

Taxonomic relationship between *Desmodium diffusum* DC. and *D. laxiflorum* DC. (Fabaceae: Papilionoideae)

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Abstract *Desmodium diffusum* DC. has usually been included in *D. laxiflorum* DC., but they are two distinct species. The former is widely distributed in China, while the latter is found only in southern China, i.e., Guangdong, Guangxi, south Yunnan, and rarely in Taiwan. *D. unibotryosum* C. Chen & X. J. Cui was once applied to the former as a new name, but this name is illegitimate. The taxonomic history of *Desmodium diffusum* and *D. laxiflorum*, key to these species, their bibliographies, synonyms and distributions are clarified. The lectotype of *D. diffusum* is designated.

Key words *Desmodium diffusum* DC., *Desmodium laxiflorum* DC., *Desmodium unibotryosum* C. Chen & X. J. Cui, Fabaceae, China.

Desmodium diffusum DC. has usually been included in *D. laxiflorum* DC. since the treatment of Benthams (1852), but is recognized as a distinct species by Chen and Ohashi (1983), Ohashi (1985, 1994, 1995) and Cui et al. (1987). This paper aims to clarify their taxonomic relationship.

The two species were described by de Candolle in January 1825 (de Candolle, 1825a). He described *Desmodium diffusum* from East India as “caule fruticoso erectiusculo, racemis terminalibus elongatis, pedicellis calyce duplo longioribus”, while *D. laxiflorum* from Nepal as “caule frutescente erecto, racemis terminalibus laxis, pedicellis hirsutis filiformibus calyce multo longioribus”. These two species were kept distinct in his succeeding work in November 1825 (de Candolle, 1825b). The type material of *D. laxiflorum* and of *D. diffusum* was examined in de Candolle: Prodrumi Herbarium in G-DC (microfiche TUS) in this study. There are four separate specimens of *D. laxiflorum*, but all bear the same label, “Glycine. Napaul. Mr. Wallich 1821.” As pointed out by Chen and Ohashi (1983), on the other hand, three separate sheets of *D. diffusum* in Prodrumi Herbarium in G-DC were examined, of which two sheets were respectively mounted with two plants and one sheet with one plant. These five plants have different labels: “Inde orient Mr. Lambert 1816” and “Inde Roxburgh Mr. Lambert 1816” on one sheet; “Inde Mr. Lambert 1816” on the other; “Glycine. Napaul. Mr. Wallich 1821” and unknown (probably the same with Napaul. Mr. Wallich 1821) on another one. De Candolle, however, doubted distinctness of both species by giving a short note for *D. laxiflorum* in the original publication as “An forte prioris (= *D. diffusum*) varietas” (de Candolle, 1825a) and again for *D. diffusum* (No. 88 in Prodrumus) after the description of *D. laxiflorum* (No. 87 in Prodrumus) as “an satis a sequente differt?” (de Candolle, 1825b). Benthams (1852) first regarded *D. diffusum* as identical with *D. laxiflorum*. This treatment was adopted by Baker (1876) for the *Flora of British India* in which both species were recorded. This concept for *D. laxiflorum* was established and has been accepted

by subsequent taxonomists (Ohashi, 1973).

Chen and Ohashi (1983), however, recognized two forms in *Desmodium laxiflorum*. They distinguished the two forms by the differences in the terminal leaflets, primary bracts, pedicels, flowers, calyces, pods and seeds, and treated them as two subspecies within the species, i.e., ssp. *laxiflorum* and ssp. *parvifolium* H. Ohashi & T. T. Chen. Cui et al. (1987) considered that *D. laxiflorum* ssp. *parvifolium* H. Ohashi & T. T. Chen is a distinct species from *D. laxiflorum* and proposed a new name, *D. unibotryosum* C. Chen & X. J. Cui, pointing out that their species is identical with *D. diffusum* (Roxb.) DC. and that this name is a later homonym of *D. diffusum* (Willd.) DC. However, they appear to be unaware that Ohashi (1985) has reached the same conclusion that *D. laxiflorum* ssp. *parvifolium* is a distinct species from *D. laxiflorum* DC., although his nomenclatural treatment is different from that of Cui et al. (1987).

Ohashi (1985) considered that *Desmodium diffusum* DC. in Prodr. 2: 335 (1825) is a correct name and different from *D. diffusum* (Willd.) DC. in Prodr. 2: 336 (1825). The type of *D. diffusum* DC. is Lambert (G-DC), although Ohashi (1994) designated its type to be Roxburgh, Cat. 57 (BM) that is the type of *Hedysarum diffusum* Roxb., non Willd. (Ohashi, 1994). According to the IDC microfiche/Prodromi Herbarium, as aforementioned, there are three sheets of *D. diffusum* DC., i.e., two of Lambert 1816 and one of Wallich 1821. In total five individuals are mounted on the three sheets and all are referable to *D. diffusum* DC. The two Lambert sheets (three individuals) must be the syntypes of *D. diffusum* DC. *Desmodium diffusum* (Roxb.) DC. is not published name, although Cui et al. (1987) cited it. de Candolle (1825a) quoted “*Hedysarum diffusum* Roxb., non Willd.” only as its synonym in the original description of *Desmodium diffusum*, and actually *H. diffusum* Roxb. in Hortus Bengalensis (1814) is an invalid nude name. *Hedysarum diffusum* (DC.) Roxb. was correctly published in 1832 based on *Desmodium diffusum* DC., but is a later homonym of *Hedysarum diffusum* Willd. published in 1802.

Desmodium diffusum (Willd.) DC. (1825) based on *Hedysarum diffusum* Willd. is an entirely different species from *D. diffusum* DC. This is a synonym of *D. dichotomum* (Willd.) DC. based on *H. dichotomum* Willd. published in 1802. In China *Desmodium dichotomum* is known only in Yunnan (Ohashi, 1995; Yang & Huang, 1995).

A new illustration of *Desmodium diffusum* DC. is provided on the plate 123 (on page 258) in *Flora of Taiwan* (Huang & Ohashi, 1993) as *D. laxiflorum*. The plate 3: 4–11 (on page 18) in *Flora Reipublicae Popularis Sinicae* 41 (Yang & Huang, 1995) is similar to *D. diffusum*. Illustration of true *D. laxiflorum* DC. is presented on the plate 18 (on page 89) in *Flore du Cambodge du Laos et du Vietnam* (Ohashi, 1994). The figure 2623 of *D. laxiflorum* in *Iconographia Cormophytorum Sinicorum* 2: 447 (1972), which is same with figure 473 in *Flora Illustralis Plantarum Primarum Sinicarum*: 484 (1955), must be drawn on the basis of the two species. The inflorescences, primary bract and calyx apparently are those of *D. laxiflorum*, but the pod is *D. diffusum*. Unfortunately, we could not find voucher specimens of the figure 2623 in *Iconographia Cormophytorum Sinicorum* in PE.

In summary, *Desmodium diffusum* DC. and *D. laxiflorum* DC. are distinguished as follows:

1. Terminal leaflet 2.5–11 cm long, apex obtuse or acute, lateral veins 5–9 pairs; primary bract usually less than 4 times as long as broad; corolla blue-violet or violet; pods smooth to more or less rough on lateral surfaces, obliquely jointed, both sutures constricted at nodes; hilum about 0.15 mm long; prostrate or ascending herbs or subshrubs *D. diffusum*
1. Terminal leaflet (5.5–)8–20 cm long, apex acute or acuminate, lateral veins 8–11 pairs; primary bract more than 4 times as long as broad; corolla white or pale violet; pods striate-veined on lateral surfaces, vertically jointed, both sutures almost straight at nodes; hilum about 0.3 mm long; erect or ascending shrubs or

subshrubs.....*D. laxiflorum*
Desmodium diffusum DC. in Ann. Sci. Nat. 4: 100. 1825; et Prodr. 2: 335, no. 88. 1825; Ohashi in Hara, Origin Evolution Divers. Pl. & Pl. Commun. 186. 1985; Ohashi et al. in Sci. Rep. Tohoku Univ. ser. 4, Biol. 39: 215. 1988; Ohashi in Dy Phon et al., Fl. Camb. Laos Vietn. 27: 86. 1994, excl. syn. cit. *H. recurvatum* Roxb. et *D. recurvatum* (Roxb.) Wight & Arn.; Ohashi in J. Jpn. Bot. 70: 113. 1995; T. C. Huang & Ohashi in Fl. Taiwan, ed. 2, 3: 252, plate 123 ut *D. laxiflorum* (1993). (Lectotype: India orient. Lambert (G-DC), n.v. fide microfiche Candolle: Prodrumi Herbarium in TUS)

Hedysarum diffusum Roxb., (Hort. Beng. no. 57 (1814), nom. nud.) Fl Ind. 3: 357. 1832; non Willd. 1802. Type: India orient. Roxburgh, Cat. no. 57 (BM), n.v., nom. illegitimate.

D. laxiflorum DC. var. *formosense* Ohwi in J. Jpn. Bot. 26: 235. 1951. Type: Formosa. Fujieda in Kizangun. leg. S. Okamoto (KYO).

Desmodium laxiflorum ssp. *parvifolium* H. Ohashi & T. T. Chen in J. Jpn. Bot. 58: 268, figs. 1, 2. 1983. Type: Taiwan. Pingtung Co. Mutan, alt. 350–400 m. In open evergreen forest, among grass, along a path. Ohashi et al. 13486 (TUS holo., iso. TAI, TI, TUS); Ohashi et al., Sci. Rep. Tohoku Univ. ser. 4, 38: 305. 1984.

Desmodium unibotryosum C. Chen & X. J. Cui, nom. nov. in Acta Bot. Yunnan. 9: 307. 1987.

Desmodium laxiflorum auct. non DC.: Benth. in Miq., Pl. Jungh. 228. 1852, p.p.; Baker in Hook. f., Fl. Brit. Ind. 2: 164. 1876, p.p.; Forbes & Hemsley in J. Linn. Soc. Bot. 23: 173. 1887; Gagnep., Fl. Gen. Indo-Chine 2: 591. 1920, p.p.; Merr., Enum. Philip. Pl. 2: 286. 1923; van Meeuwen, Reinwardtia 6: 252. 1962, p.p.; Ohashi in Ginkgoana 1: 101. 1973, p. p., incl. plate 12a et fig. 25: 1–4, 26: 4; T. C. Huang & Ohashi, Fl. Taiwan 3: 262. 1977, p. maj. p.; Ohashi in Hara & Williams, Enum. Flow. Pl. Nepal 2: 118. 1979, p. p.; Verdc., Man. New Guin. Leg. 401. 1979, p.p.; Yang & Huang in Fl. Reip. Pop. Sin. 41: 20. 1995, p.p. excl. syn. cit. *D. diffusum* (Willd.) DC.

Distribution: India, Nepal, Sikkim, Bhutan, Myanmar, Thailand, Indochina, Malesia, China (Guangdong, Guangxi, Guizhou, Sichuan, Taiwan, Yunnan).

Habitat: Margin of forests, roadsides, in grasslands; alt. 50–2000 m.

Desmodium laxiflorum DC. in Ann. Sci. Nat. 4: 100. 1825 et Prodr. 2: 335, no. 88. 1825; Meeuwen in Reinwardtia 6: 252. 1962, p.p., excl. syn. cit. *D. diffusum* DC., *H. roxburghii* Spreng. p.p.; Ohashi in Ginkgoana 1: 101. 1973, p.p., excl. syn. cit. *D. diffusum* DC., *Hedysarum roxburghii* Spreng. p.p., *D. laxiflorum* var. *formosense* Ohwi; Ohashi in Hara, Origin Evolution Divers. Pl. et Pl. Commun. 178–182. 1985; Grierson & Long, Fl. Bhutan 1: 678. 1987; Ohashi et al. in Sci. Rep. Tohoku Univ. ser. 4, Biol. 40: 19. 1991; Ohashi in Dy Phon et al., Fl. Camb. Laos Vietn. 27: 87, pl. 18: 1–3. 1994; T. C. Huang & Ohashi in Fl. Taiwan, ed. 2, 3: 256. 1993, excl. pl. 123. (Type: Nepal. Wallich 1821 (G-DC, four syntypes), n.v. fide Candolle: Prodrumi Herbarium microfiche in TUS)

D. recurvatum (Roxb.) [Grah. ex Wall., Cat. no. 5717, 1831–1832, comb. nud.] Wight & Arn. in Prodr. 226. 1834; Wight, Icon. t. 374, 1838; Hosokawa, J. Soc. Trop. Agric. 4: 201. 1932.

Distribution: Bhutan, China (Guangdong, Guangxi, Taiwan, Yunnan), Indonesia, Laos, Myanmar, Nepal New Guinea, Philippines, Sikkim, Thailand, Vietnam.

Habitat: In open grasslands and forests, margin of forests; alt. 100–1500 m.

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弥散山蚂蝗与大叶拿身草(豆科:蝶形花亚科)
的分类学关系

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摘要 弥散山蚂蝗*Desmodium diffusum*(新拟)不同于大叶拿身草*D. laxiflorum*,然而前者在中国却不被承认。弥散山蚂蝗广布于中国,与大叶拿身草相较更为普遍,而大叶拿身草仅分布于中国的广东、广西、台湾及云南南部。崔现举等将弥散山蚂蝗置于单序山蚂蝗*D. unibotrysosum*种中。根据国际命名法规,单序山蚂蝗为一非法名称,属弥散山蚂蝗的异名。本文介绍了弥散山蚂蝗和大叶拿身草的分类历史、种的检索表、种的文献、异名及分布。同时,指定了弥散山蚂蝗的后选模式。

关键词 弥散山蚂蝗; 大叶拿身草; 单序山蚂蝗; 豆科; 中国