

青藏高原横断山区科学考察丛书

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横断山区苔藓志

中国科学院青藏高原综合科学考察队

科学出版社

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BRYOFLORA OF HENGDUAN MTS
(SOUTHWEST CHINA)

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THE SERIES OF THE SCIENTIFIC EXPEDITION
TO QINGHAI-XIZANG PLATEAU

BRYOFLOA OF HENGDUAN MTS
(SOUTHWEST CHINA)

**The Comprehensive Scientific Expedition
to the Qinghai-Xizang Plateau, Academia Sinica**

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内 容 简 介

本书介绍我国横断山区的自然概况、苔藓植物的区系特点、特有植物的分布中心和苔藓植物各大类的系统描述,显示了横断山区独特的自然条件、苔藓植物的复杂性和特殊性。全书包括该地区苔藓植物的86科、294属及934种(含亚种、变种和变型)的科、属形态特征描述、属和种的检索及种的详细特征图和地理分布介绍。

本书适合于从事植物学、林业、生物多样性研究的科研人员以及国际植物界的研究机构学者、大专院校师生、医药科研机构人员阅读。

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《青藏高原横断山区科学考察丛书》序

辽阔的青藏高原，包括西藏全部、青海南部，以及四川西部和云南西北部。大部分地区海拔在4000m以上，四面以巨大的落差急剧下降，衬托出世界屋脊的磅礴气势，素有“世界第三极”之称。由于青藏高原独特的地质历史和自然条件，以及丰富的生物组成和生物群落类型，使之成为地球上一个独具特色的地理单元。青藏高原蕴藏着丰富的自然资源，又是许多少数民族生活和居住的地区，且地处边陲，合理保护和开发这一地区的自然资源，对发展经济，改善人民生活，以及巩固民族团结和加强国防建设都有重要的意义。

为了探索青藏高原形成和演变的历史，研究自然条件的特点及其对周围环境的影响，研究自然资源的数量和质量及其合理开发利用的途径，解放以后，中国科学院对这里进行了多次科学考察，特别是自1973年起组织了青藏高原综合科学考察队，对这一地区进行了更为全面、系统的综合性研究。

1973—1980年期间，考察队重点对西藏自治区进行了考察。其科学成果将集中反映在陆续出版的《青藏高原横断山区科学考察丛书》（西藏部分）及论文集和画册中。有些成果在实际生产中已得到推广和应用，在国际和国内产生了深远的影响。

考察队从1981年起将考察研究的重点转移到横断山区。横断山地处我国西南的藏东、川西和滇西北一带，是青藏高原的一个组成部分。在行政区域上包括西藏自治区的昌都地区，四川省阿坝、甘孜、凉山及云南省丽江、迪庆、怒江和大理等地（州）区，总面积约50万平方公里。

横断山脉在地质构造上处于南亚大陆与欧亚大陆镶嵌交接带的东翼，是我国东部环太平洋带与西部古地中海带间的过渡地带。地质构造复杂，新构造运动活跃。本区地势由西北向东南倾斜，大部为高山峡谷，山脉、河流南北纵贯，相间并列，高差很大，自然地理条件独具一格，生物区系绚丽多彩，且富含古老和孑遗类型，是研究生物和地学中许多重大理论问题的关键性地区。

横断山脉自然资源丰富，尤以多种矿产、水利、森林、草场等资源最为丰富。但是随着人口的增长和开发利用的加剧，自然资源承受的人类压力日益加大，有些地区生态平衡遭到破坏。为了合理利用自然资源，必须研究本区的自然资源特点，探索其合理保护利用与开发的方向和途径。

横断山区科学考察工作主要围绕六个课题进行：①横断山脉形成的原因和地质历史；②横断山区自然地理特征及其与高原隆起的关系；③横断山区自然垂直地带的结构及其规律；④横断山区生物区系的组成；⑤横断山区自然保护与自然保护区；⑥横断山区自然资源的评价及其合理开发利用。

为了使科学考察研究更密切地与当地的经济开发工作结合起来，在自然资源评价与开发利用方面着重抓了农业自然资源条件与自然资源系列制图；亚高山暗针叶林采伐与

更新；地方能源的综合利用；畜牧业发展战略及干旱河谷农业自然条件与开发利用等五项综合专题的考察研究。

横断山区的综合科学考察研究工作由中国科学院—国家计委自然资源综合考察委员会负责组织领导。参加此次考察研究的包括中国科学院有关研究所、高等院校和地方科研与生产部门等单位计 40 余个，约 300 多人，涉及 40 多个专业。

《青藏高原横断山区科学考察丛书》将系统地总结青藏高原综合科学考察第二阶段的成果。

《青藏高原横断山区科学考察丛书》计划有横断山区农业自然条件与农业自然资源评价、横断山区的地方能源资源、横断山区亚高山暗针叶林采伐与更新、横断山区畜牧业、横断山区干旱河谷的自然条件与农业资源开发利用、横断山地质构造、横断山区镁铁—超镁铁岩、横断山区锡矿带和富碱侵入岩带地球化学与成矿、横断山区花岗岩类地球化学、横断山区地层、横断山区古生物、横断山区哺乳动物化石与生活的环境、横断山区地热与水热活动区名录、腾冲地热、横断山区自然地理、横断山区地貌与第四纪地质、横断山区气候、横断山区冰川、横断山区泥石流、横断山区土壤地理、横断山区森林、横断山区植被、横断山区沼泽与泥炭、横断山区湖泊综合研究、横断山区自然垂直带结构特征及分布规律、横断山区植物（横断山区古植物、横断山区地衣、横断山区真菌、川西地区大型经济真菌、横断山区苔藓、横断山区维管植物）、横断山区鸟类、横断山区哺乳类动物、横断山区昆虫、横断山区鱼类、横断山区两栖爬行动物志、横断山区甲壳动物。我们希望它能在探索青藏高原的奥秘和我国社会主义建设中发挥积极的作用。

中国科学院青藏高原综合科学考察队

PREFACE OF "THE SERIES OF THE SCIENTIFIC EXPEDITION TO THE HENGDUAN MOUNTAINS OF THE QINGHAI - XIZANG PLATEAU"

The vast Qinghai-Xizang Plateau, consisting of the Xizang (Tibet) Autonomous Region, the southern part of Qinghai, western part of Sichuan and northwestern part of Yunnan, is often eulogized as the third polar of the world. The major parts of the Plateau are 4000 metres above sea level, while the areas around drop drastically setting off the tremendous momentum of the roof of the world. The particularities of the geological history and physical conditions, the variety of biological composition and the different types of bio-communities make the Qinghai-Xizang Plateau a unique geographical unit. As the Plateau, being rich in natural resources, lies on the border regions where inhabit many national minorities, the rational conservation and utilization of the natural resources in this region is of particular importance in developing economy, improving the local livelihood and consolidating national solidarity as well as strengthening national defence.

Ever since the foundation of new China have many scientific surveys been carried out in this region so as to make a better understanding of the history of the formation and evolution of the Qinghai-Xizang Plateau, to study the characteristic of its natural conditions, their effects on the environment around and the quantity and quality of the natural resources and thus, to find a way of exploiting and utilizing them rationally. Especially after the forming of the Qinghai-Xizang Plateau Comprehensive Scientific Expedition team in 1973, an even more comprehensive, systematic research has being made on this region.

A survey was mainly carried out on the Xizang (Tibet) Autonomous Region during the period of 1973—1980. The scientific findings of the survey, part of which have already been extended and applied to production and have brought a far-reaching influence both inside and outside China, will be concentratedly compiled in the series of scientific survey on Qinghai-Xizang Plateau (Xizang Volume), proceedings and pictorials.

Since 1981, the survey team has shifted its major research area to the Hengduan Mountains Region which is a constitutional part of the Qinghai-Xizang Plateau and is located in the east of Xizang, west of Sichuan and northwest of Yunnan in southwest China. The total area of this region is about 0.5 million square kilometres and administratively including the Changdu district of Xizang, Aba, Garzê, Liangshan of Sichuan and the Lijiang, Dêqên, Nujiang and Dali districts of Yunnan.

The Hengduan Mountains is complicated in geological structure and active in new tectonic movements. It lies on the east flank of the juncture where south Asia and Eurasia are mounted. It is the transitional region between the east zones encircling the Pacific and the west zones of ancient mediterrapian. The altitude of this area declines from northwest to southeast. Most parts of the area are characterised by a series of paralleled mountain ranges and rivers from south to north, and with

a sharp altitudinal differentiation. Its unique physical conditions and variety ecosystems being rich in flora and fauna with abundant relic species, give the area a critical nature for the fundamental research in the field of biology and earth science.

The Hengduan Mountains Region is abundant in natural resources, among which multi-mineral products, hydrological resources, forest and grasslands account for the great part. But with fast growth of the population and an extensive exploitation and utilization of the natural resources, the human pressure on natural resources has vastly increased which even caused librium damagement in some part of the area. In order to make a more reasonable utilization of natural resources, it is necessary to study the characteristics of the resources in this region so as to work our certain ways and methods for protecting, utilizing and exploiting them rationally.

There are six major subjects in the research work being carried out in the Hengduan Mountains: 1. The geological history of the Hengduan Mountains; 2. The physiographical characteristics of the Hengduan Mountains Region and their relationship with the rise of the Plateau; 3. The structure and rule of the altitudinal belts of the Hengduan Mountains Region; 4. The composition of bio-communities in the Hengduan Mountains Region; 5. The natural conservation and nature reserves in the Hengduan Mountains Region; and 6. Evaluation of the natural resources in the Hengduan Mountains Region and their rational development and conservation.

Five integrated projects have also been given special attention in the research on natural resources evaluation, ex poilation and utilization. They include as following: compilation of a series of maps on the conditions of agricultural resources; deforestation and regeneration of subalpine coniferous forest in subalpine areas; the multiple utilization of local energy resources; strategy for the development of animal husbandry and finaaly the management of the natural resources in the arid valleys. This has been done in line with the purpose of linking scientific research closely to the development of the local economy.

The integrated survey on the Hengduan Mountains Region is organized by the Commission for Integrated Survey of Natural Resources under the Chinese Academy of Sciences and the State Planning Committee. There are more than 300 people, coming from more than 40 institutions including different institutes of the Chinese Academy of Sciences, universities and local scientific research and production departments engaged in natural resources research. A series of scientific publications on the Hengduan Mountains will provide the results aquired from the second phase of the integrated scientific survey in the Qinghai-Xizang Plateau. It is designed that this series will consist of 39 volumes and 48 monographs. It is also expected that this series will play an important role in exploring the wonders of the Qinghai-Xizang Plateau and in the construction of China.

The Comprehensive Scientific Expedition
To the Qinghai-Xizang Plateau,
The Chinese Academy of Sciences

《横断山区苔藓志》前言

横断山脉是指“川滇境内南北纵贯并列的山川……对我国东西……阻隔很大，尤以其间的金沙、澜沧、怒江三大峡谷，江岭相间，山高谷深，成为交通上的‘横断’，近代地理书上遂以‘横断山脉’称呼这一区域的高山”（严德一，1956）。本书系根据1981年起由中国科学院青藏高原综合考察队统一组织全国科研和教学单位的数以百计的植物学家等翻山越岭，风餐露宿，历尽艰险，自西藏东南部、四川西南部和云南西北部向南延伸至云南中西部边疆的野外考察所获得的数万号苔藓植物标本为基础，进行全国大协作，共同研究和统一编写。因此，本书采用的横断山区的地理概念是较为广义的。横断山区由于金沙、澜沧和怒江三大江所形成的独特的地理环境为动植物提供了甚为良好的生态环境，迄今仍保存着数以万计的动植物种类。同时，还有大量中国特有和东亚特有的属、种集中分布在这一地区的山川河谷附近。植物方面包括苔藓植物在横断山区存在一个极其独特的中国和东亚特有属的分布中心（Gao et al., 1981; Li, 1981; Wu et Lou, 1981; 罗健馨、汪楣芝, 1983、1986; Wu, 1992; 黎兴江等, 1995）。无疑这一特有现象为探讨和解释中国植物区系的形成、发生和发展起了十分积极的作用。本书将为我国提供该地区全面的、近代苔藓植物的第一手材料，对今后更深入地探讨和研究喜马拉雅山系的影响也是有力的依据。由于横断山区地域辽阔，在数年内完成一大植物类群深入的研究极为艰巨。本书谨供作为今后进一步研究该地区苔藓植物区系和地理分布的“敲门砖”。

回顾苔藓植物的研究历史，对横断山区苔藓植物的调查始于19世纪末期，当时多限于横断山区的边缘地区，参与研究的有 E. Bescherelle (1892)、M. A. Coppey (1912)、V. F. Brotherus (1922, 1924, 1925) 以及 W. E. Nicholson、Th. Herzog 和 F. Verdoorn (1930) 等人。国人最早深入该地区进行苔藓植物考察的为王启无 (1935, 1936)，他在现被称之为贡山地区直至西双版纳范围内采集了数以万计极其宝贵的苔藓植物标本。19世纪30年代，陈邦杰先后在峨眉、马边、雷波等地区广泛考察了苔藓植物，为对该地区的研究奠定了基础。1960年前后，徐文宣和黎兴江分别在云南玉龙山和四川西部马尔康作了较全面的苔藓植物调查，分别发表了《云南丽江玉龙山苔藓植物的垂直分布》（徐文宣，1962）和《川西高山林区的苔藓植物》（黎兴江，1963）。1964年，陈邦杰、吴鹏程就王启无在贡山一带采集的叶附生苔类植物，首次报道了该地区叶附生苔类植物的6个种，其中新种2种。1974、1980和1981年罗健馨在横断山区的边缘山区峨眉山和卧龙自然保护区作了苔藓植物的全面考察。罗健馨和汪楣芝在1983年和1986年分别报道了《横断山脉东亚光萼苔科植物的分布中心》和《横断山脉苔藓植物特有属和新记录初报》。70年代，杨俊良在四川德钦和泸定，李乾在四川二郎山和峨眉山等地专程作了苔藓植物考察。其间，林邦娟和李登科先后考察了峨眉山。高谦、曹同等在木里、雅安和峨眉山等地区广泛采集了苔藓植物。辛宝栋和李乾在贡嘎山东坡和二郎山，秦自生和郑庆珠在卧龙和峨眉山等地亦调查了苔藓植物。1988年，吴鹏程随成都生物研究所自成都经峨眉山、青城山再转汶川县，在松潘县的黄龙寺、南坪县的九寨沟、红原县的鹧鸪山及马尔康一带进行了苔藓植物的调查。

开展横断山区苔藓植物全面和系统的调查始于 1981 年。在中国科学院青藏高原综合科学考察队统一组织下,李渤生、陈伟烈、王金亭、郎楷永和汪楣芝在西藏东南部的察隅和墨脱地区调查。1981 年 5—7 月,李渤生、王金亭、郎楷永、李良千从云南维西县等地考察;罗健馨、汪楣芝则自昆明出发,经保山县和泸水县翻越高黎贡山,经腾冲、盈江县至下关;黎兴江、王立松自大理经丽江至中甸。同年 6—9 月,黎兴江、汪楣芝、王立松由中甸县翻越白马雪山至德钦县,又自乡城县至德荣县、稻城县、理塘县、巴塘县和芒康县一带考察。1982 年 4 月,汪楣芝、张大成、臧穆和王立松由维西县翻越碧罗雪山、经福贡县上高黎贡山,再经贡山县翻越松塔山。7 月中旬由贡山进入独龙江地区,经西藏察隅县、左贡县的瓦堡等地,再翻越梅里雪山,至 10 月上旬返回云南德钦县。1983 年 6 月下旬,汪楣芝和王立松等由四川渡口市经盐边县、米易县和盐源县的百灵山和火炉山至木里县;在 8 月下旬王立松、李沛琼和夏群由四川木里县至云南中甸县一线连续考察 3 个月;与此同时,何思和费勇由四川南坪县的九寨沟,经松潘县的黄龙寺,转若尔盖、红原县、阿坝县、马尔康县的梦笔山和柏树林、康定县、雅江县的剪子湾山、卡子拉山和海子山,再入理塘县和稻城县,直至 9 月下旬结束。1984 年,倪志诚、程树志和苏永革在西藏墨脱地区定点越冬,对南迦巴瓦峰进行深入的苔藓植物垂直分布调查,并由黎兴江发表了《南迦巴瓦峰的丛藓科植物研究》和《南峰地区苔藓植物区系》两文,为该地区的苔藓研究揭开了序幕。

本书是 1985 年由中国科学院青藏高原综合科学考察队主编的《西藏苔藓植物志》的姊妹篇,两者相互间有共同之处,但也有相当程度的差异。事实上,《横断山区苔藓志》系《西藏苔藓植物志》的续篇,两者共同构成了迄今青藏高原较为完整的苔藓植物区系。这一事实同时为中国苔藓植物区系增添了极其重要的基本资料,将会成为开拓我国苔藓植物研究的一个新起点。

《横断山区苔藓志》因已有《西藏苔藓植物志》为基础,同时为节省篇幅以减轻出版费用,本书不采用传统的所有分类单位均有详细描述的方式,而是取用科属具描述,各种无描述的格式。凡一个科内具 2 个至 2 个以上的属,一个属内含 2 个至 2 个以上的种,均须有检索表。另一方面,各种必须有较详细的采集记录,或是在引用的标本量太大时,则仅择代表性标本作为本书的记录。此外,部分种类附有分布图。

本书是在中国科学院青藏高原综合科学考察队统一领导下,1984 年经昆明会议确定,本项工作由植物研究所主持,苔藓植物标本由植物研究所和昆明植物研究所分别进行初步的分门别类后交全国 9 个单位 20 余位专家研究。1985 年在上海自然博物馆又进行了具体协商,并确定了全书基本分工和编写格式,并仍采用《西藏苔藓植物志》的文责自负的原则,但为了避免因参加人员较多和在术语以及格式上的不一致,最后作了必要的统稿。

本项目进行过程中,还得到中国科学院植物研究所、中国科学院昆明植物研究所和上海自然博物馆领导的积极支持,以及中国科学院沈阳应用生态研究所、华东师范大学、西安植物园、中国科学院华南植物研究所、中山大学和东北林业大学各单位通力协作才得以完成,并承中国科学院植物研究所傅燕凤女士协助翻译本书前言英文稿。因此,《横断山区苔藓志》是我国苔藓植物学界继《西藏苔藓植物志》后的又一重大集体结晶。

吴鹏程 汪楣芝

一九九八年六月一日

BRYOFLORA OF HENGDUAN MTS

(SW China)

Foreword

Hengduan Mts Range means "the mountains in length and breadth from south to north and side by side in Sichuan and Yunnan, greatly separated from east to west in China, especially three giant gorges of Jingsha, Lanchuang and Nujiang alternated with mountains and rivers, with high mountains and deep valleys, which turn into 'transverse' in communication, in the modern geographical book named mountains in this region as Hengduan Mts Range" (Yan Deyi, 1956). This book is a great cooperation, comprehensive studies and unified compilation based on thousands of bryophyte specimens collected by hundreds of scientists from scientific and teaching units organized by Integrated Investigation Team of Qinghai-Xizang Plateau, the Chinese Academy of Sciences through field investigation from southeast Xizang, southwest Sichuan, and northwest Yunnan, southern toward border areas of middle-west Yunnan in the condition of crossing over mountain after mountain, enduring the hardships of an arduous fieldwork and undergoing through all kinds of hardships and difficulties. The geographical concept of Hengduan Mts Range adopted in this book is fairly broad sense. Due to three big rivers of Jinsha, Lanchuan and Nujiang, the unique geographical environment in Hengduan Mts Range has provided an excellent ecological environment for plants and animals, and thousands of plants and animals have remained in this area so far. At the same time, a large amount of endemic genera and species of China and East Asiatic endemic genera and species concentrated distribute at the near mountains and rivers in this area. In Hengduan Mts Range, plants, including bryophytes exist extremely unique distributive center of endemic genera to China and East Asiatic genera (Gao et al., 1981; Li, 1981; Wu et Lou, 1981; Lu Jiangxin, Wang Meizhi, 1983, 1986; Wu, 1992; Li Xinjiang etc., 1995). No doubt, this particular phenomenon has played a very important role on discussion and explaining the formation, generation and development of the flora of China. This book will provide first hand materials of whole and modern bryophytes of this region and will also provide powerful materials for further discussion and study the influence of the Himalayas. Because of vast territory in Hengduan Mts Range, within several years to fulfil the study of such large plant group is very difficult. This book will only be "a stepping-stone to success" for further study of flora of the bryoflora and geographical distribution in this region.

Looking back the history of bryophyte study, the investigation of bryophytes in Hengduan Mts Range had been started at the middle of 19th century. During that time, the investigation was only limited at the marginal areas in Hengduan Mts Range. The scientists who joined the investigation were E. Bescherelle (1892), M. A. Coppey (1912), V.

F. Brotherus (1922, 1924, 1925), W. E. Nicholson, Th. Herzog, F. Verdoorn (1930), etc. The Chinese scientist who early went this region for bryophyte investigation was Q. Y. Wang (1935, 1936), he collected thousands of very rare bryophyte specimens in present named Gongshan area to Xishuanbanna. In 30's of the 19th century, B. J. Chen did extensively investigation of bryophytes at Omei, Mabian, Laibo, etc. early or later, and paved the way for the research of this area. Round about 1960, W. X. Xu and X. J. Li did fairly complex investigation of bryophytes at Mt. Yulong in Yunnan and Maerkang in west Sichuan, who separately published *The Vertical Distribution of Bryophytes at Yulong Mountain of Lijiang in Yunnan* (HsU, 1962) and *Bryophytes at Forest Areas of High Mountain in West Sichuan* (Li, 1963). In 1964, B. J. Chen, P. C. Wu firstly reported 6 species of epiphyllous liverworts, among them there were two new species in the epiphyllous liverworts collected by Q. W. Wang at Mt. Gong. In 1974, 1980 and 1981, J. X. Luo did comprehensively investigation of bryophytes at Mt. Omei and WoLong Nature Reserve of marginal mountains in Hengduan Mts Range. In 1983 and 1986, J. X. Luo and M. Z. Wang separately reported *The Distribution Center of East Asiatic Porellaceae in Hengduan Mts* and *The Preliminary Study on the Endemic Genera and New Record of Bryophytes in Hengduan Mts*. In 70's, J. L. Yang collected bryophytes at Dexin and Luding G. Li did at Mt. Erlang and Mt. Omei in Sichuan. During that time, B. J. Lin and D. K. Li investigated at Mt. Omei, Q. Gao, T. Cao etc. did extensively collection of bryophytes at Muli, Yaan, Mt. Omei, etc. B. D. Xin and G. Li investigated bryophytes at Mt. Gongge and Mt. Erlang, Z. S. Qin and Q. Z. Zheng at Mt. Wolong and Mt. Omei. In 1988, P. C. Wu, with the scientists in Chengdu Institute of Biology investigated bryophytes from Chengdu to Mt. Omei, Mt. Qinchen, then turned to Wenchuan County, Wanglongshi at Songpan County, Jiuzhegou at Nanping County, Mt. Zhougu and Maerkang at Hongyuan County.

The work of comprehensive and systematic investigation of bryophytes in Hengduan Mts range began in 1981. Under the unified organization of the Qinghai-Xizang Plateau Comprehensive Scientific Expedition Team of the Chinese Academy of Sciences, Li Bosheng, Chen Weilie, Wang Jingting, Lang Kaiyun and Wang Meizhi did investigation at Cayu and Mutuo in southeast Xizang. From May to July of 1981, Li Bosheng, Wang Jingting, Lang Kaiyun and Li Liangqian did expedition at Weixi County, etc. in Yunnan; Luo Jiangxin, Wang Meizhi did expedition started from Kunming, through Baoshan County and Lushui County, crossing Mt. Gong at GaoLi, through Tengchong, Yinjiang counties to Xiaguan. At the same year of June to Sept, Li Xinjiang, Wang Meizhi, Wang Lisong investigated from YuLong Mt. Snow at Lijiang County through Zhongdian County crossing Beima Mt. Snow to Dexin County, and from Xiangcheng County to Derong County, Daocheng County, Litang County. Batang county and Mangkai County. In April of 1982, Wang Meizhi, Zhang Dacheng, Zhang Mu and Wang Lisong collected from Weixi County crossing Bilou Mt. Snow, through Fugong County to Mt. Gong at GaoLi, and through

Gongshan County crossing Mt. Songta. At the middle of July, they entered Dulong Jiang area from Gongshan, through Cayu County, Wabao at Zhuogong County in Xizang region, than crossing MeiLi Mt. Snow, back to Dexing County in Yunnan at the first ten days of October. At the last ten days of June in 1983, Wang Meizhi and Wang Lisong, etc. did expedition from Dukou Municipality in Sichuan through Yanbian County Miyi County and Mt. Beilin at Yanyuan County and Mt. Hulou to Muli County. At the last ten days of August, Wang Lisong, Li Piequn and Xia Qun did consecutively investigation for three months from Muli County in Sichuan to Zhongdian County in Yunnan. At the same time, He Si and Fei Yong investigated from Jiuzhaigou of Nanping County in Sichuan, through HuangLongsi at Songpan County, turned to Luoergai, Hongyuan County, Aba County, Mt. Mengbi at Maerkang County and Cypress Forest, Kangding County, Mt. Jianzhiwan, Mt. Kazhila and Mt. Haizhi at Yajiang County, then entered to Litang County and Daocheng County, and finished at the last ten days of September. In 1984, Ni Zhicheng, Chen Shuzhi and Shu Yongge spend winter at Motuo area in Xizang and did further investigation of vertical distribution of bryophytes at Nanjiabawa Mountain. Li Xingjiang published two articles of *The study of Pottiaceae at Nanjiabawa Mountain* and *Bryoflora at Nanfeng area*, which raised the curtain on the studies of bryophytes in this area.

This book is a sister book of *Bryoflora of Xizang*, Which chiefly edited by the Qinghai-Xizang Plateau Comprehensive Scientific Expedition team of the Chinese Academy of Sciences in 1983. Both had some views in common, but there still existed much difference. Actually, *Bryoflora of Hengduan Mts, S W China* is a sequel book of *Bryoflora of Xizang*, which both of them commonly formed fairly complete flora of Bryophytes in the Qinghai-Xizang Plateau so far. This fact, at the same time, has added very important basic materials for the bryoflora in China, and will open up a new starting point for the study of bryophytes in China.

Because of the base of *Bryoflora of Xizang*, and in order to save length of article for decreasing publication funds, *Bryoflora of Hengduan Mts, S W China* did not adopt the traditional method of detailed description for all taxa adopted, but used form of the description for families and genera and no description for every species. Every family with two or over two genera, every genus with two or over two species should have keys to them. On the other hand, every species should be with detailed collection records, or at the situation of adducing large amount of specimens, to select representative specimens as a record of this book. In addition, a part of species were attached distribution maps.

Under the unified leadership of the Qinghai-Xizang Plateau Comprehensive Scientific Expedition Team, and by the determination of Kunming Conference in 1984, the compilation of this book was sponsored by Institute of Botany, CAS. The specimens of bryophytes were classified preliminary by the scientists in Institute of Botany and Kunming Institute of Botany, CAS, to hand over for study by 20 scientists in 10 institutions in China. In 1985, the concrete discussion was done in Shanghai Natural History Museum and defined basic divi-

sion of work and compilation form of the book , and still adopted the principle like the *Bryoflora of Xizang* that the author took sole responsibility for his views. But the necessary unification was done at last in order to avoid varies in teams and forms with many participants.

In the compilation of this book, we extend our sincere gratitude to the actively support of the leaders in Institute of Botany, CAS, Kunming Institute of Botany, CAS and the Shanghai Natural History Museum, and a concerted efforts by the scientists in Shenyang Institute of Applied Ecology, CAS, East China Normal University, Xian Botanical Garden, South China Institute of Botany, Zhangshan University and Northeast University of Forestry, etc. We also extend our gratitude to Mrs . Fu Yanfeng, Institute of Botany, CAS for the English translation of the foreword of this book. For all of these, *Bryoflora of Hengduan Mts, S. W. China* is an important collective fruit after *Bryoflora of Xizang* in bryological circle in China.

Wu Peng-cheng Wang Mei-zhi

June 1, 1998