

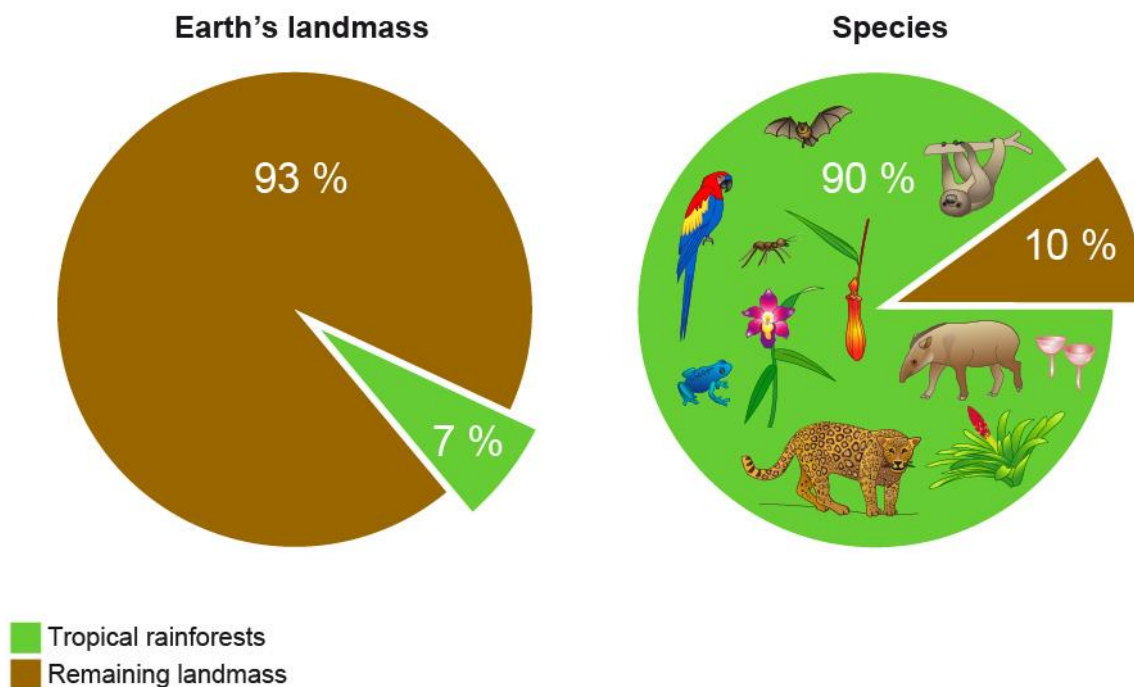
Species diversity in tropical rainforests

The mystery of tropical diversity lies hidden in the rarity of its species.

A rule of thumb for insects is that it is much easier to find ten different species of butterflies, for example, in tropical rainforests than ten butterflies of one species. An exception to this rule is social insects such as ants and termites.

Scientists estimate the number of species worldwide at 20 to 30 million, of which 1.8 million are known so far. Not all species are as prominent as tigers, toucans, and tapirs. Most species belong to the beetles, bees, flies, and “true bugs” and are far less conspicuous.

Although only 7 percent of the ice-free landmasses are covered by tropical rainforests, up to 90 percent of all known species of animals and plants are found in tropical rainforests.



The evolution of species is fostered by the lack of nutrients in tropical rainforests. The soils are extremely depleted and low in nutrients. As a result, one species cannot decisively prevail over other species. The lack of nutrients prevents individual species from being able to multiply and spread out on a large scale.

In the moderate latitudes, the soils are rich in nutrients, and the excessive use of fertilizers in agriculture increases the nutrient content even more. This leads to higher productivity in the fields with less species diversity at the same time, in contrast to the soils in tropical rainforests, which have lower productivity (nutrient poverty) and wide species diversity. This already suggests why large areas of tropical rainforests must be cleared for agricultural use: The soils are very unproductive, which is compensated for by clearing large areas and using generous amounts of fertilizers – quantity instead of quality.

The rapid death of species

Tropical rainforests are disappearing at a rate never seen before, and the species they contain are disappearing with them. The U.S. National Science Board estimates that one-fourth of all species will be extinct in 20 years. The natural loss of species looks relatively modest: Without the influence of human activity, roughly three to 25 species are lost naturally per year.

Much of our knowledge of extinction goes back to the American zoologist Edward O. Wilson. He estimates that 70 species die out every day, whereby humans accelerate extinction by a factor of 100. Nine percent of tree species are threatened by extinction. Other scientists' estimates are far more pessimistic and depict an even bleaker scenario. The American beetle specialist Terry Erwin investigated how many different arthropod species* occur in the canopies of a specific tree species (*Luehea seemannii*) in Panamanian tropical rainforests. Of the 1,200 beetle species Erwin found, 160 species live exclusively in the *Luehea* trees. If we assume that 300 tree species are lost every year, this would mean an annual loss of 48,000 beetle species, about 130 species per day. As stated, that is only beetle species. The arthropod phylum encompasses many more species.

* The arthropod phylum includes the classes of insects, arachnids, crustaceans, millipedes, and trilobites. Arthropods have a segmented body covered by an exoskeleton made from chitin. Arthropods make up a huge number of species in the tropics.