雲南珍稀樹木

RARE TREES IN YUNNAN PROVINCE

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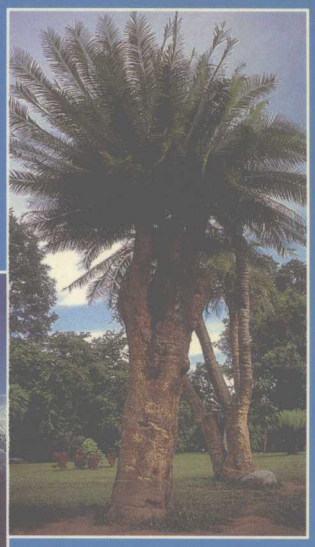

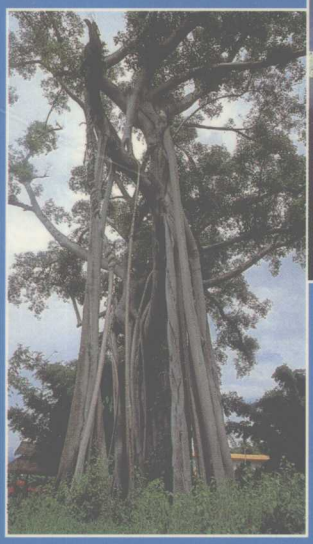

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雲南珍稀树木

RARE TREES IN YUNNAN ROM

冯志舟　杨绍增　王辽
Feng Zhizhou　Yang Shaozeng

云　南　省　林　业　科　学　院
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编　　委　张裕农　尹嘉庆　朱用亨
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Translated by: Liu Zongre
Designed by: Wang Tian

前　言

FOREWORD

云南省总面积为39.4万平方公里，占中国国土面积的4%，而种子植物总数却高达17000种，占全国的一半。其中许多珍贵、稀有、濒危与特有树种是最重要、也是最为人们所关注的。在中国植物红皮书中所列国家保护的354种植物中，云南有154种，占43.5%，在第二批公布保护的637种植物中，云南有187种，占29.4%，其中树木占了大多数。森林是云南最主要的植被类型，也是生物多样的源泉，其蓄积量在中国各省中位居第三。在云南，组成森林的乔木树种有800多种，各种森林类型多达105个，其丰富程度也为中国之冠。可以说，云南是世界上植物及生物多样性最丰富的区域，也是世界上进行植物研究和生物多样性保护的关键地区。

特殊的地理环境和气候，复杂的植物区系，是构成云南植物种类丰富多样、起源古老、特有属和特有种多的主要原因。从位置上看，云南省位于中国的西南部，东连广西壮族自治区和贵州省，北邻四川省，西北隅则与西藏自治区相接。全省边境线长3207公里，分别与缅甸、老挝、越南毗邻，恰好处于亚洲南部差异十分显著的三大自然地域（青藏高原区域、东亚季风区域和中南半岛季风热带区域）相互联接的部位。从地形上看，云南地势从西北向东南倾斜，起伏很大。海拔最高点为德钦县梅里雪山的卡格博峰，高6740米，最低点是河口县南溪河与元江汇合点，海拔仅76.4米。在一个省范围内，地势高低悬殊如此之大，在中国是少有的。全省地形以不同海拔高度呈梯层的高原面为主体，含有高原面以上的高耸山地、古夷平面—高原面、剥蚀面、河谷、盆地等五大类地貌，山地和高原占94%。不同地貌的镶嵌又构成了错综复杂、多种多样的地貌组合。

从气候上看，云南处于低纬地带，北回归线在中部偏南的地方横贯东西。总的说来省内热量充足，大气环流以西风环流和西南季风交替控制为主，一年之中，半年为干季，半年为雨季，是比较典型的季风气候。在南北相距仅910公里、八个纬度的范围内，从南到北有北热带、南亚热带、中亚热带、北亚热带、暖温带、寒温带、高山寒带等七个气候带出现，相当于在中国跨过20多个纬度带（北纬18°—42°）气候的缩影。有的地区，如从卡格博峰到山脚的澜沧江边，直线距离仅12公里的范围内，就有从干热河谷到雪山冰漠的多种气候带，可谓“一山分四季，十里不同天”，

是非常独特的立体气候。另外，全省各地气温、降水、积温、湿润状况有很大差异，滇中元江河谷年平均温度在24° C以上，而滇西北的德钦地区仅为4.7° C，一处是酷暑难当的干热河谷，另一处却是常年雪封冰冻的高寒山区；有年降雨量高达4600毫米的独龙江，也有不足300毫米的金沙江河谷，相当于中国南部海南岛至东北长春市的温差，又有南海诸岛到西北内蒙的降水差异。整个云南，没有干旱气候，只有湿润、半湿润、半干旱三个类型的气候，因而非常适合植物、特别是森林的生长发育。

地史上，在距今几百万年前的第三纪末和第四纪初，大陆板块漂移导致的印度板块与亚洲板块的对接碰撞，引起了喜马拉雅造山运动和青藏高原抬升，使滇西北形成了高峻的横断山系。由于位置偏南，加之高大山系的阻挡、河谷局部的温暖环境以及错综复杂的地形地貌，因而在第四纪冰川时期，云南的山岳冰川发育和冰期的交替变化与欧美不同，所受冰川影响甚小，形成了“生物避难所”，使发生在各个地质时代的许多古老植物历经劫难而得以保存，成为“孑遗植物”，从而给科学界提供了研究古生物和地球演变的“活化石”。滇东南（还有广西南部与越南北部地区）是古老植物特有属种的保存中心，大量第三纪古老植物的后裔在此得以生存。而滇西北横断山脉的高山地带，不仅藉助河谷避难所保存了许多古老植物群，而且随着地层抬升、环境的高寒特化，新生和分化了适应于高寒、干旱环境的温寒带植物区系成份和植物群落，从而成为新的植物属种分化中心。复杂而悠久的地质历史及生态条件，使云南在植物地理上形成了丰富多样的植物区系，既处于泛北极植物区和古热带植物区的过渡线上，又处于中国 — 喜马拉雅森林植物亚区和中国 — 日本森林植物亚区的过渡区。双重过渡区的位置，使各个区的不同植物种群在此大量汇聚、交流、蕃息。

现存的众多珍、稀、濒、特植物中，最有价值的是起源古老的孑遗植物。中国有第三纪古热带孑遗植物20属，它们中的大部分云南几乎都有，仅西双版纳就有12属30多种。以其形成年龄而论，少则数万年，多则数百万年、乃至上亿年。在4.4亿年前开始的早古生代志留纪就已出现并繁茂生长、曾经是恐龙主要食料的蕨类植物“桫椤”（树蕨），目前在其它地方仅见于化石中，而云南却至今还生长着众多的群落，是人们进行古植物研究的对象。裸子植物苏铁科也是极为古老的，人们在三亿多年前的石炭纪地层中发现了它的化石。中国不断发现新的苏铁种群，苏铁属(cycas)的记录由4种增加到现在的16种，且均分布在云南，且多为特有种。在裸子植物中，云南具有除南洋杉科外的全部现存科属，其中拥有众多的本区特有种，且许多种类是珍贵的用材，并能组成广袤的森林。被子植物中较原始的木兰科

也曾广布于全球，迄今许多地方早已绝迹，而云南省现今还有11属110余种，占全国该种类的70%以上。

除起源古老的种类外，云南特有种属植物众多。在中国种子植物204个特有属中，云南有108个，特有植物则多达1000余种。 一些中国特有的单种科，如马尾树科、连香树科、水青树科、伯乐树科、杜仲科和银杏科，以及一些单种属植物，如长蕊木兰、合果木、见血封喉等，在云南均有生长。值得注意的是，特产云南的稀有树种分布地域狭窄，有时仅在某一山沟出现，而在邻近山沟就没有，个体数量稀少；有些则往往深藏在广阔的常绿阔叶林中，如华盖木、翠柏等。在热带雨林和季雨林中，龙脑香科、楝科、番荔枝科、肉豆蔻科等多种树种，共同组成高大茂密的复层森林。中国产的12种龙脑香科树种，云南有5属8种、1变种，组成望天树林、娑罗双林等七种龙脑香林，它们是研究热带北缘雨林的重要群落。此外，云南还蕴藏着一些东南亚的特有植物，如隐翼、四数木等。近年来随着林学和植物学工作者调查研究的不断深入，又发掘出一些珍稀树种，如贡山县丙中洛石门关一带的大片野生贡山棕榈等，它们将为科学研究提供宝贵的新资料。

众多的珍稀濒特树种，向人类提供了食物、药材，工业原料和种质资源，成为人类生存所需而难得的资源之一。它们中有木材遇水即沉的黑黄檀、紫柚木等硬木树种；有多种名贵家具用材“红木”树种；有被誉为“中国桃花心木”的楝科树种；有较高药用价值的红豆杉、杜仲、银杏等；还有一些树种可提取香精、鞣料、树脂、纤维....等工业原料；有的可做蔬菜，供人们食用。更有著名的观赏植物，如珙桐、杜鹃、山茶等。事实上，有些植物种类，其价值还未被人们所知，尚待人类去发现和利用。

云南还有许多栽培植物的野生类型及近缘种，它们对于研究栽培植物的起源，以及培育和改良品种具有重要意义，如野茶树、野荔枝、野芒果、野核桃、野龙眼、山韶子、干果木、滇龙眼等。这些树种是珍贵的育种种质资源，有较高的科学和经济价值。

然而在近代，在人类不断增多的经济活动的影响下，森林正不断地大面积消失，人类对资源的开发利用到了“杀鸡取卵”、“竭泽而渔”的地步，许多珍贵树种已经灭绝，或濒于灭绝，如因其树皮具药用价值而遭到极度破坏的贡山厚朴、木材花纹色泽甚为美观的黑黄檀,榉木等即[illegible]此。加之一些种群本身生活力差，繁殖困难，适应环境的能力很弱，当生境遭受破[illegible]的延续受到威胁，种群数量锐减。科学研究表明，一个物种[illegible]会影响[illegible]统食物链的正常循环，常常导致其它许多种出现生存危机。

为了保护这些具有特殊科学意义和经济价值的珍稀濒特树种资源，中国政府多

次制定和颁布了保护政策和法律，并在云南省先后建立了104个各种类型的自然保护区（其中6个为国家级），总面积达192万多公顷，占全省土地总面积的4.9%，对种类繁多的珍稀濒特树种进行就地保护。同时，还组织大批专家学者，对遍布云南城乡的数千株百年以上的名木古树进行详细查考，各地则依据云南省政府发布的有关法令，根据每株树木的生长情况，采取不同的管理保护措施，使古木逢春。这一切为人类最大限度地利用生物资源和种质资源创造了条件，同时也为动植物的繁衍生息提供了良好的自然环境。对于那些因受人类严重干扰，或自然衰落的树种，当它们无法或难以在自然环境中繁衍时，则迁地予以保护。云南省林业科学院自1959年成立以来，和许多科研教学单位一道，曾不间断地致力于本省树种的调查和研究，并建立了昆明树木园和西双版纳普文热带树木园，专事有用树种的搜集、研究和珍稀濒特树种的引种与迁地保护工作，取得了很大的成绩。国家林业部依托于云南省林业科学院在1995年建立了“云南珍稀濒特森林植物保护和繁育重点实验室”利用现代科研手段进行深入系统的研究。

幸运的是，越来越多的人已逐步认识到：生物多样性保护是全球性应予关注的事业，而珍稀濒特物种的保护拯救工作则是生物多样性保护工作中最重要的环节之一，是社会经济与生态环境可持续发展的基本保证。保护和发展这些大自然留给我们的宝贵资源，既为我们这一代，也为我们的子孙后代。

Yunnan Province has an area of 394,000 square kilometers, accounting for 4 percent of the national total. But it boasts 17,000 species of spermatophyte plants, half of the national total. Some of rare and endangered species in the province have aroused great attention of the world. Among the 354 state-protected plant species listed in the *Red Book of Plants in China* 154 are from Yunnan, accounting for 43.5 percent, and among the second group of state-protected 637 plant species 187 are from Yunnan, accounting for 29.4 percent, of which majority are trees. Forests make up most part of vegetation in Yunnan, and they are a source of biological diversity. The province's forest growing stock ranks third among all the provinces and autonomous regions in China. More than 800 arbor species are found in Yunnan forests, and Yunnan has the largest number of forest types – 105. We may say that Yunnan Province is the richest region in the world in terms of plant and biological diversity, and thus a key region for plant study and the protection of biological diversity.

Peculiar geographical environment and climate and complex flora are the main factor in producing so many plant varieties and having preserved ancient and endemic genera and species. Yunnan lies in southwestern China with Guangxi Zhuang Autonomous Region and Guizhou Province to its east, Sichuan Province to its north and Tibet Autonomous Region to its northwest. Along its 3,207 kilometers of border line there are Myanmar, Laos and Vietnam, right along the junction of the three very different natural geographical zones in southern Asia – the Qinghai-Tibet Plateau, the East Asian Monsoon Zone and the South-Central Peninsula Monsoon Tropics.

The terrain in Yunnan Province declines from northwest toward southeast with a large drop. The highest point is Kagebo Peak of the Meili Snow Mountains in Deqin County – 6,740 meters above sea level; while the lowest point is at the confluence of the Nanxi and Yuanjiang rivers in Hekou County – only 72 meters above sea level. Such a big drop is rare in other parts of China. The landforms look like an escalator – composed of five layers one above another: high mountainous land, high plains, erosion land, river valleys and basins. Mountainous land and highland make up 94 percent of the total area of the province, and different landforms intermingle with each other to create more landforms.

Yunnan Province lies at low latitudes. The Tropic of Cancer runs at 23°23'from east to west in the middle little to the south of the province. Heat is plenty. The westerly atmospheric circulation and southwesterly monsoon dominate the province alternately. Half of the year is dry season and other half is rainy season, a typical monsoon climate. From south to north spanning 910 kilometers over eight degrees of latitude there are seven climatic zones: northern tropics, southern subtropics, middle subtropics, northern subtropics, warm temperate zone, cold temperate zone and alpine frigid zone. Yunnan Province is an epitome of climate in China crossing more than 20 degrees of latitude (from 18°N to 42°N). Some areas, such as that from Kegebo Peak to the Lancang River at the peak's foot over a straight distance of merely 12 kilometers there are many climatic zones from dry, hot river valley to snow mountains and to ice wilderness along a vertical line. Local people say: "Four seasons exist at the same time in one mountain and different weather is found within five kilometers." Yunnan presents a very unique vertical climatic phenomenon.

Temperature, precipitation, accumulated temperature and humidity vary greatly from place to place in Yunnan Province. The annual mean temperature in the Yuanjiang River Valley in central Yunnan is over 24°C while that in Deqin in northwestern Yunnan is only 4.7°C. In the dry, hot river valley the heat is unendurable and at the same time in the mountains it is cold with ever-present snow. The annual precipitation along the Dulong River is 4,600 millimeters, while that in the Jinsha River Valley is less than 300 millimeters. The temperature difference within Yunnan Province is the same as that from Hainan Island in the south to Changchun City in the north, and the precipitation difference is the same as that from the South China Sea to Inner Mongolia in the northwest. In Yunnan Province there is no arid weather but three climatic types exist – the wet, semi-wet and semi-dry. It is ideal for plants, especially for forests to grow.

Several million years ago at the end of the Tertiary and the beginning of the Quaternary Period, continental drift caused the collision between the Indian Plate and the Asian Plate to lead to the Himalayan orogenic movement and the rise of the Qinghai-Tibet Plateau. The Hengduan Mountains rose in northwestern Yunnan Province to block the cold from the north. Due to the warm environment of the river valleys and complex landforms, the growth of mountain glacier and its changes in Yunnan Province were different from those in Europe and the Americas. The glacier impact on the region was minimum and thus a "biological refuge" took shape which has preserved many ancient plants from various geological periods. These relic plants are "living fossils" for scientists to study paleontology and the earth's evolution.

Southeastern Yunnan Province (also some areas in southwestern Guangxi Zhuang Autonomous Region and northern Vietnam) is a preservation center of endemic species of ancient plants. A great number of descendants of plants from the Tertiary Period can be found there. The river valleys in the high Hengduan Mountains in northwestern Yunnan have saved many ancient plants. New and differentiated species evolved as the land rose and the climate became cold. Complex and long geological history and ecological conditions have developed diverse flora in the plant geography in Yunnan Province. They are located

in the transitional line between the Pan-Arctic Floral Region and the Palaeo-Tropical Floral Region as well as on the transitional line between the Himalayan Forest Plant Sub-Region and the China-Japan Floral Sub-Region. The two transitional regions make it possible for various plant populations to gather, exchange and multiply there.

Among the extant rare, endangered and endemic plant species, relic species are the most valuable. There are in China 20 genera of plants left from the Tertiary Period and most of them can be found in Yunnan. Xishuangbanna alone boasts more than 30 species of 12 genera. Some of them have existed over thousands of years and some of them over tens of million years, even 100 million years. The tree fern, main food for dinosaurs, was flourishing in Yunnan Province during the Silurian Period of the Paleozoic Era 440 million years ago. Only its fossils have been found in other parts of the world but it grows in Yunnan in large communities. Fossils of sago cycas, a kind of gymnosperm, were found in the Carboniferous stratum of 300 million years old. In recent years, new sago cycas populations have been discovered in China and its number of genera has increased from four to 13. Seven of them grow in Yunnan and most of them are endemic varieties. Many kinds of sago cycas are of medicinal value and can form extensive forests. Lily magnolia, a fairly old family of angiosperm, was once distributed all over the world. It has become extinct in many places. But Yunnan today has more than 110 varieties in 11 genera, accounting for 70 percent of the national total.

Yunnan also has many special plant species. Among the 204 endemic genera of spermatophyte Yunnan has 108, and the province has more than 1,000 endemic species. Plants of monospermous families such as *Rhoipteleaceae, Cercidiphyllum japonicum, Tetracentron sinense, Bratzchneideraceae, Eucommia Ulmoides* and *Ginkgoaceae* and some monspermous plant genera such as *Alcimandra cathcartii Dandy, Paramichelia baillonii* and *Antiaris toxicaria,* grow in Yunnan too. It is worthy to note that rare tree species special to Yunnan are distributed in narrow areas. They may be found in one mountain gully and cannot be found in a nearby mountain gully, and their number is very small. They often hide deep in immense evergreen broadleaved forests of canopy wood and cypress. Trees of the *Dipterocarpaceae, Melia azedarach, Annonaceae* and *Myristic fragrans* families form the multiple layers of tropical and monsoon rain forests. Of the 12 varieties of *Dipterocarpaceae* family native to China, Yunnan have eight varieties and one variant in five genera, comprising seven types of borneo camphor forests such as wangtian Chinese parasol tree and gurjunoiltree forests. They are important for the study on the northern fringe tropical rain forests. Besides Yunnan has plants special to Southeast Asia such as cypteronia and tetramela. In recent years as the study on forestry and botany deepens some and rare tree species have been discovered, including large stretches of wild Gongshan palm trees at Shimenguan in Bingzhong, Gongshan County. They provide new information for scientific research.

Many rare, endangered and endemic tree species are an indispensable source of food, medicine, industrial raw material and germplasm for human beings. The wood of some trees is so heavy it sinks in water; "red wood" is used to build high-class furniture; the Chinaberry wood is acclaimed as "Chinese peach flower heart wood;" and ormosia fir, eucommia and ginkgo trees are of very high medicinal value. Some trees provide industrial raw materials such as essence, tanning material, resin and fiber; some are edible as vegetables; and still some are decorative trees such as Chinese parasol, azalea and camellia. The value of many trees is to be yet discovered and utilized.

Many wild plants and their coenospecies in Yunnan are of great importance for the study on the origin of plant cultivation and the cultivation and improvement of strains. They include wild tea tree, litchi, mango, Chinese walnuts, longan, capulasn, *Xerospermum* bonii and Yunnan longan. The germplasm source is of high scientific and economic value.

But in modern times forests have been disappearing in large stretches due to the influence of ever-increasing economic activities. Humankind has reached the stage of "collecting eggs by killing the hen" and "catching fish by drying the lake" in their resource development. Many tree species have gone extinct or at the brink of extinction. Among them are the Gongshan official magnolia because its bark can be used as medicine, Banna black wingceltis and beech because their wood has beautiful veins and luster. Some populations have weak capability of survival, some have difficulties in reproduction and some cannot adapt themselves easily to environmental changes. When their living environment is damaged their existence is threatened and their population decreases sharply. Scientific study has proved that the extinction of a species will affect the normal cycle of the biosystem's food chain, which often threatens the existence of many other species.

In order to protect the resources of rare, endangered and endemic tree species with their special scientific significance and economic value, the Chinese government has formulated policies, promulgated several laws, and established 104 nature reserves (six of them are national) in Yunnan Province. The nature reserves have a total area of 1.92 million hectares, making up 4.9 percent of the total territory of the province. The government has also organized large numbers of specialists and scholars to conduct meticulous surveys on the several thousand trees of 100 years old or older in the cities and rural areas all over the province. Local governments followed relevant decrees of the Yunnan provincial government to protect every old tree according to its growth conditions. All this is for creating conditions for humankind to tap biological and germplasm resources in the best way and provide good natural environment for animals and plants to flourish.

Some tree species that cannot reproduce in natural environment due to human disturbance or natural degeneration will be moved to other places for protection. Since its founding in 1959 the Yunnan Academy of Forestry Science has cooperated with many scientific research institutes and schools in investigation and research on tree species in Yunnan Province. It established the Kunming Tree Park and the Xishuangbanna Puwen Tropical Tree Park, and has made tremendous achievements in collection of and research on useful tree species and in introduction and protective relocation of rare, endangered and endemic tree species.

It is fortunate that more and more people have come to realize that the protection of biological diversity is a cause commanding worldwide attention, and the protection and saving of rare, endangered and endemic species is one of the most important links in the protection of biological diversity, the basical guarantee to ensure sustainable development in social economy and ecological environment. Let's protect and develop the resources that Great Nature has bestowed on us, for our generation and future generations.

梅里雪山的卡格博峰海拔6740米，为云南省最高峰，雪线以下是茫茫无际的原始森林。

Kagebo Peak of the Meili Snow Mountains is 6,740 meters above sea level. Below the snow line of this highest peak in Yunnan Province are boundless primeval forests.