

Preface | 前言

China is one of the earth's 12 mega-biodiversity countries, and the most diverse country in the northern hemisphere. With more than 30,000 species of vascular plants, more than 1/3 of which are woody plants, the number of plant species in China is higher than in Europe and North America combined. However, a comprehensive atlas of the distribution of woody plants in China has not been yet available though atlases of the species distribution in many western countries were compiled several decades ago. For example, an atlas of the United States trees was published in the 1970s. The atlas of vascular plants in Japan with a vertical resolution of 50 m was compiled in the 1970s. A project for mapping distribution of vascular plants in Europe was launched in 1965, and 13 volumes of the atlas have been published to date. These atlases of plants are of both scientific and practical importance, and provide an indispensable database for understanding the patterns and mechanisms of species distribution, utilizing the biological resources, protecting biological diversity, implementing regional development planning, and predicting ecological responses of plants to global environmental changes.

Why has China lacked of such atlas? This might be primarily due to there being too many species and limited information on the distributions of those species. These make some people think that it is not right time to compile the national atlas for China's plants. However, I don't agree with this opinion. Nothing is perfect, especially for the information on species distribution. For example, in 1817, Alexander von Humboldt drew the first isothermal map based on temperature data from only 58 climatic stations globally, which became the basis for climatic division and physiogeographical study for decades. Japan has completed the atlas for all its vascular plants with a vertical resolution of 50 m in the 1970s with limited information on distribution of plants. Compared with these, China has accumulated copious data on plant distribution through the efforts of the several generations of botanists and ecologists over the past half century. These hard-earned data provide an essential base to systematically compile the atlas of China's plants. Therefore, in my opinion, now it is the time to compile the atlas of China's plants, which is an urgent need for the conservation and sustainable use of biological resources.

The idea of compiling the atlas of China's plants initially came into my mind in the mid-1980s when I was a PhD student in Japan. My dissertation was to examine the relationships between climate and vegetation in China and I strongly felt that China was lacking of the species distribution data. I was very impressed when I saw the detailed spatial explicit distribution maps of vascular plants in Japan, and made a copy of the maps of major species and brought them back to China. They are still kept on my bookshelf now. In

1996, I was touched again when I saw the atlas of the United States trees and European species in McGill University, Canada, where I was a visiting scholar. These two shocks made me long hope that we should have an atlas for China's plants in the near future. In 2003 as the first step of compiling an atlas for all the plants of China, we initiated a project to compile the *Atlas for All the China's Woody Plants*, although without specific funds, because distribution information is relatively rich and the checklist is well-documented for the woody plants in China. As the basic data of the atlas, we first started to construct "Database of China's Woody Plants". We documented the distribution sites for all the species based on specimen records and all the validated records documented in publications. After six years' efforts, this atlas which documents more than 11,000 woody species was eventually published.

In this atlas, we provide distribution maps for more than 11,000 species at the level of counties. We also documented information on climate, primary production and life forms for each species. This atlas contains information on both species and environmental variables, compared with the previous atlases published in other countries or regions.

As above mentioned, we launched this project without specific financial support. However, we have been lucky to have creative human resources and excellent students, who have been dedicated to the collection and compilation of these basic data, which is difficult to yield articles but is critically significant in scientific research and practical use. Here, I would like especially to mention two major contributors of this atlas, Dr. Zhiheng Wang and Dr. Zhiyao Tang, who took major responsibility to complete the atlas. Zhiheng was my PhD student whose PhD project was to examine patterns of China's woody plants and the mechanisms that shape those patterns. He joined my group in his senior year, and I asked him to postpone his defense for his PhD twice to complete the construction of the database of China's woody plants. For this reason, he stayed in my group as a PhD student for eight years. During this period he led a group of students to overcome many problems that data compilations posed and spent six years and finally completed the database, which makes publishing this atlas possible. Zhiyao donated uncounted hours of his time to collect data, check distribution records, collate species name, design maps, and so on. In addition, many staff and students contributed their time in data collection, data input and species name collation. To all of them, I am grateful.

The atlas was based on many sources of information, including a Chinese version (*Flora Reipublicae Popularis Sinicae*) and English version of "Flora of China", and "Seed Plants of China" edited by Zhengyi Wu, "Higher Plants of China" edited by Liguang Fu, and nu-

merous local flora and species surveying reports. The compilation of this atlas would be impossible without these basic, most essential works. Here, I am greatly indebted to all the authors for their efforts. I would also like to thank the botanists and field biologists who reviewed and corrected the distribution records of species. I want to acknowledge many students in the Department of Ecology, Peking University, who assisted this project by documenting distribution data. Mr. Jin'an Lin and Ms. Li Wang of Higher Education Press (China) spent lots of time editing, collating and publishing this atlas. I will like to express my many thanks for all these people. The compilation of this atlas was partly supported by the National Natural Science Foundation of China (Nos: 40638039,

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In spite of our best efforts, errors still remain in this atlas due to our limited knowledge and limited information on species distribution. Please contact us (Email: zytang@urban.pku.edu.cn) and send us your comments so that we can update the atlas in the near future.

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中国是世界上物种多样性特别丰富的国家之一，拥有维管植物约30 000余种，其中1/3以上是木本植物，比北美和欧洲的总和还要多。但中国至今尚没有全面记述这些物种地理分布的图集。这应该说是件十分缺憾的事。早在几十年前，西方国家就已经完成了物种分布图的编制工作。比如，美国于20世纪70年代完成了全美木本植物分布图的编制；日本在20世纪70年代出版了所有维管植物的分布图，物种垂直分布范围的精度达50 m；欧洲也于1965年开始了维管植物分布图的编制工作。这些分布图为揭示物种的分布规律、开发和利用生物资源、开展生物多样性保护、进行区域发展规划，以及预测气候变化的生态影响等提供了不可或缺的基本资料，其科学价值和实践意义是不言而喻的。

为什么中国缺乏这类分布图？物种多、物种分布资料不足又散布于各类文献中，造成了编制工作难度大，这可能是最主要的原因。此外，国内对编制物种分布图的保守认识也是一个重要的限制因素。

据我所知，国内一些人认为，我国物种分布资料不足，目前尚不具备编制植物分布图集的条件。但我不同意这种说法。科学技术的进步是无止境的，大自然的很多现象和规律是逐渐被认知的，否则人类文明就不会进步到今天。1817年洪堡依据全球仅有的58个气象站的气温资料，编制了世界首张全球等温线分布图，是气候分区和自然地理学研究的一个重要里程碑，成为相当长时期内开展相关研究的基石。又如，日本在30多年前就能出版垂直分布范围高达50 m精度的维管植物分布图，不能说他们当时已经掌握了所有物种准确的分布信息。因此，如果等物种分布资料齐全了才编制其分布图，那我们所待何时？事实上，经过广大植物学家、生态学家半个多世纪的努力，我国的物种分布资料已经有了相当深厚的积累，系统编制物种分布图的时机已经成熟，这也是时代发展的迫切要求。当然，随着知识的积累和认识水平的提高，这类分布图的信息需要进一步补充和完善。

编制中国植物分布图是我在学生时代就萌生的愿望。

早在20世纪80年代的中后期，我在日本读书，博士期间的研究课题就是关于中国植物分布与气候关系的研究，实感中国物种分布数据之缺乏。当我看到日本详尽的物种分布图时，那种欣喜若狂至今还记忆深刻，当时我就不加思索地把主要物种的分布图全都复印了下来，带回国内，至今还保存着。1996年，我去加拿大McGill大学做访问学者，看到美国和欧洲也有详尽的物种分布图，又一次受到触动。于是，就产生了将来我们也要编制中国植物分布图的想法。2003年，在没有专项经费支持的情况下，我们决定先编制分布资料较多、种名相对稳定的木本植物分布图，于是启动了“中国木本植物分布图的编制”自设课题。次年，作为编制物种分布图的基础工作，课题组开始了“中国木本植物分布数据库”的建设。历经6年的艰苦工作，这本多达2 000余页的图集终于与读者见面了。

本图集的特点是为11 405个物种提供县级分布信息；每个物种的分布信息在忠实于标本记录的基础上，最大可能地吸收了所有物种分布研究的成果；提供物种分布区的气候资料和分布区初级生产力的平均状况。此外，我们也提供了绝大多数物种的主要生活型信息。本图集的这些特点，既克服了西方国家仅提供物种分布信息的局限性，也满足了人们对分布区气候和物种生活型等基础信息的需求，使其更具实用性。

前面讲过，我们是在没有专项经费的条件下开始此项工作的。我们虽然没有专项经费，但有丰厚的人力资源，有非常优秀的同学，他们愿意献身于这类发表成果难、但有重要科学和应用价值的基础性数据的收集和整理工作。这里，我要特别提到本图集的两位主要作者：王志恒和唐志尧，他们是本图集的主要贡献者。王志恒当时是我的直博生，我给他的博士论文题目就是中国木本植物多样性的分布格局及其机制的研究。他自大三就进入我的研究组，直到博士毕业，一共呆了8年。为了完成数据库的建设，我两度让他推延博士毕业。他带领一批同学，克服物种多、

物种名称杂乱、物种分布信息零散不全等困难,历时6年,终于建成了“中国木本植物分布数据库”,使本图集的编制成为可能。另一名主要作者唐志尧,在物种分布数据收集、分布区和种名校核、分布图制作与设计、编辑和出版等方面,做了主要的工作。可以说,他们二位是本图集编制出版的主要贡献者。此外,很多老师和同学在数据收集和录入、种名校核等方面也做了大量繁杂的工作。

本图集凝聚了几代人的心血和汗水，它是在中英文版《中国植物志》、吴征镒先生主编的《中国植物分布数据库》所记载的物种名录、傅立国主编的《中国高等植物》以及众多地方植物志和调查报告中所记载的物种分布信息的基础上编制出版的。因此，我要特别感谢这些作者们，没有他们的工作，就没有本图集的出版。北京大学生态学系的多位同学参与了数据的收集、整理和校对，以及

分布图的制作等。数据库建成后邀请各地的有关专家对种名和分布区进行了校验和补充。高等教育出版社的林金安先生、王莉女士为本图集的制作、编辑和出版做了大量艰苦而有成效的工作。在此,对他们表示衷心的感谢。本图集在数据收集、整理和出版过程中,得到国家自然科学基金委的部分资助(编号:40638039,90711002,30721140306,40871030,40501025,49971002,39970044,39425003)。

由于我们水平有限,以及现有资料的不足,本图集肯定存在一些纰漏,请读者们批评指正(请联系zytang@urban.pku.edu.cn),以便在修订时改进。

方精云

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于北京大学