




小博士英汉对照丛书

# 热带雨林

TROPICAL  
RAINFORESTS

*REDAI  
YULIN*

解三平 马锦龙 编著 吴越 译

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## Mysterious tropical rainforests 神秘的热带雨林

Beautiful and mysterious tropical rainforests are of significant value to man. However, people came to know them relatively late. It was not until 16th and 17th centuries that many quaint<sup>①</sup>, mysterious and startling stories about tropical rainforests were discovered in the letters and diaries of some European explorers and navigators<sup>②</sup>. Dense primeval<sup>③</sup> forests stretch to the horizon; huge trees that can be embraced by a dozen people are found everywhere; the rainforests abound with so various species of plants that two trees of the same shape cannot be found at one place; lots of pole-shaped roots

热带雨林是美丽、神秘而又重要的，然而人类对它的认识却相对较晚。直到16、17世纪，才从欧洲探险家和航海家们的信件和日记中不断传出有关热带雨林离奇古怪、玄妙莫测而又耸人听闻的故事：遮天蔽日的原始森林一望无际，十几个人才能合围过来的巨树比比皆是；植物的种类极端丰富，在一个地方甚至找不到两株相同的树木；许多杆状树根从空中骤然垂下，仿佛从天而降；有些植物生在空中各个高度的树丫和枝杆上，构成令人炫目的空中花园；亦到处可见许多树木的老茎杆上不可思议地开出艳丽奇特的花朵或是挂满累累



①离奇的

②航海家

③原始的



hang down as if they drop from the air; some plants grow on the limbs and branches of different heights, looking like a dazzling garden in the air; numerous old branches blossom as if by magic, on which fruits hang heavy; some leaves are large enough for the shelter of several people; some move when touched. There is an infinite variety of fantastic things and phenomena. It is dim and damp in rainforests. People feel at a loss for mosquito and snake bites, and they often hear extremely terrible noises and human howls <sup>①</sup> while struggling with savages.

果实；一些植物的叶子大得足以容纳数人在下面避雨，有些叶子触碰时还会运动。真是千奇百怪，应有尽有。森林中光线昏暗，阴森潮湿，人们对涌来的蚊虫毒蛇的叮咬茫然不知所措，不时还会听到使人毛骨悚然的怪声和人与生番拼搏时的嚎叫。



With further exploration and research into tropical rainforests, many ecological secrets have been revealed. However, more and more discoveries bring to the light the fact that many laws of nature and biology remain unexplainable, especially the abundance of species and the diverse life styles of

随着对热带雨林的深入探查和研究，许多生态现象已被认识。但越来越多的发现也揭示，热带雨林中蕴藏着大量尚未被充分认识的生物学和自然规律，特别是其物种的极端丰富性和植物生存方式的多样性——都无法用达尔文的进化论来解释。世界上除热带雨林外

①吼声

plants, which cannot be explained by Darwin's evolutionism<sup>①</sup>. The number of the rest species on Earth amounts to one half of the totality at most, whose living-styles make little portion. For instance, temperate forest species are poor, and their living-styles are fewer. Species of frigid zones are more monotonous. It is obviously improper to draw some classic or traditional biological laws and concepts from the phenomena in these zones. Many mysteries in tropical rainforests remain unexplainable<sup>②</sup> if these laws are employed. Therefore, with further study of tropical rainforests, it is possible that the existing notions of biology will be completely changed. However, it is a pity that tropical rainforests might disappear owing to human destruction before man can uncover their mysteries.

**What is a rainforest?** Rainforests can be understood in narrow

的物种充其量仅占总物种的一半,植物生存方式也仅占一小部分。例如,温带森林,不仅种类贫乏,生存方式亦少;而寒带地区就更显单调了。依赖于这些地区得出的一些经典或传统的生物学规律和概念显然是非常不完善的,若直接用来解释热带雨林,自然有很多现象不可思议。因此,通过对热带雨林的深入研究,或许会完全改变原有的生物学观念。然而,令人遗憾的是人们还没有充分解开热带雨林之谜时,它就可能由于人类自己的破坏而永远消失了。

**何谓热带雨林?** 热带雨林有狭义和广义两种理解,狭

①进化论

②不可解释的



and broad senses. In the narrow sense, they are the dense forests located on the tropical lowlands and the region with constant warmth and humidity<sup>①</sup> throughout the year. They are typical of all tropical rainforests. In the broad sense, they are divided into "mountain" and "tropical seasonal" forests; the former are located on the humid and cool tropical hilly areas and the latter in humid regions without an even distribution of rainfall. Like rainforests in the narrow sense, those in the broad sense form the most flourishing ecosystem with less characteristics than the typical ones. Most tropical rainforests in China belong to the latter category.

**Distribution of tropical rainforests.** Tropical rainforests are mainly located between the Tropic of Capricorn and the Tropic of Cancer, in which the average temperature is 27°C with an annual

义的热带雨林指分布于赤道低地上、气候终年温暖潮湿地区的茂盛森林，这些森林中各种热带雨林的特征都十分显著。广义则包括了热带山地上气候虽然湿润、但较凉爽的热带山地上出现的“山地雨林”和生长于气候湿润但雨量分布不均匀的“热带季节雨林”。与狭义的热带雨林同样，广义的热带雨林是最繁盛的生态系统，但其雨林特征比典型的热带雨林多少打了一些折扣。我国的热带雨林多属于广义范畴。

**热带雨林的分布** 热带雨林主要分布于赤道两侧南北回归线之间的热带气候区，平均气温为 27°C，年平均降雨量在 400~1000mm 之间。世界上雨林生态系统集中分布的地区

①潮湿



average rainfall of 400 ~ 1000 mm. The regions with widely - distributed rainforest ecosystem are the following: the Amazon River in South America, the Congo River in Africa, the Guinean Gulf, the South Asia, Malaysia and some islands in Oceania.

The rainforests in our country are mainly distributed in Taiwan, Guangdong, Guangxi, Hainan and southern part of Yunnan, on the northern edge of the global rainforest zones. They are fostered by the tropical monsoon climate with abundant rainfall of 1320 ~ 1600 mm annually. It is not evenly spread, 85% being in the rainy season, and there is a marked division between dry and wet seasons.

**Soil of tropical rainforests.** Generally speaking, tropical rainforest soil is relatively aged, which can be traced back to the 3rd century (2 000 000 years ago). They are nutrient - poor and acidic (pH 4.5 ~ 5.5). It seems to con-

有:南美的亚马孙河流域、非洲刚果河盆地与几内亚湾海岸、亚洲南端与马来群岛以及大洋洲的部分岛屿。

我国的雨林主要分布于台湾、广东、广西、海南和云南的南部,属雨林分布的北部边缘地区,是在热带季风气候条件下发育成的。分布区热量充足,降水丰富,大气湿度高,年降水量为 1320 ~ 1600mm,全年降水分配不均,85%集中在雨季,干湿季节分明。

**热带雨林的土壤** 热带雨林中的土壤一般是比较老的,常常可以追溯到第三纪(200万年以前)。雨林土壤的成分是极其贫乏的,而且是酸性的(pH值 4.5 ~ 5.5)。乍看起来,这好像与茂密的植被相矛盾,



tradict the fact that there exists dense vegetation in rainforests. Almost all the required nutrients are stored in the plants on the surface. Some plants die each year and are mineralized<sup>①</sup> soon. The released nutritional elements are re-absorbed by roots directly. The rapid circulation of nutrients makes it possible for rainforests to exist for thousands of years in the same environments. However, once trees are felled or burned, the minerals in soil will be washed away by rain. Thus, rainforests will never be so dense as the primeval ones even if trees grow again.

**Vegetation & layers of tropical rainforests.** Tropical rainforest vegetation belongs to the primeval type, which is not affected by the glaciers in the geological history. The stable climate, environment, and suitable conditions of high temperature and humid air make

事实上森林所需的几乎全部营养成分,都要贮备在地上植物中。每年一部分植物死去,并很快矿质化,它所释放的营养元素直接被根系再吸收——营养成分的迅速循环,使雨林能够在同一环境中生长几千年。但一经砍伐或烧毁,土壤中的矿质营养成分就会受到雨水的强烈淋洗而大量流失,即使以后次生林能发展起来,也永远不能达到原始林的繁茂程度。

### 热带雨林的植被和分层

热带雨林是一种原始的植被类型,未受到地质历史时期冰川的影响。热带地区长期稳定的气候和环境,加上终年高温高湿的优越条件,森林非常茂盛,形成了一种高大而多层的结构。树木大小皆俱,高矮搭配,

①使矿化



them dense with a multi-layer structure. Trees of different shapes and height form three or four layers. The first layer is usually above 30 meters with the tree crowns towering<sup>①</sup> high above. The second layer is made up of giant trees of 20~30 meters tall. The lush crowns form the main part of the forest canopy. The third one contains densely-grown trees standing 10~20 meters in height. There is another layer with a height of 5~10 meters. Beside is a layer of shrubs 1~5 meters tall. It is difficult to tell the difference between shrubs and tree saplings, and that is why they are called "dwarf trees". Further below is the field layer. The surface of rainforests is the base of bare ground and humus soil. Huge mammals, such as orangutans<sup>②</sup> and cats, live there.

**The earth's lungs.** Everyone knows the importance of lungs to

构成三到四个树层。第一树层高度一般都在 30m 以上,它们的树冠高高举出成为凌驾于下面林冠层之上的耸出巨树;第二树层由 20~30m 高的大树构成,它们的树冠郁闭,是构成林冠(森林天蓬)的主要层;第三树层高 10~20m,由中、小乔木构成,树木密度大;在 5~10m 高度一般还有一个小树层。树木层之下是 1~5m 高的幼树灌木层,热带雨林的灌木在形态上与小树几乎分不清楚,难怪有人称它们为侏儒树。幼树灌木层之下为疏密不等的草本层。雨林地面则是热带雨林的最底层,除了薄薄的腐殖土层外,主要是光秃的裸地。大型哺乳动物如猩猩和美洲豹,就住在雨林地面。

**地球之肺** 能想像肺对人的重要性吗? 其实地球也有

①高耸

②猩猩



human beings. Tropical rainforests actually act as the earth's lungs. That is because they regulate the proportion between oxygen and carbon dioxide. However, their function is just contrary to that of human lungs. Carbon dioxide is absorbed and oxygen is released by tropical rainforests. It is the respiration<sup>①</sup> process that provides animals and man with required oxygen. That is why they are called "air cleaner". At the same time, they also affect the density of carbon dioxide<sup>②</sup> and slow down the pace of greenhouse effect that makes the earth warmer. Because tropical rainforests are disappearing at the pace of 15 000 000 to 20 000 000 hectares per year, the density of carbon dioxide in the atmosphere has increased by 100 per cent during the past ten decades. This is one of the main causes of global warming.

### The earth's air conditioning.

①呼吸作用

②二氧化碳

“肺”，这就是热带雨林。热带雨林之所以被喻为“地球之肺”，是因为它能通过“呼吸作用”调节地球大气中的二氧化碳和氧气的浓度，但它的功能与人的肺刚好相反：吸收的是二氧化碳，释放的是氧气。正是这种呼吸作用维持着生物圈中的动物(包括人类)生存所需的氧气，所以热带雨林还有“空气清新机”的美名。同时，它还控制着二氧化碳的浓度，有效地减缓了导致全球变暖的温室效应。由于热带雨林每年以1500万~2000万公顷的速度在递减，过去100年内大气中的二氧化碳浓度增加了一倍，这是导致目前全球变暖的主要因素之一。

### 地球温室空调 热带雨林



Tropical rainforests help balance the global climate with their abundant rainfall and hot climate. Raindrops are rapidly vaporized<sup>①</sup> into the atmosphere making them recycle all the while. It is reported that the rainfall in the Amazon Rainforests can recycle five to seven times each year. It is beneficial to soil fertility and plant growth, and it has an effect on humidity and monsoon all over the world.

**The umbrella of soils.** Tropical rainforests can serve as a type of umbrella that protect soils. In tropical rainforests, rainfall of 50mm per hour is frequent. Raindrops over 2mm in diameter fall at a speed of 7~9 meters per second. Those with a speed of 30 km per hour leave numerous pits on the ground. Each drop is said to move clay particles one centimeter in diameter. Although rain can seep into the topsoil, it would spill

有助于平衡全球气候。热带雨林降水量大，而且气候非常炎热，热力将雨水迅速蒸发回大气层，如此一来，雨水就可以循环不息。据研究，亚马孙(南美洲)森林内的雨水一年之内可以循环五至七次之多。热带雨林的这种作用不但有助于土壤肥沃与生物生长，还可以影响和调节地球各地的湿度和季风。

**土壤的保护伞** 热带雨林还是保护土壤的巨大雨伞，在热带雨林地区，经常有每小时降雨量达 50mm 的大雨。这时，直径超过 2mm 的雨滴以每秒 7~9m 左右的速度降落。受到时速 30km 左右雨滴冲击后，地表面就会出现小坑，如果这样的雨滴“像瀑布一样”倾注的话，裸露的地表面将会怎样呢？据说一次冲击会使直径 1cm 的土粒移动！雨水虽然可以渗入表土层，但是，如果降水量比



①使蒸发



over the surface if the rainfall is more than the seeping quantity per unit time. The overflow runs toward the largest slope, eroding the soil on the surface while making many ruts. With each rain, these ruts become wider and deeper and are finally turned into trenches<sup>①</sup>. If ruts and trenches are formed on the ground, soil will be eroded and the land becomes infertile. Runoff sand and mud may cause all sorts of damage and disasters. However, the exuberant vegetation, which looks like an opened umbrella, can help conserve water and prevent soil erosion and other calamities.

**Gene cells of huge species.** Tropical rainforests are the earth's most diverse ecosystem with the biggest gene cells. They are home to most continental species. There are about 250 000 types of flowering plants on the earth, of which 170 000 grow in the tropics: 80 000 in America, 40 000 in A-

每个单位时间的入渗量还多,雨水就会“像倒水桶似的”溢满地表面。溢出的雨水在坡地向最大坡度的方向径流,边侵蚀地表面的土壤,边冲刷出许多被称为雨沟的小沟。每当降雨,雨沟就会变宽和加深,不久就会发展成称为雨裂的小槽。如果形成小沟和小槽,不仅大量的土壤流失,土地贫瘠,而且径流到下游的泥沙还会产生各种损坏和灾害。但是有了热带雨林,其茂密的植被就像一把撑开的巨伞,起到保持水土、防止灾害的作用。

**巨型物种基因资料库** 热带雨林是陆地上最大的物种库和基因库,地球陆地上的大部分物种都生活在热带林中或与热带雨林有联系。全世界的有花植物近25万种,约有17万种生长在热带;大约有8万种生长在热带美洲,4万种生长在热带亚洲,3.5万种生长在

①凹槽

