases used by the team could also provide an even clearer picture of coral species diversity. And if adapted to other species, it could put us one step closer to preserving biodiversity worldwide.