

Stupendous Tropical Rainforests

By Dr Reese Halter

The breathtaking luxuriant tropical rainforests occupy about 13 percent of Earth's surface. These incredibly complex and diverse ecosystems account for half of the known biological diversity (about 800,000 different species), and conservatively there are at least another 9.2 million species yet to be discovered.

The world's tropical forests can be divided into four major regions. The American tropical forest region includes part of South America, Central America, the Galapagos Islands and the Caribbean. The African tropical forest region encompasses the Zaire Basin, the coastlands of West Africa, the uplands of East Africa and Madagascar. The Indo-Malaysian tropical forest region occupies parts of India, Burma, the Malay Peninsula and many of the Southeastern Asian islands. The Australasian tropical forest region spreads over Northeast Australia, New Guinea and the adjacent Pacific Islands. Some consider the Hawaiian Islands a smaller fifth region.

There are five types of tropical climates: rainy tropics, monsoonal tropics, wet-and-dry tropics, tropical semi-arid and tropical arid climate. Irrespective of the hemisphere they all occur within 23 degrees of the equator. Most of these forests have rainfall that at least exceeds 79 inches (2,000 millimeters).

Rainforests significantly influence rainfall. About 75 percent of rainfall evaporates directly or via the trees, and provides most of the moisture for cloud formation and rain further inland. Deforestation near the coast breaks this cycle and denies rainfall to inland tropical forests.

The complexity of millions of organisms interacting in tropical rainforests can perhaps only be matched by that of underwater life in some coral reefs.

Tropical rainforests contain big, tall trees some in excess of 230 feet (70 meters) with flaring buttresses and a bizarre array of aerial roots.

Canopies are rich with life: woody climbers resemble elaborate scaffolds; stranglers surround the trunks of trees; liverworts (leafy-looking moss-like plants) over-grow leaf blades; orchids grow in the crown humus; ants feed from flowers; insects including ants pollinate flowers; birds and bats disseminate seeds, rodents feed on fruits and leopards prey on small mammals.

Most tropical soils are extremely low in nutrients. How are they able to support such rich plant life? Ants, in large part, greatly assist in helping to break down leaves, twigs, fallen trunks and dead animals thereby recycling nutrients which are immediately taken-up by tree roots.

When tropical forests are removed the soils cannot support luxuriant growth.

The natural occurrence of fire in tropical rainforests can occur from lightning and along the edges of lava flows and from hot ash from active volcanoes. The natural frequency of fires in tropical rainforests is rare. Usually rainforests are saturated and fire does not spread far. However, the fierce El Nino of 1998 brought extreme drought conditions to Southeast Asian forests which enabled massive fire to decimate 24,957,646 acres (10.1 million hectares) of forestland.

Why are tropical rainforests so rich with so many different plant and animal species? These forests contain an awesome potential for new forms of life to develop or a process known as speciation.

New species arise from isolated populations. These new species result from either a successful mutation or recombination of existing genes that have adapted to a change in the physical environment.

Is there a higher rate of successful mutations in the tropics? Yes. Why? The levels of ultra-violet-B radiation (from the sun) are naturally the highest at the equator and within the range of the tropical forest regions compared to all other forest types on Earth. And ultra-violet radiation (which promotes cataracts and skin cancer in humans) also promotes plant mutations and hence the rate of tropical speciation is greater than anywhere else on the globe.

Speciation increases diversity and steps-up natural selection which results in the progress of evolution.

Tropical forests also contain a cornucopia of potent medicines to combat cardiovascular and neurological diseases and cancers. In addition, drugs like quinine from the South American cinchona tree fight malaria; vincristine and vinblastine from the Madagascar rose periwinkle offer hope to those afflicted with pediatric leukemia and Hodgkin's disease; active ingredients in Central and South American dart-poison frogs fight cardiac arrhythmias, Alzheimer's disease, myasthenia gravis and amyotrophic lateral sclerosis.

Tropical forests are being felled at an astounding rate – a thousand times greater than those which occur naturally – approximately 55,000 square miles a year (142,500 square kilometers a year). This is equivalent to the area of Switzerland and the Netherlands combined or to the size of a football field that is lost senselessly every second of each day of the year.

Each year we are losing at least 27,000 unknown species with unknown medicinal potentials. Currently, 25 percent of all medicines are derived from tropical plants and animals.

As the world gets warmer, scientists have predicted more, and more intense, wild weather around the globe. The incidences of diseases will skyrocket. The loss of biological diversity from tropical rainforests will impede researchers from finding cures to those diseases.

Tropical rainforest ecosystems must be protected, if not for us then certainly for our children.

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