Sampling biases shape our view of the natural world

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Abstract

Spatial patterns of biodiversity are inextricably linked to their collection methods, yet no synthesis of these patterns or their consequences exists. As such, our view of ecosystems may be incorrect, undermining countless ecological and evolutionary studies. Using 742 million records of 374,900 species, we explore the global patterns and impacts of accessibility in terrestrial and marine Systems. Pervasive sampling and observation biases exist across animals, with only 6.74% of the globe sampled, and disproportionately poor tropical sampling. High-elevations and deep-seas are comparably unknown. Over 50% of records in most groups account for under 2% of species. Citizen-science exacerbates biases, and normalizing the practice of valuing data publication is essential to bridge this gap and better represent species distributions from more distant and inaccessible areas, and provide the necessary basis for conservation and management.

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