

Editorial

A few words on our commemoration of 80 years at KIB



Eighty years ago, a botanical institute called “the Yunnan Provincial Institute of Agricultural and Forestry Botany” was jointly founded by the Jingsheng Biology Institute and the Yunnan State Department of Education in Kunming. At that time, the Heilong Dragon Park became the institute’s home (Fig. 1) and the research conducted there mostly focused on taxonomy and economical botany. When the institute came under the auspices of the Chinese Academy of Science, it still had fewer than 20 staff members.

In 1950, the institute changed its name to the Working Station of the Institute of Botany, Chinese Academy of Science. The station received support from different levels of government, which allowed for new offices, a herbarium, laboratories, and a greenhouse to gradually be built (Fig. 2). Shortly thereafter, research at the institute began to increase. In 1959, the station became the Kunming Institute of Botany, Chinese Academy of Science (KIB). KIB developed rapidly, and over the past four decades has achieved great success. From the 1970s–2010s, KIB led or played an important role in several scientific explorations, such as the first and second “Comprehensive Scientific Expedition on Qinghai-Tibet Plateau,” the “Scientific Expedition on Hengduan Mountains,” and the “Scientific Expedition on Tropical Yunnan.” Integrating the new findings from these expeditions with long-term taxonomic studies, KIB published or jointly published a series of monographs: “*Florae Republicae Popularis Sinicae* (FRPS),” “*Flora of China*,” “*Flora Yunnanica*,” “*Flora Xizangica*,” “*Vegetation of China*,” and “*Vegetation of Yunnan*.” The compilation of these monographs helped answer two very basic questions: how many plant species are there in China and where do they grow? This basic information has been important for phytochemistry research and has already led to the discovery of more than ten new medicines.

In addition to research, KIB is attentive to the needs of our country, society, as well as biodiversity conservation. In the 1950s, KIB surveyed suitable regions for rubber tree plantations, and in the 1960s the institute proposed establishing nature reserves. In the 1970s, KIB successfully cultivated *Gastroidea elata*, a type of orchid used in Chinese medicine. To protect the endangered and endemic plants of China, KIB established the Germplasm Bank of Wild Species in the 1990s.

Thus far, KIB has published over 10,000 papers, among which 5288 are SCI-listed, including 595 that are published in the top 15% of all academic journals. KIB has also been issued 140 patents, won 20 awards for scientific research on or above the provincial level, including one Yunnan State Natural Science Special Prize, three Yunnan State Natural Science first prizes, and two Yunnan

State Prizes for Progress in Technology. Recently, three disciplines—Chemistry, Pharmacology & Toxicology, and Plant & Animal Science—reached the top 1% in the ESI database. Now KIB has one State Key Laboratory, one Chinese Academy of Sciences Key Laboratory, two provincial Key Laboratories, The Germplasm Bank and a botanical garden. The institute has about 550 staff in total, including two CAS academicians and 192 PhD Candidates, 215 Master’s Candidates and 27 post-doctoral fellows from around of world. “KIB has become an influential botanical institute in the world.”

This year KIB is celebrating its 80th anniversary, and *Plant Diversity* has taken this opportunity to publish a special issue to commemorate the occasion: *Celebrating 80 years of KIB*. Eight papers are collected in this special issue. Taxonomy and Floristics are traditionally the main subjects of research at KIB. In this issue, two papers add to this field. Integrating phylogenetic information into traditional floristic analysis is a new trend and can provide a promising way to explore the ecological, biogeographical, and evolutionary processes that drive plant assemblages at multiple spatial scales. Li et al. (2018) summarize the current progress on the phylogenetic structure, spatial phylogenetic pattern, origin and diversification, phylogenetic regionalization of floristic assemblages, and application of phylogenetic information in biodiversity conservation. These summaries highlight the importance of incorporating phylogenetic information to improve our understanding of floristic assembly from an evolutionary perspective.

The development of new taxonomical theories and approaches, particularly molecular phylogenetics, has led to the expansion of traditional taxonomy based on principles of morphology and geography into the concept of “integrative taxonomy”. Yu et al. (2018a) review the achievements of researchers at KIB and their associates with respect to the taxonomy of land plants, fungi, and lichen. Major taxonomic advances are summarized for families of some major groups and the authors recommend that taxonomists continue to explore the biodiversity of China, integrate new theories and technologies with traditional taxonomic approaches, and engage in creative monographic work, with support from institutions, funding agencies, and the public (Yu et al., 2018a).

Molecular biology has developed very quickly and next-generation sequencing (NGS) has widely been used to address fundamental questions in biology. Yu et al. (2018b) summarize the applications, advantages, and limitations of four NGS-based genome-partitioning approaches in plant phylogenomics: genome skimming, transcriptome sequencing (RNA-seq), restriction site associated DNA sequencing (RAD-Seq), and targeted capture (Hyb-seq). These new approaches, particularly Hyb-seq, will bring great changes in the study of plant phylogenetics over the next few years.

Peer review under responsibility of Editorial Office of Plant Diversity.

<https://doi.org/10.1016/j.pld.2018.08.001>

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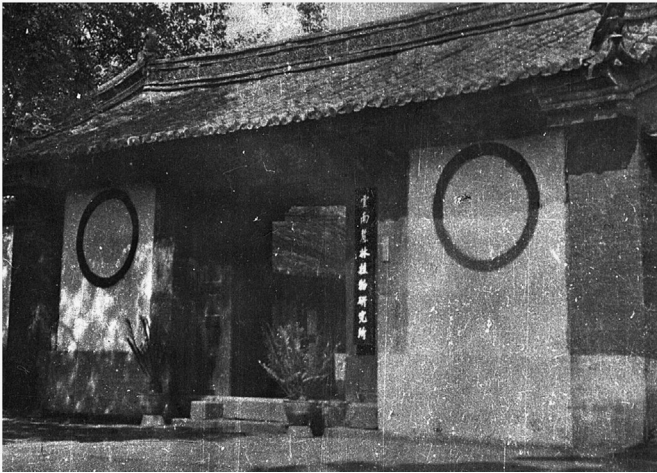


Fig. 1. KIB was set up in Heilong Dragon Park on 24th July, 1938.



Fig. 2. New office buildings and laboratory buildings in KIB.

Yunnan is extraordinarily rich in higher fungi (Ascomycota and Basidiomycota) and a total of about 90,000 fungal species has been recorded here. Feng and Yang (2018) summarize the history of fungal study in Yunnan. In the past twenty years, the combination of both morphological and molecular phylogenetic approaches has become the preferred method for understanding the diversity and evolution of higher fungi. This review focuses on our current knowledge of how geological, geographical, and ecological factors may have contributed to the diversity patterns of higher fungi in Yunnan.

Protecting biodiversity is of paramount importance to the modern world. Botanical gardens, which devote many of their resources to the study and conservation of plants, also dedicate a significant amount of energy to educating the public on the incredible diversity of plant species around the world. Chen and Sun (2018) review a framework for the integrated missions of botanical gardens, including scientific research, *in/ex situ* conservation, citizen science, and public education. They also give examples of successful species conservation approaches and public education and citizen science, as well as a brief overview of scientific research at Kunming Botanical Garden over the past 80 years.

Even though China has a long history of ethnobotanical practices and a sustainable agricultural system based on apiculture

and plant–pollinator interactions, pollination ecology is a young sub-discipline in China, only started in the 1970s. Ren et al. (2018) compile a complete pollination reference database in China including more than 600 published articles. Using this database, they identify and analyze gaps and limitations in research on the pollination ecology of China. In their review article, they also raise three important questions: 1) How much do we know about pollination systems of Chinese flora? 2) Compared with the development of research on pollination worldwide, what research areas should we promote in the future? 3) What can pollination ecologists do to understand and contribute to biodiversity and conservation in China?

Plants have sophisticated defense systems to fend off insect herbivores. How plants defend against herbivores in dicotyledonous plants has been relatively well studied, yet little is known about the defense responses in monocotyledons. In the seventh paper of this special issue, Qi et al. (2018) review our current understanding of rice (*Oryza sativa*) and maize (*Zea mays*) defense against insects.

The Orchidaceae is a diverse and wide spread family of flowering plants that are of great value in ornamental, medical, conservation, and evolutionary research. The broad diversity in morphology, growth form, life history, and habitat mean that the members of Orchidaceae exhibit various physiological properties. In the last paper of this special issue, the diversity of physiological function in Orchids is reviewed by Zhang and his colleagues (2018).

We thank all the authors for their contributions to *Celebrating 80 years of KIB*. By comparing the great successes of our institute, these articles synthesize important progress at KIB. The papers included in this special issue are mostly based on the research experience of the authors. We understand that it is not easy for our Chinese colleagues to write review articles in English. It certainly requires a lot time and energy. For this, we would like to extend our warmest appreciation.

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Available online 6 August 2018