

The Earth's Biomes I

Life's pervasiveness on Earth

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Every Thirty Minutes

<http://goo.gl/IEZ2N>

- ▶ 250,000 Indian farmers committed suicide in last 16 years
- ▶ More than 17,000 in 2009, or once every 30 minutes
- ▶ Trade liberalization, structural adjustment, and privatization pushed by IMF, WTO, & WB
- ▶ MNCs (esp. Monsanto) capitalized by promoting Bt cotton, which requires significant inputs
- ▶ Lack of public support, overproduction, usurious interest rates, expensive inputs, and crop failures leads to escalating debt cycle
- ▶ Farmers commit suicide out of despair by consuming pesticides that drove them into debt
- ▶ Economic, political, social, and human rights crisis

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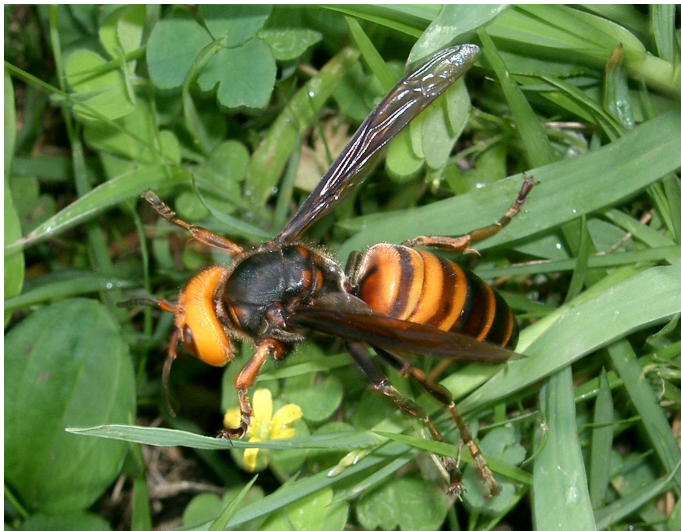
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Asian Giant Hornet

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Nopal(?) Cactus



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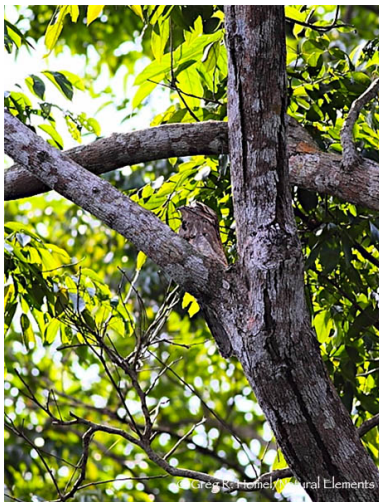
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Monarch Butterfly

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Potoo

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Walking Stick

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Species richness

- ▶ Number of species in a community/ecosystem/habitat
- ▶ Structural complexity
- ▶ Ecotone/edge effects
- ▶ Disturbance regime
- ▶ Environmental stress
- ▶ Dispersal

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Resilience and resistance

- ▶ Resistance is ability to withstand disturbances
- ▶ Resilience is ability to recover from disturbances
- ▶ Together, confer degree of community stability

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Succession

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Primary succession

- ▶ Occurs on non-vegetated or de-seeded land
- ▶ Undertaken by pioneer species

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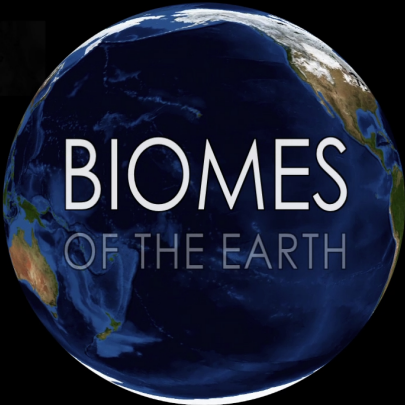
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Secondary succession

- ▶ Occurs on de-vegetated or primary successional land
- ▶ Undertaken by non-pioneer (i.e. established) species

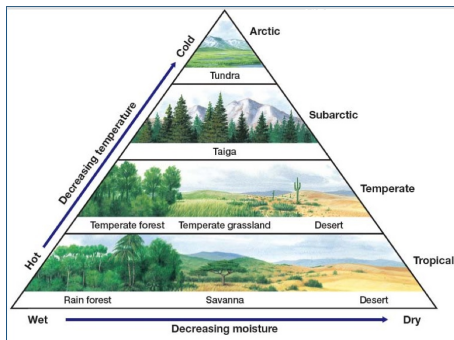
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BIOMES

OF THE EARTH

Climatic zonation



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Geo-climatic interactions

- ▶ Temperature more significant near poles
- ▶ Precipitation more significant near equator

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Ten terrestrial biomes

1. Tundra (arctic and alpine)
2. Boreal forest
3. Temperate rain forest
4. Temperate deciduous forest
5. Temperate grassland
6. Chaparral
7. Desert
8. Tropical rain forest
9. Savanna
10. Mixed montane

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Eight zoogeographical regions

1. Afrotropical
2. Antarctic
3. Australian
4. Indomalayan
5. Nearctic
6. Neotropical
7. Oceanian
8. Palearctic

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Spatial distribution of terrestrial biomes and zoogeographical regions

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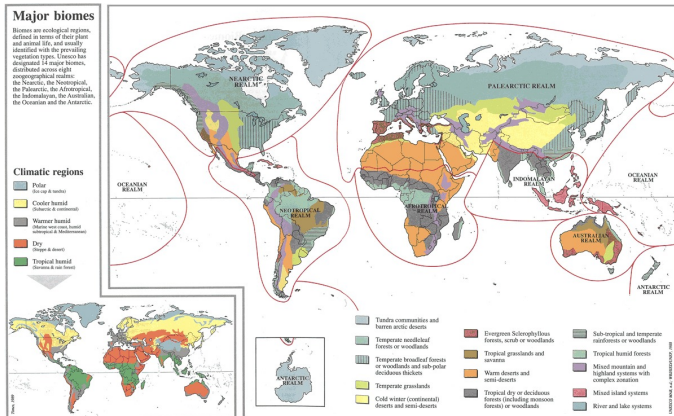
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Features to note

- ▶ Geographic range
- ▶ Seasonality
- ▶ Annual Precipitation
- ▶ Average Monthly Temperature Range
- ▶ Soil nutrients/acidity
- ▶ Predominant vegetation
- ▶ Species richness
- ▶ NPP (percent of terrestrial/freshwater total)
- ▶ Primary threats

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Tundra

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Tundra

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Terrestrial biomes

Range:	Extreme northern latitudes
Seasons:	Long, harsh winters and short summers
Precipitation:	10–25 cm
Temperature:	–30–15°C
Soil:	Low nutrient content
Vegetation:	Mosses, lichens, grasses, sedges
SR:	Low
Productivity:	1%
Threats:	Fossil-fuel exploration, climate change

Boreal forest (taiga)

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Boreal forest (taiga)

Range:	South of tundra
Seasons:	Long winters and short summers
Precipitation:	50 cm
Temperature:	−25–15°C
Soil:	Acidic, low mineral content
Vegetation:	Conifers, occasional deciduous stands
SR:	Moderate
Productivity:	9%
Threats:	Logging, mining

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Temperate rain forest

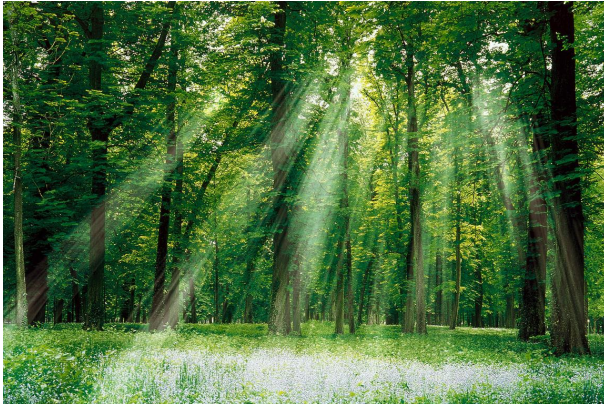
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Temperate rain forest

Range:	Northwest coast of North America, southern South America, southeastern Australia
Seasons:	Mild winters and cool summers
Precipitation:	127 cm
Temperature:	5–20°C
Soil:	Low nutrient content, high organic content
Vegetation:	Conifers, epiphytes
SR:	Very high
Productivity:	6%
Threats:	Logging

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Temperate deciduous forest

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Temperate deciduous forest

Range:	Temperate regions
Seasons:	Cold winters and hot summers
Precipitation:	75–150 cm
Temperature:	4–28°C
Soil:	High nutrient content, high organic content
Vegetation:	Broad-leaved hardwoods, broad-leaved evergreens in southern forests
SR:	High
Productivity:	8%
Threats:	Logging, agriculture, plantation forestry

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Temperate grassland

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Temperate grassland

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Terrestrial biomes

Range:	Temperate regions
Seasons:	Cold winters and hot summers
Precipitation:	25–75 cm
Temperature:	0–28°C
Soil:	High nutrient content, high organic content
Vegetation:	Grasses
SR:	Moderate (large numbers of threatened/endemics)
Productivity:	4%
Threats:	Agriculture, overgrazing

Chaparral

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Chaparral

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Range:	Mediterranean region, North American Southwest, southwestern and southern Australia, central Chile, southwestern South Africa
Seasons:	Mild winters and hot summers
Precipitation:	Abundant in winter, absent in summer
Temperature:	15–25°C
Soil:	Thin, low nutrient content
Vegetation:	Evergreen shrubs
SR:	Moderate–low
Productivity:	5%
Threats:	Fire suppression, vegetation removal

Desert

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Desert

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Range:	Temperate (cold deserts) and subtropical (hot deserts) regions
Seasons:	Hot deserts consistently hot, cold deserts vary, both undergo daily extremes
Precipitation:	< 25 cm
Temperature:	0–20°C
Soil:	Low organic content, high mineral content
Vegetation:	Cacti, scrub
SR:	Low
Productivity:	1.2%
Threats:	Recreation, poaching, development, aquifer depletion

Savanna

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Savanna

Range:	Tropical regions; Africa, South America, northern Australia
Seasons:	Predominantly driven by precipitation rather than temperature
Precipitation:	76–150 cm, highly seasonal
Temperature:	16–24°C
Soil:	Low nutrient content
Vegetation:	Grass, occasional trees
SR:	Charismatic megafauna
Productivity:	10%
Threats:	Agriculture, overgrazing, rangeland

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Savanna

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Savanna

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Tropical rain forest

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Tropical rain forest

Range:	Tropical regions; Latin America, Sub-Saharan Africa, Southeast Asia
Seasons:	Little variation
Precipitation:	200–450 cm, consistent
Temperature:	25–27°C
Soil:	Low nutrient content, nutrients in vegetation
Vegetation:	Broad-leaved deciduous trees, epiphytes, lianas
SR:	Highest levels for terrestrial biomes
Productivity:	32%
Threats:	Agriculture, logging

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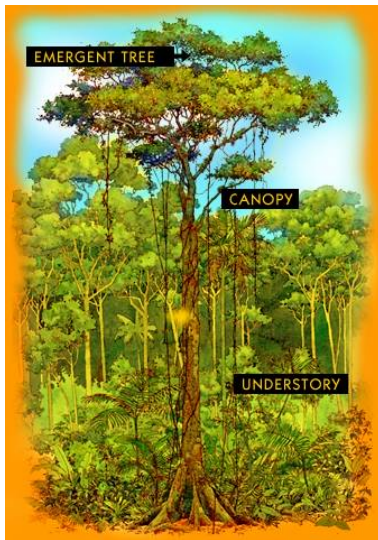
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Canopy structure



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