



A new species of *Dysphania* (Chenopodioideae, Chenopodiaceae) from South-West Tibet and East Himalaya

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Abstract

Dysphania geoffreyi is described as a new species, with records in China (Xizang and Yunnan provinces) and Bhutan. It differs from morphologically similar taxa by virtue of the clustered flowers in the inflorescence, indumentum set on the perianth, terminally concave pericarp papillae, and smaller seeds 0.5–0.6 mm in diameter. In total eight native *Dysphania* species are identified in Himalaya and Tibet, and revised distribution patterns of *D. bhutanica*, *D. himalaica* and *D. tibetica* are presented. The most significant reproductive features of all native *Dysphania* taxa are summarized.

Key words: Chenopodiaceae, distribution, *Dysphania*, Himalaya, new species, Tibet

Introduction

The chenopodiaceous taxa occurring in Himalaya and Tibet have attracted a high attention during the recent years. Many species growing in this region were previously confused with other morphologically similar taxa occurring in different parts of Central Asia. In recent years, improvements have been made in the difficult genera *Axyris* Linnaeus (1753: 979) (Sukhorukov, 2011), *Chenopodium* s.str. Linnaeus (1753: 218), and *Dysphania* Brown (1810: 411) (Sukhorukov 2012a, 2012b, 2014, Uotila 2013, Sukhorukov & Kushunina 2014).

The taxonomy of *Dysphania* has been significantly changed after investigations carried out during the last decade and following the publication of the account of Chenopodiaceae for the “Flora of China” (Zhu *et al.*, 2003). All the Chinese native *Dysphania* species belong to the sect. *Botryoides* Mosyakin & Clemants (2002: 383) (Uotila 2013, Uotila *et al.* in prep.) that comprises annuals covered with several indumentum types (sessile glands, simple and glandular hairs) occurring on the free or basally united perianth segments which are opened at the fruiting stage. Other distinguishing features of *Dysphania* sect. *Botryoides* are the minute papillate pericarp, and relatively small (0.7–1.1 mm) spherical seeds. The small-scale reproductive traits provide the most significant information about the species delimitation, and they are now well-studied and used as the most important diagnostic characters at species level (Uotila 2013, Sukhorukov & Kushunina 2014).

Until now, seven species were recognized as native in the Himalaya and Tibet (Sukhorukov & Kushunina, 2014): *D. bhutanica* Sukhorukov (2012a: 171), *D. botrys* (Linnaeus 1753: 219) Mosyakin & Clemants (2002: 383), *D. himalaica* Uotila (2013: 68), *D. kitiae* Uotila (2013: 75), *D. neglecta* Sukhorukov (2014: 347), *D. nepalensis* (Colla 1836: 25) Mosyakin & Clemants (2008: 428), and *D. tibetica* (Li 1983: 638) Uotila (2013: 67). In the present paper, a new *Dysphania* species from SW China (Xizang, Yunnan provinces) and Bhutan is described on the basis of several unique differences in general morphology and perianth indumentum.

Discussion

Carpological differences between the native Tibetan and Himalayan Dysphania

In view of the significant increasing of the number of Himalayan and Tibetan species and considering the difficulties in their identification, we provide here an overview and morphometric analysis of the most valuable reproductive features of all native *Dysphania* (Table 1). It supplements previous detailed studies (Sukhorukov 2012a, 2012b, 2014, Sukhorukov & Zhang 2013, Sukhorukov & Kushunina, 2014).

Distribution pattern of the native Dysphania in China and adjacent states

The ranges of some native Asian *Dysphania* taxa (*D. botrys*, *D. nepalensis* and *D. kitiae*) are relatively well known (Uotila 2013, Sukhorukov & Kushunina 2014). Here we combine the previously published records (Sukhorukov 2012a, Uotila 2013) and the new locations of *D. bhutanica*, *D. himalaica* and *D. tibetica* after revision of the specimens in the Chinese herbaria (Figs. 3–4; see also Appendix). It appears that *D. bhutanica* and *D. geoffreyi* are distributed in Eastern Himalaya and SW Tibet, *D. himalaica* occurs in Northern and Central Himalaya and West Tibet (Xizang province of China), while *D. tibetica* has been mostly found within the Himalayan range.

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Appendix (the specimens of *D. bhutanica*, *D. himalaica* and *D. tibetica* used for the mapping of the records of these taxa; the specimens preserved at PRA and KAS are cited in Uotila 2013).

D. bhutanica (Fig. 4): **BHUTAN**. [Thimphu distr.] Thimphu, 8000 ft, 9 August 1914, *Cooper 3376* (E-00151685); Thimphu, 2408 m, 10 August 1971, *Bedi 657* (K); Thimphu Chu, below Taba, 27°30'N 89°38'E, 2300 m, 22 July 1979, *Grierson & Long 2828* (E-00151632, K); Lango, near Paro, 2300 m, 29 June 1992, *Parker 7263* (E-00051983, holotype); Chapcha, 2200–2400 m, 1 July 1992, *Parker 7270 & 7271* (E-00051982, E-00051981). **CHINA**. Xizang: Gyantse, July–September 1904, *Walton s.n.* (CAL); [Shigatse prefecture, Gyantse county] Tsangpo valley, 10–11000 ft, 5 September 1935, *Kingdon-Ward 12308a* (BM); [Gyantse county] Tsangpo valley, Tse, 9800 ft, 31 May 1938, *Ludlow, Sherriff & Taylor 4585* (BM); [Nyingchi pref.] Mainling co., Pei [Pa] town, 12 September 1974, *The Tibetan collection team 74-4663* (PE-00511047); [Nyingchi pref.] Nang co., 3100 m, 4 August 1982, *Zhi-Cheng et al. 2744* (PE-00511029); [Nyingchi pref.] Mainling co., Qiangna, 22 August 1982, *Zhi-Cheng et al. 3109* (PE-00511027).

D. himalaica (Fig. 3): **CHINA**. Xizang: Gérgzé co., Ngari pref., 4250 m, August 1972, *Fa-Chong 69* (PE-00510701); Ali (Ngari), Gérgzé co., 4500 m, 8 September 1976, *Lang Kaiyong 10153* (PE-00511004); Changthang, S shore of Dangra Yum Tso, 30°43'N 86°35'E, 4590 m, 9 September 2003, *G. & S. Miede 03-081-05* (KAS); Changthang, S of Dangra Yum Tso, Targo River S of Targo Shang, 30°35'N, 86°89'E, 4765 m, 10 September 2003, *G. & S. Miede 03-089-01* (KAS); Saga Dzong, Upper Yarlug Tsangpo, 29°21'N, 85°14'E, 28 August 2003, *G. & S. Miede 03-043-23* (KAS). **INDIA**. Jammu & Kashmir: Ladakh: Region Pangong: Lukung, 33°59'5"N, 78°24'6"E, 4300 m, 9 September 2002, code 02-39-10, *Klimesš 6627* (PRA); Region Indus Valley: Zhung (Leh), Chogdo to Chukirmo, 33°49'4"N, 77°38'9"E, 4180–4310 m, 8 September 2001, code 01-41-10, *Klimesš 1627* (PRA); Zhung (Leh), Gya to Lato, 33°40'2"N, 77°43'9"E, 4060–4070 m, 5 September 2001, code 01-38-12, *Klimesš 1539* (PRA); Zhung (Leh), Kiameri La to Rumtse village along the Kyammar Lungpa, 33°35'N, 77°49'E, 4350 m, 15 September 1999, code 99-34-3, *Klimesš 830* (H, PRA); E Stot, Angkhung village to Puga, 33°14'N, 78°16'E, 4550 m, 8 September 1999, code 99-27-9, *Klimesš 6627* (H, PRA); E Stot, Sumdu Gonma to Kiagar La, 33°10'2"N, 78°21'5"E, 4690 m, 7 September 2003, code 03-26-3, *Klimesš 3461* (PRA); Region W & C Shyok, Wari La to confluence of Lurten Lungpa and Lazun Lungpa, 33°10'2"N, 78°21'5"E, 3840 m, 15 September 2001, code 01-47-40, *Klimesš 1868* (PRA); Region Rupshu: Samad Rockhen, Polokongka Valley, 33°16'4"N, 78°6'1"E, 4660–4750 m, 5 August 2002, code 01-8-11, *Klimesš 1255* (PRA); Tso Moriri, Lunglung valley, 33°2'5"N, 78°18'0"E, 4700 m, 8 September 2003, code 03-27-5a, *Klimesš 3476* (PRA); Ladakh, Region Indus valley, E Stot, Nyi [Nior Nis; Njurnis] to Neboche, 33°28'13"N, 78°14'25"E, 4600–4700 m, 2 September 2005, code 05-29-16, *Klimes 6175* (PRA, holotype); Samad Rockhen, Thukje village to Nyamur, 33°20'13"N, 78°1'67"E, 4560 m, 9 September 2005, code 05-36-2, *Klimesš 6270* (PRA); Samad Rockhen, Thangmar, 33°20'4"N, 78°1'8"E, 4590 m, 5 August 2001, code 01-8-8, *Klimesš 1271* (PRA). **NEPAL**. Dhaulagiri zone: Mustang distr., Chalungpa, Lower Jeula forest, 28°54'N, 83°45'E, 3410 m, 8 September 2001, *Miede et al. 01-119-03* (KAS).

D. tibetica (Fig. 4): **CHINA**. Xizang: [?Xigatse pref.] expedition to Everest, 16000 ft, 1921, *Wollaston 47* (K); Gyangze, 3960 m, 5 September 1974, *Qinghai-Xizang Complex Expedition 74-2077* (PE-00024039, holotype); [Ngari pref.] Coqen, 4000 m, 15 September 1976, *Qingzang Team Zhidi Group 12350* (PE-00540038); Ngari pref., Cuoqin [Coqen] co., Zhari Namco, 4600 m, 15 September 1976, *Tibetan collection team 12580* (PE-00235091). **INDIA**. Jammu and Kashmir: Ladakh: Region Rupshu: Rupshu, 32°58'5"N, 77°24'E, ca. 4600 m, 11 July 2000, code 00-10-4, *Klimesš* (H-1757589); Tso Moriri, Lapgo River Valley, 32°58'7"N, 78°21'3"E, 4810 m, 11 July 2000, *Klimesš*

6268 (PRA); Region Indus Valley: Zhung, Chukirmo, 33°49'5"N, 77°39'1"E, 4150 m, 8 September 2001, *Klimeš 1657* (PRA); Zhung, Lato, 33°40'7"N, 77°43'8"E, 4020 m, 5 September 2001, *Klimeš 1545* (PRA); Zhung, Stagar (Sakti) to Wari La, 34°2'8"N, 77°49'3"E, 4240–4270 m, 12 September 2001, *Klimeš 1741* (PRA); Stot (E), above the Tiri village, 33°31'5"N, 77°58'6"E, 4330–4460 m, 1 August 2001, *Klimeš 1190* (PRA); Region Rupshu: Samand Rockhen, Thukje village to Nyamur, 33°20'13"N, 78°1'67"E, 4560 m, 9 September 2005, *Klimeš 6268* (PRA); Tso Moriri, Karzok to Peldo, 32°59'5"N, 78°15'E, 4550 m, 13 September 2005, *Klimeš 6309* (PRA).