



秦岭植物志

增补

种子植物

李思锋 黎 斌 主编



科学出版社

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北京

内 容 简 介

本书收录、记载了最近 30 年来秦岭植物区系中增补的种子植物 413 种（含种下等级），隶属于 90 科 153 属，附有插图 267 幅，其中，有《秦岭植物志》中遗漏或新记录的 6 科，61 属。本书科的编排，裸子植物按郑万钧、傅立国（1978）系统，被子植物按恩格勒系统。科以下分类等级的编排，则主要依据《秦岭植物志》和《中国植物志》。每种植物按中名、别名、拉丁名及其主要文献引证、常见异名及其主要文献引证、形态特征、花果期、分布、生境及用途等顺序编写。书后附有书中植物种类的中名索引、拉丁名索引及秦岭种子植物名录，便于查阅和检索。

本书可供植物分类学、植物区系学、植物地理学、植物生态学、植物资源学、生物多样性保护、农业、林业、园林园艺、中医药等专业及植物学师生、资源及环境保护工作者、植物爱好者等参考使用。

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李思锋，男，研究员，汉族，享受国务院特殊津贴的专家，陕西省有突出贡献专家，陕西省劳动模范，陕西省“三五”人才，陕西省“三秦学者”特聘研究员。1960年11月生，陕西富平人。1982年毕业于兰州大学生物系，先后任中国科学院西北植物研究所植物分类研究室主任、副所长，陕西省微生物研究所所长。现任陕西省西安植物园园长，陕西省植物研究所所长，陕西省植物资源保护与利用工程技术研究中心主任，中国植物学会理事，陕西省植物学会副理事长。主要从事系统与演化植物学，植物资源保护与利用研究工作。先后主持国家和省部级研究课题30余项，发表论文70多篇，出版专著5部，获陕西省科技进步奖5项。

Professor LI Sifeng, was born in Fuping county of Shaanxi province in November, 1960. He is a recognized expert receiving special allowance of the State Council of China. He is also entitled as the Model Employee and 'Sanqin Scholar' of Shaanxi province. After graduated from the Department of Biology of Lanzhou University in 1982, he had served as the director of Research Centre of Plant Taxonomy of the Northwest Institute of Botany, the Chinese Academy of Sciences, associate director of Northwest Institute of Botany, and the director of Shaanxi Institute of Microbiology. Now he is the director of Shaanxi Xi'an Botanical Garden, the director of Shaanxi Institute of Botany, the director of Research and Engineering Centre of Shaanxi province for Plant Resource Conservation & Utilization. He serves also as a board member of the Chinese Society of Botany, and the deputy chairman of the Botanical Society of Shaanxi province. His researches focused on plant taxonomy and conservation & utilization of plant resources and had completed over 30 of both state and provincial level research projects. He published more than 70 scientific papers and 5 books. He has won 5 prizes of Shaanxi Province Scientific and Technological Advances Award.



黎斌，男，副研究员，汉族。1973年5月生，重庆梁平人。1996年毕业于兰州大学生物系细胞生物学专业，先后在中国科学院西北植物研究所植物分类研究室、西北农林科技大学生命科学学院从事植物学科研、教学工作。现任陕西省西安植物园（陕西省植物研究所）植物多样性研究室主任，陕西省植物学会理事。主要从事植物分类学、植物多样性保护、秦巴山区植物资源调查与开发利用等研究工作。先后主持或参加国家级研究课题8项、省部级及地市级研究课题24项。发表论文32篇，参编专著4部，获陕西省科技进步奖1项。

Associate Professor LI Bin, was born in Liangping county of Chongqing city in May, 1973. He graduated from the Department of Biology of Lanzhou University in 1996 and majored in cell biology. Since then, he was working and teaching in Research Centre of Plant Taxonomy of Northwest Institute of Botany, the Chinese Academy of Sciences, and in the Life Science College of the Northwest Agriculture & Forestry University. Now he is the director of the research section of plant diversity, Shaanxi Xi'an Botanical Garden (Shaanxi Institute of Botany), and a board member of Shaanxi Botanical Society. His principal areas of research include systematic botany, plant diversity conservation, and investigation & utilization of plant resources in Qinling-bashan Mountains. He had directed or had participated 8 state level research projects and 24 provincial or local research projects. He published 32 scientific papers and co-edited 4 books. He has won one prize of Shaanxi Province Scientific and Technological Advances Award.

序

秦岭山脉东西走向，横亘于中国中部，壤接甘肃、陕西、河南三省，东西长 800 余千米的绵延山体，气势磅礴，巍峨壮观。《禹贡》、《诗经》、《山海经》对秦岭均有历史记载，久远的历史让秦岭具有厚重的文化底蕴。

《秦岭植物志》历 20 余年，在大量野外调查和采集标本的基础上编纂而成，无疑是国人自主创新的成果。囿于国家的大力支持，《中国植物志》以及各省（自治区）植物志都陆续完成，是中国植物学界值得庆幸的盛事。《秦岭植物志增补》是国内为数不多的地区性植物志再版或增补者之一，可见陕西省对植物志编研工作的重视和支持，十分可贵。

秦岭向东至淮河一线是中国南北的自然分界线，秦岭南北坡在生物区系、植被类型、地貌特征和气候特点等方面均显分异，孕育着丰富的生物区系，也是植物分类学、植物生态学、植被学和植物区系地理学研究不可忽视的关键节点。

在《秦岭植物志》出版 20 余年后，陕西省西安植物园和陕西植物研究所诸君经数十次的再调查、采集、鉴定、考订、补充，编撰成《秦岭植物志增补》，新增 6 科、增补 61 属、增 400 余种植物的科学记载。值此，秦岭山脉地区的植物达 164 科、1052 属、3841 种，植物物种在全国著名山脉中仅次于横断山脉，居第二位，足显秦岭山脉植物多样性的丰富度。

新增的 6 科中主要分布于北坡的有茨藻科 (Najadaceae)，铁青树科 (Olacaceae)、大血藤科 (Sargentodoxaceae)、茶茱萸科 (Icacinaceae)、小二仙草科 (Haloragidaceae)、假牛繁缕科 (Theligonaceae) 主要分布于南坡。特别值得一提的是假牛繁缕科（原属茜草科，后独立成科），现有 3 种，属欧亚温带型的地中海区至西亚（或中亚）和东南亚间断分布类型，其中 1 种原分布于中国西南部（川西），今发现于秦岭南坡，显然向北推进不少，在植物区系地理分布研究上很有意义。

对已出版植物志的再版增补或修订是植物志工作的延续和发展，有条件的地区应适时加以推进，让植物志书在植物资源利用、生态环境保护 and 生物多样性保育中不断发挥应有的作用。

是为序。

中国科学院院士



2012 年 8 月 17 日于昆明

Foreword

The magnificent Qinling Mountains range runs 800 kilometres from east to west across central China, bordering on Gansu, Shaanxi and Henan. The range, well documented in ancient Chinese classics such as *Yu Gong*, *Shi Jing* and *Shan Hai Jing*, boasts a profound cultural legacy left behind by its age-old history.

Flora Tsinlingensis, the compilation of which spanned well over two decades, is the result of substantial efforts in field surveys and specimen collection. It is, with no doubt, an independent and original work by the team of researchers. With the unwavering support of our government, the compilation of *Flora of China* and provincial floras has been completed in succession. This is surely an outstanding achievement by the botanical community in China that calls for celebration. *Flora Tsinlingensis (Supplement)* is one of the rare efforts by local authorities to reprint or supplement local flora, which just goes to show the importance attached and the much valued support given to the project by the government of Shaanxi Province.

The Qinling Mountains range and the Huaihe River provide a natural boundary between the north and the south of the country. There remain differences in biota characteristics, vegetation types, geomorphic characteristics and the features of climate between the northern side and the southern side of the Qinling Mountains. The Qinling Mountains serves as a cradle of such rich and colorful biotas here, and it is also a key link that could not be ignored for the study of botany, plant ecology, and vegetation science as well as biogeography.

Twenty years later after *Flora Tsinlingensis* having been published, with dozens of times re-investigation, recollection, evaluation, the researchers from Xi'an Botanical Garden and Shaanxi Institute of Botany compiled *Flora Tsinlingensis (Supplement)* by adding 6 families, 61 genera and more than 400 species of vascular plants which have not been recorded in *Flora Tsinlingensis*. Up to now, the plant resource in Qinling Mountains area reaches 164 families, 1 052 genera, 3 841 species. Its species amount compared with other well-known mountains across the country is just second to Hengduan Mountains range, and that precisely tells the abundance of plant diversity in Qinling Mountains range.

Najadaceae is one of the six newly added families, and it is mainly distributed over the northern slope of the Qinling Mountains. The others including Olacaceae, Sargentodoxaceae, Icacinaceae, Haloragidaceae and Theligonaceae, are all distributed over the southern slope of the Qinling Mountains. Theligonaceae (which was included in Rubiaceae and becomes an independent family of its own), with 3 species, belongs to disjunctive distribution type over

the Mediterranean in Eurasia temperate zone, west Asia (or central Asia) and southeast Asia. One of its species which was originally distributed over southwest China only is now also found in the southern slope of the Qinling Mountains. So it turns out that its distribution pushes northward a lot, and that is significant for the study of floristic geographical distribution.

New additions or revisions to published flora are the continuance and development of flora. Those regions with preferable conditions should continually promote this project to bring its functions in utilization of plant resources, ecological environment protection and nurturing biological diversity into full play.

It is with great pleasure that I wrote this foreword.

Academician of Chinese Academy of Sciences

Prof. Wu Zhengyi

Kunming August 17, 2012

前 言

秦岭横亘于陕西南部，是中国中部呈东西走向的最大山脉，素有“华夏龙脉”之称。它东起河南伏牛山，西至甘肃岷江，北临渭河，南界汉水，位于东经 $104^{\circ}30'$ — $112^{\circ}52'$ ，北纬 $32^{\circ}50'$ — $34^{\circ}45'$ ，东西长逾 800 千米，南北宽为 140—200 千米。秦岭山脉北坡陡峭，南坡相对平缓，山体高大雄伟，层峦叠嶂，河谷深切，主脊平均海拔约 2500 米。主峰太白山海拔 3767 米，为中国大陆青藏高原以东的最高山峰。秦岭在中国自然地理气候研究中具有重要的地位与作用，是长江和黄河两大水系的分水岭和重要的水源涵养地，暖温带与北亚热带气候的分界线和我国南北重要的地质分界线。

特殊的地理位置、多样的气候类型和丰富的地貌类型，加之由于受第四纪冰川的影响较小，为秦岭众多生物种类（特别是古老、珍稀、特有植物）的产生、繁衍和保存提供了各种各样的生境和条件。秦岭不仅植物种类繁多，特有程度较高，是地球同纬度上生物多样性最丰富、生态环境最优越的地区之一，而且区系成分复杂，是中国—日本森林植物区系和中国—喜马拉雅森林植物区系的交汇地带和天然分界。因此，具备丰富的物种多样性、茂密的森林植被及保存有东亚地区最完整的山地生态系统的秦岭山脉，不仅是中国中西部地区的天然生态屏障，而且也是全球生物多样性热点地区、中国生物多样性关键地区之一。

秦岭宝贵独特的植物资源，一直强烈地吸引着国内外的自然博物学家和植物分类学家。19 世纪下半叶至今，国内外学者对秦岭地区植物资源的调查、采集、引种、开发利用等活动从未间断过。20 世纪 60 年代，在国务院“关于利用和收集我国野生植物原料的指示”的号召下，西北植物研究所开展了秦岭地区植物资源调查研究，并着手进行《秦岭植物志》的编撰。此后 20 余年间，经过几代科学家的努力，于 1971—1985 年先后完成《秦岭植物志》各卷册的编写，由科学出版社出版。这部著作对秦岭地区的植物资源第一次进行了系统、全面、详细的记述，已出版 3 卷 7 册。其中，第 1 卷共 5 册，对秦岭地区 158 科 991 属 3426 种（含种下等级）种子植物的形态特征、地理分布及主要用途进行了详细叙述。作为地区性植物学巨著，《秦岭植物志》已经成为该地区植物分类学工作者的标志性研究成果之一，成为研究秦岭植物资源的必备工具书和志书编著的重要参考，成为了解与鉴定秦岭地区植物类群、开发利用植物资源、进行有关植物学研究的最基本的文献资料，在秦岭地区植物资源保护与开发利用以及社会经济建设诸多方面都发挥了重要的作用，在国内外产生了重大的影响。

在持续性的野外考察、标本采集与分类学研究的基础上，对已出版的植物志进行查漏补缺和修订，是从事该地区植物分类学、植物资源学研究者的一项基本的、长期的工作任务。对于秦岭这样一个具有丰富的生物多样性，同时又是划分中国南北和北亚热带与暖温带典型气候区域的关键地区，这种持续性研究工作尤显重要。《秦岭植物志》出

版 20 多年来,随着调查和研究工作的持续开展和不断深入,在秦岭地区陆续发现了许多新物种和分布新记录,散布在国内外数百份植物学刊物上。此外,限于历史条件和认知水平,后来发现有少数种类的分类学处理甚至存在严重错误。

为了更全面地反映秦岭地区的种子植物多样性,弥补《秦岭植物志》之遗漏,更改其个别错误,也为了有效地保护和利用这些珍贵的植物资源,从 20 世纪 90 年代末期开始,陕西省西安植物园、陕西省植物研究所李思锋研究员、黎斌副研究员就带领着课题组全体成员,对秦岭地区植物资源进行了全面系统的调查,收集、整理有关文献和资料,到相关标本馆、标本产地进行物种的考订、查证。尤其自 2006 年以来,在国家、陕西省及陕西省科学院等相关研究项目的资助下,课题组成员跋山涉水,风餐露宿,对秦岭山脉的植物资源进行了数十次调查,足迹踏遍秦岭的山山水水,采集、鉴定了 25 000 余份标本,发现了许多新记录类群及新类群,并对最近几十年来秦岭地区植物分类学研究的新成就和新进展进行了系统总结。几度春秋寒暑,几多困苦艰辛,终使这部《秦岭植物志增补》即将付梓。

本书收录、记载了自《秦岭植物志》出版以来近 30 年间秦岭植物区系中增补的种子植物 413 种(含种下等级),隶属于 90 科 153 属,其中,有《秦岭植物志》中遗漏或新记录的 6 科 61 属,并附有插图 267 幅。至此,秦岭地区有种子植物 164 科 1052 属 3839 种。其物种数量在我国著名山脉中仅次于横断山脉。

本书科的编排,裸子植物按郑万钧、傅立国(1978)系统,被子植物按恩格勒系统,科以下分类等级的编排,则主要依据《秦岭植物志》和《中国植物志》。每种植物按中名、别名、拉丁名及其主要文献引证、常见异名及其主要文献引证、形态特征、花果期、分布、生境及用途等顺序编写。书后附有书中植物种类的中名索引、拉丁名索引及“秦岭种子植物名录”,便于查阅和检索。

本书的编写,得到了国家科技基础性工作专项重点项目“秦巴山区生态群落与生物种质资源调查(2007FY110800)”、陕西省“13115”科技创新工程重大科技专项(2010ZDKG-03)及陕西省科学院科技计划项目等项目的资助,还得到了陕西省西安植物园、陕西省植物研究所、陕西省科学院、陕西省科技厅、陕西省林业厅、陕西省财政厅、西北农林科技大学及陕南各市县林业局、自然保护区、森林公园等单位的支持和协助,在此我们致以诚挚的谢意,并向为本书的物种调查、标本考订、文献资料查证作出贡献的有关专家和支持这一工作的各位同仁,表示衷心的感谢。向已 97 岁高龄还为本书作序的吴征镒院士表示由衷的敬佩和衷心的感谢。

限于我们的水平,书中疏漏和不妥之处,敬请广大读者批评指正。

李思锋 黎 斌

2012 年 10 月

于西安植物园

Preface

Being the largest mountain ranges running east-westward in central China, the Qinling Mountains are considered as one of the most magnificent and critical landscapes, and important natural heritages of China. These mountains range cover an area of about 120 000 km², roughly about 800 km long (from east to west) and 140—200 km wide (from north to south) corresponding to 104°30' E—112°52' E and 32°50' N—34°45' N, delimited by the Funiu Mountain in Henan Province at the east, the Minjiang River in Gansu Province at the west, the Weihe River at the north, and Han River at the south. The Qinling Mountains consisting of tall and majestic mountains and hills and deep valleys are characterized with steep slopes on their northern side and relatively flat slopes on their southern side. The average elevation of the main range is above 2 500 meters, with Taibaishan, the summit of the ranges with an altitude of 3 767 meters, being the highest mountain of China to the east of the Qinghai-Tibet Plateau. The Qinling Mountains are critical geological, geographic and climate barriers and landmarks dividing the warm temperate and northern subtropical zones of China. They are also the water-shed and the most critical reservoirs of water resources of the two river systems of China, Yellow River and Yangtze River.

Thanks to the unique geographic locations, diversified climate and topological habitat, and the geological history less impacted by the Quaternary Glaciations of the mountains, numerous biological species, particularly ancient relict, rare and endemic species, could survive and diversify in these mountains. The Qinling Mountains offer the most majestic habitat and harbor the richest flora with high endemism and complex floristic elements among the areas of the belt on the earth with the same latitude. In floristic classifications, the Qinling Mountains are the frontier and transitional region between the Sino-Japanese and Sino-Himalayan forest floristic Regions. With high species diversity, dense forest and well-preserved and most complete mountain ecosystem in eastern Asia, the Qinling Mountains become not only the most important natural ecological barrier and biodiversity key area in central to western China, but also a hotspot of global biodiversity.

The rich and unique plant resources in the Qinling Mountains have attracted both Chinese and western botanists and naturalists for long. Since middle 19th century, continuous botanical resource investigation, collection, introduction and development studies have been conducted by Chinese and western scientists. In 1960s, a comprehensive investigation was performed in this area by Northwest Institute of Botany of the Chinese Academy of Sciences, following the call “Utilization and Collection of Wild Plant Resources of China” issued by the

State Council of China, and started to compile the *Flora Tsinlingensis*. With over 20 years great efforts of several generations of botanists, volumes of the *Flora Tsinlingensis* were completed and published during 1971~1985 by the Science Press. As the first and most complete, comprehensive and detailed documentation, the *Flora Tsinlingensis* was published with 3 volumes and 7 issues. The Volume One was published with 5 issues and recorded 3 426 species (including intraspecific taxa) belonging to 158 families and 991 genera. The detailed morphology, distribution, and uses were described for each species. As a comprehensive local flora, the *Flora Tsinlingensis* was considered as an important milestone of plant taxonomical research in China. The flora is becoming a valuable tool and standard reference for botanical studies to identify species and plant resource preservation and utilization in the Qinling Mountains, significantly impacting both scientific and economic development of the region, and is becoming recognized both in China and abroad.

It is a fundamental and long-lasting task for local taxonomists and plant resource researchers to revise and amend published floras of a region based on continuous field explorations, specimen collections and taxonomic studies. Such continuous efforts are particularly important for a region like the Qinling Mountains with extreme high biodiversity and as a critical geological and geographical belt dividing the south and north of China and the north subtropical and warm temperate climate zones of China. Over the 20 years after the publication of the *Flora Tsinlingensis*, new species and new distribution records in the Qinling Mountains were sparsely published in hundreds of different botanical journals. Some serious errors in this flora concerning taxonomic treatments of a few species were also found.

In order to amend the *Flora Tsinlingensis* and correct its errors, to reflect more completely the biodiversity of seed plants, to preserve and utilize plant resources in the Qinling Mountains more efficiently, Professor Li Sifeng, Associate Professor Li Bin and their staff from Xi'an Botanical Garden of Shaanxi Province and the Institute of Botany of Shaanxi Province have performed systematic field investigations, collections, literature studies, and herbarium examinations since late 1990s, to confirm and revise each species of plants from the Qinling Mountains. Particularly since 2006, research projects were funded by the state, Shaanxi Province and Shaanxi Academy of Sciences to support the related investigations. With these supports, the team members have conducted tens of thorough field expeditions to search every corner of the mountains by camping in the wild, and over 25 000 specimens were collected and identified with quite some new taxa and new records found. A survey of literature was also performed to summarize the recent progresses of plant taxonomic research concerning the Qinling Mountains. Years of hard working in both fields and the laboratories finally result in the completion of the "*Flora Tsinlingensis (Supplement)*".

In this *Flora Tsinlingensis (Supplement)* recorded are 413 species (including intraspecific taxa) newly found to the science or to this region during the last 30 years. These species belong to 90 families and 153 genera (6 families and 61 genera were newly found). 267

illustrations were also presented. Up to now, 3 839 species belonging to 164 families and 1 052 genera are known to the Qinling Mountains. The species richness in these mountains is just next to the Hengduan Mountains among the mountains of China.

For the arrangement of families, the system of Zheng Wanjun & Fu Liguó (1978) was adopted for gymnosperms, and the system of Engler was adopted for angiosperms. For the arrangements of intra-familial ranks, the relevant systems adopted in the *Flora Tsinlingensis* and *Flora of China* were followed. Each species was described with its Chinese name, Chinese synonyms, the scientific name and its citation, common synonyms and their citations, plant morphology, flowering and fruiting phenology, distribution, habitats, common uses, etc. Indexes to species Chinese names, scientific names were prepared, and a name list of seed plants known to the Qinling Mountains was also presented for reader's convenience of use.

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Critical comments and reviews from experts and readers are cordially invited.

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