

Preface

The Pan-Himalaya, including the Himalaya, the Hengduan Mountains, the Karakoran, and NE Hindu Kosh, constitutes a unique geographic unit of the earth. Mittermeier et al. (2004) identified 34 biodiversity hotspots for the world. Of these, "Himalaya" and "Mountains of Southwestern China" (nearly corresponding to the Hengduan Mountains) fall almost entirely within the Pan-Himalaya, and "Indo-Burma" falls partly within this area.

The classification systems used in *Flora of Pan-Himalaya* are hoped to reflect our current understanding of phylogenetic relationships of the relevant groups. The third edition of the Angiosperm Phylogeny Group system (APG III) is basically adopted for the angiosperms, as it has been used in several major herbaria of the world, and up-to-date phylogenetic systems for the gymnosperms, ferns, and lycophytes are followed for the treatments of those groups. The more recent APG IV system (The Angiosperm Phylogeny Group, 2016) made a few changes after APG III, but it is too recent for the major herbaria to adopt. In fact I had already arranged the catalogue according to APG IV system, but it would involve changes of some families in planned volumes. Therefore the editor-in-chief asked me for still using APG III system. This Flora is probably the first one using the achievements of phylogenetic / phylogenomic analyses. There are many differences between APG III system and the Engler or the Hutchinson classification system adopted in most Floras, so that it is a great challenge for FLPH authors to grasp the scopes and placements of the families recognized. To avoid confusion and omissions, it is urgent to produce a preliminary catalogue for this Flora. The purpose of the compilation of this catalogue is to provide a framework for the compilation of *Flora of Pan-Himalaya*, rather than to provide a complete list of accepted scientific names and synonyms of plants in this region.

The work on this catalogue started in 2010. I consulted major floristic works, checklists, important website resources, and recent papers or monographs related to the Pan-Himalayan region. In the present catalogue, 25 families of angiosperms are added, mainly because of the changes made by the APG III system. However, for gymnosperms, two families are reduced. The Taxodiaceae and Cephalotaxaceae are merged to the Cupressaceae and Taxaceae respectively. More changes have occurred for many genera in the systematic position in their families.

Earlier this year, I sent a draft of the catalogue to the authors of *Flora of Pan-Himalaya*. With kind help of many authors, treatments of many families have been revised. As for those already published volumes, the present catalogue accepts their treatments. Added to the catalogue are many new species published in recent years, such as *Amomum nimkeyense* M. Sabu, Hareesh, Tatum & A. K. Das (2018), *Amomum riwathii* M. Sabu & Hareesh (2018), *Amomum sabuanum* V. P. Thomas, Nissar & U. Gupta (2014), *Hedychium putaense* Y. H. Tan & H. B. Ding (2018), *Monolophus arunachalensis* Bhaumik, S. Dey & Langhu (2017), *Zingiber arunachalensis* A. Joe, T. Jayakr., Hareesh & M. Sabu (2017) in the Zingiberaceae. However, if I found a new scientific name already treated as synonym, the "new species" is not listed, e.g. *Salweenia bouffordiana* H. Sun, Zhi M. Li & J. P. Yue (2011), which is treated as a synonym of *S. wardii* Baker f. by Zhu (2015). Some newly published generic names are not recognized because of recent researches or not recognized by new references. For instances, *Nujiangia* X. H. Jin & D. Z. Li (2012) is included in *Gemmaria* Parl. by Jin et al. (2015); *Kuepferia* Adr. Favre and *Sinogentiana* Adr. Favre & Y. M. Yuan published by Favre et al. (2014) are included in *Gentiana* L. in the Catalogue of

Life website. Some old generic names were reduced by new treatments, e.g. *Kobresia* Willd., which is included in *Carex* L. following Global Carex Group (2015), and *Nomocharis* Franch. is included in *Lilium* L. following Gao Y D & Gao X F (2016).

Generally speaking, the eastern Pan-Himalaya is much richer than the western Pan-Himalaya in species diversity. There are only 617 species of flowering plants recorded from the Wakhan corridor in NE Afghanistan, with 103 species of the Asteraceae, 87 species of the Poaceae, 67 species of the Fabaceae, and only two species of the Orchidaceae (Podlech, 2012). On the other side, the eastern Pan-Himalaya is a biodiversity hotspot, with new species being continuously described even in recent years. For example, more than 50 new species of *Saussurea* DC. have been described from the eastern Pan-Himalaya within the last ten years.

This catalogue includes 282 families, 2535 genera and 19,462 species of vascular plants in the Pan-Himalaya. The Pan-Himalayan region is renowned and characterized by its distinct mountain flora, with plants ranging from tropical, subtropical, temperate, to arctic on the same mountain at different altitudes. This region holds the richest temperate and alpine flora in the world, with tremendously differentiated genera, such as *Pedicularis* (414/600) *, *Rhododendron* (342/1000), *Corydalis* (301/465), *Primula* (285/500), *Saxifraga* (256/450), *Carex* (240/2000), *Saussurea* (236/460), *Gentiana* (218/360), *Impatiens* (191/900), *Berberis* (175/500), *Delphinium* (144/350), *Aconitum* (127/400), *Salix* (118/520), *Artemisia* (117/380), *Rubus* (106/700), *Arenaria* (99/300), *Ligularia* (94/140), *Polystichum* (94/500), *Dryopteris* (91/400), *Athyrium* (89/220), *Androsace* (86/100), *Strobilanthes* (85/400), *Oxytropis* (80/310), *Clematis* (77/300), *Cremanthodium* (74/76), *Meconopsis* (73/74), *Anaphalis* (59/110), *Rhodiola* (54/90).

I try to list only accepted scientific names in this catalogue. However, some uncertain species or unresolved names are listed because they have not been revised by any expert. For those species without the type variety or subspecies within our region, one of the infraspecific taxa is regarded as representative of the species in statistics. The list of the subspecies and varieties in this catalogue is not necessarily complete. It is difficult to edit a catalogue accepted by all people, especially for pteridophytes, where things become more complicated. For example, a specific name has many synonyms from different genera, or even from different families, or an expert accepted a species that is distributed in India, but another expert treated such material as a different species. In this case, I usually adopt the treatment of *Flora of China*, or new taxonomic revisions, or the Catalogue of Life website.

* The numerator is the number of species in the Pan-Himalaya, while the denominator is the total species number of the genus.