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The genus *Disporum* (Liliaceae) of the Himalayas

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Abstract

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The author reviews three Himalayan species of the genus *Disporum* (Liliaceae) i.e.: *D. leucanthum* Hara, *D. calcaratum* D. Don, and *D. cantoniense* (Lour.) Merrill. *D. leucanthum* which is easily distinguishable by its terminal flowers, forms a natural group with five other Asian species: *D. smilacinum* A. Gray, *D. lutescens* (Maxim.) Koidzumi, *D. viridescens* (Maxim.) Nakai, *D. ovale* Ohwi and *D. tonkinense* Koyama. *D. cantoniense* represents a collective species, very variable both from a morphological and a cytological point of view. The variety *sikkimense* var. nov. which is distinguished from the type species by several floral characteristics, shows affinities with *D. megalanthum* Wang and Tang from West China.

The genus *Disporum* comprises about 15 species in Asia and 5 species in North-America. In the Himalayas, only two species have so far been reported from Nepal (Hara in Enum. Flow. Pl. Nepal 1: 72, 1978), but I have collected two other plants from Darjeeling and Sikkim, and cultivated them in Tokyo. These four plants are:

1. *Disporum leucanthum* Hara in Journ. Jap. Bot. 47: 114 (1972); in Fl. E. Himal. 3: 131 (1975).

Rhizome with long slender creeping stolons 2–3 mm thick. Stems simple, 15–40 cm high, glabrous, with 4–6 sheathing bracts in the lower part, and 3–5 leaves in the upper part. Leaves oblong or elliptic, 3–8 cm long, 1–3.5 cm wide, acute or acuminate at the apex, broad-cuneate or roundish at the base, glabrous, with flat cells on margin; petiole short. Flowers terminal, 1–4-fasciculate, with smooth pedicels 1–17 mm long, nodding, white, widely opening flowers 2–3 cm in diameter. Tepals broad oblanceolate or spatulate, subacute at the apex, 13–20 mm long, 3–5 mm wide, smooth, only slightly saccate at the base. Stamens nearly as long as the tepals, sometimes shorter; filaments 8–11 mm long, white, glabrous; anthers 3–5 mm long. Style 9–12 mm long, shortly trifid at the apex. Chromosome $2n = 16$ (S. Kurosawa, 1983).

Distr. Darjeeling and Sikkim, alt. 1000–2500 m, probably also in East Nepal.

Specimens examined. Darjeeling: Kurseong, 1550 m (M. Togashi, Apr. 12, 1960, fl. – type, TI no 6602); Sinchul, 7000 ft. (T. Anderson, no 25776, May 1862, fl., CAL); Senchal (H. Hara & M. Togashi, Apr. 18, 1960, TI); Palmajua to Rimbick (H. Kanai et al., May 5, 1960, TI); Rimbick to Ramam (J. Sinclair no 4142, Apr. 22, 1945, fl., E).

Sikkim: Choongtam, 7–9000 ft. (J. D. Hooker, May 20, 1849, fl., K); Neirie, 5000 ft. (J. L. Lister, Apr. 1877, fl., CAL); Mahalderam (J. S. Gamble, no 10317, Apr. 1882, fl., K); above Rhikisum, 7100 ft., (C. C. Lacaíta, no 15529, Apr. 25, 1913, fl., BM).

Among the Himalayan species, *D. leucanthum* is very distinct in having simple stem with 1–4-flowered terminal inflorescence, white widely opening turbinate flowers, acute tepals only slightly saccate at the base. The surface-pattern of pollen grain is also different from that of *D. cantoniense*. Q. Jones (1951) referred all Asiatic species to his Sect. *Eudisporum* (= Sect. *Disporum*), and separated the American species as Sect. *Pro-sartes* (D. Don) Q. Jones. This way of proceeding is valid because the American species have red or orange berries and shorter chromosomes, and are more or less pubescent, whereas the Asiatic species have black or blue-black berries and longer chromosomes, and are glabrescent. The Asiatic species, however, are variable, and some other contrasting characters pointed out by Jones are not always applicable. For example, *D. leucanthum* has terminal inflorescence, white widely opening flowers, oblanceolate tepals only slightly saccate at the base, and style very shortly trifid at the apex similar to some American species. On the other hand, the flowers of *D. sessile* D. Don of Japan, Korea and China much resemble those of *D. Smithii* (Hook.) Piper of Western North America. In Asia, *D. leucanthum* seems to form a natural group with *D. smilacinum* A. Gray (Japan, East China), *D. lutescens* (Maxim.) Koidzumi (West Japan), *D. viridescens* (Maxim.) Nakai (Ussuri, North China, Japan), *D. ovale* Ohwi (Korea, North China) and also with *D. tonkinense* Koyama (Tonkin), and *D. Leschenaultianum* D. Don (India, Ceylon).

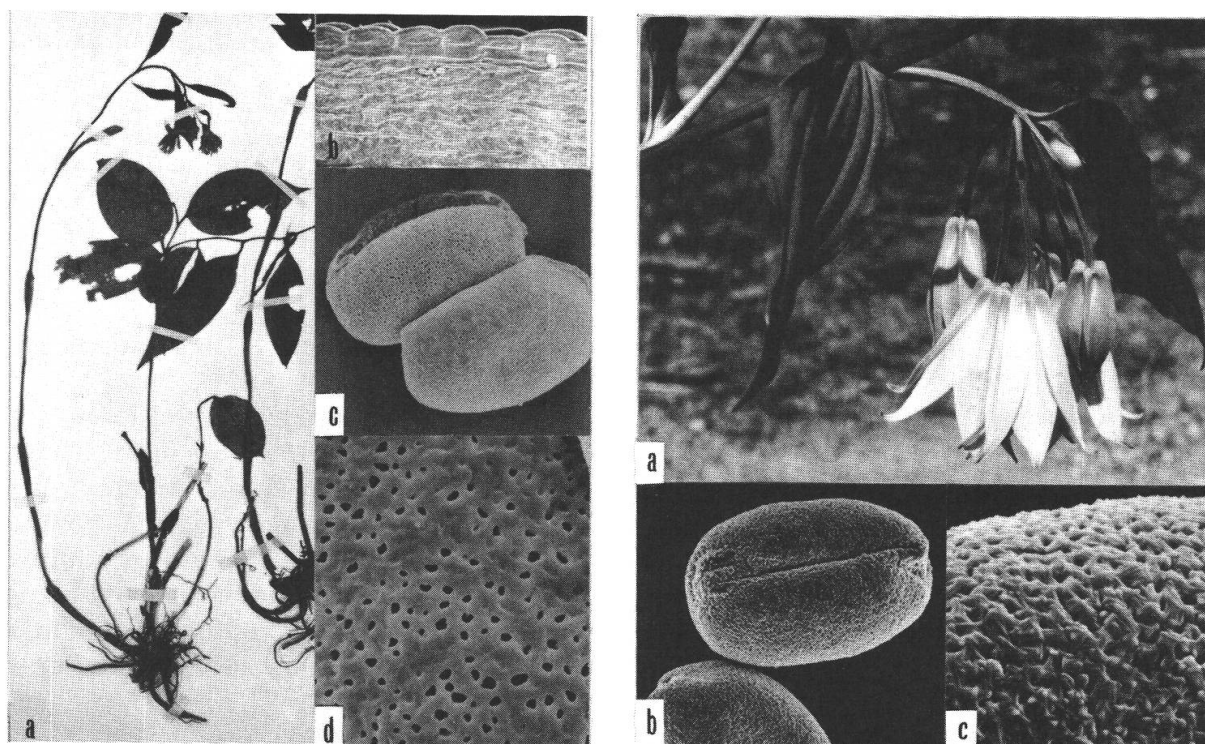


Fig. 1. *Disporum leucanthum* Hara. a. A part of the holotype, showing a flowering stem and stems of the previous year with leaves. $\times 2/5$. b. Leaf-margin. SEM-photograph. $\times 150$. c. Pollen grains. SEM-photograph. $\times 2000$. d. Surface of pollen grain. SEM-photograph. $\times 10,000$.

Fig. 2. *Disporum cantoniense* var. *sikkimense* Hara. a. A flowering branch. $\times 1.5$. b. Pollen grains. SEM-photograph. $\times 2000$. c. Surface of pollen grain. SEM-photograph. $\times 10,000$.

2. *Disporum calcaratum* D. Don in Proc. Linn. Soc. Lond. 1: 45 (1839): in Trans. Linn. Soc. Lond. 18: 516 (1841). Hara in Enum. Flow. Pl. Nepal 1: 72 (1978).

Uvularia calcarata Wallich, Cat. no 5087 (1832), nom. nud. *U. Hamiltoniana* Wallich, Cat. no 5088 (1832), nom. nud., p.p. *D. Wallichii* D. Don, l.c. 45 (1839); l.c. 516 (1841). *D. Hamiltonianum* D. Don, l.c. 45 (1839); l.c. 517 (1841). *D. calcaratum* var. *Hamiltonianum* (D. Don) Baker in J. Linn. Soc. Bot. 14: 589 (1875).

Distr. East Himalaya (Nepal, Sikkim, Bhutan), Assam (Khasia), Manipur, N. Burma, Thailand, Indo-China, and South China (South Yunnan), alt. 1200–2400 m.

Authentic specimens examined. Khasia: Silhet, ad Jentya (G. Gomez, Wallich, Cat. no 5087, fl. – type of *D. calcaratum*, K-W). Near Nepal: Morang Hills (B. Hamilton, Jun, 1810, Wallich, Cat. no 5088 A, sub *Uvularia Betua* Hamilt., fl. – type of *D. Hamiltonianum*, K-W). Napalia: ad Bunipa (N. Wallich, 1821, Cat. no 5088 B, sub *Uvularia nervosa* – syntype of *D. Wallichii*, K-W); Sheopore (N. Wallich, 1819, BM).

The species is characterized by an elongate spur 4–5 mm long, and shorter anthers. The chromosome number $2n = 18$ was reported by Larsen (1963) based on the material from Thailand, and he suggested that the two small chromosomes can be B-chromosomes. Sen (1974) reported $2n = 16$ for the species from eastern Darjeeling.

3. *Disporum cantoniense* (Lour.) Merrill in Philip. Journ. Sci. 15: 229 (1920); in Trans. Amer. Philos. Soc. n.s. 24 (2): 109 (1935).

Fritillaria cantoniensis Lour., Fl. Cochinchin. 1: 206 (1790). *Uvularia chinensis* Ker-Gawler in Curtis, Bot. Mag. 23: t. 916 (1806); 37: sub t. 1537 (1813). *Disporum pullum* Salisb. in Trans. Hort. Soc. Lond. 1: 331 (1812), nom. illeg. Hook. f. in Fl. Brit. Ind. 6: 360 (1892). *Streptopus chinensis* (Ker-Gawl.) Smith in Rees, Cyclop. vol. 37 sub *Uvularia* (1818). *S. peduncularis* Smith, l.c. sub *Uvularia* (1818). *Uvularia Pitsutu* (Buch.-Hamilt. ex Smith, l.c. (1818), pro syn.) (D. Don) Buch.-Hamilt. ex Spreng., Syst. Veg. 4: 136 (1827). *U. parviflora* Wall. in Asiat. Res. 13: 378 (1820); Cat. no. 5091 (1832). *U. umbellata* Wall., l.c. 379 (1820); Cat. no 5090 (1832); Pl. Asiat. Rar. 3: 43, t. 269 (1832). *Disporum Pitsutum* D. Don, Prodr. Fl. Nepal. 50 (1825). *D. parviflorum* (Wall.) D. Don, l.c. 50 (1825). *D. pullum* var. *parviflorum* (Wall.) Baker in Journ. Linn. Soc. Bot. 14: 589 (1875). *D. chinense* (Ker.-Gawl.) O. Kuntze, Rev. Gen. Pl. 2: 708 (1891), cum var. *D. cantoniense* var. *parviflorum* (Wall.) Hara, Fl. E. Himal. 407 (1966); in Enum. Flow. Pl. Nepal 1: 72 (1978).

Distr. Himalaya (Simla east to NEFA), Assam, Manipur, N. Burma, N. Thailand, Indo-China, and China.

Authentic Himalayan specimens examined. C. Nepal: Chitlong (Buch.-Hamilton, Apr. 11, 1802, sub *Uvularia Pitsutu*, fl. – holotype of *Streptopus peduncularis*, LINN-Smith Herb. no 586; type of *Disporum Pitsutum*, BM); Napalia (Wallich, Maio 1818, fl. – type of *Uvularia parviflora*, BM); Napalia (Wallich, 1819, fl. – type of *U. umbellata*, BM); Napalia (Wallich, 1821, no 5090, *U. umbellata*, fl., K-W); Napalia (Wallich, 1821, no 5091, *U. parviflora*, fl., K-W).

This group is exceedingly variable morphologically and also cytogenetically. Typical *D. cantoniense* var. *cantoniense*, as illustrated by Ker-Gawler (1806) under *Uvularia chinensis*, has smaller brown-purple flowers 10–18 mm long, acutish tepals shortly spurred at the base (spur 2–3 mm long) and only slightly papillose on lower margin, anthers 2.5–4 mm long, distinctly trifid style 7–15 mm long, and relatively shorter pedicels 5–15 mm long and slightly rugose on ridges. This race which originates from China has been cultivated in gardens in Europe and also in Japan from ancient times.

Specimens from Dharan of East Nepal (L. H. J. Williams, no 90, BM), and West Bhutan (H. Kanai et al., no 14531, TI) resemble this typical form.

But the Himalayan plants tend to have greenish or creamy white flowers, tepals very shortly gibbose (1–1.5 mm long) at the base and minutely papillose on margin, shortly trifid style with branches 1–3 mm long, and longer and minutely papillose pedicels often up to 2–3 cm long. So I have treated this race common in the Himalayas as var. *parviflorum* (Wall.) Hara (1966 & 1978).

Even in the Himalayas, however, the plants are considerably variable. The holotype of *Streptopus peduncularis* is the same collection as that of *D. Pitsutum*, as cited above. They have ovate-lanceolate leaves, and often elongate peduncle up to 2 cm long, although the inflorescences are generally sessile or shortly pedunculate.

Uvularia umbellata illustrated by Wallich (1832) is very near to this form, but has slightly more elongate narrower leaves. Whereas the type (BM) of *U. umbellata* Wall. (1820) cited above has narrow linear-lanceolate leaves 5–13 mm wide, and this narrow-leaved form occurs also in Garhwal, Bhutan, and Assam. The type (BM) of *U. parviflora* Wall. (1820) also has similar narrow lanceolate leaves, and small flowers with short filaments, anthers and style, but its flowers seem to be not fully developed as yet.

The Himalayan plants are also variable cytogenetically, and 3 different chromosome numbers, $2n = 14$, 16 and 30 (Kurosawa 1966, 1971; Sen 1973–75), and several different karyotypes have been reported. The cytotype with $2n = 14$ chromosomes has hitherto been found from East Nepal, Darjeeling, West Bhutan, and Shillong; one with $2n = 16$ from Katmandu, Darjeeling, and Mussooree; and one with $2n = 30$ from Central Nepal, and Darjeeling. The primary basic number seems to be 8, and $x = 7$ can be derived from 8, and $2n = 30$ may be amphidiploid originated from $x = 7$ and 8. But the relationship between morphological phenotypic characters and cytogenetical genotypic ones has not been studied in detail in this species. So it is difficult for the present to discuss infraspecific taxa of Himalayan *D. cantoniense*. The Malaysian race seems to differ from the Sino-Himalayan races, although Jessop (1979) grouped them together in *D. cantoniense* even including such a distinct species as *D. Leschenaultianum* D. Don.

4. *Disporum cantoniense* var. *sikkimense* Hara, var. nov.

Caulis superne pauci-ramosus. Folia late lanceolata, apice longe acuminata, margine scabra. Inflorescentiae pseudolaterales, sessiles, raro pedunculatae, 3–6 = florum. Pedicelli 15–22 mm longi, minute papilloso. Flores nutantes, 2–3 cm longi, turbinati-campanulati, basi subtruncati, albidi paullo viridescens. Tepala late oblanceolata, 20–32 mm longa, 4–9 mm lata, apice caudati-acuminata, basi breviter gibbosa, margine superiore leviter papillosa, extus medio distincte carinati-costata. Stamina 12–20 mm longa; filamenta 14–17 mm longa, albida, laevia; antherae anguste oblongae, 4–4.5 mm longae. Stylus 17–20 mm longus, albus, apice brevissime trifidus. Ovarium obovatum, ca 4.5 mm longum. Chromosomata $2n = 16$ (S. Kurosawa, 1983).

Distr. Sikkim: Tendong Peak (H. Hara, Jun. 1969 & cult. in Karuizawa, Japan, May 16, 1972, fl. – type in TI); Damthang forest, above Temi, 6000 ft. (C. C. Lacaíta, no 15556, May 2, 1913, fl., BM).

This variety has much larger flowers with caudately acuminate tepals, longer stamens, and longer style which is very shortly trifid at the apex, and looks very different from typical *D. cantoniense*. However, *D. cantoniense* is extremely variable morphologically and cytogenetically in the Himalayas and China as mentioned above, and there are some specimens from Nepal (O. Polunin, no 43, BM, E), and Bhutan (Ludlow, Sherriff & Hicks, no 18761, BM & no 20541, BM, E) which look somewhat inter-

mediate between var. *sikkimense* and var. *parviflorum*. Taking the great variability of *D. cantoniense* into consideration, I have here treated the Sikkim plant as a variety of *D. cantoniense*.

On the other hand, var. *sikkimense* is closely allied to *D. megalanthum* Wang & Tang (1978) described from West China, but the latter species seems to have flowers much narrowed in the lower part, almost smooth pedicels, acutish tepals, larger anthers, and shorter style with more deeply trifid stigmas.

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