

Lecture 5 Tropical Vegetation

Natural vegetation refers to vegetation unaffected by humans. This is not a precise term.

Spontaneous vegetation is probably a better term.

Factors responsible for vegetation

Climate (temperature, rainfall, insolation)

Soil

Topography (elevation, aspect or direction of slope)

Water supply

Human activity



Tropical Rainforest (Af Climate)

A Classical Tropical Climate

Note: *Evergreen Rainforest* is not as good a term because evergreen rainforest is also associated with California–Washington coast.

Waterfall, Costa Rica

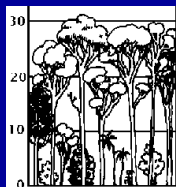


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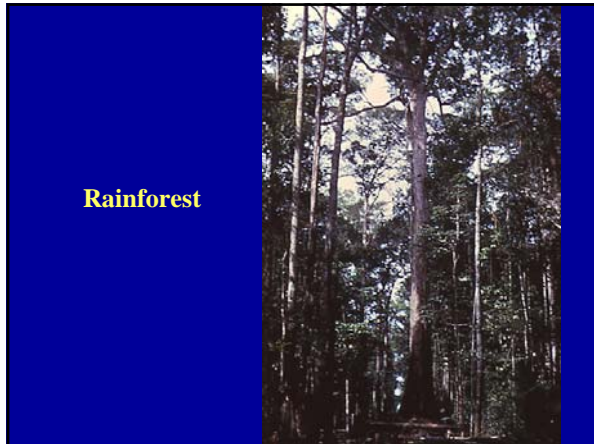


Greatest extent is in tropical South America. Here it is sometimes known as *Selva* (Spanish) or *Silva* (Portuguese). The forest is characterized by a continuous canopy of foliage. (Note: Woodland implies widely scattered, spaced trees.)



The tropical rainforest is scattered through the peninsular and insular (island) lowlands of Southeast Asia. This is found up to elevations of 2000 to 3000'.

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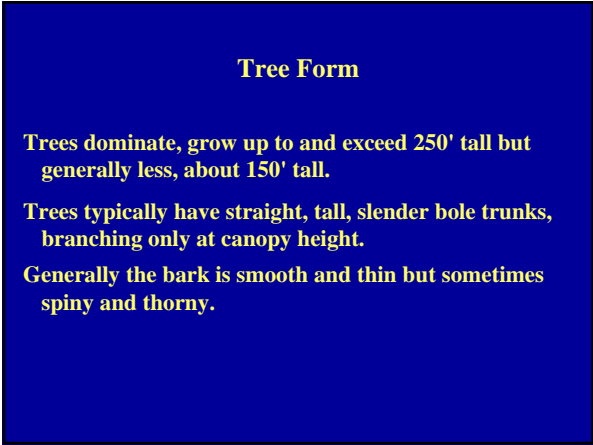




This type of forest was unknown to the conquistadors.
Olviado: Spanish source of early New World Intrusion
in the early 1500s described it thus:
*"A great and dark sea...The trees of these Indies are
a thing that cannot be explained for the multitude."*

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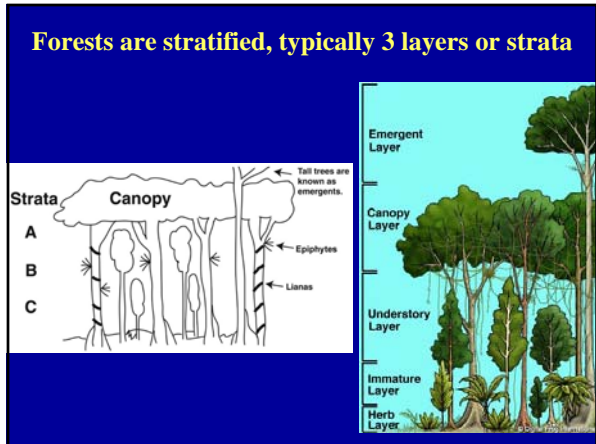




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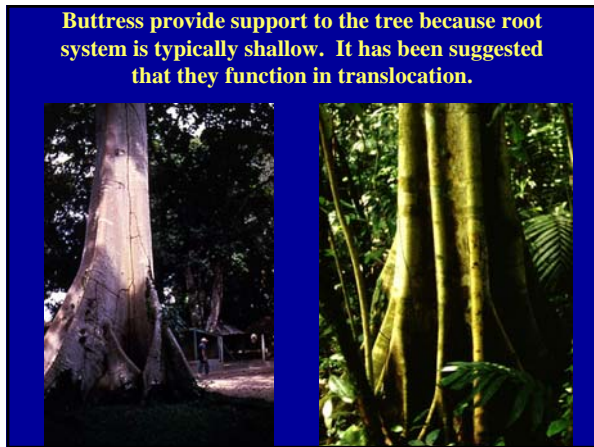
Leaves are soft, wide, and evergreen.
There is always a gentle rain of leaves.
The floor of the forest is covered with a brown layer of decaying litter.
On the floor of the forest there is little growth because it is so dark.
It is quite easy to walk through a rainforest; it is cathedral-like, dark, cool with tall columns of trunks.

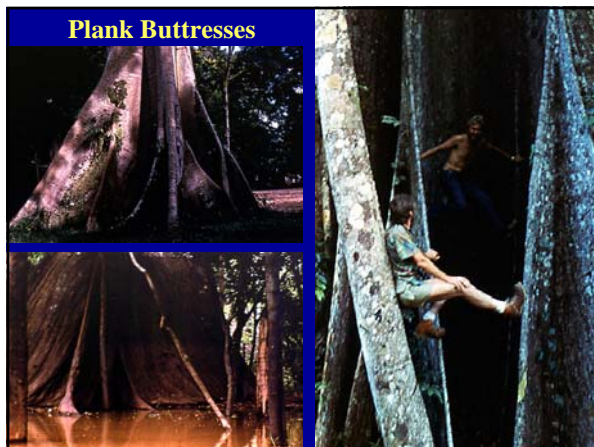




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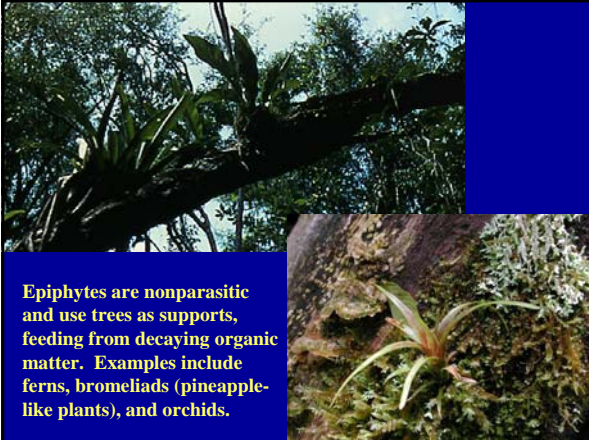
Lianas, Belize



Lianas are woody vines, useful for cordage when young. Some up to 1000' long. These are not parasites although some (strangler vine) may cause girdling.

Strangler vine





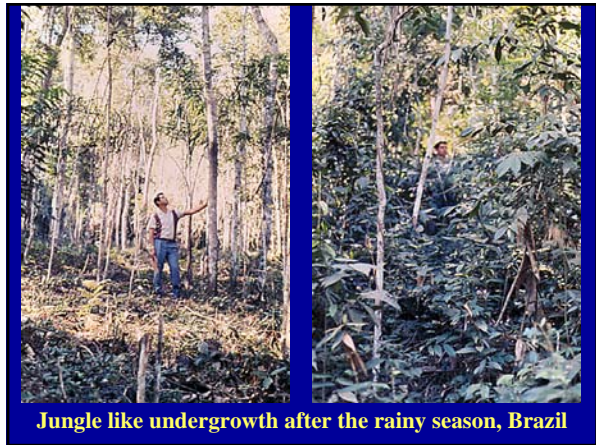
Epiphytes are nonparasitic and use trees as supports, feeding from decaying organic matter. Examples include ferns, bromeliads (pineapple-like plants), and orchids.

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The rainforest is not a jungle, which is a dense almost impenetrable growth where one needs a machete to traverse.

Jungle occurs when the rainforest is removed and dense growth occurs.

The jungle occurs at the edge of rainforest and particularly next to streams where light enters.





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Flora and Vegetation

In describing vegetation we must distinguish between flora, a list of plant kinds and vegetation, the aggregation of plants into communities.

There is enormous richness of flora in the tropical rainforest, high biodiversity.

The great variety of trees has important economic consequences.

It is often difficult to gather and accumulate a single species!

This is very different from temperate communities of forests where a few species predominate in the climax vegetation, the vegetation of the mature forest.

Mangrove Forest

This is a special kind of coastal vegetation which depends on silt, mud, and periodic inundation with sea water.

Usually found near deltas of large rivers.

Also found in brackish water where sea water is diluted with fresh water.

This is best developed in the true tropics.

Rhizophora is a common genus, usually short, 10 to 20', but up to 90' in height.

The leaves are evergreen, small and tough.

The prop and aerial roots are the outstanding characteristics.

They are similar to screw pine.

Mangrove forest is particularly common in Malaysia.



Other common vegetation

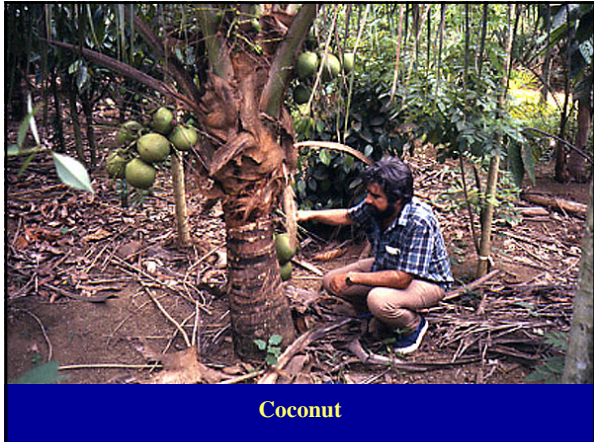
Coconut (*Cocos*) but often connotes a man-made vegetation

Screw pine (*Pandanus*), native to Old World, characterized by stilt-like aerial roots, long sword-shaped leaves.



Coconut Plantation

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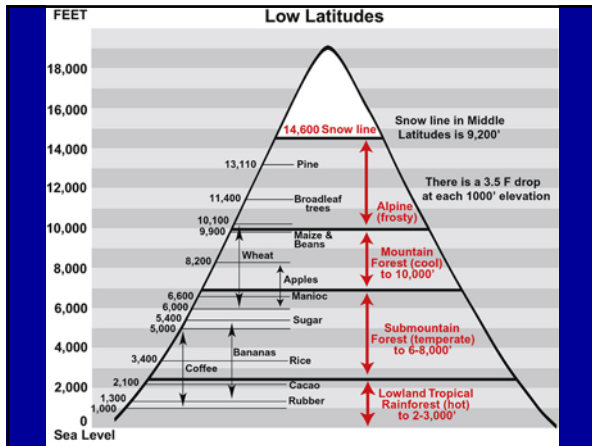


Effects of Elevation

Mountainous vegetation in the tropics change with elevation.

The structure of vegetation and flora alters with altitude.

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Sub-mountain Forest

The tall luxuriant growth of the lowlands, typically with three strata, give way at 2000–3000' (up to 6000–8000') to a lower mountain (sub-mountain) rainforest. The trees are still evergreen but shorter.

There are two layers, an upper layer, 80 to 90' tall with a single layer beneath.

The flora becomes impoverished.

Temperate families of trees become common (as Fagaceae) with genera such as *Quercus* (oaks)—but different species from the temperate areas.

Buttressing of trees diminishes.

Mountain Forest (6000–8000 to 10,000')

The trees are shorter still (10–30'), gnarled, less neat.

Lianas are rare.

There is typically one layer of trees.

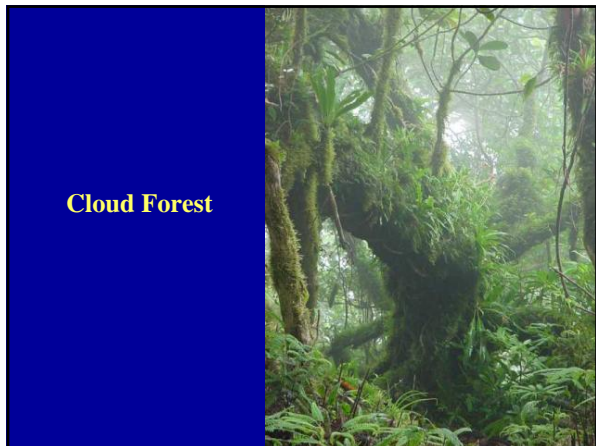
Epiphytes are very common, particularly mosses.

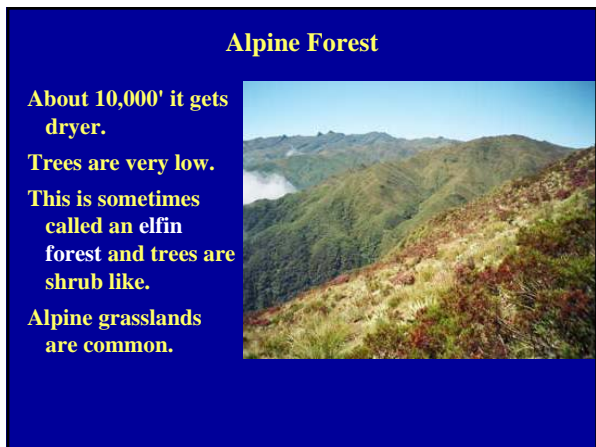
Mountain forest is often known as a Mossy or Cloud Forest or *seja de la montana* in Spanish, “the eyebrow of the mountain.”

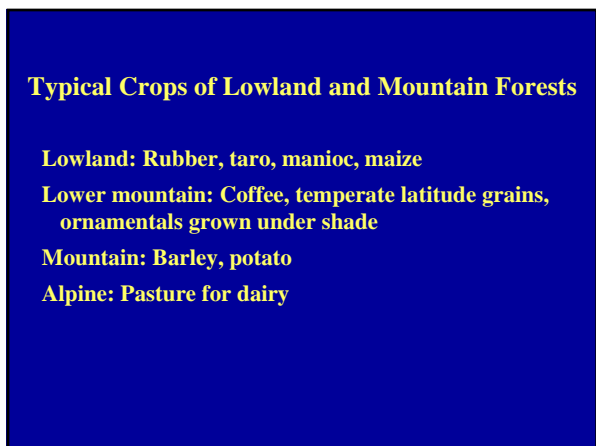
Because of the altitude it is typically very wet.

Condensation is very common.

Cloud cover is almost continuous.







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Monsoon Forests (*Am* Climates)

The monsoon climates are warm all year but there is a short dry season and a concentration of very heavy precipitation in the rainy season.

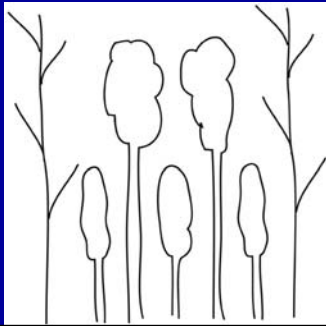
The spontaneous vegetation reflects the differences in rainfall pattern.

This climate is typical in Burma, Thailand, Indonesia, South China, and West Coast of India.

In the south Malabar coast of India there is a very short dry season but the dry season extends as you go North.

The vegetation changes reflect this.

The forest is stratified as the tropical forests. However, the top layer is deciduous in the dry winter.



There is usually enough moisture in the soil to maintain growth throughout the year.

In the deciduous trees the leaves fall and flowering occurs in the dry season.

The forest is less rich than the lowland tropical rainforest.

The trees are further apart and less luxuriant.

Epiphytes and lianas are less common.

A common species is teak (*Tectona grandis*) now planted all over the world.



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Savanna Climates (*Aw*)

This known as tropical wet-and-dry, or winter-dry tropical.

The origin of the word is from Cuba.

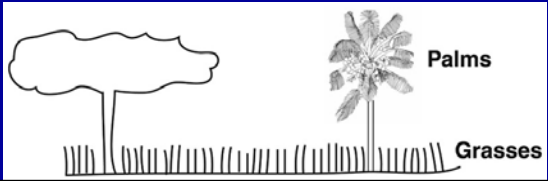
The name “savanna” is the Spanish spelling of an Indian name.

This is a tropical or subtropical grassland containing scattered trees and xerophitic undergrowth.

The savanna vegetation however is not confined to *Aw* climates. Good examples are found outside of tropical wet and dry such as Mediterranean climates of California, mountains country of the American southwest, and in temperate Australia.

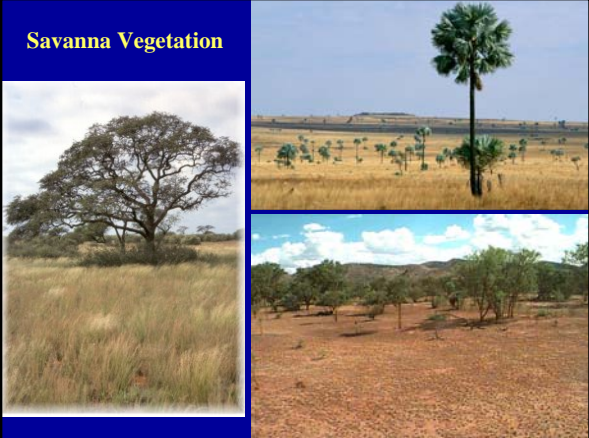
Typical savanna contains spreading trees, palms, or pines.

Cover is not continuous



The diagram shows a cross-section of savanna vegetation. On the left is a large, spreading tree with a thick trunk and a wide, flat canopy. In the center is a palm tree with a long, slender trunk and a crown of fronds. On the right, there is a patch of grasses. The labels 'Palms' and 'Grasses' are placed next to their respective elements.

Savanna Vegetation



The collage consists of three photographs. The top-left photo shows a large, spreading tree in a savanna landscape. The top-right photo shows a tall palm tree in a savanna landscape. The bottom photo shows a dry savanna landscape with scattered trees and a reddish-brown ground.

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There are a number of classical vegetation types in savanna.

Woodland: Forest condition between rain forest and savanna.

Thornforest: Low forest of trees that are thorny with small leaves. These are known as xerophytic vegetation, vegetation adapted to dry climate. The Kiave forest of Hawaii is a good example. The thorns are an adaptation to protect against grazing.

Grassland: Continuous grass; trees only on river and stream banks.

Much of vegetation consists of a mosaic of these types of vegetation.

The Brazilian terms are very descriptive

Campo cerrado: "Closed" field, Trees are touching.

Campo limpo: "Clean" or open grassy field.

Campo sujo: "Dirty" or scattered trees.

In Africa, trees are evergreen in moist savanna; trees are deciduous in dry savanna.



Cerrado, Brazil

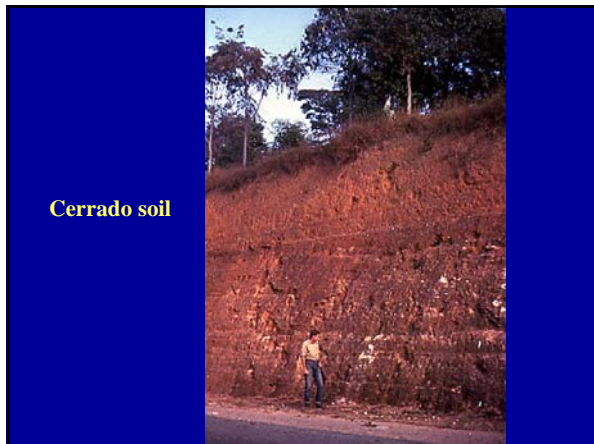
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Tropical Grasslands

However in many areas, despite ample rainfall to support forest, the vegetation is grassy.

Climate is not the only factor determining vegetation.

The extensive grasslands in these areas is known as Anthropogenic grasslands.

They are due to a combination of grazing, cutting, and burning as a result of human interference.

Burning is very common in the dry season and fire is very damaging.

The constant smoky atmosphere in the dry season in the savanna of Brazil is known as *Broma seca* or dry fog.

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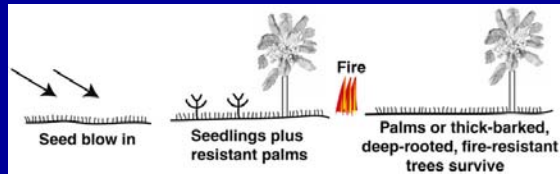
Cerrado burning, Brazil



After burning

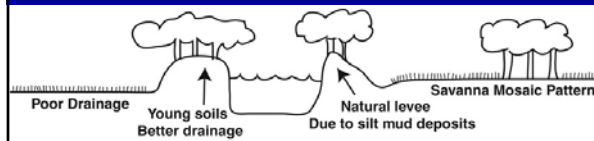
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Another factor giving rise to extensive grasslands are the presence of hardpan development in old eroded soils



The water accumulates as the plains are flooded. Many trees are nonadapted to "wet feet" and die out while grasses take over. Grasslands are very adapted to this condition. In some cases the trees that survive are palms. This occurs because palms are fire resistant. The fires spread easily across the grasslands.

Savanna landscape changes along rivers



Gallery (*galleria*) forest occurs along the river. The mosaic pattern may reflect different sequence of fire. Other factors include the felling of forests and development of horticulture and agriculture.