New Data on Orchidaceae from Tibet, China (Postprint)

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Abstract

Located at the junction of the eastern Himalayas and the Indo-Burma region, southeastern Tibet, China is a global biodiversity hotspot. Particularly Mêdog in this region, with its substantial altitudinal range, exhibits significant vertical zonation of vegetation types, diverse flora, and complex vegetation structure. To further investigate the orchid resources in this region, we report three newly recorded genera of wild orchids in Tibet, namely Zeuxine, Herpysma, and Holcoglossum; and 27 newly recorded species, namely Zeuxine goodyeroides (白肋线柱兰), Herpysma longicaulis (爬兰), Holcoglossum himalaicum (小花槽舌兰), Anoectochilus elwesii (西南齿唇兰), Arachnis labrosa (窄唇蜘蛛兰), Bulbophyllum stenobulbon (短足石豆兰), Bulbophyllum forrestii (尖角卷瓣兰), Calanthe lyroglossa (南方虾脊兰), Ceratostylis siamensis (泰国牛角兰), Chrysoglossum ornatum (金唇兰), Coelogyne griffithii (格力贝母兰), Coelogyne assamica (云南贝母兰), Cymbidium tigrinum (斑舌兰), Dendrobium strongylanthum (梳唇石斛), Dendrobium angustifolium (狭叶金石斛), Dendrobium mariae (厚唇兰), Pinalia amica (粗茎苹兰), Goodyera pendula (垂叶斑叶兰), Goodyera viridiflora (绿花斑叶兰), Liparis perpusilla (狭叶羊耳蒜), Liparis platyrachis (小花羊耳蒜), Liparis mannii (三裂羊耳蒜), Oberonia falcata (镰叶鸢尾兰), Oberonia latipetala (阔瓣鸢尾兰), Pholidota convallariae (凹唇石仙桃), Sunipia scariosa (大苞兰), and Thelasis khasiana (滇南矮柱兰), based on joint scientific expeditions and literature analysis. Voucher specimens are deposited in the herbaria of the Institute of Botany, Chinese Academy of Sciences (PE), the Tibetan Plateau Institute of Biology (XZ), and the Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences (HITBC). The discovery of these new records is of great significance for enriching the flora of Tibet and for the conservation and research of species diversity in this region.

Full Text

New Orchid Records from Tibet, China

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Abstract

Southeastern Tibet is situated at the intersection of the Eastern Himalaya and Indo-Burma region, representing a global biodiversity hotspot. Medog County, located in this area, features extreme elevational gradients that create pronounced vertical vegetation zonation, rich plant species diversity, and complex vegetation structure. To further understand orchid resources in this region, we conducted joint scientific expeditions combined with literature analysis, reporting three genera new to Tibet: *Zeuxine*, *Herpysma*, and *Holcoglossum*, and twenty-seven species new to the region: *Zeuxine goodyeroides*, *Herpysma longicaulis*, *Holcoglossum himalaicum*, *Anoectochilus elwesii*, *Arachnis labrosa*, *Bulbophyllum stenobulbon*, *Bulbophyllum forrestii*, *Calanthe lyroglossa*, *Ceratostylis siamensis*, *Chrysoglossum ornatum*, *Coelogyne griffithii*, *Coelogyne assamica*, *Cymbidium tigrinum*, *Dendrobium strongylanthum*, *Dendrobium angustifolium*, *Dendrobium mariae*, *Pinalia amica*, *Goodyera pendula*, *Goodyera viridiflora*, *Liparis perpusilla*, *Liparis platyrachis*, *Liparis mannii*, *Oberonia falcata*, *Oberonia latipetala*, *Pholidota convallariae*, *Sunipia scariosa*, and *Thelasis khasiana*. Voucher specimens are deposited at the herbaria of the Institute of Botany, Chinese Academy of Sciences (PE), Tibet Plateau Institute of Biology (XZ), and Xishuangbanna Tropical Botanical Garden (HITBC). These discoveries significantly enrich the documented flora of Tibet and provide important baseline data for biodiversity conservation and research in the region.

Keywords: *Zeuxine*, *Herpysma*, *Holcoglossum*, Orchidaceae, newly recorded species, Tibet

Southeastern Tibet represents a biodiversity hotspot (Mittermeier et al, 2005). The unique geographical environment and complex climate types contribute to exceptionally rich orchid diversity, with *Flora of Tibet* documenting 64 genera, 191 species, and two varieties of Orchidaceae in the region (Lang Kaiyong and

Ji Zhanhe, 1987). Improved transportation infrastructure in recent years has facilitated increased botanical research and fieldwork in this area.

In November 2017, researchers from the Institute of Botany (Chinese Academy of Sciences), Tibet Plateau Institute of Biology, and Xishuangbanna Tropical Botanical Garden conducted a two-week joint scientific expedition to investigate wild orchids in Medog County, Tibet. The survey documented three genera and twenty-seven species new to Tibet, which we report herein. Voucher specimens are preserved at PE, XZ, and HITBC.

1. *Zeuxine goodyeroides* Lindl., Gen. Sp. Orch. Pl. 486. 1840.

Figure I: A

Distribution in the region: Medog County, Beibeng Township, 1,451 m, epiphytic on tree trunks in forest; Jin Xiaohua, Li Jianwu, Wang Xilong, Wang Chengwang 19305 (PE).

Distribution outside the region: The genus comprises over 50 species, with 13 species occurring in China, primarily in southeastern Yunnan and western Guangxi. Also distributed in Nepal, Sikkim, Bhutan, and northeastern India. Type specimen collected from India. Both the species and genus *Zeuxine* Lindl. represent new records for Tibet.

2. *Herpysma longicaulis* Lindl. in Gen. Sp. Orchid. Pl. 506. 1840.

Figure I: B

Distribution in the region: Medog County, Beibeng Township, 1,381 m, growing in humus soil under dense forest, flowering; Jin Xiaohua, Li Jianwu, Wang Xilong, Wang Chengwang 19335 (PE).

Distribution outside the region: The genus is monotypic, with *H. longicaulis* distributed in Yunnan (China), Bhutan, northeastern India, Indonesia, Myanmar, Nepal, Thailand, and Vietnam. Both the species and genus *Herpysma* Lind. represent new records for Tibet.

3. *Holcoglossum himalaicum* (Deb, Sengupta & Malick) Aver. (*Ascocentrum himalaicum* (Deb, Sengupta & Malick) Christenson)

Both Chinese and English editions of *Flora of China* placed this species in the genus *Ascocentrum* Schltr. (Ji Zhanhe et al, 1999; Chen et al, 1999), but we here follow recent research and assign it to *Holcoglossum*.

Distribution in the region: Medog County, Gedang Township, 1,769 m, epiphytic on tree trunks in forest, flowering; Jin Xiaohua, Li Jianwu, Wang Xilong, Wang Chengwang 19190 (PE).

Distribution outside the region: The genus comprises 12 species, primarily distributed in Yunnan and Sichuan (China), with additional distribution in

India, Laos, Myanmar, Thailand, and Vietnam. Both the species and genus *Holcoglossum* Schltr. represent new records for Tibet.

4. *Anoectochilus elwesii* (Clarke ex Hook. f.) King et Pantl. in Ann. Bot. Gard. Calcutta 8: 296, t. 394. 1898.

Distribution in the region: Medog County, Beibeng Township, 1,451 m, epiphytic in shady, humid humus soil under forest; Jin Xiaohua, Li Jianwu, Wang Xilong, Wang Chengwang 19306 (PE).

Distribution outside the region: Distributed in Guangxi, Sichuan, Guizhou, Yunnan, and Taiwan (China); also in Sikkim, Bhutan, northeastern India, northern Myanmar, Thailand, and Vietnam. Type specimen collected from India. This species represents a new record for Tibet.

5. *Arachnis labrosa* (Lindl. & Paxton) Rchb.f. in Bot. Centralbl. 28: 343. 1886.

Distribution in the region: Medog County, Dexing Township, 1,077 m, epiphytic on tree trunks in forest; Jin Xiaohua, Li Jianwu, Wang Xilong, Wang Chengwang 19126 (PE).

Distribution outside the region: The genus comprises over 13 species, with only one species in China, distributed in Taiwan, Hainan, Guangxi, and southern Yunnan. Externally distributed in Bhutan, northeastern India, Myanmar, and southern Vietnam. This species represents a new record for Tibet.

6. *Bulbophyllum stenobulbon* E. C. Parish & Rchb.f. in Trans. Linn. Soc. London 30: 153.

Distribution in the region: Medog County, along 50K-80K road, 1,087 m, epiphytic on tree trunks in forest; Jin Xiaohua, Li Jianwu, Wang Xilong, Wang Chengwang 19065 (PE).

Distribution outside the region: The genus comprises approximately 1,900 species, primarily distributed in tropical regions of the Old and New Worlds; 103 species occur in China, found in Guangdong, southwestern Guizhou, and southeastern Yunnan. Also distributed in Bhutan, Sikkim, Laos, Myanmar, Thailand, and Vietnam. This species represents a new record for Tibet.

7. *Bulbophyllum forrestii* Seidenf. in Dansk Bot. Ark. 29(1): 120. 1974.

Distribution in the region: Medog County, along 50K-80K road, 1,087 m, epiphytic on tree trunks in forest; Jin Xiaohua, Li Jianwu, Wang Xilong, Wang Chengwang 19070 (PE).

Distribution outside the region: Primarily distributed in southern to northwestern Yunnan (Meng Hai, Tengchong, Lushui, Nujiang River basin). Exter-

nally distributed in Myanmar and Thailand. Type specimen collected from northwestern Yunnan. Similar to *Bulbophyllum helenae* (Kuntze) J. J. Smith but differs in its apricot-yellow flowers and entire dorsal sepal. This species represents a new record for Tibet.

8. *Calanthe lyroglossa* Rchb.f. in Otia Bot. Hamburg. 1: 53. 1878.

Distribution in the region: Medog County, Beibeng Township, 1,596 m, epiphytic on tree trunks in forest; Jin Xiaohua, Li Jianwu, Wang Xilong, Wang Chengwang 19252 (PE).

Distribution outside the region: In China, primarily distributed in Hainan and Taiwan; externally distributed in Cambodia, northeastern India, Japan, Laos, Malaysia, Myanmar, Philippines, Thailand, and Vietnam. This species represents a new record for Tibet.

9. *Ceratostylis siamensis* Rolfe ex Downie. in Bull. Misc. Inform. Kew 1925, 379.

Distribution in the region: Medog County, Gedang Township, 1,680 m, epiphytic on tree trunks in forest; Jin Xiaohua, Li Jianwu, Wang Xilong, Wang Chengwang 19223 (PE).

Distribution outside the region: The genus comprises approximately 100 species, primarily distributed in tropical Asia to New Guinea and Pacific islands; four species occur in China, found in Yunnan and Tibet, with external distribution mainly in Thailand. This species was previously discovered in Yunnan (Li Jianwu et al, 2015) with specimens deposited at HITB herbarium. This represents a new record for Tibet.

10. *Chrysoglossum ornatum* Bl. in Bijdr. 338. 1825.

Distribution in the region: Medog County, Dexing Township, 1,077 m, growing in shady, humid forest understory; Jin Xiaohua, Li Jianwu, Wang Xilong, Wang Chengwang 19133 (PE).

Distribution outside the region: Primarily distributed in Guangxi, Hainan, Taiwan, and southern and southwestern Yunnan (China); externally distributed in Bhutan, India, Nepal, and Southeast Asia. This species represents a new record for Tibet.

11. *Coelogyne griffithii* Hook.f. in Fl. Brit. India. 5: 838. 1890.

Distribution in the region: Medog County, Beibeng Township, 712 m, epiphytic on tree trunks in forest; Jin Xiaohua, Li Jianwu, Wang Xilong, Wang Chengwang 19280 (PE).

Distribution outside the region: Primarily distributed in southeastern Yunnan (China); also in northeastern India and Myanmar. This species represents

a new record for Tibet.

12. *Coelogyne assamica* Linden & Rchb.f. in Berliner Allg. Gartenzeitung 25: 403. 1857.

Distribution in the region: Medog County, Beibeng Township, 728 m, epiphytic on tree trunks in forest; Jin Xiaohua, Li Jianwu, Wang Xilong, Wang Chengwang 19293 (PE).

Distribution outside the region: Distributed in northwestern Yunnan (China); Bhutan, northeastern India, Myanmar, Thailand, and Vietnam. This species represents a new record for Tibet.

13. *Cymbidium tigrinum* E. C. Parish ex Hook. in Bot. Mag. 90: ad t. 5457. 1864.

Distribution in the region: Medog County, Gedang Township, 1,769 m, epiphytic on tree trunks in forest; Jin Xiaohua, Li Jianwu, Wang Xilong, Wang Chengwang 19185 (PE).

Distribution outside the region: Primarily distributed in Yunnan (China); India and Myanmar. This species represents a new record for Tibet.

14. *Dendrobium angustifolium* (Bl.) Lindl. in Gen. Sp. Orchid. Pl. 76. 1830. (*Flickingeria angustifolia* (Bl.) Hawkes)

Both Chinese and English editions of *Flora of China* placed this species in the genus *Flickingeria* A.D.Hawkes, but we here follow recent research and assign it to *Dendrobium* (Xiang et al, 2012; Fan et al, 2014).

Distribution in the region: Medog County, Beibeng Township, 1,451 m, epiphytic on tree trunks in forest; Jin Xiaohua, Li Jianwu, Wang Xilong, Wang Chengwang 19315 (PE).

Distribution outside the region: Hainan (Wuzhi Mountain and other areas), southwestern Guangxi (Jingxi, Debao), and Yunnan (Xishuangbanna, Pu'er and other areas) in China.

15. *Dendrobium mariae* Schuit. & Peter B.Adams in Meulleria 29(1): 66. 2011. (*Epigeneium clemensiae* Gagnep.)

Both Chinese and English editions of *Flora of China* placed this species in the genus *Epigeneium* Gagnep., but we here follow recent research and assign it to *Dendrobium* (Schuiteman & Adams, 2011).

Distribution in the region: Medog County, Gedang Township, 1,769 m, epiphytic on tree trunks in forest; Jin Xiaohua, Li Jianwu, Wang Xilong, Wang Chengwang 19197 (PE).

Distribution outside the region: Primarily distributed in Guizhou, Hainan, and Yunnan, China. This species represents a new record for Tibet.

16. *Dendrobium strongylanthum* Rchb.f. in Gard. Chron., n.s., 9: 462. 1878.

Distribution in the region: Medog County, Motuo Town, 1,440 m, epiphytic on tree trunks in forest; Jin Xiaohua, Li Jianwu, Wang Xilong, Wang Chengwang 19107 (PE).

Distribution outside the region: Primarily distributed in Hainan and Yunnan, China; Myanmar, Thailand, and Vietnam. This species represents a new record for Tibet.

17. *Pinalia amica* (Rchb.f.) Kuntze in Revis. Gen. Pl. 2: 679. 1891.

Distribution in the region: Medog County, Gedang Township, 1,689 m, epiphytic on tree trunks in forest; Jin Xiaohua, Li Jianwu, Wang Xilong, Wang Chengwang 19163 (PE).

Distribution outside the region: Primarily distributed in Taiwan and Yunnan, China; also in Bhutan, Cambodia, India, Laos, Myanmar, Nepal, Thailand, and Vietnam. This species represents a new record for Tibet.

18. *Goodyera pendula* Maxim. in Bull. Acad. Imp. Sci. Saint-Pétersbourg 32: 623. 1888.

Distribution in the region: Bomi County, along the road from Pailong to Tongmai, 2,243 m, growing at forest edge; Jin Xiaohua, Li Jianwu, Wang Xilong, Wang Chengwang 19007 (PE).

Distribution outside the region: Primarily distributed in Taiwan, China; also in Japan. This species represents a new record for Tibet.

19. *Goodyera viridiflora* (Bl.) Lindl. ex D. Dietrich in Syn. Pl. 5: 165. 1852.

Distribution in the region: Medog County, Gedang Township, 1,336 m, growing at forest edge, flowering; Jin Xiaohua, Li Jianwu, Wang Xilong, Wang Chengwang 19156 (PE).

Distribution outside the region: Distributed in Fujian, Guangdong, Hainan, Jiangxi, Yunnan, and Taiwan, China; Bhutan, India, Japan, Nepal, Philippines, Thailand, and Vietnam. This species represents a new record for Tibet.

20. *Liparis perpusilla* Hook.f. in Hooker' s Icon. Pl. 19: ad t. 1856b. 1889.

Distribution in the region: Medog County, Motuo Town, 2,003 m, epiphytic on tree trunks in forest; Jin Xiaohua, Li Jianwu, Wang Xilong, Wang Chengwang 19092 (PE).

Distribution outside the region: Primarily distributed in southwestern Yunnan, China; Bhutan, India, Nepal, and Sikkim. This species represents a new record for Tibet.

21. *Liparis platyrachis* Hook.f. in Hooker' s Icon. Pl. 19: ad t. 1890. 1889.

Distribution in the region: Medog County, Motuo Town, 1,440 m, epiphytic on tree trunks in forest; Jin Xiaohua, Li Jianwu, Wang Xilong, Wang Chengwang 19105 (PE).

Distribution outside the region: Primarily distributed in western Yunnan, China; Nepal and Sikkim. This species represents a new record for Tibet.

22. *Liparis mannii* Rchb.f. in Flora 55: 275. 1872.

Distribution in the region: Medog County, Dexing Township, 1,077 m, epiphytic on tree trunks in forest; Jin Xiaohua, Li Jianwu, Wang Xilong, Wang Chengwang 19119 (PE).

Distribution outside the region: Primarily distributed in southern Yunnan, China; northeastern India and Vietnam. This species represents a new record for Tibet.

23. *Oberonia falcata* King & Pantl. in Journ. As. Soc. Beng. II. 64: 329, 1895.

Distribution in the region: Medog County, Gedang Township, 1,689 m, epiphytic on tree trunks in forest; Jin Xiaohua, Li Jianwu, Wang Xilong, Wang Chengwang 19160 (PE).

Distribution outside the region: Primarily distributed in Yunnan, China; this represents a new record for Tibet.

24. *Oberonia latipetala* L. O. Williams in Bot. Mus. Leafl. 5: 165. 1938.

Distribution in the region: Medog County, Gedang Township, 1,769 m, epiphytic on tree trunks in forest; Jin Xiaohua, Li Jianwu, Wang Xilong, Wang Chengwang 19186 (PE).

Distribution outside the region: Discovered and reported from Yunnan, China in 2013 (Tian Huaizhen et al, 2013); this represents a new record for Tibet.

25. *Pholidota convallariae* (E. C. Parish & Rchb.f.) Hook.f. in Hooker' s Icon. Pl. 19: ad t. 1880.

Distribution in the region: Medog County, Gedang Township, 1,769 m, epiphytic on tree trunks in forest; Jin Xiaohua, Li Jianwu, Wang Xilong, Wang Chengwang 19184 (PE).

Distribution outside the region: Primarily distributed in southwestern Yunnan, China; northeastern India, Myanmar, Thailand, and Vietnam. This represents a new record for Tibet.

26. *Sunipia scariosa* Lindl. in Gen. Sp. Orchid. Pl. 179. 1833.

Distribution in the region: Medog County, Beibeng Township, 1,381 m, epiphytic on tree trunks in forest; Jin Xiaohua, Li Jianwu, Wang Xilong, Wang Chengwang 19343 (PE).

Distribution outside the region: Primarily distributed in Yunnan, China; northeastern India, Myanmar, Nepal, and Thailand. This represents a new record for Tibet.

27. *Thelasis khasiana* Hook.f. in Fl. Brit. India. 6: 87. 1890.

Distribution in the region: Medog County, Dexing Township, 1,077 m, epiphytic on tree trunks in forest; Jin Xiaohua, Li Jianwu, Wang Xilong, Wang Chengwang 19120 (PE).

Distribution outside the region: Primarily distributed in southwestern Yunnan, China; India, Thailand, and Vietnam. This represents a new record for Tibet.

Note: A. *Zeuxine goodyeroides*; B. *Herpysma longicaulis*; C. *Holcoglossum himalaicum*

Plate I Three genera of orchids newly recorded to Tibet

The discovery of three new genera and twenty-seven new species during a two-week expedition demonstrates the exceptional richness of orchid diversity in Medog. The Yarlung Tsangpo River serves as a natural water vapor channel, bringing warm, moist air from the Indian Ocean and creating a substantial rainfall zone that provides abundant water and heat conditions for plant growth. The Tibetan name "Medog" means "flowers," reflecting the region' s rich plant resources. The terrain slopes from high in the north to low in the south, with extreme elevational differences—from 7,756 m at Namjagbarwa Peak to only 200–500 m in the southern lowlands. The Yarlung Tsangpo River' s great bend

traverses the region, with annual precipitation exceeding 2,000 mm (Han Weidong et al, 1992). Spanning multiple climate and vegetation zones, the area exhibits complex climate patterns with pronounced vertical variation, creating a complete vertical spectrum of vegetation types and earning it the designation "natural museum of vegetation types." These special geographical and climatic conditions foster a unique orchid flora found nowhere else in the world (Lang Kaiyong, 1980).

Although Medog lies within the Himalayan biodiversity hotspot, it is also an ecologically fragile zone. In April 2000, the State Council approved the expansion and renaming of the Medog National Nature Reserve as the Yarlung Tsangpo Grand Canyon National Nature Reserve, broadening the protected area. We recommend that while developing and utilizing these valuable orchid resources, Medog should strengthen scientific management of the Yarlung Tsangpo Grand Canyon National Nature Reserve, strictly limit human access to core and buffer zones, enhance forestry law enforcement, and prohibit illegal collection and trade of orchids. As a biodiversity hotspot, collaborative efforts between the reserve management bureau and research institutions are needed to conduct comprehensive surveys of all orchid resources, establish detailed inventories, and particularly document endemic species to provide scientific foundations for reserve management and orchid diversity conservation.

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