**Correlations and dominant climatic factors among diversity patterns of plant families, genera, and species**

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**Supplementary Information**

The link to download China data (including Taiwan Province) from the Global Biodiversity Information Facility (GBIF) is as follows: GBIF.org (6 December 2021) GBIF Occurrence Download <https://doi.org/10.15468/dl.spbpq9> and GBIF.org (29 December 2021) GBIF Occurrence Download <https://doi.org/10.15468/dl.7ujus2>, and the deadline is in December 2021. The plant data in this paper are for vascular plant specimens and the statistics do not distinguish between native, endemic or introduced. We only considered whether the plant data occurred in China, with the aim of capturing as much of the Chinese plant data distribution as possible. The data processing flow is shown in Figure S1. Firstly, Basis of record was chosen to select preserved specimen, compared with the Chinese Flora, Gansu, Ningxia and other places where the number of plant data is high due to the excessive data of plant species recorded by different institutions. Secondly, we selected the Basis of record to select the preserved specimen, with data publisher from the Chinese Academy of Sciences (CAS). We found that Chinese Academy of Sciences plant preserved specimen data are too low in Taiwan Province. To address this problem, we expanded the publisher of data on plant specimens from Taiwan Province. Then, According to Hou’s vegetation map of China (1:1 million), the areas with too little plant data were merged according to similar vegetation types, and the units with too small areas were merged (Figure S2). Finally, 237 study units were counted (Table S1), with a total of 335 families, 3326 genera, and 25,213 species of plants, and 1,364,986 events occurred.

To avoid the effect of plant data composition on diversity patterns, we counted how many species the same family of plants contained as opposed to the same genus, respectively (Figure S3 and Figure S4). The results show that most families and genera contain a small number of species and only a few contain a large number of species. The composition of the plant data avoids the influence of a single family or genus containing a large number of species on the results.

**Appendix:** **supplementary figures and tables**



**Figure S1** Plant data processing flow.



**Figure S2** 1:1 million vegetation map of China.



**Figure S3** Number of species included in each family. The top five plant families are *Asteraceae, Poaceae, Fabaceae, Rosaceae, Orchidaceae.*



**Figure S4** Number of species included in each genus. The top five plant genera are *Rhododendron, Carex,* *Salix, Pedicularis, Saussurea.*

**Table S1.** Rules for merging plants at the municipal-level in China

|  |  |
| --- | --- |
| Target Cities | List of Merged Cities |
| Anhui:Chizhou | Anhui:Tongling |
| Anhui:Hefei | Anhui:Ma'anshan; Anhui:Huainan; Anhui:Chuzhou;  Anhui:Chaohu |
| Anhui:Suzhou | Anhui:Fuyang; Anhui:Bozhou; Anhui:Huaibei; Anhui:Bengbu;  Jiangsu:Xuzhou; Jiangsu:Suqian |
| Beijing:Beijing | Hebei:Langfang; Tianjin:Tianjin |
| Fujian:Fuzhou | Fujian:Ningde |
| Gansu:Jiuquan | Gansu:Jiayuguan |
| Gansu:Wuwei | Gansu:Jinchang |
| Guangdong:Chaozhou | Guangdong:Jieyang; Guangdong:Shantou; Guangdong:Shanwei |
| Guangdong:Guangzhou | Guangdong:Zhongshan; Guangdong:Foshan |
| Guangdong:Jiangmen | Guangdong:Zhuhai; Macao |
| Guangdong:Shenzhen | Guangdong:Dongguan; Hong Kong |
| Hebei:Shijiazhuang | Shanxi:Yangquan |
| Heilongjiang:Qiqihar | Heilongjiang:Suihua; Heilongjiang:Daqing; Jilin:Baicheng;  Jilin:Songyuan |
| Henan:Luoyang | Henan:Pingdingshan |
| Henan:Xinxiang | Henan:Anyang; Henan:Puyang; Henan:Hebi |
| Henan:Xinyang | Henan:Zhumadian |
| Henan:Zhengzhou | Henan:Kaifeng; Henan:Xuchang; Henan:Zhoukou;  Henan:Shangqiu; Henan:luohe |
| Hubei:Wuhan | Hubei:Xiaogan; Hubei:Ezhou; Hubei:Huangshi |
| Hubei:Yichang | Hubei:Xiangfan; Hubei:Jingmen; Hubei:Suizhou Shi |
| Hunan:Changde | Hunan:Yiyang; Hubei:Jingzhou |
| Hunan:Changsha | Jiangxi:Yichun |
| Hunan:Shaoyang | Hunan:Xiangtan; Hunan:Loudi |
| Hunan:Yueyang | Hubei:Xianning |
| Jiangsu:Yangzhou | Jiangsu:Taizhou |
| Jilin:Changchun | Jilin:Siping |
| Jilin:Liaoyuan | Liaoning:Tieling |
| Jilin:Tonghua | Liaoning:Fushun |
| Liaoning:Benxi | Liaoning:Liaoyang |
| Liaoning:Chaoyang | Liaoning:Fuxin |
| Liaoning:Huludao | Liaoning:Panjin; Liaoning:Jinzhou |
| Nei Mongol:Alxa | Nei Mongol:Wuhai; Ningxia Hui:Shizuishan;  Ningxia Hui:Yinchuan |
| Nei Mongol:Baotou | Nei Mongol:Baynnur |
| Nei Mongol:Chifeng | Nei Mongol:Tongliao |
| Nei Mongol:Hulunbuir | Heilongjiang:Daxing'anling |
| Qinghai:Golog Tibetan | Qinghai:Huangnan Tibetan |
| Shaanxi:Yan'an | Shaanxi:Tongchuan |
| Shandong:Jinan | Hebei:Cangzhou; Hebei:Hengshui; Shandong:Liaocheng;  Shandong:Dezhou; Shandong:Binzhou; Shandong:Zibo;  Shandong:Dongying; Shandong:Weifang |
| Shandong:Tai'an | Shandong:Heze; Shandong:Jining; Shandong:Zaozhuang;  Shandong:Linyi; Shandong:Rizhao |
| Shandong:Yantai | Shandong:Weihai |
| Shanghai:Shanghai | Zhejiang:Jiaxing |
| Shanxi:Datong | Shanxi:Shuozhou |
| Shanxi:Jincheng | Henan:Jiyuan; Henan:Jiaozuo |
| Sichuan:Dazhou | Sichuan:Guang'an |
| Sichuan:Guangyuan | Sichuan:Bazhong |
| Sichuan:Meishan | Sichuan:Neijiang; Sichuan:Ziyang |
| Sichuan:Mianyang | Sichuan:Nanchong; Sichuan:Suining; Sichuan:Deyang |
| Sichuan:Yibin | Sichuan:Luzhou; Sichuan:Zigong |
| Xinjiang Uygur:Aksu | Xinjiang Uygur:Alaer |
| Xinjiang Uygur:Altay | Xinjiang Uygur:Beitun |
| Xinjiang Uygur:Bayin'gholin Mongol | Xinjiang Uygur:Tiemenguan |
| Xinjiang Uygur:Börtala Mongol | Xinjiang Uygur:Shuanghe |
| Xinjiang Uygur:Changji Hui | Xinjiang Uygur:Wujiaqu |
| Xinjiang Uygur:Ili Kazakh | Xinjiang Uygur:Cocodala |
| Xinjiang Uygur:Kashgar | Xinjiang Uygur:Tumushuke |
| Xinjiang Uygur:Khotan | Xinjiang Uygur:Kunyu |
| Xinjiang Uygur:Tacheng | Xinjiang Uygur:Karamay; Xinjiang Uygur:Shihezi |
| Zhejiang:Ningbo | Zhejiang:Zhoushan; Zhejiang:Shaoxing |