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Data Descriptor

A Dataset of Plant Species Richness in Chinese National Nature Reserves

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Abstract: This comprehensive dataset on the number of plant species, genera, and families in 383 national nature reserves in China has been compiled based on the available literature. Heilongjiang Province and the Guangxi Zhuang Autonomous Region have the highest number of nature reserves. Species richness is relatively high in the Jinfoshan, Dabashan, Wenshan, Hupingshan, and Shennongjia Nature Reserves. This dataset provides important baseline information on plant species richness coupling with genus and family numbers in Chinese national nature reserves and should help researchers and environmentalists understand the dynamic species changes in various nature reserves. This detailed and reliable information may serve as the foundation for future plant research in Chinese nature reserves and play a positive role in promoting more effective natural protection, biological distribution, and biodiversity conservation in these areas.

Dataset: https://www.scidb.cn/en/anonymous/eXlRbk1i (accessed on 6 October 2024).

Keywords: biodiversity conservation; China; plant diversity; protected areas; species richness

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1. Introduction

The function of nature reserves is to strictly protect habitats of rare and endangered animal and plant species with primitive or minimal disturbance, as well as ecosystems and natural relics highly sensitive to human activities. As of the end of 2021, China has 474 national nature reserves. These nature reserves have a high coverage of species, and relevant studies have shown that Chinese nature reserves protect approximately 97% of orchids [1] and 534 mammalian species [2]. Many scholars have proposed the goal of covering 30% of the world's land, freshwater, and oceans with nature reserves and protected areas by 2030 [3,4].

Based on the analysis of biodiversity changes, scholars from several countries have conducted extensive research on the evaluation of conservation effectiveness at the global and national scales and within individual nature reserves. In [5], Venter et al. evaluated the conservation status of 4118 threatened vertebrates in protected area at a global scale and found that 17% of threatened species were still not covered by protected areas. The protection capacity of protected areas for endangered forest plants may vary depending on the ecological area in which they are located [6]. The southern region of China has great potential for the protection of endangered plant species [7]. The species richness of Chinese nature reserves is influenced by many factors, such as water, energy, and altitude [8]. Climate data can help predict large-scale distribution patterns of plant richness at different taxonomic levels [9]. In addition, research on Chinese nature reserves indicates that

gross primary productivity significantly relates to plant species richness at a geographical scale [10].

This dataset covers a complete range of species, including aquatic and terrestrial plants. These data can help plant taxonomists and conservation biologists quickly determine the species richness of each protected area and conduct more in-depth research. Based on these data, resource archives can be established to reveal the dynamic changes in biological communities, ecological processes, and other mechanisms [11]. In addition, sustainable development is an important strategic goal for many countries, and different countries have achieved varying degrees of success in sustainable development. Sustainable development has six hidden development dimensions [12], and natural resource conservation is an important part of them. Therefore, species resources within nature reserves are very important, and this dataset can guide the rational management of plants in nature reserves.

2. Data Description

This dataset includes information on the plant diversity of 383 national nature reserves in China, distributed in 31 provinces (data are not yet available for three provinces in China, namely, Taiwan, Hong Kong, and Macau). There are 35 nature reserves in Heilongjiang Province, 33 in the Guangxi Zhuang Autonomous Region, 29 in the Inner Mongolia Autonomous Region, 22 in Hunan Province, 22 in Sichuan Province, 17 in Hebei Province, 17 in Liaoning Province, 16 in Hubei Province, 15 in Fujian Province, 15 in Jilin Province, 15 in Yunnan Province, 14 in Gansu Province, 14 in Shaanxi Province, 13 in Henan Province, 12 in Jiangxi Province, 9 in Guangdong Province, 8 in Anhui Province, 8 in Guizhou Province, 8 in Ningxia Hui Autonomous Region, 8 in Shanxi Province, 8 in Xinjiang Uygur Autonomous Region, 8 in Tibet Province, 7 in Zhejiang Province, 6 in Chongqing City, 6 in Hainan Province, 6 in Qinghai Province, 4 in Beijing City, 4 in Shandong Province, 2 in Jiangsu Province, 1 in Shanghai City, and 1 in Tianjin City (Figure 1).

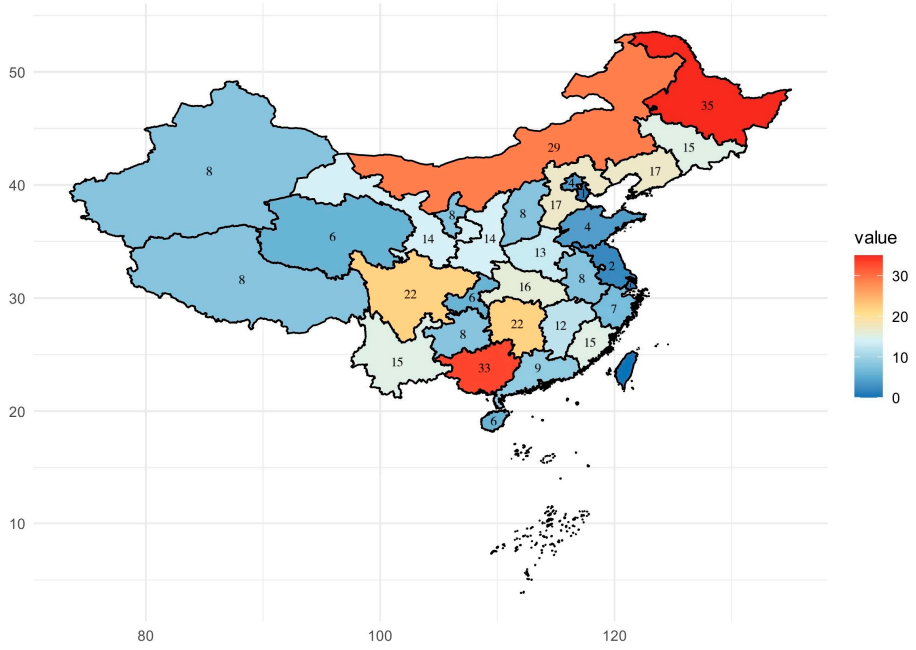

Figure 1. The number of nature reserves in 31 provinces of China recorded in these data.

The number of families in these nature reserves ranges from 14 to 243, the number of genera ranges from 20 to 1290, and the number of species ranges from 22 to 4543. There are 6 nature reserve with over 3000 species in China, 14 with 2500–3000 species, 37 with 2000–2500 species, 57 with 1500–2000 species, 69 with 1000–1500 species, 108 with 500–1000 species, and 92 with 0–500 species (Figure 2). Specifically, there are about five

nature reserves in China with more than 3000 plant species, including the Jinfoshan Nature Reserve (4543 species), the Dabashan Nature Reserve (3465 species), the Wenshan Nature Reserve (3419 species), the Hupingshan Nature Reserve (3080 species), and the Shennongjia Nature Reserve (3023 species) (Figures 2 and 3).

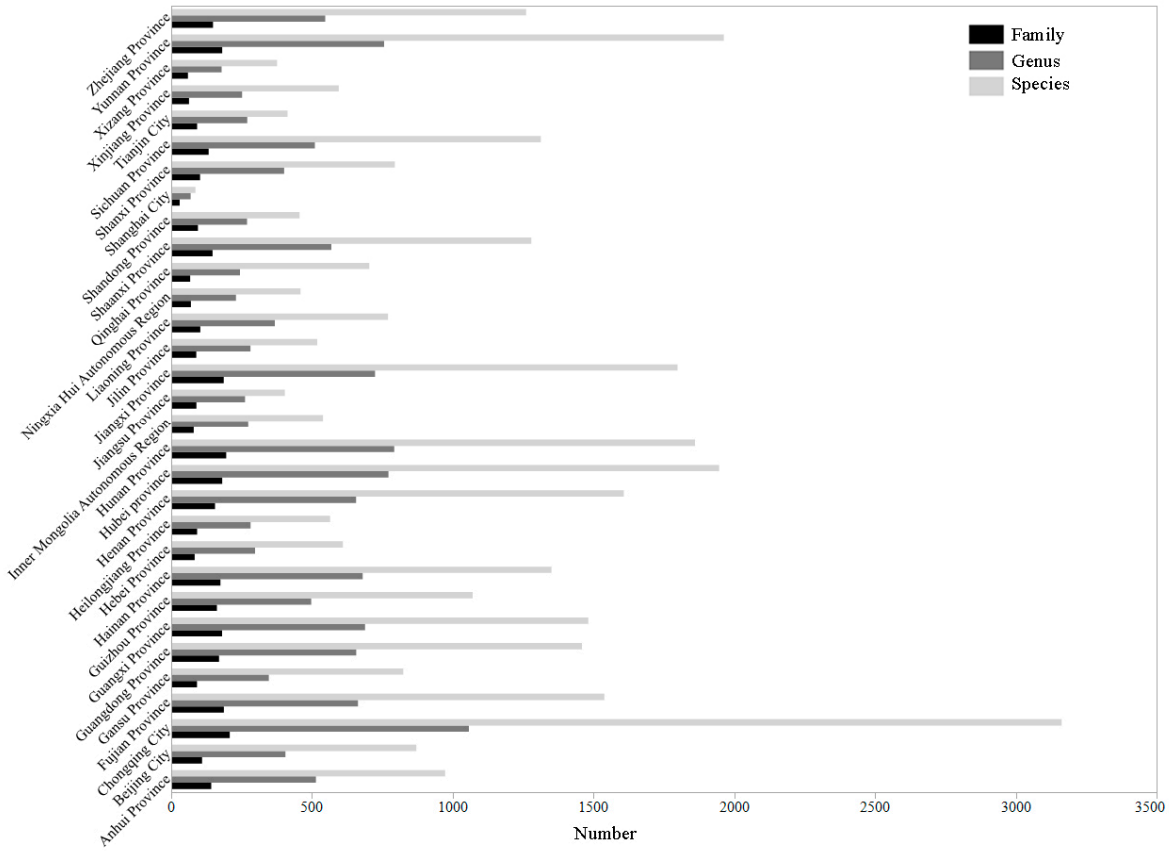

Figure 2. Number of families, genera, and species of plants in 383 nature reserves in China.

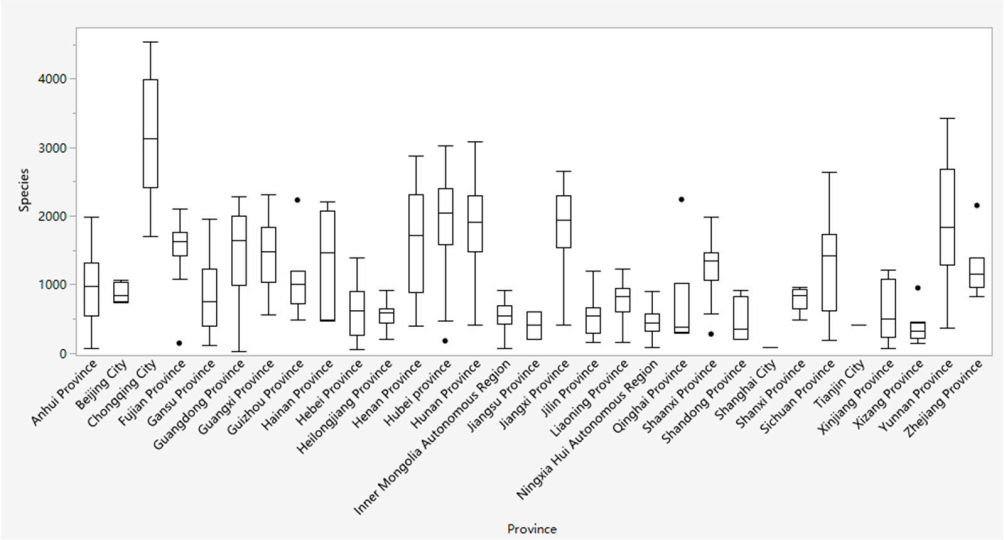

Figure 3. Boxplot of the range of species numbers in each province. Box plots show the medium (black line), and 5% minimum and 95% maximum (bars).

There are about eight nature reserves with more than 1000 plant genera, namely, the Jinfoshan Nature Reserve (1290 genera), the Dabashan Nature Reserve (1270 genera), the

Huanglianshan Nature Reserve (1099 genera), the Wenshan Nature Reserve (1059 genera), the Hupingshan Nature Reserve (1034 genera), the Xishuangbanna Nature Reserve (1012 genera), the Shibalichangxia Nature Reserve (1004 genera), and the Jinggangshan Nature Reserve (1000 genera).

There are about seven nature reserves with 230 or more plant families, namely, the Jiulingshan Nature Reserve (243 families), the Huanglianshan Nature Reserve (239 families), the Emeifeng Nature Reserve (238 families), the Xiongjianghuangchulin Nature Reserve (236 families), the Jinfoshan Nature Reserve (235 families), the Jintongshan Nature Reserve (230 families), and the Guniujiang Nature Reserve (230 families (Figure 2)).

3. Methods

The steps for creating this dataset are as follows:

- According to the "China Forestry National Nature Reserve" compiled by the State Forestry Administration of China [13], the plant species, provinces, families, genera, and species names of each nature reserve in China were recorded.
- We checked relevant studies on plants in Chinese nature reserves [9,14], and combined a large amount of internal scientific research data to record the families, genera, and species of plants in the literature. Some studies do not include species lists, only data on richness indices, which we have also referred to.
- According to iPlant (http://www.iplant.cn (accessed on 6 October 2024)), information for each species was retrieved and corrected, and the taxonomic status of plant species was updated based on the PPG I classification system for lycophytes and ferns, the Young's classification system for gymnosperms [15], and the APG IV classification system for angiosperms. According to the protected area platform (http://bhq.papc.cn (accessed on 6 October 2024)), the information of nature reserves was verified, and the species list of nature reserves was organized and arranged.
- We used pivot tables in Excel to calculate the number of plant families, genera, and species in Chinese national nature reserves. Due to policy regulations in China, detailed species lists of nature reserves are confidential and cannot be made public. Therefore, our final dataset only retained five columns of information: nature reserves, province, family, genus, and species. We used ArcGIS 10.8 (https://www.esri.com/en-us/arcgis/products/arcgis-desktop/resources (accessed on 6 October 2024)) and the online analysis software Hiplot (https://hiplot.com.cn (accessed on 6 October 2024)) to create the figure.

4. Discussion

We have collected data for 383 national nature reserves in China. These missing data of national nature reserves may contain information about specific regions or ecosystems that were not included in the research scope, which may lead to some bias in the analysis and conclusions of plant species richness in Chinese nature reserves. In subsequent investigation, we will collect further relevant data. The 383 national nature reserves covered in this study are distributed across 31 provinces, and the coverage of these data ensures the representativeness and reliability of the research results, providing a solid foundation for in-depth exploration of plant species diversity in Chinese national nature reserves. We provided the list of nature reserves with high plant species richness. Further updates on plant species richness in nature reserves should be referred to the Science Data Bank link (https://doi.org/10.57760/sciencedb.15973 (accessed on 6 October 2024)), following the data policy of the Science Data Bank and the government of the People's Republic of China. The access permission of this database follows the data policy of the Science Data Bank and the government of the People's Republic of China.

Our study has significant potential to contribute to conservation policy and management of natural reserves in China. Numerous studies have used data on natural reserves coupled with climate vulnerability assessment and environmental management policies to guide governments and organizations in their conservation actions [16–18]. Based on the

details of species richness of nature reserves, this dataset could improve the effectiveness of conservation actions [19]. Furthermore, our study could provide references for future research about distribution predictions of species diversity and conservation planning for the areas with high species diversity [9,20,21]. Hence, it is possible that our database can support updating the species list and assessing conservation effectiveness [22].

Although our study covers a wide range of nature reserves, contributing to the representativeness of the data and its utility for future research, it has a few limitations:

(1) The plant species richness of nature reserves will change due to ecological succession and habitat restoration. The species richness data we compiled should be updated in the future.

(2) More data should be added to cover more nature reserves so that high-quality research can be developed using our database. Furthermore, most data were from published papers and books. Hence, we are not sure that this database is fully correct.

(3) Our database is a dynamic resource that will be continually updated with new data. We encourage researchers to stay engaged with our work by following the link to the Science Data Bank (https://doi.org/10.57760/sciencedb.15973 (accessed on 6 October 2024)). This will ensure that researchers have access to the most current information and can contribute to the ongoing research in this field.

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Conflicts of Interest: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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