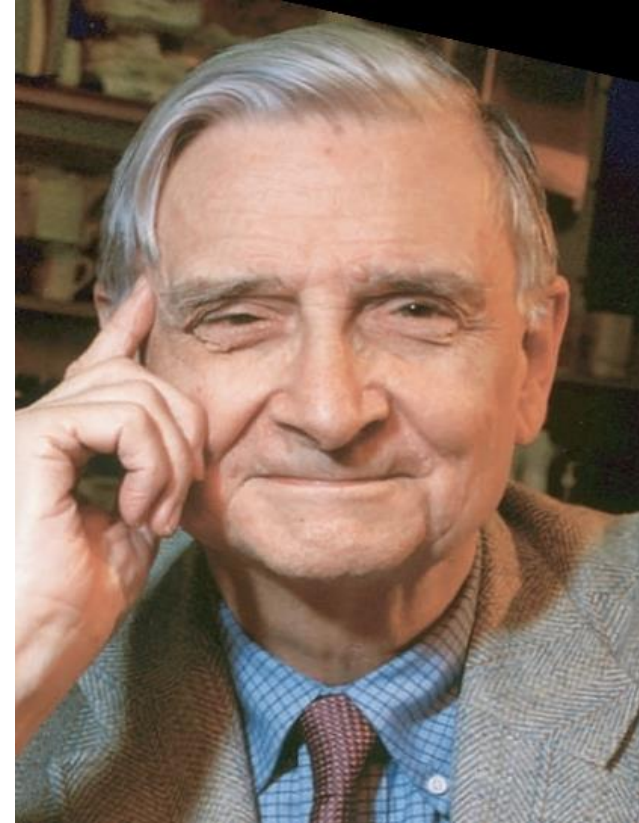


A scenic view of a mountain range covered in dense green forest. The sky is overcast with grey clouds. The text "BIODIVERSITY AND CONSERVATION" is centered over the image in a bold, white font with a blue outline.

BIODIVERSITY AND CONSERVATION



Thomas Lovejoy coined the term 'biological diversity' in **1980**



Edward. O. Wilson applied the term 'biodiversity' introduced earlier by Walter G. Rosen (1982) in a report for the first American Forum in Biological Diversity (**1985**)

BIODIVERSITY - Definition

“The variability among living organisms from all sources, including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part: this includes diversity within species, between species and of ecosystems”.

- UN Earth Summit at Rio de Janeiro (1992)



BIODIVERSITY – Other Definitions

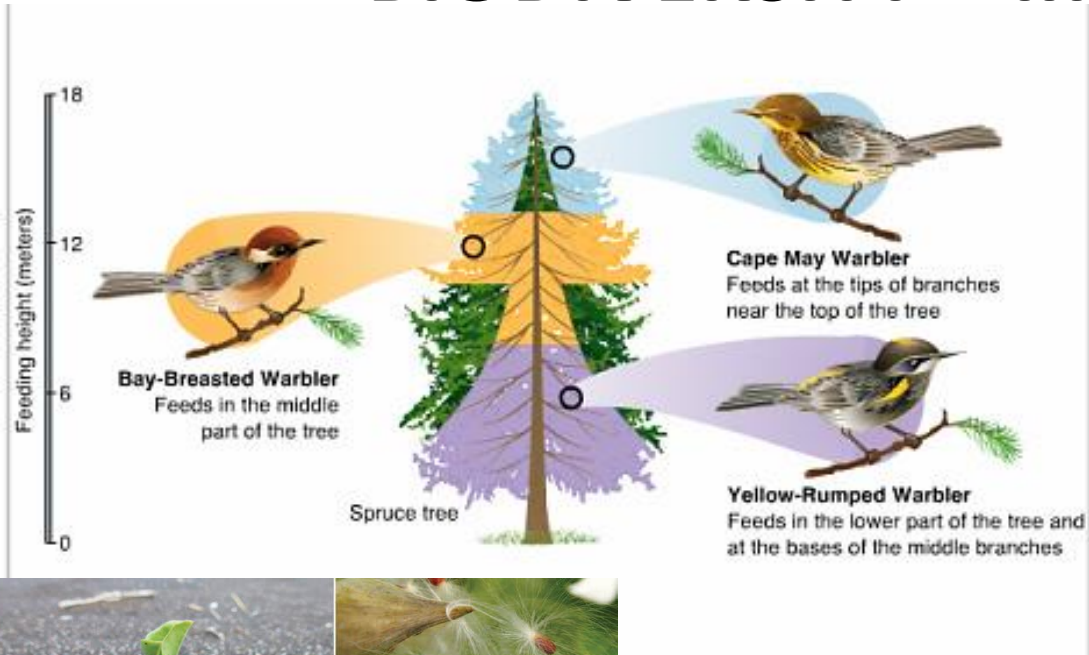
“Biodiversity refers to the variety and variability of organisms, of genetic material and of community or ecosystem. This includes diversity within species (genetic diversity), between species (organismal diversity) and ecosystem or community (ecological diversity)”

“Biodiversity encompasses all the levels of natural variations from the molecular and genetic to the species level, where we have most of our interaction with biodiversity through enjoyment of the common, strange and beautiful form of life or through suffering caused by the effects of pests, parasites and diseases”

“Global diversity is defined as the total diversity and variability of living organisms and of the systems of which they are a part. This covers the total range of variation and variability among systems and organisms at the bioregional, landscape, ecosystem, habitat and organismal level down to species, populations, individuals and genes”

“The variety of organisms considered at all levels of genetic variants belonging to the same species through arrays of species, genera, families and still higher taxonomic levels including the variety of ecosystems which comprise both communities of organisms within a particular habitat and the physical condition under which they live”

BIODIVERSITY – Importance / Significance



1. Ecological roles, niches, services



2. Natural products as food by tribals₅

BIODIVERSITY – Importance / Significance



3. Products of commercial importance – resins, gums, honey, etc.



4. Use of medicinal plants and medical tourism

BIODIVERSITY – Importance / Significance



Areca



Banana



Bamboo



Hemp



Jute



Kenaf



Palm



Pineapple



Sisal



5. Natural fibres



6. Firewood and fuels – natural sources

BIODIVERSITY – Importance / Significance



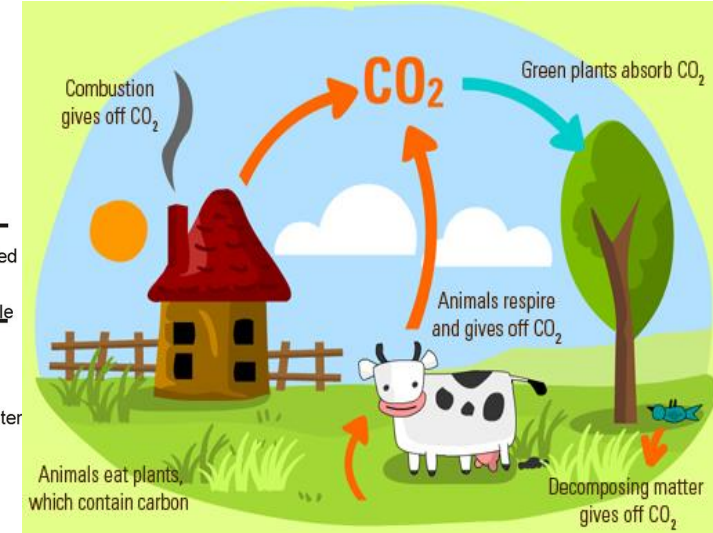
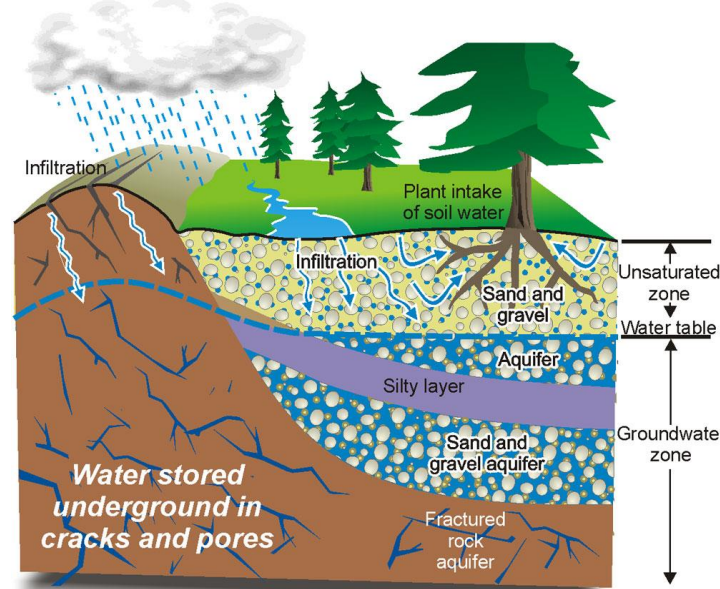
7. Timber for housing and building

8. Nature tourism

BIODIVERSITY – Importance / Significance



9. Essential ecosystem benefits – soil formation, salinity reduction, decomposition, nutrient cycling, etc.



10. Maintenance of gaseous balance, ground water recharge, soil erosion reduction

BIODIVERSITY – Importance / Significance



11. Cultural values of biodiversity

12. Aesthetics of nature and biodiversity

BIODIVERSITY – Importance / Significance



13. Option Value – generating new species by biotechnologists

14. Hardiness and vigour provided by genetic diversity

LEVELS OF BIODIVERSITY

Levels of Biodiversity

Species Diversity

Also called organismal diversity. It refers to variety of species and abundance of individual organisms of each species in a region.



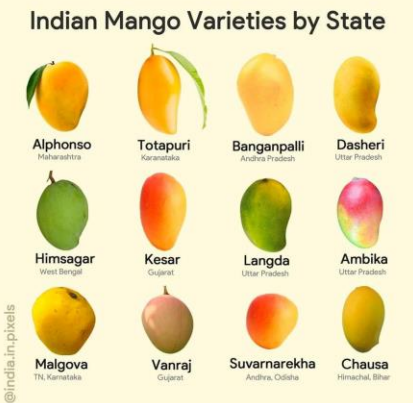
Ecosystem Diversity

It is the highest level of diversity referring to variations of different ecosystems on earth, eg. Deserts, grasslands, etc.



Genetic Diversity

Genetic diversity refers to variations in individuals of a species, attributed to differences in their genes.

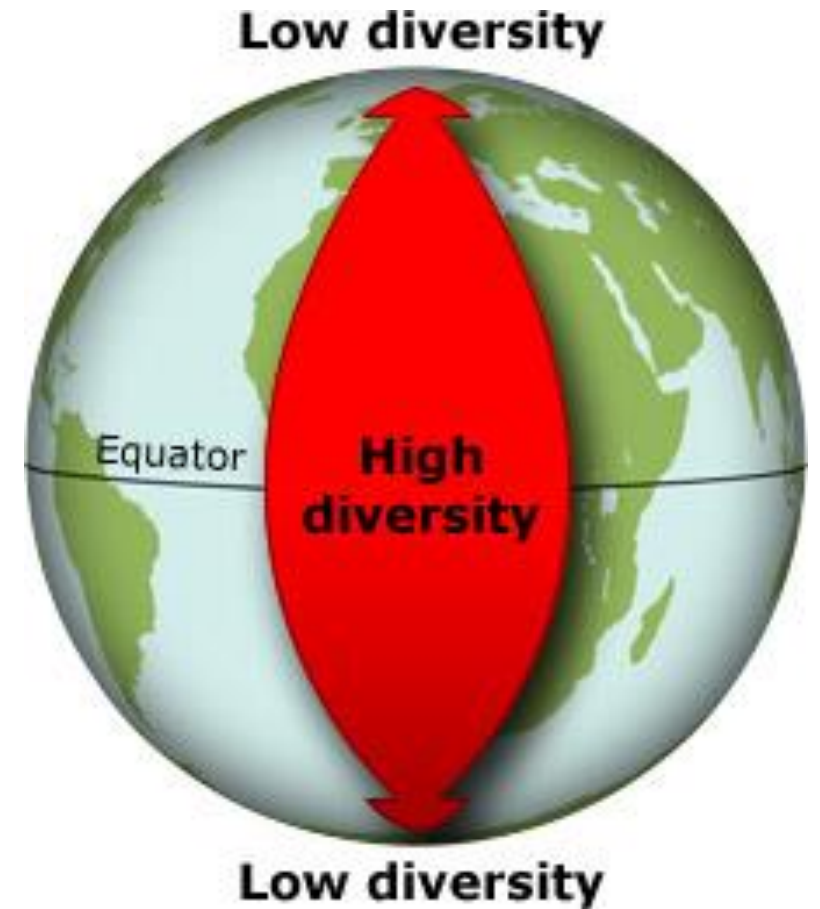
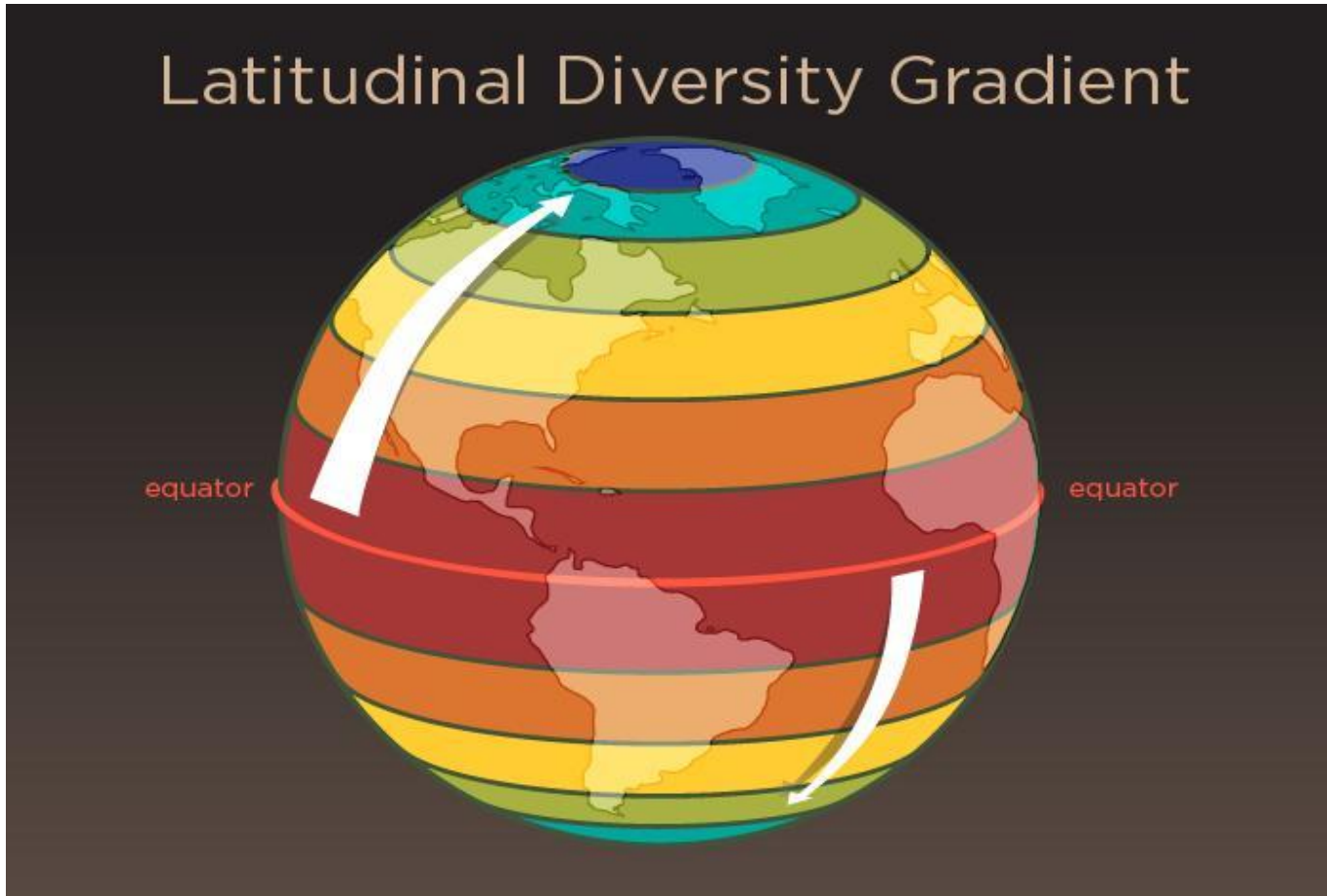


Ecosystem diversity has three main perspectives:

1. α -diversity – Diversity of organisms exhibited within a community.
2. β -diversity – Rate of replacement of species along a gradient of habitat.
3. γ -diversity – Diversity of habitats over total landscape / geographical area.

PATTERNS OF BIODIVERSITY

Latitudinal Gradient



As one goes from equator to the polar regions, the diversity decreases

Tropical forests – Storehouse of Biodiversity



- 7% of the earth's land surface
- Maximum in tropical rainforests
- Amazon rainforests (Lungs of the world) includes 40,000 plant spp., 1,300 bird spp., 427 mammals spp., etc.
- Approximately 7 million spp. in such ecosystems – Robert May

Approximate no. of plant spp. in tropical forest ecosystems = 2,87,655 spp!

PATTERNS OF BIODIVERSITY

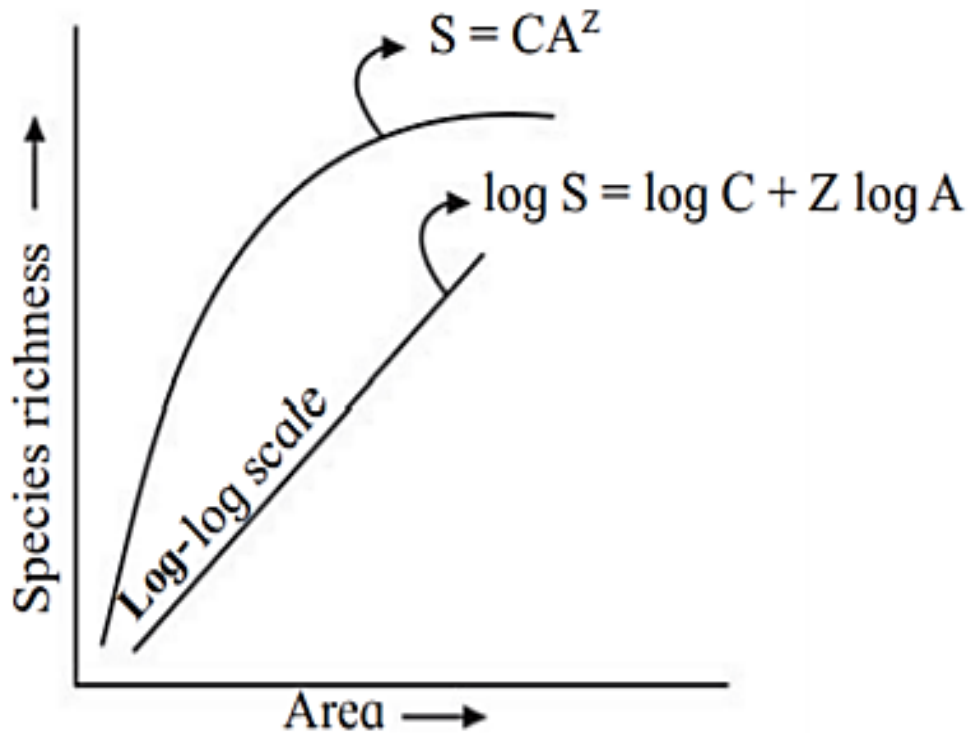
Altitudinal Gradient



Species diversity is more at lower altitudes than higher altitudes

PATTERNS OF BIODIVERSITY

Species Area Relationship



Observed by German naturalist Alexander von Humboldt.

S – Species richness

A – Area under study

C – Y intercept

Z – slope of the line

For smaller areas, value of Z varies between 0.1 and 0.2 regardless of species or region studied.

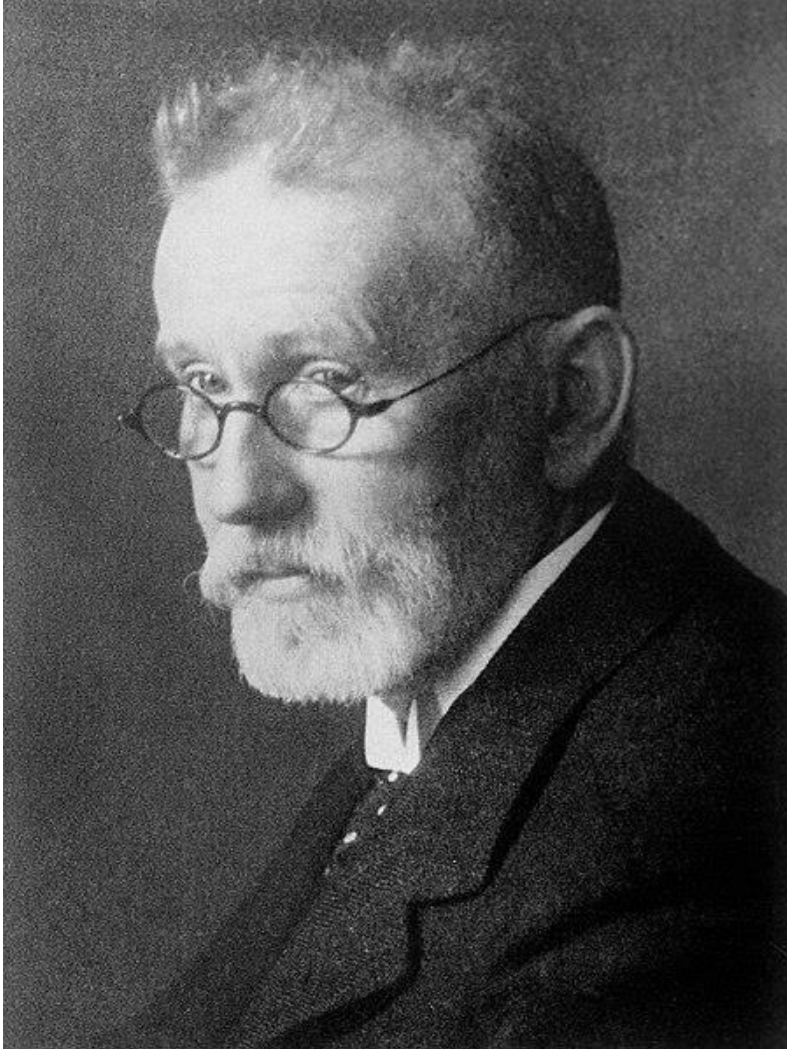
PRODUCTIVITY – STABILITY HYPOTHESIS



David Tilman, on the basis of field experiments, proved that species richness helps in stability of ecosystem.

Rich diversity leads to lesser variation in biomass production over period of time.

RIVET – POPPER HYPOTHESIS



Paul Ehrlich

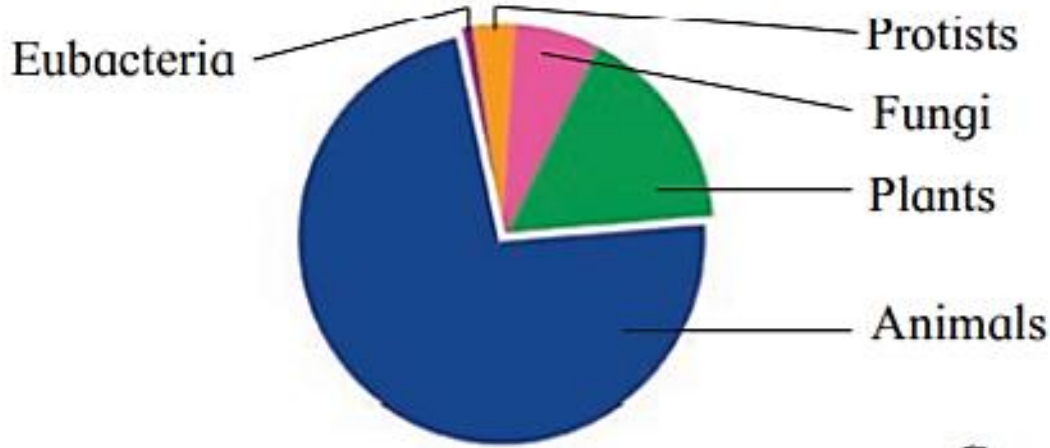


All organisms in an ecosystem considered to be parts of an aeroplane, which is a fully functional ecosystem. If, during the flight, one by one, the parts are removed, initially the turbulence will be less but later there will be drastic breakdown. This can be correlated with importance of every species in an ecosystem.

BIODIVERSITY – CURRENT SCENARIO

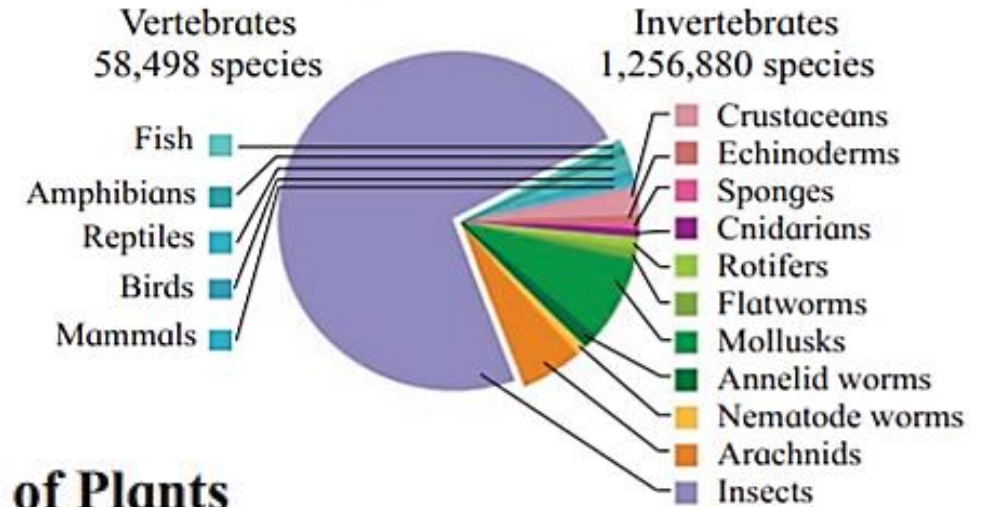
A. Known species of Organism

Total = roughly 1,800,000 species



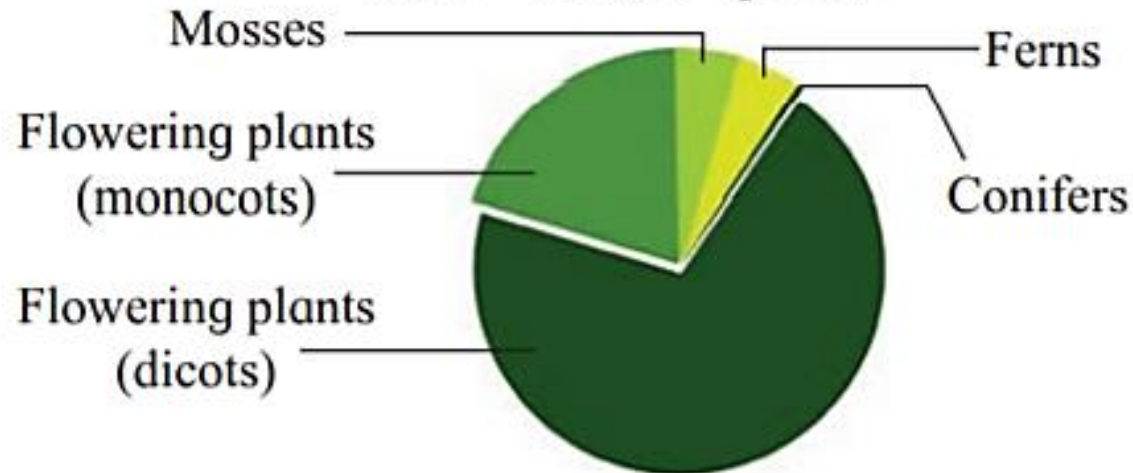
B. Known species of Animals

Total = roughly 1,315,378 species



C. Known species of Plants

Total = 287,655 species



National Status of Biodiversity



- Total landmass of India = 3029 million hectares
- Himalayas in the north, Bay of Bengal in east, Arabian sea in west, Indian Ocean in south
- Ten phytogeographical regions
- Very rich biodiversity due to varied climatic and altitudinal conditions



Humid tropical
Western Ghats



Hot deserts of
Rajasthan



Dry regions of
peninsular India



Icy mountains of
the Himalayas



Islands



Mangroves

- India shares **8.1%** of total biodiversity wealth of earth.
- **2.4%** of total land area of world.
- One of the **17** mega-diversity nations of the world.
- About **45,000 plant spp.** and nearly double no. of animal spp. in India.
- We have recorded only **22%** of our natural wealth – Robert May



QUICK RECAP...

The term 'biological diversity' was coined by _____. (Thomas Lovejoy / Carl Woese / Walter Rosen)

According to David Tilman, rich diversity leads to _____ variation in biomass production over a period of time. (lesser / greater)

The Rivet Popper hypothesis compares the ecosystem to _____. (train / bus / aeroplane)

Diversity between various individuals of the same species is due to their _____. (genes / chromosomes / morphology)

Maximum biodiversity is observed in the _____ regions of earth. (temperate / alpine / tropical)

India has about 1000 varieties of mango. This is an example of _____ diversity. (species / genetic / ecological)

In the equation for species area relationship, S stands for _____. (Species diversity / Species richness / Species number)

Species diversity is _____ in the lower altitudes than the higher altitudes. (more / less)

The variations in biodiversity between deserts and grasslands is categorized under _____ diversity. (species / genetic / ecosystem)

Out of the given countries, biodiversity in _____ would be the least. (Sri Lanka / Greenland / Russia)