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How Are Species Discovered?



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The Yellow Dyer Rainfrog, *Diasporus citrinobapheus* (pictured above) was described in 2012 from the mountains of western Panama. This frog belongs to a species-rich group of frogs, the so called rainfrogs that lack a tadpole stage, but develop directly as little frogs inside the egg. Photo credit: Andreas Hertz, Frank Hauenschild, Sebastian Lotzkat, Gunther Köhler, Zookeys. CC BY

Discovering new species

While undiscovered biodiversity exists everywhere in the world, certain locations on Earth are particularly species rich. According to existing overviews, “the most species-rich environments appear to be tropical rain forests, tropical deciduous forests, coral reefs, the deep sea, and large tropical lakes” (Primack 2004). Some of the spots with the most biological diversity are also the ones most threatened with habitat degradation and species extinction, leading them to be categorized as biodiversity hotspots or crisis ecoregions by various organizations that evaluate conservation priorities. In threatened high-biodiversity areas such as Micronesia or the Congo basin, there is a high risk that endemic species—species that are uniquely found in a specific location—may become extinct before they are ever described or studied by humans.

Undiscovered biodiversity also exists in habitats that are simply difficult for humans to access, such as the deep sea, rainforest canopies and the “rainforest mezzanine,” or the insides of other plants and animals (which are distinctive ecological niches that can house parasitic or harmless microorganisms). Discoveries of vertebrate animals and flowering plants have slowed (though by no means stopped) after centuries of exploration, but less conspicuous taxa are constantly being discovered, from previously undescribed insects to entire new invertebrate animal phyla; the number of undescribed species is estimated to number in the millions. The most overwhelming amount of undiscovered biological diversity exists in the bacteria, archaea, and other microbes; with the invention of DNA sequencing, their diversity is only beginning to be fully appreciated, and raises new challenges in how we think about biodiversity. Furthermore, even among species that have been named, only a fraction has actually been studied in nature beyond their initial description.

References

Primack, R. A Primer of Conservation Biology. 3rd Edition. 2004. Sinauer Associates, Sunderland, Massachusetts.