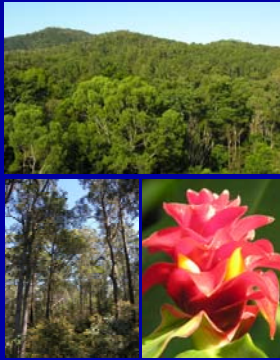


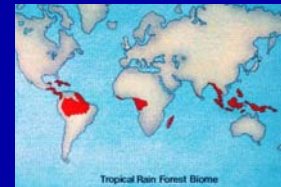
Tropical Biomes of the World

- Tropical Evergreen Forests (rain forests)
- Tropical Deciduous Forests (seasonal forests or monsoon forests)
- Tropical Scrub "Forests"
- Tropical Grasslands



Tropical Rain Forests

- Cover 6% of world land area
- Contain 75-90% of the world's plant and animal species



Tropical Biomes in North America



Tropical Rain Forests: Climate

- Hot and wet
- Average annual precipitation
 - 100-180"
 - (60-400" range)
- Distributed evenly with short droughts
- Temperatures uniform
 - Warm to hot (80-90 F)
 - Daily fluctuation often as large as annual



Tropical Rain Forests: Dominant Life Form



- Broadleaved evergreen trees dominate
- Drop and replace leaves individually rather than collectively
- Often flower and fruit in different seasons

Tropical Rain Forests: Diversity



- Extremely high diversity—both plants and animals
- Costa Rica has over 200 families that contain trees
- One Brazilian rain forest contains 300 tree species in a single square mile

Tropical Rain Forest: Layers or Strata



- Emergent layer
- Intermediate layer
- Understory layer

Tropical Rain Forest: Layers



Tropical Rain Forests: Emergent Layer

Trees 75-150' tall
Long, unbranched trunks
Fluted and buttressed bases



Tropical Rain Forest: Intermediate Layer

- Trees 15-75' tall (typically not fluted or buttressed)
- Dense canopy
- Low light and high humidity (within & below)



Unusual Strategies:

Prop roots, strangler figs, twisting vines



Unusual Rooting Strategies:

Pneumatophores, Aerial Roots & Prop Roots

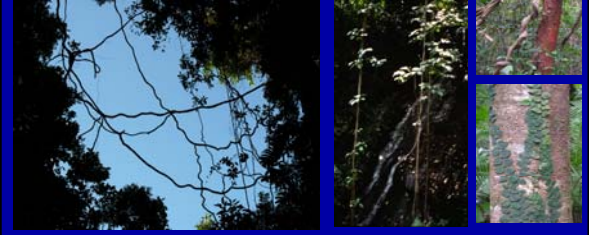


Tropical Rain Forests: Epiphytes



Tropical Rain Forest: Vines and Lianas

Twisting, snarling, suffocating
 Some germinate in the ground and some in the canopy
 Tremendous growth rates
 Link tree canopies together
 Often need to be cut before falling trees



Importance of vines



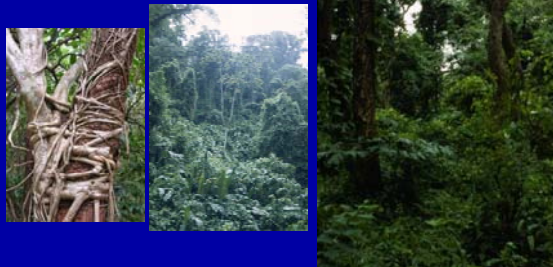
Tropical Rain Forests: Understories

- Vary dramatically
 - depends on light and disturbance
- Heavy overstory means less light and less understory
- Disturbed overstory means dense understory



Tropical Rain Forests: Understories

- Open canopies (typically disturbed) result in dense understories (jungle-like)



Tropical Rain Forests: Productivity

High net productivity—high respiration



Tropical Rain Forest: Soils

Diverse and highly variable
Many soils low in nutrients
High losses to run-off and leaching
Most nutrients held in plants
Adverse effects from removing vegetation



Competing uses for tropical forest land



Tropical Rain Forests: Deforestation

- Estimate: 80 acres harvested every minute
- Once occupied 16% of world's surface—now about 6%
- Impact: loss of species diversity, loss of carbon sequestration, uprooting of indigenous peoples, loss of medicines (25% of medicines derived from rain forest plants)



Shifting Agriculture (Slash and Burn)



Mangrove "Forests"

- Occur throughout tropical regions where forests meet the ocean
- Multiple genera—25-30 species
- Always associated with salt water
- Different species tolerate different amount of salt
- Not all mangroves have same adaptations



Mangrove Adaptations: Pneumatophores



Mangrove Adaptations: Viviparous Seedlings



Mangrove Adaptations: Prop Roots



Mangroves on the march



Tropical Rain Forests: Biodiversity

Cauliflorous flowering and fruiting

Forest termites



Tropical Rain Forests: Biodiversity

Forest-dwelling kingfisher

Chameleon



Tropical Rain Forest: Animals



Trends and Issues

- Deforestation
 - once 16% land's area, now 6%
- Animal harvest
 - Survival food
 - Pet trade
 - Souvenirs and aphrodisiacs
- Contribution to atmosphere
 - water, oxygen, and carbon sequestration
- Medicinal values
 - perhaps 25% world's medicines come from here
- Loss of biological diversity



Tropical Deciduous Forests



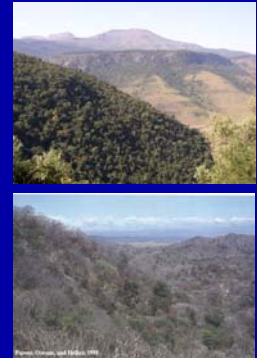
Tropical Deciduous Forests



- High rainfall—up to 800"/year!
- Seasonal distribution
 - Very wet and bone dry
- Temperatures tend to be hot
 - cold periods in northern regions and higher elev.
- Vegetation has less diversity than tropical rain forests but more than other regions

Tropical Deciduous Forests

- Trees commonly dry-season deciduous
 - Lose leaves at same time
- Commonly transition into savannah lands or desert grasslands on dry end—tropical rain forests on wet end
- High tree diversity
 - 40-100 spp./hectare
 - < tropical rain forests but > temperate forests



Important Trees

- No single species dominates
- Teak and mahoganies are most important commercial species
- Teak native to southeast Asia, but widely planted



Bamboo

- Grass rather than woody
- Many species
- Commonly lowland, wet site plant
- Astronomical growth rates
- Very important for building



Epiphytic Cacti



Cultural Significance



Trends and Issues

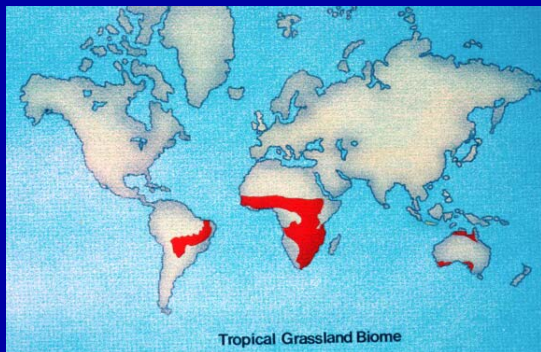
- Large-scale agriculture
- Social pressure
 - Population
 - Poverty
- Grazing
- Harvest for firewood



Animals



Tropical Grasslands and Thorn-Scrub (Savannas)



Tropical Grasslands

- Climate hot and dry. Rains seasonal.
- Grasses dominant life form. Scattered clumps of trees exist



Thorn-scrub “forests”

- Trees small and drought resistant
- Many have deep tap roots
- Most heavily armed with spines and thorns
- Although that doesn't stop browsing



Browse lines in acacias



Primary use of wood: Fuel



Vast herds of migratory grazers



Domestic livestock



Home of big cats



..and plaques of grasshoppers and locusts

