

Chapter 03

Inside Tropical Rain Forests: Structure

PLATE 3-1

A look directly up into a tropical forest canopy shows the structural complexity and tall stature characteristic of this ecosystem.

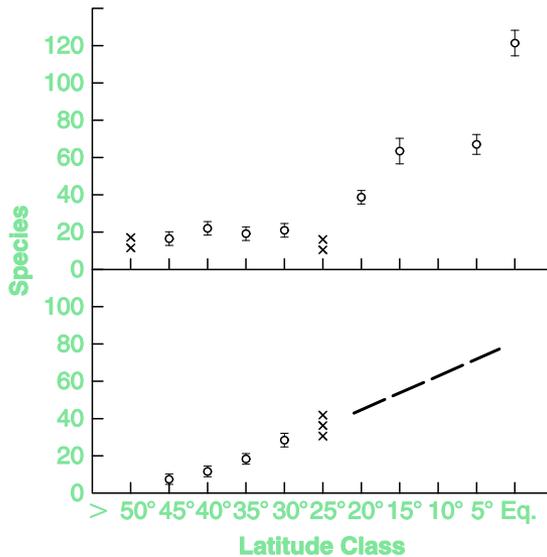


FIGURE 3-1

This figure shows the number of bird species as it changes with latitude in summer (top) and winter (bottom). Note the significant jump in number of species at 20° latitude, which is within the tropics. Also note how the number of species is by far highest at the equator, 0° latitude.

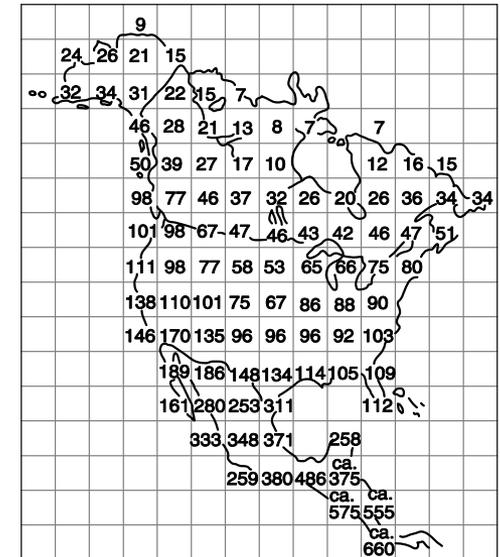


FIGURE 3-2

The squares on this map indicate the number of landbird species found within. Each square represents 500 kilometers (about 300 miles) on a side. Look at Central America and note how the number becomes much higher even though some of the land areas do not cover an entire square.

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FIGURE 3-3

This is a sketch of a section of Barro Colorado forest in Panama. It conveys the structural complexity and tree diversity typical of tropical lowland forest.



PLATE 3-2

This forest gap shows a high density of small trees that are growing in the well-lit gap.



PLATE 3-3

This extensive gap in Ecuador demonstrates the dense and irregular vegetation profile. It is an area of ecological succession.



PLATE 3-4

A stream such as this one, meandering through rain forest and seen from this vantage point, would look similar anywhere on Earth where rain forest occurs because rain forest plant species have converged in overall structural characteristics, and numerous families have global distributions. This particular stream is in Queensland, Australia. Note the reddish soil, typical of tropical soils in many regions.

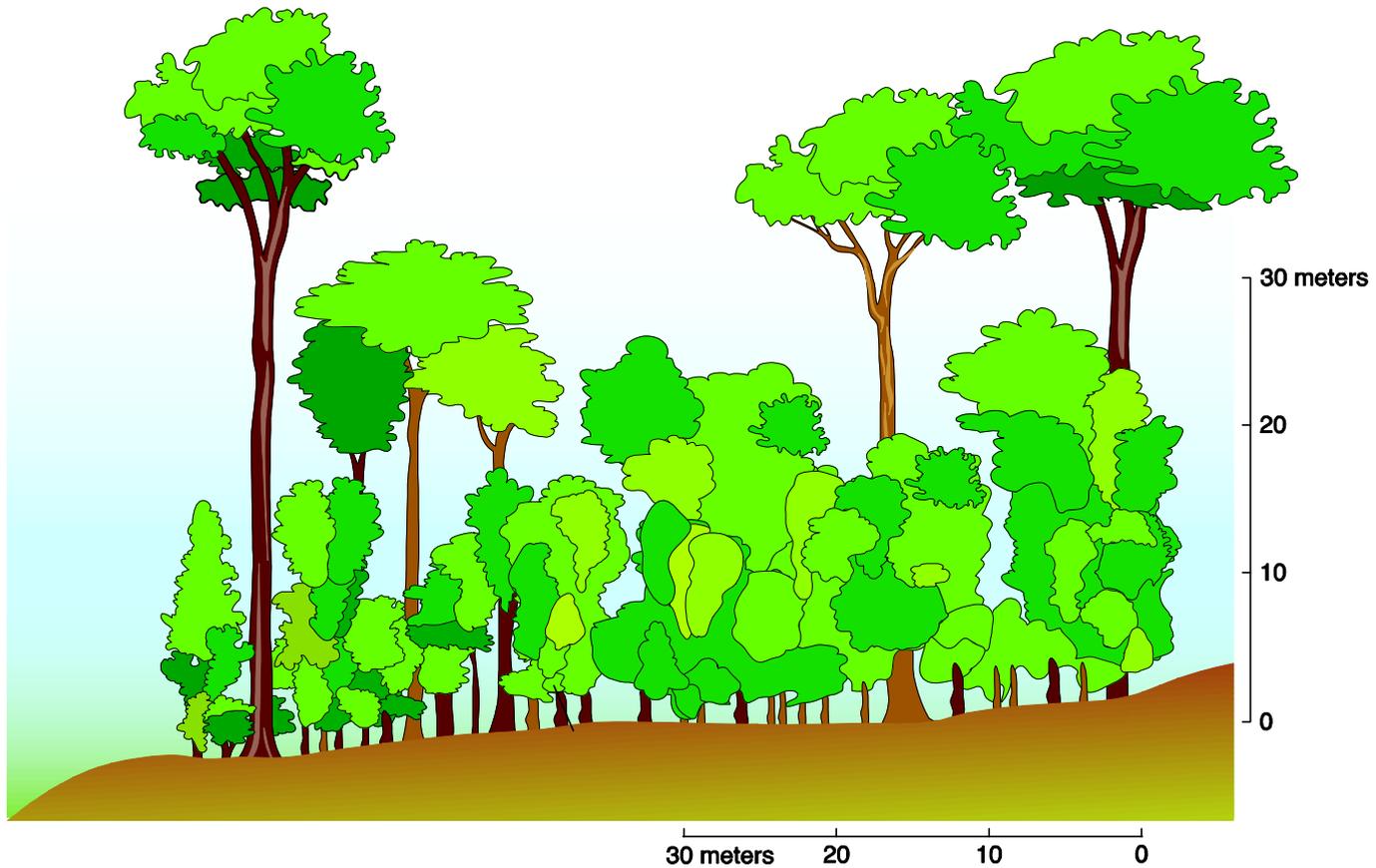


FIGURE 3-4

This drawing illustrates a mature dipterocarp forest in Belalong, Brunei. The smaller, younger dipterocarps in the understory exhibit a monopodial crown (which is taller than it is broad). The mature canopy trees exhibit a sympodial crown, broader than it is tall. Such transition in growth form is typical of many tropical tree species.



PLATE 3-5

Dark-colored monkeys such as these black howler monkeys in Panama are sometimes difficult to see well when in the canopy with pale sky behind them.



PLATE 3-6

Colorful and large birds, such as this trogon in Panama, are often difficult to detect as they sit motionless in the shaded forest under-story or canopy.

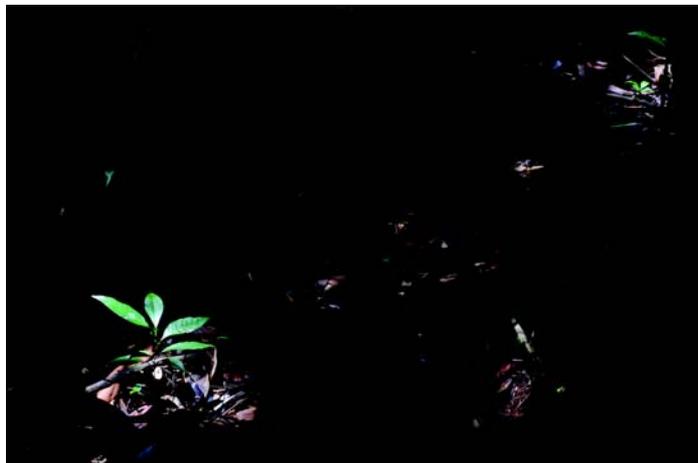


PLATE 3-7

Sun flecks illuminate a seedling on an otherwise dark rain forest floor. This image illustrates how most light is absorbed well before reaching the floor of a tropical rain forest.



PLATE 3-8

Cycads are ancient gymnosperms. Note the palm-like leaves. The central cone resembles those of others gymnosperms such as pines and spruces. Cycads are common in many tropical regions.



PLATE 3-9

Tropical trees characteristically show major branches radiating out like spokes.



PLATE 3-10

This isolated tree along the Napa River in Ecuador demonstrates the growth form typical of many tropical tree species.



PLATE 3-11

This tree has dropped its leaves but is in full flower. Lack of leaves makes the flowering tree more obvious to pollinating animals.



PLATE 3-12

Buttressed roots characterize numerous species of tropical trees.



PLATE 3-13

This is an example of a large buttress.



PLATE 3-14

Prop roots in an Ecuadorian forest.



PLATE 3-15

Prop roots in an Ecuadorian forest.

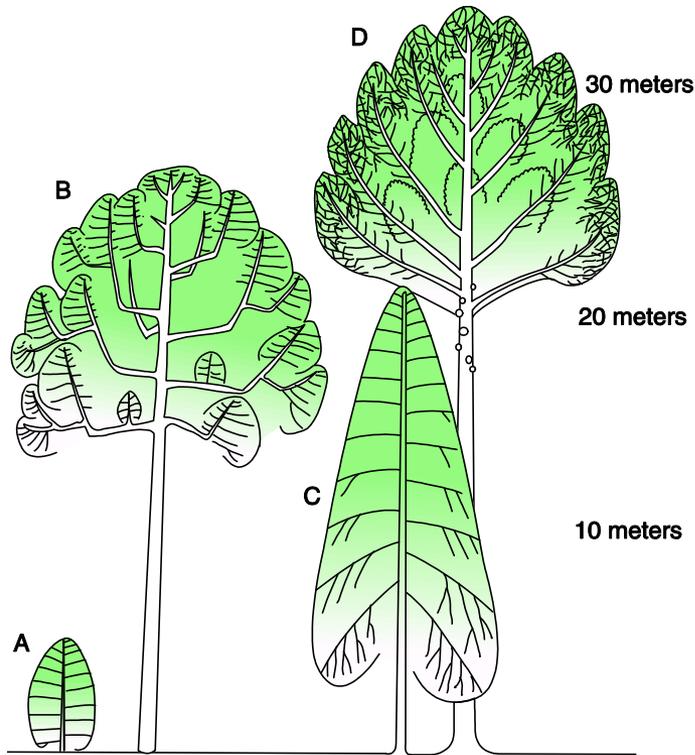


FIGURE 3-5

These two diagrams of dipterocarp species demonstrate that as young plants, they exhibit monopodial growth, but as mature trees, they are sympodial. See also Figure 3-4.

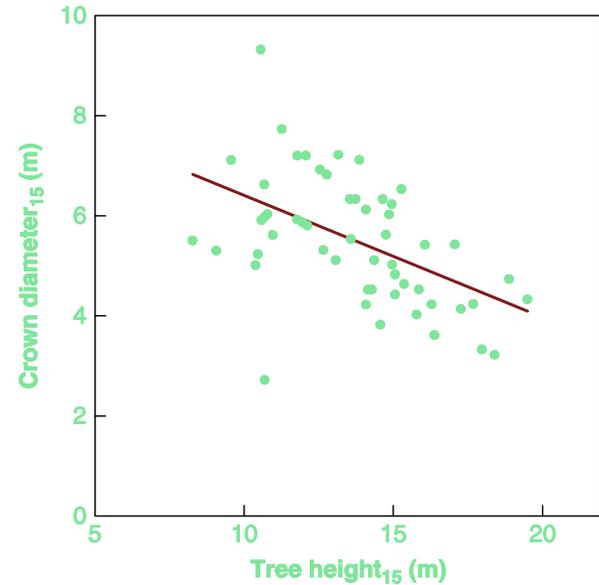


FIGURE 3-6

This graph illustrates the negative correlation between crown diameter and tree height for 53 rain forest tree species. As trees become taller, crowns widen less. Broad crowns would place trees in danger of windfall and other forms of mechanical failure, so there is fitness in having a smaller crown when a tree is tall.



PLATE 3-16

Cauliflorous fruits of cacao.



PLATE 3-17

Ripened cauliflorous fruits of cacao.



(a)



(b)

PLATE 3-18

(a) The pointed ends of these two leaves are called drip-tips because they facilitate the flow of water off the leaves. (b) This small collection of leaves from a Belizean tropical forest demonstrates the large size (note 12-inch ruler in foreground) and diversity of shapes of tropical leaves. Many of the leaves here have drip-tips.



PLATE 3-19

Leaves of the kapok tree, *Ceiba pentandra*, show the waxy appearance typical of many species.



PLATE 3-20

Leaves of *Castilla* demonstrate the simple, nonlobed, nonserrated pattern typical of many species of tropical tree leaves.



PLATE 3-21

This photo shows how large some tropical leaves become (notice the leaf lying atop the leaf) and also shows insect damage typical of tropical leaves in general.



PLATE 3-22
RAFFLESIA INFLORESCENCE

PLATE 3-23
Heliconias are among the most characteristic plants of Neotropical forests. The bright red structures are bracts, not flowers. The flowers are contained within the bracts and may be seen protruding from them. The red bracts attract various hummingbird species that aid in pollinating the plant.





PLATE 3-24
DURIAN FRUIT



PLATE 3-25

Fruits from the Lecythidaceae (Brazil nut family) are typically very large.

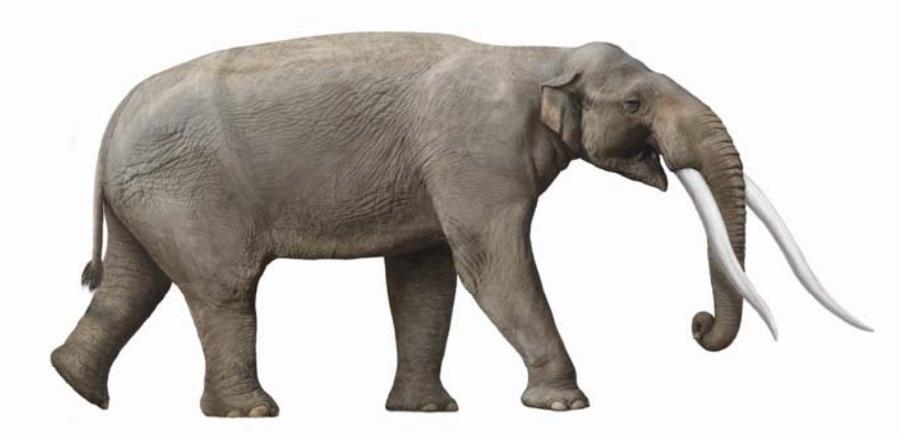


FIGURE 3-7
GOMPHOTHERE



PLATE 3-26
BREADFRUIT



PLATE 3-27

Seeds of *Pithecoctenium crucigerum* (Bignoniaceae), a liana, are encased within wind-dispersed, wing-like structures. From Costa Rica.

PLATE 3-28
Moriche palm (*Moriche flexuosa*) is common along riverine areas throughout the Neotropics.





PLATE 3-29

Extensive vine growth draping throughout vegetation in an Ecuadorian rain forest.

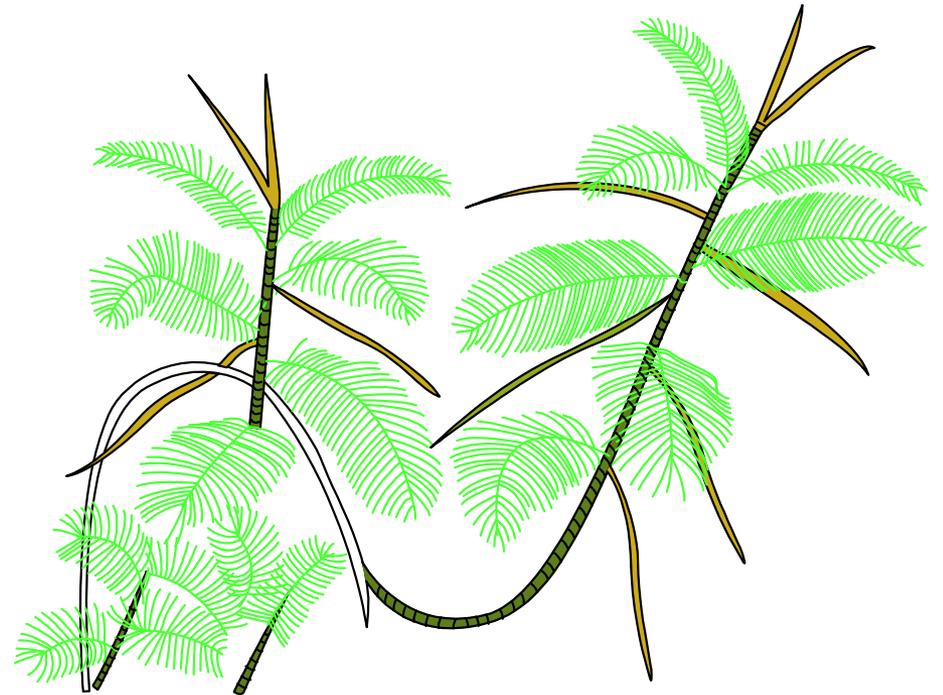


PLATE 3-30

Typical rattan, showing vine-like growth pattern.



PLATE 3-31

This helix-shaped liana stem is typical of many types of *lianas*, woody vines that are abundant in many tropical forests.



PLATE 3-32

This *Ficus*, a strangler, is typical of how hemiepiphytes grow to eventually reach the ground.

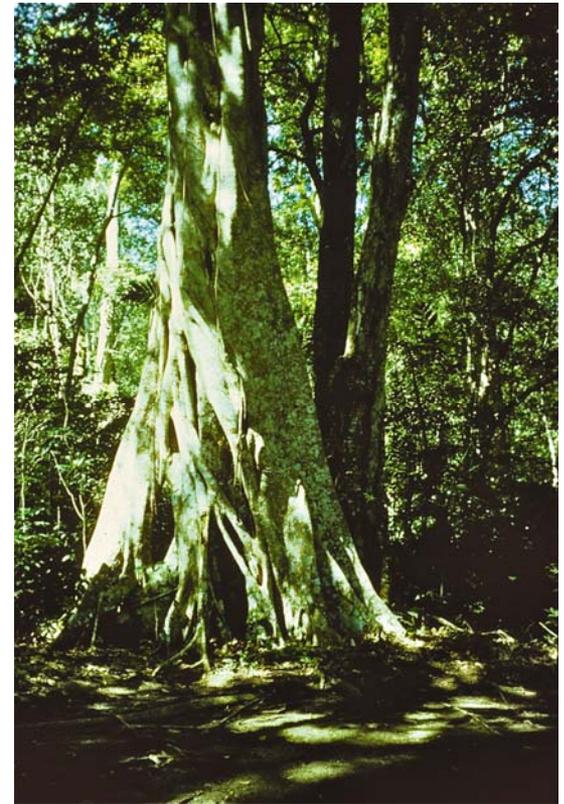


PLATE 3-34

Eventually a strangler will completely obliterate its host tree.



PLATE 3-33

Named the *curtain fig*, this impressive *Ficus* is well known and often visited in Queensland, Australia.

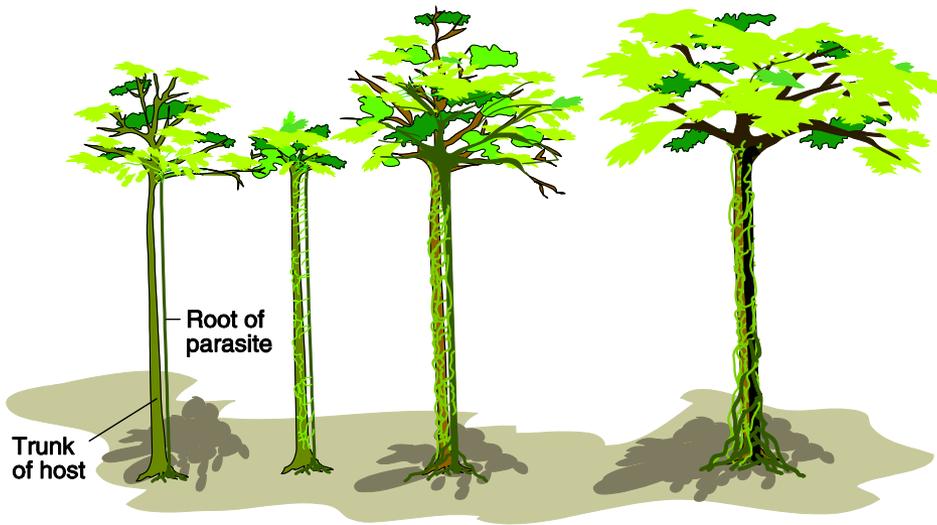


FIGURE 3-8

Diagram of how a strangler fig surrounds and eventually replaces its host tree.



PLATE 3-35

Climbers often adhere tightly to the bark of the host tree.



PLATE 3-36

Large leaves of the philodendron *Monstera* grow on the trunk of this Guatemalan tree.



PLATE 3-37

This deciduous tree in Belize demonstrates how densely epiphytic growth covers the major branches.



PLATE 3-38

The sharply spiky leaves of a tank bromeliad adorn this Ecuadorian tree.



PLATE 3-39

Pineapple crop in Costa Rica.



PLATE 3-40

The orchid flower of *Prostecchia fragans*.
The photo shows the lip petal “landing pad”
used by pollinating insects.



PLATE 3-41

Epiphylls of various kinds adorn
this large leaf in the forest
understory.