

Postprint: Study on the Seed Plant Flora of Peku Co, Tibet

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Abstract

Through field surveys, specimen collection, and review of relevant literature, a statistical analysis was conducted on the seed plant flora of Lake Paiku in Tibet. The results show: 1) The plant species are relatively impoverished. Lake Paiku has a total of 31 families, 77 genera, and 115 species of seed plants, accounting for only 18.90%, 6.73%, and 2.17% of Tibet's seed plants, respectively. Among them, gymnosperms comprise 2 families, 2 genera, and 2 species, while angiosperms comprise 29 families, 75 genera, and 113 species; within angiosperms, dicotyledons have 23 families, 58 genera, and 91 species, and monocotyledons have 6 families, 17 genera, and 22 species. 2) Dominant families are evident, with single-species families holding absolute dominance. Among all families, five families contain at least seven seed plant species, accounting for 39.13% of the total species in the study area and representing the main components of this flora; simultaneously, 11 families contain only one species, and such families account for a significant proportion. 3) The flora of seed plants is relatively complex, divided into 3 family distribution types and 10 genus distribution types, among which temperate elements hold absolute dominance: temperate-distributed families and genera account for 29.03% and 77.92% of the total, respectively, indicating that this flora possesses distinct temperate characteristics. 4) The phenomenon of family- and genus-level endemism is not pronounced; there are no Chinese endemic families, with only one Chinese endemic genus present, indicating that the degree of endemism in the Lake Paiku flora is extremely low, demonstrating the youthfulness of the alpine flora formed through the combination of cold-aridification and specialization in high mountains and plateaus. 5) The findings of this study enrich the geographical research data on the flora of the Tibetan Plateau, provide reference basis for in-depth vegetation ecological research in this region and the development, utilization, and conservation of biological resources, and furnish fundamental data for promoting ecological civilization construction in Tibet and building a national ecological security barrier.

Full Text

Studies on the Flora of Seed Plants in Peiku Co, Tibet

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Abstract

Based on field surveys, specimen collection, and literature review, we conducted a statistical analysis of the seed plant flora in Peiku Co, Tibet. The results indicate: (1) The flora is relatively species-poor, with 31 families, 77 genera, and 115 species of seed plants, representing only 18.90%, 6.73%, and 2.17% of Tibet's total seed plant diversity, respectively. This includes 2 gymnosperm species belonging to 2 genera and 2 families, and 113 angiosperm species belonging to 75 genera and 29 families. Among angiosperms, dicots comprise 23 families, 58 genera, and 91 species, while monocots comprise 6 families, 17 genera, and 22 species. (2) Dominant families are evident, with single-species families being predominant. Five families contain at least 7 species each, accounting for 39.13% of the total species in the study area and forming the main components of this flora. Meanwhile, 11 families contain only a single species, representing a notable proportion. (3) The floristic elements are relatively complex, classified into 3 family distribution types and 10 genus distribution types, with temperate elements being absolutely dominant. Temperate families and genera account for 29.03% and 77.92% of the totals, respectively, indicating a clear temperate nature. (4) Endemism at the family and genus levels is not pronounced. No families are endemic to China, and only one genus is endemic, suggesting extremely low endemism in the Peiku Co flora and reflecting the "youthfulness" of this alpine flora shaped by the combined effects of cold-arid conditions and high-altitude specialization. (5) These findings enrich the biogeographical data for the Tibetan Plateau flora, provide a reference basis for in-depth vegetation ecology research and biological resource development, utilization, and conservation in this region, and offer fundamental data for promoting ecological civilization construction and building a national ecological security barrier in Tibet.

Keywords: Peiku Co, seed plants, flora, Tibet

Introduction

Peiku Co is located at the junction of Gyirong County and Nyalam County in Shigatse City, Tibet Autonomous Region, on the northern slopes of Mount Shishapangma in the Himalayas. Its unique geographical position, complex surrounding topography, and diverse natural vegetation types create distinctive hydrothermal conditions that provide favorable habitats for various plant species. In recent years, several studies have reported on the flora of Tibet (Zhu et al., 2003; Luo et al., 2003; Zhou et al., 2007; Chen et al., 2016; Qu et al., 2016). However, research on the flora of lake and river basins in Tibet remains limited, with only studies on the Lhasa River basin (Luo et al., 2012), the Niyang River floodplain (Duan et al., 2010), and the Lancang River (Tibet section) (Wang et al., 2008). Situated within the Qomolangma Nature Reserve, where lake conservation prioritizes Peiku Co, this area has attracted scholarly attention, yet no studies on its vegetation ecology have been reported to date. Based on comprehensive surveys of plant species and their ecological-geographical distributions, this study conducts statistical analysis of floristic geographical elements to discuss the nature of this flora and its connections with other floras. Our objectives are to enrich research on the Tibetan Plateau flora, provide references for vegetation ecology studies and biological resource conservation, and supply fundamental data for promoting ecological civilization and building a national ecological security barrier in Tibet.

1.1 Study Area Overview

Peiku Co lies at the border of Nyalam and Gyirong counties in Shigatse, upstream of the Yarlung Tsangpo River, between the Himalayas and the Gangdise Mountains. Geographical coordinates are 85°35' E, 28°50' N, with a lake surface elevation of 4,590 m. As a major inland saline lake in southern Tibet, Peiku Co is a barrier lake with a total area of 300 km², primarily fed by glacial meltwater and precipitation (Lei et al., 2014; Deji et al., 2016; Nie et al., 2003; Dai et al., 2013; Zhao et al., 2016). The region features a plateau semi-arid climate with concentrated summer precipitation, distinct wet and dry seasons, and abundant sunshine. Annual sunshine hours reach 2,723.5 h, mean annual temperature is 3.8 °C, and annual precipitation is approximately 380.6 mm (Deji et al., 2016). Vegetation consists of alpine steppe dominated by annual or perennial herbs with high coverage. No trees are present, and shrub height generally does not exceed 1 m. Soils are nutrient-poor, gravelly, and highly permeable.

1.2 Vegetation Survey Methods

In August 2017, we conducted vegetation surveys in the study area. Typical community plots were established around the lake perimeter. For each vegetation type, we set up either a 50 m transect or a 10 m × 10 m quadrat.

Along each transect, 1 m × 1 m herb quadrats were placed at 10 m intervals on both sides of the transect line. In large quadrats, 1 m × 1 m sub-quadrats were established at diagonal intersection points and four corners. We recorded shrub and herb species, height, coverage, and documented elevation, latitude, and longitude for each quadrat. Additional plant species not recorded in the quadrats were documented through comprehensive field surveys. All collected specimens were brought to the Herbarium of the Research Institute of Plateau Ecology at Tibet Agricultural and Animal Husbandry College for identification by professional taxonomists using *Flora of China* and *Flora of Tibet*. Based on identification results, we compiled a taxonomic inventory and classified families and genera according to Wu Zhengyi' s distribution type system (Wu et al., 2003; Wu, 1991).

2.1 Basic Composition of the Flora

Our survey documented 115 seed plant species belonging to 77 genera and 31 families, with a species-to-genus ratio of 1.49. This includes 2 gymnosperm species in 2 genera and 2 families, and 113 angiosperm species in 75 genera and 29 families. Among angiosperms, dicots comprise 23 families, 58 genera, and 91 species (74.19%, 75.32%, and 79.13% of the study area' s totals, respectively), making them the most abundant group. Monocots comprise 6 families, 17 genera, and 22 species (19.35%, 22.08%, and 19.13%, respectively). Compared with Tibet' s overall flora (Wu, 1983-1987), Peiku Co' s seed plants represent only 18.90% of families, 6.73% of genera, and 2.17% of species, indicating relatively poor species composition associated with the high-altitude region and unique basin hydrothermal conditions. Nevertheless, this flora holds an irreplaceable position and role in the phytogeography of southern Tibet.

2.2 Family-Level Floristic Composition

The 31 families were divided into four categories based on species richness . Five families contain at least 7 species each, including Asteraceae (7 genera, 13 species), Gramineae (6 genera, 7 species), accounting for 39.13% of total species and representing the main components of this flora with crucial ecological roles. Conversely, 11 families contain only a single species, representing 35.48% of total families. While not major components, these families enrich the floristic composition of Peiku Co.

Following Wu Zhengyi' s classification system, we categorized the 31 families, 77 genera, and 115 species into geographical distribution types .

2.3 Genus-Level Floristic Composition

Analysis of the 77 genera reveals 10 distribution types. Tropical elements comprise 3 genera (3.90% of total), while temperate elements comprise 60 genera (77.92% of total), with a tropical-to-temperate ratio (R/T) of 0.05. This demonstrates overwhelmingly temperate characteristics at the genus level, while also reflecting the flora's extensive and complex connections.

Cosmopolitan genera total 13 (16.88% of all genera), comprising 25 species in 12 families, predominantly herbs such as *Carex* (3 species), *Chenopodium* (2 species), *Poa* (1 species), *Juncus* (1 species), *Triglochin* (1 species), and *Salsola* (1 species).

Among the six tropical distribution types (types 2-7), only type 2 (pantropical) is represented, with 3 genera and 3 species in 3 families (3.90% of total genera), including *Impatiens*, *Pennisetum*, and *Ephedra*. The minimal representation of tropical elements indicates their subordinate position in the Peiku Co flora. Although these few genera extend from tropical to temperate regions, suggesting historical connections with tropical floras, few tropical species can survive under the low-temperature, windy, high-radiation conditions of this region.

Temperate distribution includes six of the seven possible types (types 8-14), totaling 60 genera and 87 species in 25 families (77.92% of total genera). These dominate the flora and constitute its main components. Specifically: (1) North Temperate and Old World Temperate distributions are the primary types, with 34 genera (44.16%) and 54 species (46.96%) in the former, including *Primula* (2 species), *Oxytropis* (2 species), and *Stipa* (2 species); and 9 genera (11.69%) with 12 species (10.43%) in the latter, including *Dracocephalum* (2 species), *Elsholtzia* (2 species), and *Achnatherum* (1 species). (2) East Asian distribution and its variants comprise 8 genera with 9 species (12.50% of non-cosmopolitan genera). East Asia is a key region for early angiosperm differentiation (Lu, 1999). The Sino-Himalayan element is particularly prominent, with 5 genera and 5 species (62.50% and 55.56% of East Asian types), including *Dolomiaea*, *Lancea*, *Microula*, *Lamiophlomis*, and *Milula*.

Only one genus, *Microgynoecium*, is endemic to China (type 15), representing 1.56% of non-cosmopolitan genera. This extreme scarcity of Chinese endemic genera reflects the “youthfulness” of this alpine flora shaped by the combined effects of cold-arid conditions and high-altitude specialization.

2.4 Species-Level Floristic Composition

Species-level analysis reveals the most specific floristic characteristics and represents the fundamental unit for floristic analysis. Based on *Flora of Tibet* and *Flora of China*, we classified the 115 species into 8 distribution types.

Cosmopolitan species total 2 (1.74% of all species), in 2 families and 2 genera,

both herbs: *Galinsoga parviflora* and *Hippuris vulgaris*.

Temperate distribution types comprise 94 species (81.74% of total). North Temperate distribution includes 13 herbaceous species such as *Polygonum viviparum*, *Festuca ovina*, and *Potentilla anserina*. East Asian distribution includes 56 species (48.70% of total), all of which are Sino-Himalayan elements. Most are dominant or constructive species in the herb layer, including *Clematis tenuifolia* [FIGURE:II-D], *Astragalus strictus*, *Salix sclerophylla*, *Delphinium caeruleum*, *Milula spicata*, and *Heteropappus gouldii* [FIGURE:I-A], indicating strong connections with East Asian flora.

Chinese endemic distribution comprises 19 species (16.52% of total), ranking second after East Asian distribution. All are herbs, including *Nothosmyrniium xizangense*, *Gentiana crenulatotruncata*, *Stipa capillacea*, *Urtica tibetica*, *Morina kokonorica*, *Phlomis younghusbandii*, *Onosma hookeri*, *Ephedra saxatilis* [FIGURE:II-C], *Artemisia younghusbandii* [FIGURE:I-B], and *Delphinium kingianum* [FIGURE:II-B].

Plate I. Some Asteraceae and Scrophulariaceae Plants from Peiku Co, Tibet

Note: Asteraceae plants: A. *Heteropappus gouldii*; B. *Artemisia younghusbandii*; C. *Artemisia moorcroftiana*; Scrophulariaceae plants: D. *Pedicularis longiflora*; E. *Pedicularis kansuensis*; F. *Pedicularis longiflora*.

Plate II. Some Seed Plants from Peiku Co, Tibet

Note: A. *Oxytropis microphylla*; B. *Delphinium kingianum*; C. *Ephedra saxatilis*; D. *Clematis tenuifolia*; E. *Taraxacum tibetanum*; F. *Thermopsis lanceolata*; G. *Arabidopsis tibetica*; H. *Corydalis thyrsoflora*; I. *Silene gyirongensis*.

3. Comparative Analysis with Adjacent Regions

Floristic composition reflects the spatiotemporal distribution and evolutionary development of plants in specific environments. As floras provide theoretical evidence for historical environmental changes and reflect modern physical geographical conditions, floristic geographical distribution serves as an important indicator for comparing relationships among different regional floras (Li et al., 2016). To further understand the nature and position of Peiku Co's flora within Tibet's flora and its relationships with adjacent regions, we selected three areas for comparison: western Ngari (Zhou et al., 2007), Mila Mountains (Luo et al., 2003), and Lhasa River basin (Luo et al., 2012).

3.1 Comparison of Genus Distribution Types Using Wu Zhengyi' s 15 distribution types and relevant literature, we compared the seed plant floras of Peiku Co, western Ngari, Mila Mountains, and Lhasa River basin . The R/T value (tropical/temperate genus ratio) for Peiku Co (0.050) is higher than that of western Ngari (0.049) but lower than Mila Mountains (0.150) and Lhasa River basin (0.146), indicating that Peiku Co' s flora is less temperate than western Ngari but more temperate than Mila Mountains and Lhasa River basin.

Western Ngari exhibits the strongest temperate characteristics, located north-west of Peiku Co with minimal tropical elements. Mila Mountains features complex topography and diverse microclimates, spanning montane temperate, subalpine cold temperate, and alpine cold zones, resulting in more tropical elements than Peiku Co and western Ngari. The Lhasa River basin in central-southern Tibet has unique hydrothermal conditions dominated by temperate plateau monsoon semi-arid valley and cold semi-humid plateau climates, with fewer tropical elements than Mila Mountains.

3.2 Relationship Between Peiku Co and Western Ngari Floras Peiku Co' s flora shows close relationships with those of Mila Mountains, Lhasa River basin, and western Ngari, but the relationship with western Ngari is the strongest. The shortest distance between them results in strong commonality at all taxonomic levels. Nearly all families in Peiku Co occur in western Ngari, although families common in western Ngari such as Fumariaceae, Saxifragaceae, Campanulaceae, Geraniaceae, and Hypecoaceae are absent from Peiku Co. The two regions also share many genera, including *Artemisia*, *Lancea*, *Potentilla*, *Achnatherum*, *Polygonum*, *Stipa*, *Carex*, and *Caragana*, most of which are temperate in distribution.

4. Conclusions

Based on our investigation and statistical analysis of distribution types, Peiku Co' s seed plant flora exhibits the following characteristics:

1. **Relatively poor species composition:** The flora comprises 31 families, 77 genera, and 115 species, including 2 gymnosperm species in 2 genera and 2 families, and 113 angiosperm species in 75 genera and 29 families. Among angiosperms, dicots include 23 families, 58 genera, and 91 species, while monocots include 6 families, 17 genera, and 22 species. Compared with Tibet' s overall flora, these represent only 18.90% of families, 6.73% of genera, and 2.17% of species.
2. **Dominant families evident, with single-species families predominant:** Five families contain at least 7 species each, accounting for 39.13% of total species and forming the main components with crucial ecological roles. Eleven families contain only a single species, representing 9.57% of total families.

3. **Complex geographical composition:** The 31 families can be classified into 3 distribution types, and the 77 genera into 10 types. Temperate families and genera dominate the flora, reflecting clear temperate characteristics. Although tropical elements are minimal, their presence indicates historical connections with tropical floras during the flora's development.
4. **Weak endemism at family and genus levels:** No families are endemic to China, and only one genus (*Microgynoecium*) is endemic, demonstrating extremely low endemism and reflecting the "youthfulness" of this alpine flora shaped by cold-arid conditions and high-altitude specialization. Nineteen Chinese endemic species further support this pattern.

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Appendix: Seed Plant List of Peiku Co, Tibet

Family Name	Genus Name	Chinese Name	Latin Name
Liliaceae	Allium	垫状点地梅	<i>Allium fasciculatum</i>
Liliaceae	Polygonatum	-	<i>Allium przewalskianum</i>
Liliaceae	Milula	-	<i>Polygonatum cirrhifolium</i>
Cupressaceae	Juniperus	-	<i>Milula spicata</i> Prain
Primulaceae	Androsace	-	<i>Juniperus squamata</i>
Primulaceae	Primula	-	<i>Androsace tapete</i>
Primulaceae	Glaux	-	<i>Primula sikkimensis</i>
Dipsacaceae	Morina	-	<i>Primula tibetica</i>
Labiatae	Lamiophlomis	-	<i>Glaux maritima</i>

Family Name	Genus Name	Chinese Name	Latin Name
Labiatae	Dracocephalum	-	<i>Morina kokonorica</i>
Labiatae	Nepeta	-	<i>Lamiophlomis rotata</i>
Labiatae	Elsholtzia	白花枝子花	<i>Dracocephalum heterophyllum</i>
Labiatae	Phlomis	-	<i>Dracocephalum tanguticum</i>
Thymelaeaceae	Stellera	-	<i>Nepeta coerulescens</i>
Juncaceae	Juncus	-	<i>Elsholtzia eriostachya</i>
Leguminosae	Caragana	-	<i>Elsholtzia densa</i>
Leguminosae	Oxytropis	-	<i>Phlomis younghusbandii</i>
Leguminosae	Astragalus	-	<i>Euphorbia fischeriana</i>
Leguminosae	Thermopsis	喜马拉雅灯心草	<i>Juncus himalensis</i>
Balsaminaceae	Impatiens	变色锦鸡儿	<i>Caragana versicolor</i>
Gramineae	Orinus	蒺藜叶黄耆	<i>Oxytropis microphylla</i>
Gramineae	Achnatherum	披针叶野决明	<i>Oxytropis sericopetala</i>
Gramineae	Elymus	-	<i>Astragalus tribulifolius</i>
Gramineae	Stipa	-	<i>Astragalus tibetanus</i>
Gramineae	Festuca	西藏早熟禾	<i>Astragalus heydei</i>
Gramineae	Pennisetum	-	<i>Astragalus strictus</i>
Gramineae	Roegneria	-	<i>Thermopsis lanceolata</i>
Gramineae	Oryzopsis	光花芒颖鹅观草	<i>Impatiens sulcata</i>
Crassulaceae	Rhodiola	-	<i>Orinus thoroldii</i>
Chenopodiaceae	Artemisia	-	<i>Achnatherum splendens</i>
Chenopodiaceae	Heteropappus	-	<i>Elymus tangutorum</i>
Chenopodiaceae	Dolomiaea	西藏早熟禾	<i>Stipa purpurea</i>
Chenopodiaceae	Cousinia	-	<i>Stipa capillacea</i>
Chenopodiaceae	Galinsoga	-	<i>Poa tibetica</i>
Chenopodiaceae	Youngia	-	<i>Festuca ovina</i>
Chenopodiaceae	Taraxacum	-	<i>pennisetum centrasiaticum</i>
Chenopodiaceae	Salsola	-	<i>Roegneria aristiglumis</i>
Chenopodiaceae	Chenopodium	-	<i>Oryzopsis munroi</i>
Polygonaceae	Polygonum	异鳞红景天	<i>Rhodiola smithii</i>
Onagraceae	Epilobium	异齿红景天	<i>Rhodiola heterodonta</i>
Gentianaceae	Gentianella	细裂叶莲蒿	<i>Artemisia gmelinii</i>
Gentianaceae	Gentiana	-	<i>Artemisia hedinii</i>
Gentianaceae	Lomatogonium	-	<i>Artemisia japonica</i>
Ephedraceae	Ephedra	-	<i>Artemisia moorcroftiana</i>
Ranunculaceae	Delphinium	-	<i>Artemisia younghusbandii</i>
Ranunculaceae	Halerpestes	-	<i>Artemisia wellbyi</i>
Ranunculaceae	Clematis	-	<i>Heteropappus gouldii</i>
Ranunculaceae	Thalictrum	美叶川木香	<i>Dolomiaea calophylla</i>
Rosaceae	Spiraea	毛苞刺头菊	<i>Cousinia thomsonii</i>
Rosaceae	Potentilla	-	<i>Galinsoga parviflora</i>
Umbelliferae	Nothosmyrnum	-	<i>Youngia simulatrix</i>
Umbelliferae	Bupleurum	-	<i>Youngia gracilipes</i>
Umbelliferae	Peucedanum	-	<i>Taraxacum tibetanum</i>

Family Name	Genus Name	Chinese Name	Latin Name
Cyperaceae	Carex	单翅猪毛菜	<i>Salsola monopectera</i>
Cyperaceae	Kobresia	-	<i>Chenopodium glaucum</i>
-	Microgynoecium	-	<i>Chenopodium foetidum</i>
-	-	-	<i>Ceratoides latens</i>
-	-	-	<i>Ceratoides</i>
-	-	-	<i>Microgynoecium tibeticum</i>
-	-	-	<i>Polygonum tortuosum</i>
-	-	细叶西伯利亚蓼	<i>Polygonum sibiricum</i>
-	-	沼生柳叶菜	<i>Epilobium palustre</i>
-	-	-	<i>Polygonum viviparum</i>
-	-	-	<i>Polygonum macrophyllum</i>
-	-	黑边假龙胆	<i>Gentianella azurea</i>
-	-	圆齿褶龙胆	<i>Gentiana leucomelaena</i>
-	-	-	<i>Gentiana crenulatotruncata</i>
-	-	-	<i>Gentiana straminea</i>
-	-	-	<i>Gentiana robusta</i>
-	-	-	<i>Lomatogonium thomsonii</i>
-	-	-	<i>Ephedra saxatilis</i>
-	-	密叶翠雀花	<i>Delphinium caeruleum</i>
-	-	三裂碱毛茛	<i>Delphinium kingianum</i>
-	-	-	<i>Halerpestes tricuspis</i>
-	-	西藏铁线莲	<i>Clematis tenuifolia</i>
-	-	芸香叶唐松草	<i>Thalictrum rutifolium</i>
-	-	拱枝绣线菊	<i>Spiraea arcuata</i>
-	-	-	<i>Potentilla anserina</i>
-	-	-	<i>Potentilla parvifolia</i>
-	-	-	<i>Potentilla multifida</i>
-	-	-	<i>Potentilla bifurca</i>
-	-	西藏白苞芹	<i>Nothosmyrnum xizangense</i>
-	-	窄竹叶柴胡	<i>Bupleurum marginatum</i>
-	-	-	<i>Peucedanum nanum</i>
-	-	-	<i>Carex moorcroftii</i>
-	-	-	<i>Carex praeclara</i>
-	-	-	<i>Carex angustifructus</i>
-	-	-	<i>Kobresia microglochis</i>
-	-	-	<i>Kobresia macrantha</i>
-	-	-	<i>Hippuris vulgaris</i>
-	-	垂果大蒜芥	<i>Sisymbrium heteromallum</i>
-	-	线果高原芥	<i>Christolea crassifolia</i>
-	-	三角叶山箭菜	<i>Christolea parkeri</i>
-	-	-	<i>Eutrema deltoideum</i>
-	-	头花独行菜	<i>Lepidium capitatum</i>
-	-	西藏鼠耳芥	<i>Arabidopsis tibetica</i>
-	-	-	<i>Dimorphostemon glandulosus</i>

Family Name	Genus Name	Chinese Name	Latin Name
-	-	吉隆蝇子草	<i>Silene gyirongensis</i>
-	-	云南蝇子草	<i>Silene yunnanensis</i>
-	-	-	<i>Triglochin maritima</i>
-	-	大花小米草	<i>Euphrasia jaeschkei</i>
-	-	甘肃马先蒿	<i>Pedicularis kansuensis</i>
-	-	鹞形马先蒿	<i>Pedicularis longiflora</i>
-	-	管状长花马先蒿	<i>Pedicularis scolopax</i>
-	-	-	<i>Lancea tibetica</i>
-	-	小花毛果草	<i>Urtica hyperborea</i>
-	-	长花滇紫草	<i>Urtica tibetica</i>
-	-	团花滇紫草	<i>Salix sclerophylla</i>
-	-	-	<i>Corydalis thyrsoiflora</i>
-	-	-	<i>Corydalis crispa</i>
-	-	-	<i>Iris loczyi</i>
-	-	-	<i>Lasiocaryum densiflorum</i>
-	-	-	<i>Lasiocaryum munroi</i>
-	-	-	<i>Onosma hookeri</i>
-	-	-	<i>Onosma glomeratum</i>
-	-	-	<i>Microula sikkimensis</i>

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

Source: ChinaXiv – Machine translation. Verify with original.