

## Preface

Volume 13 of the *Flora of China* is the 13th of a 25-volume work. It includes 33 families, 151 genera, and 1288 species, among which 11 genera and 649 species (50%) are endemic to China, and three families, 14 genera, and 76 species are introduced to China.

Volume 13 is formatted in the same manner as the first 12 volumes of the series: vol. 17 (1994), vol. 16 (1995), vol. 15 (1996), vol. 18 (1998), vol. 4 (1999), vol. 24 (2000), vol. 8 (2001), vol. 6 (2001), vol. 9 (2003), vol. 5 (2003), vol. 14 (2005), and vol. 22 (2006). The following 11 accompanying volumes of the *Flora of China Illustrations* have been published to date: vol. 17 (1998), vol. 16 (1999), vol. 15 (2000), vol. 18 (2000), vol. 4 (2001), vol. 24 (2002), vol. 8 (2003), vol. 6 (2003), vol. 9 (2004), vol. 5 (2004), and vol. 14 (2006). Volume 22 is in production.

Bruce Bartholomew edited the Melastomataceae, Myrtaceae, and Rhizophoraceae, assisted in the early stages by Orbélia R. Robinson. Michael G. Gilbert co-authored and edited the Bixaceae, Cistaceae, Elaeagnaceae, and Thymelaeaceae. Anthony R. Brach co-authored and edited the Crypteroniaceae and edited the Alangiaceae, Clusiaceae, Dipterocarpaceae, Elaeagnaceae, Flacourtiaceae, Nyssaceae, Stachyuraceae, Thymelaeaceae, and Violaceae. Anthony R. Brach and Nicholas J. Turland edited the Ancistrocladaceae, Araliaceae, Begoniaceae, Frankeniaceae, Lecythydaceae, Lythraceae, Onagraceae, Passifloraceae, Tamaricaceae, and Trapaceae. Nicholas J. Turland co-authored and edited the Caricaceae, Combretaceae, and Tetramelaceae and edited the Cactaceae, Cynomoriaceae, Elatinaceae, Haloragaceae, and Hippuridaceae. Nicholas J. Turland checked the nomenclature and carried out the final editing. Peng Hua (彭华), Yang Qiner (杨亲二), and Zhang Libing (张丽兵) corrected errors and omissions in the Chinese and pinyin names. Diana Gunter, Han Xuezhe (韩学哲), Beth Parada, Lisa J. Pepper, Sarah J. VanVickle-Chavez, and Zeng Jianfei (曾建飞) proofread the volume. Nicholas J. Turland compiled the indexes. Rosemary Tanaka typeset the volume for publication.

The 14th volume in the series (vol. 12) will contain 18 families, including the Balsaminaceae, Rhamnaceae, Theaceae, and Vitaceae, as well as the Malvaceae and related families.

Wu Zhengyi (吴征镒)

Peter H. Raven

Hong Deyuan (洪德元)

## Introduction

The *Flora of China* will be published in 24 volumes of text and will account for all known vascular plants of China. The taxa treated in the Flora include all native and naturalized plants, as well as economically important exotics, such as crops or plantation plants. Each text volume will be followed by an accompanying volume of the *Flora of China Illustrations*, which will provide detailed line drawings of approximately 60% of the species treated in the text volumes. A list of the volumes published to date is provided at the end of this book. An introductory volume will complete the Flora.

The Flora generally follows the same sequence of families as in *Flora Reipublicae Popularis Sinicae* (FRPS), i.e., a modified Englerian system that treats the monocotyledons last. However, the circumscription of some families reflects the present understanding of the groups. For example, the Menyanthaceae and Gentianaceae are both recognized, instead of combining them as the Gentianaceae, whereas the Lythraceae, Punicaceae, and Sonneratiaceae are combined as the Lythraceae. Genera and species are arranged taxonomically, or occasionally alphabetically.

Taxonomic treatments are presented from the level of family to species and infraspecific ranks. Although intermediate ranks (e.g., subfamily, tribe, subgenus, section, series) are useful in the taxonomy of certain large families (e.g., Poaceae) and genera (e.g., *Rhododendron*), they are used only sparingly. Accepted names are cited with authors, bibliographic citations, and synonyms, except above the rank of genus when only the name is cited. Each recognized taxon has a description as well as an indication of the number of subordinate taxa and the distribution worldwide. For infraspecific taxa, either subspecies or varieties are recognized. Forms are not treated. All keys are dichotomous, indented, and generally artificial.

The synonymy given is based on close examination of accepted names and synonyms listed in major East Asian floras. At the generic level, synonyms widely used in the literature are included. At the specific and infraspecific levels, only the main synonyms, especially those listed in the floras of neighboring countries, are included. All names based on Chinese material are included. The complete bibliographic citation of synonyms is given only for basionyms or replaced synonyms of accepted names; only the authors' names are provided for other synonyms. The basionym of an accepted name is listed before other synonyms, which are arranged alphabetically. As far as possible, the bibliographic citations of all accepted names and their basionyms have been verified. Names not validly published or misapplied in major East Asian and local Chinese floras are not included in synonymy. Discussions relating to such names are dealt with as notes. Differences of opinion among authors in the circumscription of taxa are mentioned as notes.

Except where no material was available to authors and collaborators, all descriptions are based on Chinese plants. In general, the description of a given taxon does not exceed 130 words. Descriptions of families are followed by the number of genera and species, distribution, and usually other comments, including reference to FRPS accounts. If a species is represented in China by more than one infraspecific taxon, a full description is provided for the species, and only diagnostic features are listed under the infraspecific taxa. If only one infraspecific taxon of a species occurs in China, a full description is given under the infraspecific taxon. Flowering (fl.) and fruiting (fr.) times are usually given by month using the first three letters of the month.

If a single measurement is used, it indicates length. When both length and width are used, the measurements are given as length  $\times$  width. A range of measurements is separated by an en-dash (–). Discontinuous

states within a taxon are separated by the word “or.” Exceptional measurements or character states are in parentheses ( ) or, when applicable only to material from outside of China, in brackets [ ].

The distribution in China is given at the provincial level, listed alphabetically as follows: Anhui, Beijing, Chongqing, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanghai, Shanxi, Sichuan, Taiwan, Tianjin, Xinjiang, Xizang, Yunnan, and Zhejiang. Distributions may also include the special districts of Hong Kong and Macau, but only if the taxon is absent from Guangdong Province. The provincial map is provided on the front- and endpapers of this volume. The distributions are sometimes modified by using the directions C(entral), E(ast), N(orth), S(outh), W(est), or intermediate directions. A taxon endemic to China is marked with a bullet (●) at the beginning of the paragraph on habitat and distribution. Where a taxon is very local, the exact distribution may be given in parentheses. However, localities are not given below the level of *xian* (equivalent to county) or mountain. Elevations are rounded off to the nearest 100 m.

The distribution by country, continent, or area is given alphabetically in brackets [ ] for taxa extending beyond China. Only the countries adjacent to China are explicitly listed, as well as the other countries of tropical Asia from India eastward. These include Afghanistan, Bangladesh, Bhutan, Cambodia, India, Indonesia, Japan, Kashmir, Kazakhstan, Korea, Kyrgyzstan, Laos, Malaysia, Mongolia, Myanmar (formerly Burma), Nepal, Pakistan, Papua New Guinea, the Philippines, Russia, Singapore, Sri Lanka, Tajikistan, Thailand, Turkmenistan, Uzbekistan, and Vietnam. When the distribution extends beyond these countries a generalized range (including Africa, SW Asia, Australia, Europe, North America, the Pacific Islands, and South America) is given.

Whenever available, somatic chromosome numbers are included at the end of descriptions of specific and infraspecific taxa; an asterisk (\*) indicates counts made from Chinese material.

A question mark (?) placed immediately before a synonym, character state in a description, or territory within a distribution indicates that confirmation is required.

Each recognized taxon in the *Flora of China* has one Chinese name, followed by its pinyin transliteration. Three indexes are included at the end of each volume: one for Chinese plant names, another for the pinyin transliterations, and the third for scientific names.

The family names of authors of plant names are written out in full. When it is necessary to use initials to differentiate authors with the same family name, the initials (if any) of the abbreviation published by Brummitt and Powell in *Authors of Plant Names* (Royal Botanic Gardens, Kew, 1992) and its continuously updated on-line supplement (at <http://www.ipni.org/>) are used. The abbreviation “f.” is not used for the Latin *filius*, but the son’s initials are used (e.g., “J. D. Hooker” rather than “Hook. f.”), except when the names of the parent and descendant are identical (e.g., “Linnaeus” and “Linnaeus f.”).

Abbreviations of periodicals are according to Bridson’s *BPH-2 (Botanico-Periodicum-Huntianum*, ed. 2; Pittsburgh: Hunt Institute for Botanical Documentation, 2004), and abbreviations for books follow Stafleu and Cowan’s *Taxonomic Literature*, ed. 2 (*TL-2*; Utrecht/Antwerpen: Bohn, Scheltema and Holkema; The Hague/Boston: dr. W. Junk b.v., 1976–1988) and its supplements. Books and periodicals not included in these two works are abbreviated according to the recommendations in the Appendix of *BPH-2*.

## Acknowledgments

Partial funding of the *Flora of China* project has been provided by the U.S. National Science Foundation (grants BSR-8906215, BSR-9201378, DEB 9626806, DEB 0072682, DEB-0101991, DEB-0343439, DEB-0514279), the National Natural Science Foundation of China, the Starr Foundation, the Chinese Academy of Sciences, the Ministry of Science and Technology of China, and the Stanley Smith Horticultural Trust.

The following botanists are warmly thanked for their reviews of the manuscripts: Frank Almeda (CAS; Melastomataceae), Leslie R. Landrum (ASU; Myrtaceae), Mark Newman (E; Dipterocarpaceae), Orbélia R. Robinson (CAS; Melastomataceae), Norman K. B. Robson (BM; Clusiaceae), Prachaya Srisanga (QBG; Violaceae), and James L. Zarucchi (MO; Hypericoideae). The following are likewise thanked for helping with nomenclatural queries: Richard K. Brummitt (K), Rosemary Davies (K), Kanchi N. Gandhi (GH), Roy Gereau (MO), Werner Greuter (B), and John McNeill (E).

The regional advisors, Eona M. M. Aitken (E), Rudolf V. Kamelin (LE), Kai Larsen (AAU), Jin Murata (TI), Alexei K. Skvortsov (MHA), and Willem J. J. O. de Wilde (L), were asked to review the accounts in this volume. Valuable nomenclatural and distributional comments on taxa occurring in China and neighboring countries were received. Alisa E. Grabovskaya-Borodina (LE) and Ching-I Peng (彭镜毅; HAST) provided valuable assistance.

The directors, curators, and librarians of the following institutions are warmly thanked for their continued assistance in sending loans of specimens and/or providing library or herbarium facilities to the authors and editors of the *Flora of China*: A, B, BM, CANT, CAS, CDBI, E, F, GH, HAST, HIB, HNWP, IBSC, K, KUN, LE, MO, NAS, NY, P, PE, S, SCFI, SZ, TAI, TI, UPS, US, W, WU, XJA, XJU, and YUKU.

Victoria C. Hollowell, Beth Parada, Diana Gunter, and Barb Mack, of Missouri Botanical Garden Press, edited and facilitated publication of relevant preliminary papers in *Novon* and played an important role in finalizing the production of this volume. Amy McPherson (Botanical Society of America) served as Managing Editor for a number of the papers in *Novon*. Thanks are also due to the Editors-in-Chief of *Acta Phytotaxonomica Sinica*, previously Yang Qiner (杨亲二), currently Chen Zhiduan (陈之端) and Qiu Yinlong (仇寅龙), for editing and facilitating publication of relevant papers in that journal.

Many other persons have helped at various stages of the project or contributed directly to the production of this volume. These include: He Si (何思), Robert Magill, Candy McCandliss, Olga Martha Montiel, Song Hong (宋宏), and the late Zhu Guanghua (朱光华). To all of these, the project is most grateful.