Composition and Floristic Characteristics of National Key Protected Wild Plants in Hainan Province (Postprint)

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Abstract

Based on the 2021 List of Nationally Key Protected Wild Plants and related materials, combined with field investigations, we compiled the List of Nationally Key Protected Wild Plants in Hainan Province and analyzed its composition and floristic characteristics. The results indicated: (1) Among the nationally key protected wild plants, the previously recognized Cycas changjiangensis, C. hainanensis, C. lingshuigensis, and C. taiwaniana were synonymized under C. taiwaniana; compared with the 1999 List of Nationally Key Protected Wild Plants, Semiliquidambar cathayensis and Amphicarpaea linearis were delisted, Bretschneidera sinensis was downgraded from first-class to second-class protection, 127 new species were added to the national key protected wild plants, and together with the original species, there were a total of 173 species (including varieties), belonging to 53 families and 83 genera, including 8 first-class nationally protected wild plant species and 165 second-class nationally protected wild plant species, with 32 endemic species to Hainan Province, distributed across 4 groups, among which angiosperms were the most abundant with 129 species. (2) According to multi-year field survey information and the results of this investigation, Cycas rumphii, C. shanyagensis, Alsophila costularis, and Paphiopedilum purpuratum have not yet been documented. (3) The 173 protected plant species exhibited five life form types, dominated by phanerophytes (115 species), followed by hemicryptophytes (34 species) and geophytes (22 species), with chamaephytes and cushion plants being the least represented (1 species each). (4) At the family level, Orchidaceae was the most species-rich with 47 species (27.17%); at the genus level, Dendrobium was the most species-rich with 21 species (12.14%). (5) The floristic elements were complex with distinct tropical characteristics; families were predominantly pantropical and its variant types in distribution; genera were predominantly tropical Asian and its variant

types in distribution. In summary, the nationally key protected wild plants in Hainan Province exhibit pronounced tropical nature and endemism, with numerous newly added protected species; therefore, continuous baseline surveys and dynamic monitoring should be conducted, law enforcement strengthened, human disturbance and habitat destruction reduced, and targeted in-situ and ex-situ conservation measures implemented to enhance protection and management.

Full Text

Preamble

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Composition and Floristic Characteristics of National Key Protected Wild Plants in Hainan Province, China

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Abstract: Based on the 2021 *National Key Protected Wild Plants List* and related data, combined with field investigations, we compiled the *National Key Protected Wild Plants List of Hainan Province* and analyzed its composition and floristic characteristics. The results showed: (1) Among the national key protected wild plants, the original *Cycas changjiangensis*, *C. hainanensis*, *C. lingshuigensis*, and *C. taiwaniana* were merged into *C. taiwaniana*. Compared with the 1999 *National Key Protected Wild Plants List*, *Semiliquidambar cathayensis* and *Amphicarpaea linearis* were removed from protection, *Bretschneidera sinensis* was downgraded from Category I to Category II protection, and 127 new species were added. Together with the original species, there are now 173 species (including varieties) belonging to 53 families and 83 genera, including 8 Category I protected species and 165 Category II protected species. There are 32 Hainan endemics, belonging to 4 groups, with angiosperms being the most abundant (129 species). (2) Based on years of field survey data and this investigation, *Cycas rumphii*, *C. shanyagensis*, *Alsophila costularis*, and *Paphiopedilum purpuratum* have not been found. (3) The 173 protected plants exhibit 5 life forms, dominated by phanerophytes (115 species), followed by hemicryptophytes (34 species) and geophytes (22 species), with chamaephytes and cushion plants being the least common (1 species each). (4) At the family level, Orchidaceae is the most species-rich (47 species, 27.17%). At the genus level, *Dendrobium* is the most species-rich (21 species, 12.14%). (5) The flora shows complex composition with obvious tropical characteristics. Families are mainly pantropical and their variants; genera are mainly tropical Asian and their variants. In summary, Hainan's national key protected wild plants show obvious tropical nature and endemism, with many newly added protected species. Therefore, continuous

background investigation and dynamic monitoring should be carried out, law enforcement strengthened, human disturbance to habitats reduced, and targeted in-situ and ex-situ conservation measures implemented.

Keywords: Hainan Province; national key protected wild plants; species composition; floristic characteristics

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Introduction

China is one of the world's most plant-diverse countries, with approximately 31,000 vascular plant species (Qin & Zhao, 2017). However, with explosive population and economic growth over the past 30 years, natural ecosystems have suffered severe destruction, and China's plant diversity faces enormous threats. Statistics indicate that approximately 4,000-5,000 plant species are endangered (HUANG H, 2011). Following a second national quantitative survey of wild plant resources in 2021, the State Council approved and released the adjusted *National Key Protected Wild Plants List* (hereinafter referred to as "the List") (State Forestry and Grassland Administration and Ministry of Agriculture and Rural Affairs, 2021), simultaneously abolishing the 1999 List, which included 455 species and 40 categories of national key protected wild plants.

Flora represents the collective assemblage of all plant species in a region, forming the basis of vegetation distribution and reflecting spatial patterns of species formation processes (Feng et al., 2009), encompassing both geographic and historical components. Endemism is particularly significant in floristic analysis as it can indicate the nature of a flora, such as its antiquity and affinity with surrounding floras, and serves as an important indicator for floristic regionalization (Dang et al., 2001). Therefore, floristic characteristic studies are crucial for revealing plant origins and floristic evolution.

Hainan Province is located on the northern edge of the tropics and includes, in addition to the main island of Hainan, the islands and reefs of the Xisha, Zhongsha, Nansha, and Dongsha archipelagos and their surrounding waters. With an average annual temperature of 23°C, it has a tropical monsoon climate with average annual precipitation of 2068.6 mm (Su et al., 2022), abundant sunlight, distinct dry and rainy seasons, and diverse, complex vegetation types, including representative mangroves, lowland rainforests, montane rainforests, and cloud forests (Yang, 2019). Hainan's superior natural geographical conditions harbor rich plant resources, and understanding the current status of nationally

protected wild plant resources in Hainan is essential for plant diversity conservation.

National key protected wild plants have consistently attracted high social attention, and Hainan is no exception. Scholars have paid particular attention to nationally protected plants. Since the release of the 1999 List, many researchers have conducted relevant studies on Hainan's national key protected wild plants. Ma et al. (2003) clarified the species of rare, endangered, and nationally protected wild plants in Hainan based on the *China Plant Red Data Book* and the 1999 List. Wang et al. (2007) revealed the species and conservation status of rare and endangered plants in the Yinggeling area and proposed corresponding protection recommendations for threatened species. Mo et al. (2007) studied the distribution status of 14 national key protected wild plants in the Jianfengling Reserve and understood their endangered causes through population and community characteristic analysis. Long et al. (2007) studied the flora of rare and endangered plants in Diaoluoshan, showing that the flora is dominated by tropical genera, with tropical Asian distribution types accounting for the largest proportion. Chen (2011) studied the distribution patterns of 27 national key protected plants in Bawangling, revealing their distribution patterns and ability to utilize environmental resources in communities. Yang et al. (2016) published the book *Illustrated Handbook and Distribution Characteristics of Rare and Protected Plants in Hainan*, which scientifically, comprehensively, and systematically studied the morphological characteristics and distribution status of rare, endangered, and nationally protected wild plants in Hainan, filling a research gap. In summary, extensive research on Hainan's national key protected wild plants, particularly on their floristic characteristics, survival status, and endangered mechanisms, has provided reliable information sources for their conservation and utilization.

Compared with the 1999 List, the 2021 List underwent significant adjustments. Following the List update, some provinces have conducted corresponding research on species changes and distribution status of national key protected wild plants within their jurisdictions. Some provinces have analyzed the floristic characteristics of adjusted species, revealing compositional characteristics from a geographic component perspective. For example, Li et al. (2023) showed that national key protected wild plants in Shaanxi have obvious temperate and tropical characteristics, with endemic components accounting for a large proportion. Zheng et al. (2023) concluded that the flora of national key protected wild plants in Yunnan is tropical in nature, consistent with Yunnan's status as a biodiversity-rich tropical region. Wang et al. (2022) clarified that national key protected wild plants in Xinjiang show obvious temperate characteristics. Some scholars have studied the distribution patterns of national key protected wild plants within their provinces, understanding endangered mechanisms from species distribution characteristics or vegetation types they depend on. For instance, Tian et al. (2023) found that national key protected wild plants in Guizhou are mainly distributed in the Qiannan Buyi and Miao Autonomous Prefecture, Qianxinan Buyi and Miao Autonomous Prefecture, the Miaoling

Mountains, and the Wujiang River system. Wang et al. (2022) revealed that national key protected wild vascular plants in the Tibet Autonomous Region are mainly distributed in the montane forest vegetation belts of southeastern and southern Tibet. Other scholars have reported on List adjustments within their provinces, such as Chen et al. (2022) indicating that Qinghai added 44 national key protected wild plant species, and Yi et al. (2023) identifying 29 species, 1 subspecies, and 3 varieties of newly added national key protected wild plants in Henan Province. However, since the List update, no systematic analysis has been conducted on the resource status and floristic characteristics of national key protected wild plants in Hainan. Therefore, this study takes Hainan Province as the research area and national key protected plants as the research object, based on the 2021 List, combined with relevant data and years of field survey data from our research group, to explore the species diversity and geographic floristic characteristics of national key protected wild plants in Hainan, aiming to provide a scientific basis for the effective protection and rational utilization of Hainan's wild plant resources.

Materials and Methods

Based on the 2021 List, we consulted *Flora Reipublicae Popularis Sinicae* (Editorial Committee of Flora Reipublicae Popularis Sinicae, Chinese Academy of Sciences, 1959–2004), *Flora of China* (Wu et al., 2013), and combined with *Inventory of Plant Species Diversity of Hainan* (Xing et al., 2012), *List of Species in Hainan* (Yang, 2013), *Illustrated Handbook of Plants in Hainan* (Yang, 2015), "Status of vascular plant species on Hainan Island" (Chen et al., 2016), and "A dataset on inventory and geographical distributions of wild vascular plants in Hainan Province, China" (Liang et al., 2023) to compile the latest *National Key Protected Wild Plants List of Hainan Province*.

From 2022 to 2023, based on the *National Key Protected Wild Plants List of Hainan Province* and combined with years of field survey data from our research group, we conducted additional field investigations to further verify the current status of national key protected wild plants in Hainan. Following national survey methods for key protected wild plants and according to the distribution characteristics of protected plants, we used quadrat methods for species with continuous and uniform distribution, and actual measurement methods for species with narrow distribution ranges, small populations, and easy direct counting. We recorded the latitude and longitude, distribution area, population size, and habitat characteristics of protected plants.

Lycophytes and ferns were arranged according to Qin Renchang's 1978 system combined with *Flora of China*; gymnosperms were arranged according to Zheng Wanjun and Fu Liguo's 1977 *Flora Reipublicae Popularis Sinicae* system; angiosperms were arranged according to Hutchinson's 1926 and 1934 systems.

Family and genus distribution types for bryophytes and seed plants were classified according to the methods for Chinese seed plant families and genera (Wu,

2003; Wu et al., 2005). Fern families and genera distribution types were classified according to pteridological classification methods (Lu, 2007). Bryophyte life forms were classified according to K. Magdefrau's bryophyte life form classification (Mägdefrau, 1982). Vascular plant life forms were classified using Raunkiaer's life form classification system (Raunkiær, 1934).

Results and Analysis

2.1 Changes in the National Key Protected Wild Plants List of Hainan Province

Based on the 1999 and 2021 Lists and related data, we compiled the National Key Protected Wild Plants List of Hainan Province (Schedule 1). According to the 1999 List, Hainan had 51 species of national key protected wild plants in 29 families and 40 genera (Table 1), including 10 fern species in 5 families and 6 genera, 9 gymnosperm species in 3 families and 4 genera, and 32 angiosperm species in 21 families and 30 genera. There were 8 Category I protected species and 43 Category II protected species.

Compared with the 1999 List, changes to Hainan's national key protected wild plants in the 2021 List are as follows: (1) Four species were merged: *Cycas changjiangensis*, *C. hainanensis*, *C. lingshuigensis*, and *C. taiwaniana* were incorporated into *C. taiwaniana*. (2) Two species were removed: *Semiliquidambar cathayensis* and *Amphicarpaea linearis* were delisted. (3) One species was downgraded: *Bretschneidera sinensis* was downgraded from Category I to Category II protection. (4) 127 species were added: 1 bryophyte (*Leucobryum juniperoideum*), 22 lycophytes and ferns (e.g., *Huperzia javanica*, *Phlegmariurus carinatus*, *P. fordii*, *P. guangdongensis*), 5 gymnosperms (e.g., *Pinus massoniana* var. *hainanensis*, *Podocarpus annamiensis*, *P. neriifolius*, *P. pilgeri*, *Cephalotaxus hainanensis*), and 99 angiosperms (e.g., *Michelia gioii*, *Chieniodendron hainanense*, *Alseodaphnopsis rugosa*, *Hernandia nymphaeifolia*). Among the added species, Orchidaceae had the most with 47 species. (5) Four species are doubtful: three original species (*Cycas rumphii*, *C. shanyagensis*, *Alsophila costularis*) and one added species (*Paphiopedilum purpuratum*) have historical distribution records in Hainan but have not been found by our research group after years of field surveys.

In summary, there are historical distribution records of 173 species in 53 families and 83 genera of national key protected wild plants in Hainan, but wild populations of 4 species have not been found.

2.2 Species Composition

2.2.1 Overall Composition Based on the 2021 List, Hainan has 173 species (including 3 varieties) of national key protected wild plants in 53 families and 83 genera (Table 2), including bryophytes, lycophytes and ferns, gymnosperms, and angiosperms. There is only 1 bryophyte species: *Leucobryum*

juniperoideum. Lycophytes and ferns include 7 families such as Lycopodiaceae, Ophioglossaceae, and Marattiaceae, with 32 species total. Gymnosperms include 5 families such as Cycadaceae, Pinaceae, and Cupressaceae, with 11 species total. Angiosperms include 40 families such as Magnoliaceae, Annonaceae, and Lauraceae, with 129 species, accounting for 74.57% of the total. There are 8 Category I protected species (3 gymnosperms and 5 angiosperms) and 165 Category II protected species (1 bryophyte, 32 lycophytes and ferns, 8 gymnosperms, and 124 angiosperms). The agricultural and rural authorities manage 50 species, while forestry authorities manage 123 species.

2.2.2 Family Composition Family composition is shown in Table 3 . Among the 53 families of national key protected wild plants, only 1 family has more than 20 species: Orchidaceae with 47 species (27.17% of the total). Two families have 10-19 species: Fabaceae and Marattiaceae, accounting for 15.03% of the total. Three families have 5-9 species: Lycopodiaceae, Cyatheaceae, and Poaceae, accounting for 10.98% of the total. Twenty families have 2-4 species, such as Podostemaceae, Sapindaceae, and Arecaceae, accounting for 31.21% of the total. Twenty-seven families have only 1 species, such as Leucobryaceae, Dicksoniaceae, and Blechnaceae, accounting for 15.61% of the total. Orchidaceae, Fabaceae, and Marattiaceae are the three dominant families, with 12 genera and 73 species, accounting for 14.46% of total genera and 42.20% of total species, indicating their dominant position in family composition. Oligotypic families (2-4 species) account for the largest proportion, followed by monotypic families (1 species), indicating rich family composition in this flora.

2.2.3 Genus Composition Genus composition is shown in Table 4 . Among the 83 genera, only 1 genus has more than 20 species: *Dendrobium* with 21 species (12.14% of the total). Three genera have 10-19 species: *Cymbidium*, *Angiopteris*, and *Ormosia*, accounting for 24.28% of the total. Two genera have 5-9 species: *Phlegmariurus* and *Alsophila*, accounting for 6.94% of the total. Eighteen genera have 2-4 species, totaling 41 species, such as *Cycas*, *Podocarpus*, *Ottelia*, etc., accounting for 23.70% of the total. Fifty-nine genera have only 1 species, such as *Leucobryum*, *Huperzia*, *Helminthostachys*, etc., accounting for 34.10% of the total. Monotypic genera (1 species) and oligotypic genera (2-4 species) account for the largest proportion of both genus number and species number, indicating they form the main body of the flora and occupy an important position, with high intraspecific differentiation.

2.2.4 Endemic Species Among the national key protected wild plants in Hainan, there are 32 Hainan endemic species, accounting for 18.50% of the total. *Cycas shanyagensis* is a Category I protected species, while the rest are Category II protected species: *Angiopteris acutidentata*, *A. hainanensis*, *A. neglecta*, *A. oblanceolata*, *A. caudipinna*, *Keteleeria hainanensis*, *Pinus massoniana* var. *hainanensis*, *Michelia shiluensis*, *Alseodaphnopsis rugosa*, *Arcangelisia gusanlung*, *Begonia hainanensis*, *Firmiana hainanensis*, *F. pulcherrima*, *Dal-*

bergia hainanensis, *Ormosia howii*, *O. inflata*, *Chunia bucklandioides*, *Quercus bawanglingensis*, *Lepisanthes unilocularis*, *Paranephelium hainanense*, *Madhuca hainanensis*, *Wenchengia alternifolia*, *Orchidantha insularis*, *Amomum hainanense*, *Chuniophoenix hainanensis*, *C. humilis*, *Anoectochilus baotingensis*, *A. hainanensis*, *Cymbidium lii*, *Dendrobium sinense*, and *Phaius hainanensis*.

2.2.5 Life Form Composition The life form composition of national key protected wild plants in Hainan is shown in Table 5 . The region's national key protected wild plants have 5 life forms: cushion plants, phanerophytes, chamaephytes, hemicryptophytes, and geophytes. Phanerophytes far exceed other life forms with 115 species, accounting for 66.47% of the total, mainly woody plants and epiphytic orchids. Hemicryptophytes include 34 species, comprising all Marattiaceae species, terrestrial orchid species, and some Poaceae species, accounting for 19.65% of the total. Geophytes include 22 species, comprising all freshwater wetland protected plants and tuberous-root and stem-root protected plants, accounting for 12.72% of the total. Chamaephytes and cushion plants each have only 1 species, accounting for 0.58% of the total. *Wenchengia alternifolia* is a chamaephyte, while *Leucobryum juniperoideum* is a cushion plant.

2.3 Distribution Patterns

2.3.1 Family Distribution Types The 53 families of national key protected wild plants in Hainan can be divided into 8 distribution types and 6 variants (Table 6). Tropical distribution is the dominant type, mainly pantropical distribution and its variants, with temperate distribution and its variants accounting for a smaller proportion, indicating strong tropical characteristics at the family level. There are 13 cosmopolitan families, accounting for 24.52% of the total, with the top 3 species-rich families being Orchidaceae, Poaceae, and Hydrocharitaceae. Tropical distribution families (types 2-7) include 30 families, accounting for 56.60% of the total, with the top 5 species-rich families being Fabaceae, Marattiaceae, Cyatheaceae, Sapindaceae, and Arecaceae. Temperate distribution families (types 8-14) include 10 families, accounting for 18.86% of the total, with the top 3 species-rich families being Lycopodiaceae, Pinaceae, and Liliaceae. No Chinese endemic families were found.

2.3.2 Genus Distribution Types The 83 genera of national key protected wild plants in Hainan can be divided into 13 distribution types and 3 variants (Table 6). Tropical distribution is the dominant type, mainly tropical Asian distribution and its variants, with obvious tropical characteristics at the genus level. There are 2 cosmopolitan genera, accounting for 2.41% of the total: *Huperzia* and *Leucobryum*. Tropical distribution genera include 64 genera, accounting for 77.11% of the total, with the top 5 species-rich genera being *Dendrobium*, *Cymbidium*, *Angiopteris*, *Ormosia*, and *Phlegmariurus*. Temperate distribution genera also occur, with 10 genera accounting for 12.05% of the total, with the top 3 species-rich genera being *Paris*, *Hopea*, and *Firmiana*. Chinese endemic

distribution genera include 7 genera, accounting for 8.34% of the total, containing relatively primitive genera such as *Chunia* and *Bretschneidera*, reflecting the ancient origin of Hainan's national key protected wild plants.

Discussion and Conclusion

Among national key protected wild plants, *Cycas changjiangensis*, *C. hainanensis*, *C. lingshuigensis*, and *C. taiwaniana* were merged into *C. taiwaniana* (The Biodiversity Committee of Chinese Academy of Sciences, 2023). *Huperzia serrata* was revised to *Huperzia javanica* (SHRESTHA et al., 2014). *Flora Reipublicae Popularis Sinicae* (Editorial Committee of Flora Reipublicae Popularis Sinicae, 1959-2004) recorded that *Ormosia semicastrata* has forms including *O. semicastrata* f. *litchifolia* and *O. semicastrata* f. *pallida*, while Niu et al. (2023) suggested that *Ormosia howii* should be merged into *O. semicastrata*, but this remains controversial and was not merged in our list. Due to continuous improvement and strengthened protection measures for national key protected wild plants in China in recent years, the endangered status of some protected species has been alleviated, such as *Semiliquidambar cathayensis* and *Amphicarpaea linearis* being delisted, and *Bretschneidera sinensis* being downgraded from Category I to Category II. Hainan's vegetation is still in a recovery period, with some plant populations severely damaged in the early stage, hindering population recovery and still requiring protection. With increasing human disturbance, the original habitats of some plants have been destroyed, posing serious threats to populations, especially epiphytic orchids, freshwater wetland species, and sensitive ferns and lycophytes whose populations shrink once habitats are destroyed. Therefore, these urgently protected plants were included in the latest List. The List adjustment demonstrates enhanced protection efforts for rare and endangered plants in China, but also indicates worsening status of wild plant resources. The number of newly added protected species in Hainan is more than twice the original number, reflecting both severe damage to Hainan's plant diversity and its plant endemism. The newly added protected species have different habitats and uneven distributions—some are concentrated in central Hainan mountains, while others are scattered throughout Hainan, such as *Lumnitzera littorea* in coastal mangroves and freshwater wetland plants like *Ottelia cordata* in low-altitude watersheds in northern Hainan. Although species distributed in central Hainan mountains have the Hainan Tropical Rainforest National Park as an ecological barrier, complex habitats and terrain mean some plant populations receive less attention, and their survival status cannot be timely understood, making it difficult to formulate accurate and effective conservation plans, as with *Ormosia simplicifolia*. Among scattered national key protected wild plants, those in provincial nature reserves can be effectively protected, but those in secondary forests and freshwater watersheds have fragile habitats and severe human disturbance, especially from artificial forest plantations and river water pollution, posing significant threats to these rare and endangered plants. How to strengthen management and balance ecological resource sustainable development with socio-economic development needs is a key

challenge facing Hainan's wild plant conservation efforts.

Cycas rumphii, *C. shanyagensis*, *Paphiopedilum purpuratum*, and *Alsophila costularis* have not been found in scientific expeditions over the past 20 years. *Cycas rumphii* was recorded in *Flora Hainanica* (South China Institute of Botany, Chinese Academy of Sciences, 1964), but Wang (2000) considered this record a misidentification, actually being *C. taiwaniana* (now merged into *C. taiwaniana*). *Cycas shanyagensis* is a new species discovered by Fu (2006) in lowland rainforests of Baolong Mountain in Sanya and Kafaling in Ledong County, but Jian et al. (2013) indicated it belongs to the *Cycas taiwaniana* complex, though no wild populations have been found. *Flora Reipublicae Popularis Sinicae* recorded *Paphiopedilum purpuratum* and *Alsophila costularis* in Hainan, but they have not been found in the wild either. In summary, although these four species have historical distribution records in relevant literature, many research results are consistent with our research group's years of field surveys that have failed to find wild populations. Whether Hainan still has wild populations of these species, whether due to misidentification or other reasons, requires future verification.

Since 2021, among provinces with reported national key protected wild plants, Hainan has a relatively rich diversity with 173 species, ranking below Yunnan (542 species), Guangxi (332 species), Guizhou (241 species), and Sichuan (231 species), at a medium level. Hainan's national key protected wild plants include 4 plant groups, with 32 lycophyte and fern species, second only to Yunnan (55 species). Angiosperms are the most species-rich plant group, accounting for the largest proportion, consistent with other provinces. At the family level, Orchidaceae has the most species with 47, accounting for 27.17%, similar to the proportion in Guizhou (Tian et al., 2023) and Qinghai (Chen et al., 2022). At the genus level, *Dendrobium* has the most species with 21, accounting for 12.14% of the total, exceeding Guangdong (13 species) (Yang et al., 2022) in the same South China region. At the species level, there are 32 Hainan endemics, accounting for 18.50% of Hainan's national key protected wild plants, while Hainan endemics account for 10.5% of Hainan's total wild vascular plants (Liang et al., 2023), indicating a relatively high proportion of endemics among protected plants, which is significant for both endemic and rare plant conservation. Tropical rainforest is Hainan's typical vegetation type, and its superior hydrothermal conditions and hot, humid climate provide the main habitat for Hainan's national key protected wild plants, resulting in the highest proportion of phanerophytes (66.47%), higher than that in Guizhou (33.2%) (Tian et al., 2023).

The floristic characteristics of Hainan's national key protected wild plants differ from those of other provinces at the same level. According to existing data, Shaanxi's national key protected plants are dominated by temperate distribution at family and genus levels, followed by tropical distribution (Li et al., 2023). Yunnan's national key protected wild plant flora is dominated by tropical components (Zheng et al., 2023). Xinjiang's national key protected wild plants

are absolutely dominated by temperate distribution at genus and species levels (Wang et al., 2022). In contrast, Hainan's national key protected plants are dominated by tropical distribution at both family and genus levels, showing strong tropical characteristics, consistent with Lin's (2016) research on Hainan's local wild vascular plant flora. The genus-level floristic characteristics of national key protected wild plants in Hainan, Xinjiang, Shaanxi, and Yunnan are basically consistent with those of each province's wild vascular plants. The tropical nature of the flora is mainly related to Hainan's geographic location at China's southernmost tip on the northern edge of the tropics. Since the Paleozoic, Hainan Island has been connected to Guangdong's mainland, only separating from the mainland in the early Quaternary (Zhang, 2001). Therefore, the flora composition has an inseparable connection with the South China subregion, both showing tropical distribution dominance (Lin, 2016). Hainan's national key protected wild plants have complex floristic composition, with 14 family distribution types (8 types, 6 variants), second only to Yunnan (17 types: 9 types, 8 variants) (Zheng et al., 2023), and higher than Shaanxi's 11 types (6 types, 5 variants) (Li et al., 2023). This is because Hainan's diverse vegetation types and unique natural geographical conditions harbor rich plant resources and preserve many rare and endangered plants. With Hainan's land area being only one-tenth of Yunnan's, the wide distribution types of national key protected wild plants are evident. Hainan's national key protected wild plant flora has ancient origins, containing many ancient relict plants. For example, Cyatheaceae originated in the Middle Jurassic (Zhang, 2001), *Keteleeria* originated in the Triassic (Liao, 1986), and Magnoliaceae and Hamamelidaceae originated in the Jurassic or Triassic, possibly even traceable to the Cretaceous (Wang, 1979). As global climate warmed after the last glacial period in the late Quaternary, plants gradually migrated southward to Hainan, providing refuge for ancient plant groups that survived and differentiated, forming new lineages (Jin et al., 2008).

The precarious survival of Hainan's national key protected wild plants stems mainly from two aspects. (1) Human disturbance: Species such as *Cibotium barometz*, *Arcangelisia gusanlung*, and *Dalbergia odorifera* have high medicinal and economic value and are often illegally harvested, with wild resources severely depleted (Dong et al., 2003; Lin et al., 1987). Species like *Ottelia cordata*, *O. alismoides*, and *Sorghum propinquum* have habitats near villages with severe pollution, and their suitable habitats are rapidly shrinking (Liang et al., 2023). Orchidaceae species have both medicinal and ornamental value and remain popular, leading to continuous human damage to wild populations (Wang & Du, 2007), hence the high number of newly added orchid species. (2) Intrinsic factors: Species such as *Lumnitzera littorea*, *Bretschneidera sinensis*, and *Chieniodendron hainanense* have reduced suitable habitats, weak interspecific competition, and few mature individuals, which are not conducive to population expansion, resulting in narrow distribution ranges; species such as *Chunia bucklandioides* and *Horsfieldia hainanensis* have limited seed reproduction capacity, making it difficult to maintain population renewal. Based on the above

issues, we propose three recommendations to better protect these wild plants: (1) Relevant departments should further improve policies and laws for national key protected wild plants. For species distributed in central mountainous areas, law enforcement should be strengthened, expansion of artificial forests such as betel nut and rubber should be strictly prohibited, and protection should be enhanced for high-value species like *Dalbergia odorifera*, *Cibotium barometz*, and *Paphiopedilum appletonianum*, while conducting science education for local residents and tourists. For species distributed in coastal and peripheral areas with poorer management and protection, the conservation status should first be determined, and protection plots with warning signs should be established for unprotected species like *Paranephelium hainanense*, *Wenchengia alternifolia*, and *Cordia subcordata*. For freshwater species like *Ottelia cordata* and *O. alismoides*, environmental awareness of nearby residents should be improved, illegal discharge should be prohibited, invasive companion species like *Pistia stratiotes* and *Eichhornia crassipes* should be removed, and ex-situ conservation should be implemented for populations with severely damaged habitats. (2) For species with small populations, poor habitat adaptability, and limited seed reproduction that hinder population expansion, ex-situ conservation should be implemented, fully considering natural conditions such as soil, light, and water to improve their competitive ability, while strengthening artificial pollination and cultivation management to improve fruiting rates and seed germination. (3) Continuous background investigation, dynamic monitoring, and specialized scientific research on Hainan's national key protected wild plants should be carried out, focusing on newly added species with limited previous research, promoting multidisciplinary comprehensive studies, and expanding population sizes, which is important for species diversity conservation and sustainable resource utilization.

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Schedule 1 List of National Key Protected Wild Plants in Hainan Province

Ordinal	Family	Genus	Species	Protection Category	Bibliography
1	Ophioglossaceae	Helminthostachys	Helminthostachys zeylanica	Category II	Flora Reipublicae Popularis Sinicae 2:26 (1959); Flora Hainanica 1: 16 (1964); Flora Guangdongensis 7: 26 (2006); Flora of China 2-3: 77 (2013)
2	Dicksoniaceae	Cibotium	Cibotium barometz	Category II	Flora Reipublicae Popularis Sinicae 2: 197 (1959); Flora Hainanica 1: 45 (1964); Flora Guangdongensis 7: 72 (2006); Flora of China 2-3: 132 (2013)
3	Cyatheaceae	Alsophila	Alsophila costularis	Category II	Flora Reipublicae Popularis Sinicae 6(3): 256 (2004); Flora of China 2-3:136 (2013)

Ordinal	Family	Genus	Species	Protection Category	Bibliography
4	Cyatheaceae	Alsophila	A. latebrosa	Category II	Flora Reipublicae Popularis Sinicae 6(3): 261 (2004); Flora Guangdongensis 7:75 (2006); Flora of China 2-3: 136 (2013); *Cyathea tsangii* Ching et S.H.Wu in Act. Phytotax. Sin.9:366.(1964); Flora Hainanica 1:140 (1964)

Ordinal	Family	Genus	Species	Protection Category	Bibliography
5	Cyatheaceae	Alsophila	Alsophila gigantea	Category II	Flora Reipublicae Popularis Sinicae 6(3):258(2004); *Cyathea gigantea* (Wall.)Holtt. in Gard. Bull. Str. Settl. 8:318.1935; Flora Hainanica 1:139(1964); *Cyathea pectinata* Ching S.H.Wu in Acta Phytotax. Sinica 9:365.1964; Flora Hainanica 1:138(1964); *Cyathea petiolulata* Ching et S.H.Wu in Acta Phytotax. Sinica 9:365.1964; Flora Hainanica 1:139(1964); *Cyathea pseudogigantea* Ching S.H.Wu in Acta Phytotax. Sinica 9:365.1964; Flora Hainanica 1:138(1964); *Cyathea tinganensis* Ching et S.H.Wu in Acta Phytotax.

Ordinal	Family	Genus	Species	Protection Category	Bibliography
6	Cyatheaceae	Gymnosphaera	Gymnosphaera podophylla	Category II	Flora Reipublicae Popularis Sinicae 6(3): 265 (2004); Flora Guangdongensis 7: 76 (2006); Flora of China 2-3: 137 (2013)
7	Cyatheaceae	Alsophila	Alsophila spinulosa	Category II	Flora Reipublicae Popularis Sinicae 6(3): 258 (2004); Flora Guangdongensis 7: 75 (2006); Flora of China 2-3: 136 (2013)

Ordinal	Family	Genus	Species	Protection Category	Bibliography
8	Cyatheaceae	Sphaeropteris	Sphaeropteris brunoniana	Category II	Flora Reipublicae Popularis Sinicae 6(3): 250 (2004); Flora Guangdongensis 7: 74 (2006); Flora of China 2-3:134 (2013); *Cyathea contaminans* (Wall.) Cop. in Philip. J. Sci. Bot. 4: 60.1909; Flora Hainanica 1: 139 (1964); *Cyathea hainanensis* Ching in Act. Phytotax. Sin. 8: 147, pl. 21. fig. 23 [Figure 23: see original paper]. 1959
9	Blechnaceae	Brainea	Brainea insignis	Category II	Flora Reipublicae Popularis Sinicae 4(2):197 (1999); Flora Guangdongensis 7:212 (2006); Flora of China 2-3: 414 (2013)

Ordinal	Family	Genus	Species	Protection Category	Bibliography
10	Pteridaceae	Ceratopteris	Ceratopteris thalictroides	Category II	Flora Reipublicae Popularis Sinicae 3(1): 275 (1990); Flora Guangdongensis 7:128 (2006); Flora of China 2-3: 180 (2013)
11	Cupressaceae	Calocedrus	Calocedrus macrolepis	Category II	Flora Reipublicae Popularis Sinicae 7: 325 (1978); Flora of China 4: 65 (1999); Flora Guangdongensis 4: 26 (2000)
12	Cycadaceae	Cycas	Cycas taiwaniana	Category I	Flora Reipublicae Popularis Sinicae 7:9 (1978); Flora of China 4: 5 (1999); Flora Guangdongensis 4: 4 (2000)
13	Cycadaceae	Cycas	Cycas rumphii	Category I	Flora Hainanica 1: 208 (1964); Flora Reipublicae Popularis Sinicae 7: 16 (1978)

Ordinal	Family	Genus	Species	Protection Category	Bibliography
14	Cycadaceae	Cycas	Cycas shanya-gensis	Category I	G. A. Fu, Bull. Bot. Res., Harbin 26(1): 2. 2006.
15	Pinaceae	Keteleeria	Keteleeria haina-nensis	Category II	Flora Hainanica 1: 209 (1964); Flora Reipublicae Popularis Sinicae 7: 36 (1978); Flora of China 4: 42 (1999); Flora Guang-dongensis 4: 10 (2000)
16	Pinaceae	Pinus	Pinus kwang-tungen-sis	Category II	Flora Hainanica 1: 210 (1964); Flora Reipublicae Popularis Sinicae 7: 231 (1978); Flora of China 4: 25 (1999); Flora Guangdon-gensis 4: 15 (2000)

Ordinal	Family	Genus	Species	Protection Category	Bibliography
17	Magnoliaceae	Michelia	Michelia shiluensis	Category II	Flora Hainanica 1: 227 (1964); Flora Reipublicae Popularis Sinicae 30(1): 181 (1996); Flora Guangdongensis 1: 15 (2006); Flora of China 7: 86 (2008)
18	Lauraceae	Alseodaphne	Alseodaphne hainanensis	Category II	Flora Hainanica 1: 265 (1964); Flora Reipublicae Popularis Sinicae 31: 72 (1982); Flora Guangdongensis 6: 13 (2006); Flora of China 7: 228 (2008)

Ordinal	Family	Genus	Species	Protection Category	Bibliography
19	Lauraceae	Cinnamomum	Cinnamomum rigidissimum	Category II	Flora Guangdongensis 6: 5 (2005); Flora of China 7:178 (2008); *Cinnamomum ovatum* Allen in Journ. Arn. Arb. 20: 56. 1939; Flora Hainanica 1: 264 (1964); Flora Reipublicae Popularis Sinicae 31: 198(1982)
20	Myristicaceae	Horsfieldia	Horsfieldia hainanensis	Category II	*Horsfieldia hainanensis* Merr. in Lingnan Sci. J. 11: 43. 1932; Flora Hainanica 1: 304 (1964); Flora Reipublicae Popularis Sinicae 30(2): 202(1979); Flora Guangdongensis 2: 41 (1991)

Ordinal	Family	Genus	Species	Protection Category	Bibliography
21	Akaniaceae	Bretschneidera	Bretschneidera sinensis	Category II	Hooker's Icon Pl. 28: t. 2708.1905; Flora Reipublicae Popularis Sinicae 34(1): 8 (1984); Flora of China 8: 197 (2001)
22	Thymelaeaceae	Aquilaria	Aquilaria sinensis	Category II	Flora Hainanica 1: 434 (1964); Flora Guangdongensis 3: 84 (1995); Flora Reipublicae Popularis Sinicae 52(1): 290 (1999); Flora of China 13: 214 (2007)
23	Dipterocarpaceae	Hopea	Hopea hainanensis	Category I	Flora Hainanica 1: 517 (1964); Flora Reipublicae Popularis Sinicae 50(2): 120 (1990); Flora Guangdongensis 3: 159 (1995); Flora of China 13: 50 (2007)

Ordinal	Family	Genus	Species	Protection Category	Bibliography
24	Dipterocarpaceae	Hopea	Hopea reticulata	Category II	Flora of China 13: 50 (2007); *Hopea exalata* W. T. Lin in Acta Phytotax. Sin. 16(3): 87. t. 1. 1978; Flora Reipublicae Popularis Sinicae 50(2): 120 (1990); Flora Guangdongensis 3:160 (1995)
25	Dipterocarpaceae	Vatica	Vatica mangachapoi	Category II	Flora Reipublicae Popularis Sinicae 50(2): 130 (1990); Flora Guangdongensis 3:158 (1995); Flora of China 13: 53 (2007); *Vatica astrotricha* Hance in Journ. Bot. 14: 241. 1876; Flora Hainanica 1: 516 (1964)

Ordinal	Family	Genus	Species	Protection Category	Bibliography
26	Tiliaceae	Diplodiscus	Diplodiscus trichos-permus	Category II	Flora Hainanica 2:57 (1965); Flora Reipublicae Popularis Sinicae 49(1):120 (1989); Flora Guangdon-gensis 4:159 (2000)
27	Sterculiaceae	Firmiana	Firmiana haina-nensis	Category II	Flora Hainanica 2: 75 (1965); Flora Reipublicae Popularis Sinicae 49(2): 134 (1984); Flora Guangdon-gensis 1: 131 (1987); Flora of China 12: 311 (2007)

Ordinal	Family	Genus	Species	Protection Category	Bibliography
28	Sterculiaceae	Heritiera	Heritiera parvifolia	Category II	Flora of China 12: 313 (2007); *Tarrietia parvifolia* (Merr.) Merr. & Chun in Sunyatseni. 2: 281. 1935; Flora Hainanica 2: 76 (1965); Flora Reipublicae Popularis Sinicae 49(2): 140 (1984); Flora Guangdongensis 1: 133 (1987)
29	Fabaceae	Sindora	Sindora glabra	Category II	Flora Hainanica 2:235 (1965); Flora Reipublicae Popularis Sinicae 39: 214 (1988); Flora Guangdongensis 5: 201 (2003); Flora of China 10: 25 (2010)

Ordinal	Family	Genus	Species	Protection Category	Bibliography
30	Fabaceae	Dalbergia	Dalbergia odor-ifera	Category II	Flora Hainanica 2: 289 (1965); Flora Reipublicae Popularis Sinicae 40: 114 (1994); Flora Guang-dongensis 5: 225 (2003); Flora of China 10: 128 (2010)
31	Fabaceae	Ormosia	Ormosia howii	Category II	Flora Hainanica 2: 242 (1965); Flora Reipublicae Popularis Sinicae 40: 25 (1994); Flora Guang-dongensis 5: 211 (2003); Flora of China 10: 78 (2010)
32	Fagaceae	Castanopsis	Castanopsis concinna	Category II	Flora Reipublicae Popularis Sinicae 22: 30 (1998); Flora of China 4: 322 (1999); Flora Guangdon-gensis 9: 8 (2009)

Ordinal	Family	Genus	Species	Protection Category	Bibliography
33	Hamamelidaceae	Chunia	Chunia bucklandioides	Category II	Flora Hainanica 2: 330 (1965); Flora Reipublicae Popularis Sinicae 35(2): 52 (1979); Flora Guangdongensis 1: 152 (1987); Flora of China 9: 26 (2003)
34	Hamamelidaceae	Loropetalum	Loropetalum subcordatum	Category II	Flora of China 9: 33 (2003). —— *Tetrathyrium subcordatum* Benth. 1. C, Chun, 1. c; Flora Reipublicae Popularis Sinicae 35(2): 68 (1979); Flora Guangdongensis 1: 159 (1987)

Ordinal	Family	Genus	Species	Protection Category	Bibliography
35	Meliaceae	Toona	Toona ciliata	Category II	Flora Reipublicae Popularis Sinicae 43(3): 40 (1997); Flora of China 11: 114 (2008). —— *Toona macrocarpa* (DC.) Harms in Engl. & Prantl. Nat. Pflanzenfam. 3(4): 270. 1895; Flora Hainanica 3: 74 (1974); Flora Guangdongensis 2: 303 (1991)
36	Apiaceae	Glehnia	Glehnia littoralis	Category II	Flora Hainanica 3: 135. 1974; Flora Guangdongensis 2: 345. 1991; Flora Reipublicae Popularis Sinicae 55(3): 77. 1992; Flora of China 14: 173. 2005

Ordinal	Family	Genus	Species	Protection Category	Bibliography
37	Sapotaceae	Madhuca	Madhuca hainanensis	Category II	Flora Hainanica 3: 161. 1974; Flora Reipublicae Popularis Sinicae 60(1): 56. 1987; Flora Guangdongensis 2: 349. 1991; Flora of China 15: 206. 1996
38	Rubiaceae	Morinda	Morinda officinalis	Category II	Flora Hainanica 3: 332. 1974; Flora Reipublicae Popularis Sinicae 71(2): 199. 1999; Flora Guangdongensis 6: 240. 2005; Flora of China 19: 224. 2011
39	Asclepiadaceae	Merrillanthus	Merrillanthus hainanensis	Category II	Flora Hainanica 3:261. 1974; Flora Reipublicae Popularis Sinicae 63: 394. 1977; Flora Guangdongensis 1: 513. 1987; Flora of China 16: 252. 1995

Ordinal	Family	Genus	Species	Protection Category	Bibliography
40	Verbenaceae	Gmelina	Gmelina hainanensis	Category II	Flora Hainanica 4: 21. 1977; Flora Reipublicae Popularis Sinicae 65(1): 126. 1982; Flora of China 17: 33. 1994; Flora Guangdongensis 3:
41	Hydrocharitaceae	Ottelia	Ottelia acuminata	Category II	Flora Reipublicae Popularis Sinicae 8: 160. 1992; Flora of China 23: 96. 2010
42	Zingiberaceae	Etlingera	Etlingera yunnanensis	Category II	Flora of China 24: 357. 2000
43	Arecaceae	Plectocomia	Plectocomia microstachys	Category II	Flora Hainanica 4: 171. 1977; Flora Reipublicae Popularis Sinicae 13(1): 54. 1991; Flora of China 23: 134-135. 2010

Ordinal	Family	Genus	Species	Protection Category	Bibliography
44	Poaceae	Oryza	Oryza officinalis	Category II	Flora Reipublicae Popularis Sinicae 9(2): 4. 2002; Flora of China 22: 182. 2006. —— *Oryza minuta* J. S. Presl ex C. B. Presl, Rel. Haenk 1: 208. 1830; Flora Hainanica 4: 396. 1977
45	Poaceae	Oryza	Oryza rufipogon	Category II	Flora Reipublicae Popularis Sinicae 9(2): 5. 2002; Flora of China 22: 183
46	Poaceae	Sorghum	Sorghum propinquum	Category II	Flora Reipublicae Popularis Sinicae 10(2): 121. 1997; Flora of China 22:
47	Leucobryaceae	Leucobryum	Leucobryum juniperoideum	Category II	*Dicranum juniperoideum* Brid.; Bryol. Univ. 1: 409

Ordinal	Family	Genus	Species	Protection Category	Bibliography
48	Lycopodiaceae	Huperzia	Huperzia javanica	Category II	Flora of China 2-3 (2013); *Huperzia javanica* (Sw.) C. Y. Yang Bulletin of the Academy of Military Medical Sciences 13(5): 368(1989)
49	Lycopodiaceae	Phlegmariurus	Phlegmariurus carinatus	Category II	Flora Reipublicae Popularis Sinicae 6(3):53(1999); *Lycopodium carinatum* Desv. In Lam. Encyct. Bot. Snppl. 3:555. 1814; Flora Hainanica 1:7(1964)
50	Lycopodiaceae	Phlegmariurus	Phlegmariurus fordii	Category II	Flora Reipublicae Popularis Sinicae 6(3): 44 (1999); Flora of China 2-3: 23, 25 (2013)

Ordinal	Family	Genus	Species	Protection Category	Bibliography
51	Lycopodiaceae	Phlegmariurus	Phlegmariurus guangdongensis	Category II	Flora Reipublicae Popularis Sinicae 6(3): 35(1999); Flora of China 2-3: 21, 22 (2013); *Lycopodium filiforme* Roxb. in Calc. Journ. Nat. Hist. Soc. 4: 473.1844; Flora Hainanica 1: 7 (1964)
52	Lycopodiaceae	Phlegmariurus	Phlegmariurus mingcheensis	Category II	Yunnan. 4(2): 125(1982)
53	Lycopodiaceae	Phlegmariurus	Phlegmariurus petiolatus	Category II	H. S. Kung & Li Bing Zhang; Acta Phytotax. Sin. 37: 45(1999)

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54	Lycopodiaceae	Phlegmariurus	Phlegmariurus phlegmaria	Category II	Flora Reipublicae Popularis Sinicae 6(3): 33 (1999); Flora of China 2-3: 21, 22 (2013); *Lycopodium phlegmaria* Linn. Sp. Pl. 2: 1101. 1753; Flora Hainanica 1: (1964); *Phlegmariuru phlegmaria* (Linn.) Holub; Flora Guangdongensis 7: 7 (2006)
55	Lycopodiaceae	Phlegmariurus	Phlegmariurus taiwanensis	Category II	Flora Reipublicae Popularis Sinicae 6(3): 38 (1999); Flora of China 2-3: 22, 23 (2013)

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56	Ophioglossaceae	Ophioderma	Ophioderma pendulum	Category II	*Ophioglossum pendulum* Linnaeus, Sp. Pl. 2: 1518. 1763; Flora of China 2-3: 78 (2013); Flora Reipublicae Popularis Sinicae 2: 11 (1959); Flora Hainanica 1: 15 (1964); Flora Guangdongensis 7: 31 (2006)
57	Marattiaceae	Angiopteris	Angiopteris acutidentata	Category II	Phytotax. Sinica 8: 127, pl. 16, fig. 1 [Figure 1: see original paper]. 1959, Flora Reipublicae Popularis Sinicae 2: 39 (1959); Flora Hainanica 1: 19 (1964); Flora of China 2-3: 85, 88 (2013)
58	Marattiaceae	Angiopteris	Angiopteris caudatiformis	Category II	Flora Reipublicae Popularis Sinicae 2: 46 (1959); Flora of China 2-3: 84, 87 (2013)

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59	Marattiaceae	Angiopteris	Angiopteris cochinchinensis	Category II	Marattiac. 23(1853)
60	Marattiaceae	Angiopteris	Angiopteris crassipes	Category II	Flora Reipublicae Popularis Sinicae 2: 52 (1959); Flora Hainanica 1: 20 (1964); Flora Guangdongensis 7:34 (2006)
61	Marattiaceae	Angiopteris	Angiopteris fokiensis	Category II	Flora Reipublicae Popularis Sinicae 2:57 (1959); Flora Guangdongensis 7: 34 (2006); Flora of China 2-3: 83, 84, 88 (2013)
62	Marattiaceae	Angiopteris	Angiopteris hainanensis	Category II	Flora Reipublicae Popularis Sinicae 2: 48 (1959); Flora Hainanica 1: 20 (1964); Flora Guangdongensis 7: 33 (2006); Flora of China 2-3: 84, 87 (2013)
63	Marattiaceae	Angiopteris	Angiopteris neglecta	Category II	Phytotax. Sin. 8: 129. 1959

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64	Marattiaceae	Angiopteris	Angiopteris oblanceolata	Category II	Phytotax. Sin. VIII (1959) 129, r. 17, f. 6, Flora Reipublicae Popularis Sinicae 2: 48 (1959); Flora Guangdongensis 7: 33 (2006); Flora of China 2-3: 84, 88 (2013)

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65	Marattiaceae	Angiopteris	Angiopteris caudip-inna	Category II	Phytotax. Sin. 8: 158. 1959; Flora of China 2-3: 83, 85, 88 (2013); *Angiopteris subintegra* Ching in Act. Phytotax. Sin. 8: 130, pl. 17, fig. 8 [Figure 8: see original paper]. 1959; Flora Reipublicae Popularis Sinicae 2: 33 (1959), Flora Hainanica 1: 17 (1964); *Angiopteris remota* Ching et C. H. Wang in Act. Phytotax. Sin. 8: 129, pl. 17, fig. 7 [Figure 7: see original paper].1959; Flora Reipublicae Popularis Sinicae 2: 37 (1959); Flora Hainanica 1: 18 (1964); *Angiopteris venulosa* Ching in Act. Phytotax. Sin.8: 130, pl. 18, fig. 9 [Figure 9: see original paper]. 1959; Flora Reipublicae Popularis Sinicae 2: 35

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66	Marattiaceae	Angiopteris	Angiopteris latipinna	Category II	Flora of China 2-3: 85 (2013); *Archangiopteris latipinna* Ching, Icon. Fil. Sin. 5: t. 207 (1958); Flora Reipublicae Popularis Sinicae 2: 63 (1959)
67	Marattiaceae	Angiopteris	Angiopteris somae	Category II	Flora of China 2-3: 83, 84, 86 (2013); *Archangiopteris somai* Hayata; Flora Reipublicae Popularis Sinicae 2: 64 (1959)

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68	Marattiaceae	Angiopteris	Angiopteris tonkinensis	Category II	Flora of China 2-3: 84, 85 (2013); *Archangiopteris tonkinensis* (Hayata) Ching, Icon. Filic. Sin. 5: t. 209. 1958; Flora Reipublicae Popularis Sinicae 2: 62 (1959); Flora Hainanica 1: 21 (1964); Flora Guangdongensis 7: 35 (2006)
69	Pteridaceae	Ceratopteris	Ceratopteris shingii	Category II	Phytotaxa 449(1): 23. 2020
70	Pinaceae	Pinus	Pinus massoniana var. hainanensis	Category II	Flora Reipublicae Popularis Sinicae 7: 266 (1978); Flora of China 4: 15 (1999); Flora Guangdongensis 4: 17 (2000)

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71	Podocarpaceae	Podocarpus	Podocarpus annamiensis	Category II	Flora Reipublicae Popularis Sinicae 7: 417 (1978); Flora of China 4: 83 (1999); Flora Guangdongensis 4: 34 (2000)
72	Podocarpaceae	Podocarpus	Podocarpus nerifolius	Category II	Flora Hainanica 1: 216 (1964); Flora of China 4: 82 (1999)
73	Podocarpaceae	Podocarpus	Podocarpus pilgeri	Category II	*Podocarpus wangii* C. C. Chang, Sunyatsenia. 6: 26. 1941; Flora of China 4: 81 (1999); Flora Guangdongensis 4: 35 (2000); *Podocarpus brevifolius* (Stapf) Foxw. in Philipp. J. Sci. 6: 160. t. 29. f. 2. 1911; Flora Hainanica 1: 216 (1964); Flora Reipublicae Popularis Sinicae 7: 419 (1978)

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74	Cephalotaxaceae	Cephalotaxus	Cephalotaxus hainanensis	Category II	Flora Reipublicae Popularis Sinicae 7: 433 (1978); Flora of China 4: 87 (1999); Flora Guangdongensis 4: 39 (2000)
75	Magnoliaceae	Michelia	Michelia gioii	Category II	*Michelia hypolampra* Dandy, J. Bot. 66: 321. 1928; Flora of China 7: 89 (2008); *Michelia hedyosperm* Law in Bull. Bot. Res. 5(3): 123. 1985; Flora Guangdongensis 1: 15 (1987); Flora Reipublicae Popularis Sinicae 30(1): 173 (1996)

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76	Annonaceae	Chieniodendron	Chieniodendron hainanense	Category II	Flora Hainanica 1: 243 (1964); Flora of China 19: 690 (2011); *Oncodostigma hainanense* (Merr.) Tsiang et P. T. Li, in Philip, J. Linn. Soc., Bot. 23: 241. 1923; Flora Guangdongensis 2: 22 (1991); Flora Reipublicae Popularis Sinicae 30(2): 81 (1999)
77	Lauraceae	Alseodaphne	Alseodaphne rugosa	Category II	Flora Hainanica 1: 265 (1964); Flora Reipublicae Popularis Sinicae 31: 70 (1982); Flora Guangdongensis 6: 12 (2006); Flora of China 7: 228 (2008)
78	Hernandiaceae	Hernandia	Hernandia nymphaeifolia	Category II	Syst. 90: 272. 1970

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79	Myristicaceae	Horsfieldia	Horsfieldia amygdalina	Category II	Flora Guangdongensis 1: 31 (1987); Flora Reipublicae Popularis Sinicae 30(1): 12 (1996); Flora of China 7: 5 (2008); *Arcangelisia loureiri* (Pierre) Diels in Engl. Pflanzenr. 46(IV. 94): 104. 1910; Flora Hainanica 1: 317 (1964)
80	Menispermaceae	Arcangelisia	Arcangelisia gusanlung	Category II	Flora Hainanica 1: 373. 1964; Flora Reipublicae Popularis Sinicae 24:5 (1988); Flora of China 5:191 (2003)
81	Podostemaceae	Cladopus	Cladopus nymanii	Category II	Flora Hainanica 1: 373. 1964; Flora Reipublicae Popularis Sinicae 24:5 (1988); Flora of China 5:191 (2003)
82	Podostemaceae	Cladopus	Cladopus yinggelingensis	Category II	Phytotaxa 270(1):50 (2016)

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83	Podostemaceae	Terniopsis	Terniopsis daoyinensis	Category II	Phytotaxa 270(1): 52. 2016
84	Podostemaceae	Paracladopus	Paracladopus chiangmaiensis	Category II	Geobot. 57: 29. 2006
85	Lythraceae	Pemphis	Pemphis acidula	Category II	Flora Reipublicae Popularis Sinicae 52(2): 89. 1983; Flora Guangdongensis 3: 78. 1995; Flora of China 13: 282. 2007
86	Salicaceae	Hydnocarpus	Hydnocarpus hainanensis	Category II	Flora Hainanica 1: 454. 1964; Flora Guangdongensis 3: 100. 1995; Flora Reipublicae Popularis Sinicae 52(1): 11. 1999; Flora of China 13: 115. 2007

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87	Begoniaceae	Begonia	Begonia hainanensis	Category II	Flora Hainanica 1: 487 (1964); Flora Guangdongensis 3: 145 (1995); Flora Reipublicae Popularis Sinicae 52(1): 157(1999); Flora of China 13: 177 (2007)
88	Theaceae	Camellia	Camellia sinensis var. assamica	Category II	Flora of China 12: 376, 377 (2007); *Camellia* (Mast.) Chang in Acta Sci. Nat. Univ. Sunyatseni. 23(1): 11. 1984; Flora Guangdongensis 2: 138 (1991); Flora Reipublicae Popularis Sinicae 49(3): 133(1998); *Thea assamica* Mast. in Journ. Agr. Hort. Soc. India 3: 63. 1844; Flora Hainanica 1: 497 (1964)

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89	Theaceae	Camellia	Camellia sinensis var. pubilimba	Category II	Flora of China 12: 377 (2007)
90	Combretaceae	Laumnitzera	Laumnitzera littorea	Category I	Flora Hainanica 2: 44. 1965; Flora Reipublicae Popularis Sinicae 53(1): 14. 1984; Flora Guangdongensis 3: 200. 1995; Flora of China 13: 310. 2007
91	Sterculiaceae	Firmiana	Firmiana pulcherrima	Category II	Flora Hainanica 2: 74 (1965); Flora Guangdongensis 1: 131 (1987); Flora of China 12: 312 (2007)
92	Fabaceae	Dalbergia	Dalbergia hainanensis	Category II	Flora Hainanica 2: 289 (1965); Flora Guangdongensis 5: 225 (2003); Flora of China 10: 129 (2010)
93	Fabaceae	Euchresta	Euchresta japonica	Category II	Flora Reipublicae Popularis Sinicae 42(2): 384. 1998; Flora of China 10:

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94	Fabaceae	Ormosia	Ormosia balansae	Category II	Flora Hainanica 2: 244 (1965); Flora Reipublicae Popularis Sinicae 40: 11 (1994); Flora Guangdongensis 5: 208 (2003); Flora of China 10: 75 (2010)
95	Fabaceae	Ormosia	Ormosia emarginata	Category II	Flora Hainanica 2: 241 (1965); Flora Reipublicae Popularis Sinicae 40: 34 (1994); Flora Guangdongensis 5: 212 (2003); Flora of China 10: 80 (2010)
96	Fabaceae	Ormosia	Ormosia fordiana	Category II	Flora Hainanica 2: 243 (1965); Flora Reipublicae Popularis Sinicae 40: 20 (1994); Flora Guangdongensis 5: 210 (2003); Flora of China 10: 77 (2010)

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97	Fabaceae	Ormosia	Ormosia glaber-rima	Category II	Flora Hainanica 2: 242 (1965); Flora Reipublicae Popularis Sinicae 40: 36 (1994); Flora Guang-dongensis 5: 212 (2003); Flora of China 10: 80 (2010)
98	Fabaceae	Ormosia	Ormosia inflata	Category II	Flora Hainanica 2: 243 (1965); Flora Reipublicae Popularis Sinicae 40: 16 (1994); Flora Guang-dongensis 5: 209 (2003); Flora of China 10:
99	Fabaceae	Ormosia	Ormosia pinnata	Category II	Flora Hainanica 2: 242 (1965); Flora Reipublicae Popularis Sinicae 40: 43 (1994); Flora Guang-dongensis 5: 213 (2003); Flora of China 10: 76 (2010)

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100	Fabaceae	Ormosia	Ormosia semicastrata	Category II	Flora Hainanica 2: 243 (1965); Flora Reipublicae Popularis Sinicae 40: 22 (1994); Flora Guangdongensis 5: 210 (2003); Flora of China 10: 77 (2010); *Ormosia semicastrata* f. *litchifolia* F.C. How in Acta Phytotax. Sin. 1: 235. 1951; Flora Hainanica 2: 243 (1965); Flora Reipublicae Popularis Sinicae 40: 24 (1994)
101	Fabaceae	Ormosia	Ormosia simplicifolia	Category II	Flora Reipublicae Popularis Sinicae 40: 22 (1994); Flora Guangdongensis 5: 210 (2003); Flora of China 10: 77 (2010)

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102	Fabaceae	Ormosia	Ormosia xylo-carpa	Category II	Flora Hainanica 2: 243 (1965); Flora Reipublicae Popularis Sinicae 40: 41(1994); Flora Guang-dongensis 5: 215 (2003); Flora of China 10: 82 (2010)
103	Fagaceae	Quercus	Quercus bawan-glingen-sis	Category II	Flora Reipublicae Popularis Sinicae 22:257 (1998); Flora of China 4: 372 (1999); Flora Guang-dongensis 9: 35 (2009)
104	Aquifoliaceae	Ilex	Ilex kaushue	Category II	Flora Hainanica 2: 430. 1965; Flora Reipublicae Popularis Sinicae 45(2): 105. 1999; Flora Guangdon-gensis 5: 394. 2003; Flora of China 11: 394. 2008

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105	Rutaceae	Citrus	Citrus japonica	Category II	Flora Reipublicae Popularis Sinicae 43(2): 173. 1997. —— *Fortunella hindsii* (Champ.ex Benth.) Swingle, Journ. Wash. Acad. Sci.5: 175. 1915; Flora Hainanica 3: 48. 1974; Flora Guangdongensis 2: 266. 1991; Flora Reipublicae Popularis Sinicae 43(2): 172
106	Simaroubaceae	Suriana	Suriana maritima	Category II	Flora Guangdongensis 1: 234. 1987; Flora Reipublicae Popularis Sinicae 43(3): 13. 1997; Flora of China 11: 105. 2008

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107	Meliaceae	Aglaia	Aglaia lawii	Category II	Flora Reipublicae Popularis Sinicae 43(3): 83 (1997). —— *Aglaia tsangii* Merr. in Lingnan Sci. J. 6: 281. 1928; Flora Hainanica 3: 66 (1974); Flora Guangdongensis 2: 292 (1991). —— *Aglaia tetrapetala* Pierre, Fl. Forest. Cochinch. 4: t. 337. 1896; Flora Hainanica 3: 66 (1974); Flora Guangdongensis 2: 291 (1991)
108	Meliaceae	Xylocarpus	Xylocarpus granatum	Category II	Flora Hainanica 3: 70. 1974; Flora Guangdongensis 2: 295. 1991; Flora Reipublicae Popularis Sinicae 43(3): 103. 1997; Flora of China 11: 131. 2008

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109	Sapindaceae	Dimocarpus	Dimocarpus longan	Category II	Flora Reipublicae Popularis Sinicae 47(1): 28. 1985; Flora Guangdongensis 1: 245. 1987; Flora of China 12: 15. 2007. —— *Euphoria longan* (Lour.) Stend. Nomencl. 1: 328. 1821; Flora Hainanica 3: 83. 1974
110	Sapindaceae	Lepisanthes	Lepisanthes unilocularis	Category II	Flora Hainanica 3: 575. 1974; Flora Reipublicae Popularis Sinicae 47(1): 26. 1985; Flora Guangdongensis 1: 244. 1987

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111	Sapindaceae	Litchi	Litchi chinensis	Category II	Flora Hainanica 3: 83(1974); Flora Reipublicae Popularis Sinicae 47(1): 32(1985); Flora Guangdongensis 1: 246(1987); Flora of China 12: 16(2007)
112	Sapindaceae	Paranephelium	Paranephelium hainanense	Category II	Flora Hainanica 3: 89. 1974; Flora Reipublicae Popularis Sinicae 47(1): 52. 1985; Flora Guangdongensis 1: 252. 1987; Flora of China 12: 10. 2007
113	Boraginaceae	Cordia	Cordia subcordata	Category II	Flora Hainanica 3: 451. 1974; Flora Reipublicae Popularis Sinicae 64(2): 7..1989; Flora of China 16: 332. 1995

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114	Lamiaceae	Wenchengia	Wenchengia alternifolia	Category II	Flora Hainanica 4: 30 (1977); Flora Reipublicae Popularis Sinicae 65(2): 98 (1977); Flora of China 17: 70 (1994); Flora Guangdongensis 3: 396 (1995)
115	Hydrocharitaceae	Ottelia	Ottelia alismoides	Category II	Flora Hainanica 4: 58. 1977; Flora Reipublicae Popularis Sinicae 8: 153. 1992; Flora Guangdongensis 6: 291. 2005; Flora of China 23: 95. 2010
116	Hydrocharitaceae	Ottelia	Ottelia cordata	Category II	Flora Hainanica 4: 59. 1977; Flora Reipublicae Popularis Sinicae 8: 157. 1992; Flora Guangdongensis 6: 291. 2005; Flora of China 23: 96. 2010

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117	Lowiaceae	Orchidantha	Orchidantha insularis	Category II	Flora Hainanica 4: 89 (1977); Flora Reipublicae Popularis Sinicae 16(2): 20 (1981); Flora Guangdongensis 2: 399 (1991); Flora of China 24: 319 (2000)
118	Zingiberaceae	Amomum	Amomum hainanense	Category II	J. P. Liao & P. Zou Nordic Journal of Botany 36(12): e01735: 1. 2018
119	Asparagaceae	Dracaena	Dracaena cambodiana	Category II	Flora Hainanica 4: 155 (1977), Flora Reipublicae Popularis Sinicae 14: 276 (1980); Flora of China 24: 216 (2000); Flora Guangdongensis 9: 213 (2009)

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120	Liliaceae	Paris	Paris dunniana	Category II	Flora of China 24: 89 (2000); Flora Guangdongensis 9: 171 (2009). —— *Paris hainanensis* Merr. In Philip. J. Sci. 23: 238. 1923; Flora Hainanica 4: 120 (1977)
121	Liliaceae	Paris	Paris polyphylla	Category II	Flora Reipublicae Popularis Sinicae 15: 92(1978); Flora of China 24: 91 (2000)
122	Arecaceae	Chuniophoenix	Chuniophoenix hainanensis	Category II	Flora Hainanica 4: 16 (1977); Flora Reipublicae Popularis Sinicae 13(1): 39 (1991); Flora Guangdongensis 2: 450 (1991); Flora of China 23: 149 (2010)

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123	Arecaceae	Chuniophoenix	Chuniophoenix humilis	Category II	Flora Guangdongensis 2:451 (1991); Flora of China 23: 149 (2010). —— *Chuniophoenix nana* Burret in Notizbl. Bot. Gart. berlin. 15:97. 1940; Flora Reipublicae Popularis Sinicae 13(1): 39 (1991)
124	Arecaceae	Nypa	Nypa fruticans	Category II	Flora Hainanica 4: 168. 1977; Flora Reipublicae Popularis Sinicae 13(1): 149. 1991; Flora Guangdongensis 2: 457. 1991; Flora of China 23: 143. 2010

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125	Orchidaceae	Anoectochilus	Anoectochilus roxburghii	Category II	Flora Hainanica 4: 203 (1977); Flora Reipublicae Popularis Sinicae 17: 220 (1999); Flora Guangdongensis 7: 363 (2006); Flora of China 25: 79 (2009)
126	Orchidaceae	Anoectochilus	Anoectochilus baotingensis	Category II	Flora of China 25: 78 (2009). —— *Anoectochilus roxburghii* (Wall.) Lindl. var. *baotingensis* K. Y. Lang in Acta Phytotax, Sin. 34(5): 557. 1996; Flora Reipublicae Popularis Sinicae 17: 220 (1999); Flora Guangdongensis 7: 364 (2006)
127	Orchidaceae	Anoectochilus	Anoectochilus hainanensis	Category II	Flora of China 25: 79 (2009)

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128	Orchidaceae	Cymbidium	Cymbidium aloifolium	Category II	Flora Reipublicae Popularis Sinicae 18: 194 (1999); Flora Guangdongensis 7: 381 (2006); Flora of China 25: 262 (2009)
129	Orchidaceae	Cymbidium	Cymbidium atropurpureum	Category II	Flora of China 25: 264 (2009)
130	Orchidaceae	Cymbidium	Cymbidium cyperifolium	Category II	Flora Reipublicae Popularis Sinicae 18: 218 (1999); Flora Guangdongensis 7: 385 (2006); Flora of China 25: 273 (2009)
131	Orchidaceae	Cymbidium	Cymbidium dayanum	Category II	Flora Hainanica 4: 246 (1977); Flora Reipublicae Popularis Sinicae 18: 197 (1999); Flora Guangdongensis 7: 382(2006); Flora of China 25: 265 (2009)

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132	Orchidaceae	Cymbidium	Cymbidium eburneum	Category II	Flora Hainanica 4: 247 (1977); Flora Reipublicae Popularis Sinicae 18: 208 (1999); Flora Guangdongensis 7: 383(2006); Flora of China 25: 270 (2009)
133	Orchidaceae	Cymbidium	Cymbidium ensifolium	Category II	Flora Reipublicae Popularis Sinicae 18: 213 (1999); Flora Guangdongensis 7: 385 (2006); Flora of China 25: 274 (2009)
134	Orchidaceae	Cymbidium	Cymbidium floribundum	Category II	Flora Reipublicae Popularis Sinicae 18: 198 (1999); Flora Guangdongensis 7: 382 (2006); Flora of China 25: 265 (2009)
135	Orchidaceae	Cymbidium	Cymbidium haematodes	Category II	Flora of China 25: 274 (2009)

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136	Orchidaceae	Cymbidium	Cymbidium hookeri-anum	Category II	Flora Reipublicae Popularis Sinicae 18: 203 (1999); Flora Guang-dongensis 7: 384 (2006); Flora of China 25: 268 (2009)
137	Orchidaceae	Cymbidium	Cymbidium insigne	Category I	Flora Hainanica 4: 247 (1977); Flora Reipublicae Popularis Sinicae 18: 205 (1999); Flora Guang-dongensis 7: 383 (2006); Flora of China 25: 269 (2009)
138	Orchidaceae	Cymbidium	Cymbidium kanran	Category II	Flora Reipublicae Popularis Sinicae 18: 217 (1999); Flora Guang-dongensis 7: 386 (2006); Flora of China 25: 275 (2009)
139	Orchidaceae	Cymbidium	Cymbidium lii	Category II	Phytotaxa 314: 290 (2017)

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140	Orchidaceae	Cymbidium	Cymbidium lowianum	Category II	Flora Reipublicae Popularis Sinicae 18: 205 (1999); Flora Guangdongensis 7: 383 (2006); Flora of China 25: 268 (2009)
141	Orchidaceae	Cymbidium	Cymbidium mannii	Category II	Flora of China 25: 264 (2009).
					Cymbidium bicolor Lindl, Gen. Sp. Orch. P1. 164. 1833; Flora Reipublicae Popularis Sinicae 18: 196 (1999); Flora Guangdongensis 7:382 (2006)
142	Orchidaceae	Cymbidium	Cymbidium nanulum	Category II	Flora Reipublicae Popularis Sinicae 18: 216 (1999); Flora of China 25: 263 (2009)
143	Orchidaceae	Cymbidium	Cymbidium paucifolium	Category II	Wuhan Bot. Res. 20: 350. 2002

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144	Orchidaceae	Cymbidium	Cymbidium suavissimum	Category II	Flora Reipublicae Popularis Sinicae 18: 200 (1999); Flora of China 25: 262 (2009)
145	Orchidaceae	Cymbidium	Cymbidium sinense	Category II	Flora Hainanica 4: 246 (1977); Flora Reipublicae Popularis Sinicae 18:215 (1999); Flora Guangdongensis 7: 386 (2006); Flora of China 25: 274 (2009)
146	Orchidaceae	Dendrobium	Dendrobium aduncum	Category II	Flora Reipublicae Popularis Sinicae 19: 123 (1999); Flora Guangdongensis 7: 441 (2006); Flora of China 25: 389 (2009)
147	Orchidaceae	Dendrobium	Dendrobium cariniferum	Category II	Flora Reipublicae Popularis Sinicae 19: 131 (1999); Flora of China 25: 369 (2009)

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148	Orchidaceae	Dendrobium	Dendrobium chrysanthum	Category II	Flora Reipublicae Popularis Sinicae 19: 96 (1999); Flora of China 25: 377 (2009)
149	Orchidaceae	Dendrobium	Dendrobium chryseum	Category II	Flora of China 25: 386 (2009).
					Dendrobium aurantiacum Rchb. f., in Gard. Chron. ser. 3, 2: 98. 1887; Flora Reipublicae Popularis Sinicae 19: 88 (1999)
150	Orchidaceae	Dendrobium	Dendrobium crystallinum	Category II	Flora Reipublicae Popularis Sinicae 19: 109 (1999); Flora of China 25: 380 (2009)

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151	Orchidaceae	Dendrobium	Dendrobium denneanum	Category II	Flora Guangdongensis 7: 442 (2006); Flora of China 25: 386 (2009). ——*Dendrobium aurantiacum* var. *denneanum* (Kerr) Z. H. Tsi, In: Fl. Reipubl. Popularis Sin. 19: 89. (1999); Flora Reipublicae Popularis Sinicae 19: 89 (1999)
152	Orchidaceae	Dendrobium	Dendrobium densiflorum	Category II	Flora Hainanica 4: 222 (1977); Flora Reipublicae Popularis Sinicae 19: 82 (1999); Flora Guangdongensis 7: 438 (2006); Flora of China 25: 375 (2009)
153	Orchidaceae	Dendrobium	Dendrobium fimbriatum	Category II	Flora Reipublicae Popularis Sinicae 19: 90 (1999); Flora of China 25: 386 (2009)

Ordinal	Family	Genus	Species	Protection Category	Bibliography
154	Orchidaceae	Dendrobium	Dendrobium hainanense	Category II	Flora Hainanica 4: 224 (1977); Flora Reipublicae Popularis Sinicae 19: 122(1999); Flora Guangdongensis 7: 441 (2006); Flora of China 25: 389 (2009)
155	Orchidaceae	Dendrobium	Dendrobium hercoglossum	Category II	Flora Hainanica 4: 221 (1977); Flora Reipublicae Popularis Sinicae 19: 122 (1999); Flora Guangdongensis 7: 441 (2006); Flora of China 25: 389 (2009)
156	Orchidaceae	Dendrobium	Dendrobium jenkinsii	Category II	Flora Hainanica 4: 222 (1977); Flora Reipublicae Popularis Sinicae 19: 79 (1999); Flora of China 25: 375 (2009)

Ordinal	Family	Genus	Species	Protection Category	Bibliography
157	Orchidaceae	Dendrobium	Dendrobium linawianum	Category II	Flora Reipublicae Popularis Sinicae 19: 113 (1999); Flora of China 25: 381(2009)
158	Orchidaceae	Dendrobium	Dendrobium lindleyi	Category II	Flora Reipublicae Popularis Sinicae 19: 78 (1999); Flora Guangdongensis 7: 437 (2006); Flora of China 25: 374 (2009)
159	Orchidaceae	Dendrobium	Dendrobium loddigesii	Category II	Flora Hainanica 4: 224 (1977); Flora Reipublicae Popularis Sinicae 19: 104 (1999); Flora Guangdongensis 7: 443 (2006); Flora of China 25: 379 (2009)
160	Orchidaceae	Dendrobium	Dendrobium lagarum	Category II	Flora of China 25: (2009)

Ordinal	Family	Genus	Species	Protection Category	Bibliography
161	Orchidaceae	Dendrobium	Dendrobium nobile	Category II	Flora Hainanica 4: 223 (1977); Flora Reipublicae Popularis Sinicae 19:111 (1999); Flora Guangdongensis 7: 443 (2006); Flora of China 25: 381 (2009)
162	Orchidaceae	Dendrobium	Dendrobium salaccense	Category II	Flora Hainanica 4: 223 (1977); Flora Reipublicae Popularis Sinicae 19: 75 (1999); Flora Guangdongensis 7: 440 (2006); Flora of China 25: 373 (2009)
163	Orchidaceae	Dendrobium	Dendrobium sinense	Category II	Flora Hainanica 4: 222 (1977); Flora Reipublicae Popularis Sinicae 19: 133 (1999); Flora Guangdongensis 7: 438 (2006); Flora of China 25: 392 (2009)

Ordinal	Family	Genus	Species	Protection Category	Bibliography
164	Orchidaceae	Dendrobium	Dendrobium spatella	Category II	Flora of China 25: 396 (2009).
					Dendrobium acinaciforme Roxb Hort Beng 63. 1814; Flora Hainanica 4: 221 (1977); Flora Reipublicae Popularis Sinicae 19: 142 (1999); Flora Guangdongensis 7: 439 (2006)
165	Orchidaceae	Dendrobium	Dendrobium strongylanthum	Category II	Flora Reipublicae Popularis Sinicae 19: 135 (1999); Flora Guangdongensis 7: 440 (2006); Flora of China 25: 393 (2009)
166	Orchidaceae	Dendrobium	Dendrobium williamsonii	Category II	Flora Reipublicae Popularis Sinicae 19: 133 (1999); Flora of China 25: 393 (2009)

Ordinal	Family	Genus	Species	Protection Category	Bibliography
167	Orchidaceae	Ludisia	Ludisia discolor	Category II	Flora Hainanica 4: 199 (1977); Flora Reipublicae Popularis Sinicae 17: 157 (1999); Flora Guangdongensis 7: 353 (2006); Flora of China 25: 55 (2009)
168	Orchidaceae	Paphiopedilum	Paphiopedilum appletonianum	Category I	Flora Hainanica 4: 190 (1977), Flora Reipublicae Popularis Sinicae 17: 68 (1999); Flora Guangdongensis 7: 329 (2006); Flora of China 25: 43 (2009)
169	Orchidaceae	Paphiopedilum	Paphiopedilum purpuratum	Category I	Flora Reipublicae Popularis Sinicae 17: 69 (1999); Flora Guangdongensis 7: 330 (2006); Flora of China 25: 43 (2009)

Ordinal	Family	Genus	Species	Protection Category	Bibliography
170	Orchidaceae	Phaius	Phaius hainanensis	Category II	Flora Reipublicae Popularis Sinicae 18: 267 (1999); Flora Guangdongensis 7: 420 (2006); Flora of China 25: 292 (2009)
171	Orchidaceae	Renanthera	Renanthera coccinea	Category II	Flora Hainanica 4: 255 (1977); Flora Reipublicae Popularis Sinicae 19: 292 (1999); Flora Guangdongensis 7: 498 (2006); Flora of China 25: 451 (2009)
172	Poaceae	Hygroryza	Hygroryza aristata	Category II	Flora Hainanica 4: 397. 1977; Flora Reipublicae Popularis Sinicae 9(2): 13. 2002; Flora of China 22: 186. 2006

Ordinal	Family	Genus	Species	Protection Category	Bibliography
173	Poaceae	Oryza	Oryza granulata	Category II	Flora of China 22: 183 (2006). —— *Oryza meyeriana* Nees & Arn. ex Hook. f. in Fl. Brit. Ind. 7: 93. 1896; Flora Reipublicae Popularis Sinicae 9(2): 5 (2002). —— *Oryza meyeriana* (Zollinger & Moritzi) Baill. in Hist. Pl. 12: 166. (1894); Flora Hainanica 4: 395 (1977)

Note: indicates Hainan endemic; species marked with * are under the authority of the administrative department of agriculture or fisheries; unmarked species are under forestry authority; aliases are in parentheses.

Note: Figure translations are in progress. See original paper for figures.