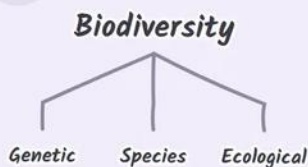


counting species is the easy part, keeping them is not

Three levels of biodiversity

- genetic diversity : variation within one species, e.g. rice and mango varieties across India
- species diversity : how many species live in a region, from a patch to the whole planet
- ecological diversity : variety of ecosystems in a region, e.g. deserts, wetlands, rainforests, coral reefs
- a plan aimed at only one level can let the other two quietly erode

Three levels, one word *



the same word covers variation within a species, across species, and across whole ecosystems

How many species are there

- roughly 1.7 to 1.8 million species have been formally described so far
- a working estimate for the true total, described plus undescribed, is about 7 million species
- over 70% of described animal species are insects, by far the most species-rich group
- described fungal species alone outnumber the combined total of fishes, amphibians, reptiles and mammals

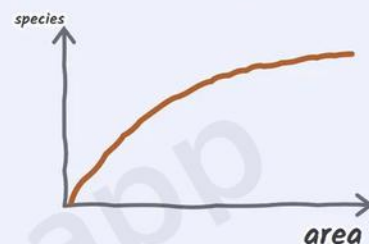
Patterns across the globe: the latitudinal gradient

- species diversity is generally highest near the equator and falls steadily toward the poles
- tropics stayed relatively undisturbed over a long evolutionary time, letting speciation build up diversity
- temperate regions, by contrast, were repeatedly reshaped by glaciation, resetting that process
- tropical climates are more stable and less seasonal, favouring niche specialisation among species
- tropics receive more solar energy, supporting higher productivity and so more species

Reading the species-area relationship

Q. For a hypothetical island, the species-area relationship is $\log S = \log C + Z \log A$, with $C = 5$ and $Z = 0.25$. Estimate the number of species S for an area A of 10,000 units.

- $\log A = \log 10,000 = 4$ (10,000 is 10 to the power 4)
- $Z \log A$ is 0.25 times 4, which is 1
- $\log C$ is log of 5, about 0.70
- $\log S = \log C + Z \log A = \text{about } 0.70 + 1 = 1.70$
- $S = 10$ raised to the power 1.70
- since $\log 5$ is about 0.70, this equals 10×5



species richness rises quickly with area explored, then flattens as returns diminish

Answer

about 50 species for this area, given these assumed C and Z values

