



Taxonomic revision of Chenopodiaceae in Nepal

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Abstract

A taxonomic revision of the family Chenopodiaceae in Nepal with new diagnostic keys, descriptions and detailed distribution patterns is here presented for the first time. 24 species from 13 genera are reported. The apophytes in Himalaya are found in both ruderal and segetal plant communities in contrast to Chenopodiaceae in temperate parts of Eurasia which prefer ruderal places only. The Himalaya and West Tibet are considered to be the regions with the greatest taxonomic diversity of native *Dysphania* in Eurasia. *Chenopodium perttii* is described as new for science, and its differences from other related taxa are described, including its unique minute-papillate (almost smooth when dry) pericarp. *C. bengalense* seems to be an older name for the taxa known as *C. giganteum* or *C. album* subsp. *amaranticolor*. The lectotypes of *Chenopodium giganteum*, *C. album* subsp. *yunnanense*, *C. aristatum* f. *muticum* (here synonymized with *Dysphania kitiae*) and *Microgynoecium tibeticum* are designated. Both lectotype and epitype for *Atriplex bengalensis* (basionym of *C. bengalense*), *C. giganteum* and the re-instated species *C. pallidum* are designated.

Key words: *Chenopodiaceae*, *Dysphania*, distribution, ecology, Himalaya, Nepal, new species, typification, taxonomic revision.

Introduction

The family Chenopodiaceae Vent. comprises about 100 genera and approximately 1600 species distributed worldwide (Sukhorukov 2014) and it is a sister group to Amaranthaceae according to molecular investigations (Kadereit *et al.* 2003). Most of Chenopodiaceae are widespread in the semiarid and arid regions of the World. The Himalaya, especially the northern territories including NW India and Pakistan, is rich in Chenopodiaceae (Rechinger 1997, Klimeš & Dickoré 2005), but the number of the representatives decreases towards the south-east territories. In Bhutan, only eight species in the family were reported (Long 1984).

The revision of Chenopodiaceae in Nepal has not been carried out before now. In the first comprehensive account of the Eastern Himalaya (Bhutan, parts of India and Nepal) based on expeditions lasting several years, only two representatives [*Chenopodium album* Linnaeus (1753: 219) and *Dysphania ambrosioides* (Linnaeus 1753: 219) Mosyakin & Clemants (2002: 382) (sub *C. ambrosioides*)] were recorded (Hara 1966). The treatment of the entire family (14 species from 7 genera) was provided for Mustang Province in the mountainous Central Nepal (Yonekura 2008), as well as revised contributions relating to the complicated Himalayan and Tibetan species of the genera *Axyris* Linnaeus (1753: 979) (Sukhorukov 2011) and *Dysphania* Brown (1810: 411) (Sukhorukov 2012a, 2012b, 2014; Uotila 2013). The aim of the present study is a revision of the family in Nepal using recent and improved taxonomy and detailed distribution patterns.

Material and Methods

The field investigations were carried out by the first author during 2005–2013 in many provinces of Nepal in all major parts of the country (West, Central and Eastern Nepal). The herbarium material is preserved in the herbaria B, BM,

(Press *et al.* 2000). This remarkable taxon with its triangular leaf shape is distributed in North India, northern Pakistan and Afghanistan (Uotila 1997), but it does not apparently occur in north-eastern Indian states close to the Nepali border. The most predictable taxa are *Dysphania tibetica* (Uotila 2013) and *Corispermum nanum* Sukhor. & Zhang (Sukhorukov *et al.* 2014: 84) found in West Tibet near Nepali territory. The Terai region of Nepal may include some *Chenopodium* species recently described (Pandeya & Pandeya 2003) and accepted in Paul's (2012) treatment of Indian Chenopodiaceae, but the composition of this genus in tropical part of India has been very poorly studied so far and requires additional investigation.

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Appendix. Specimens of *Dysphania kitiae* re-identified in the herbaria visited:

Gansu prov.: Lanzhou county, 27 September 1956, *Expedition team s.n.* (PE-00510830); Yongchang county, near Wu-wei, 1958, *anonym s.n.* (PE); Yongdeng, Liancheng, 2999 m, 14 September 1958, *Ganqing Team Zhong Buqiu 10147* (WUK). **Ningxia** prov.: Yanchi, Yangliubu, 1310 m, 18 September 1984, *Yang Jinxiang 5222* (WUK). **Inner Mongolia** prov.: Rehe Chifeng vicinity (Zhifang Village), 570 m, 21 September 1952, *Liou Tchen-ngo 5220* (WUK); Fengzhen, Xuegangshan Mountains, 1230 m, 28 September 1984, *Huangtu Team (Jin) 4197* (WUK). **Hebei** prov.: Lingshankou, Choluhsien, 7 September 1930, *Hsia 2448* (PE-00510747); Eastern Tombs, 16 September 1930, *Liou 1603* (PE-00510746); Neiqiu County, Xiaolingdi village, Bulaoqing, 16 September 1950, *Liu Ying 13801* (PE); [near Beijing] Baihuashan, Huang’antuo, 19 September 1950, *Wang Wen-cai 744* (PE); Huailai county, Zhaojiapeng, Tianqiaoshan, 19 September 1959, *anonym 172* (PE). **Shansi** prov.: Luyashan, Ning-wu, 5000 ft, 20 August 1929, *Hsia 1616* (PE-00510771); Chieh-hsiu [Jiexiu] distr., Sung-Lin-miao, in cultis, ca. 800 m, 3 October 1924, *Smith 7899* (PE-00510602); Sihsien, Shikowtze, 1500 m, 3 September 1935, *Wang 3449* (PE-00510781); Shangchuang, Sihsien, 1200 m, 12 September 1935, *Wang 3600* (PE-00510772). **Shaanxi** [Shensi] prov.: along Wei river, 10 September 1932, *Hao 4526* (PE-00510872); Ningshen-hsien, 900 m, 19 July 1933, *Kung 3105* (PE-00510797); Tsashui Hsien [Zhàshuǐ Xiàn], 8 October 1933, *Wang 1991* (PE-00510790); Yulin, 10 August 1982, *Yang Jinxiang 3988* (PE); Wuqi County, 1200 m, 13 September 1984, *Yang Jinxiang 5115* (WUK); Zhouzhi, Taibeishan, 1500 m, 6 July 1999, *Zhu & Xu 1546* (PE-00235085). **Sichuan** prov.: Xiao, October 1914, *Handel-Mazzetti s.n.* (W); NW part, Rumichango, 2000 m, 29 October 1922, *Smith 4872* (PE-00510698); Mu-li, Ko-pa-ting, 2500 m, 17 July 1937, *Yu 7290* (PE-00510910); Songpan [Songpan], Heihichiao, 1600 m, 23 October 1937, *Wang 7939* (PE-00510903). **Yunnan** prov.: Wei-se Hsien [Wēixìn Xiàn], 2600 m, 19 September 1934, *Tsai 57965* (PE-00510952); Tehching, Tsawalungla, 2800 m, 18 September 1937, *Yu 10331* (PE-00510961).