

***Dioscorea scortechinii* Prain & Burkill, a new record for Thailand and its infraspecific variation**

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ABSTRACT. *Dioscorea scortechinii* Prain & Burkill is a compound-leaved species with significant infraspecific variation in floral organ size and shape across its broad, but scattered distribution in South-East Asia. Previous classifications included a distinct variety (var. *parviflora* Prain & Burkill) at the northern end of its range in China and Vietnam. Its discovery in Thailand has allowed the distribution of the species as a whole to be clarified. The specimens available from China and Vietnam have tepals which are at the smaller end of a continuous range of size variation and thus the variety does not appear to merit recognition. A full description, illustrations and a provisional conservation assessment are given. The relationships of *D. scortechinii* with the mainly Philippine taxa of *D. sect. Botrysicyos* (Hochst.) Uline with capsules greater than 25 mm long which do not fully reflex, and which often have thicker leaves with very prominent veins on the lower surface, are suggested to be in need of detailed systematic study.

INTRODUCTION

Dioscorea scortechinii Prain & Burkill was described in 1908 (Prain & Burkill 1908) based on female specimens from Peninsular Malaysia and Vietnam. Prain & Burkill (1927, 1936a) did not regard *D. scortechinii* as a species occurring in Thailand. The latter publication cites specimens from the Malay Peninsula (from Perak southwards) and Sumatra, and a disjunct group of collections from Vietnam and Hainan. They also cited a specimen possibly of this species from Kwang Si [Guangxi] province in mainland South-western China. According to Prain & Burkill (1936a), *D. scortechinii* belonged to a group of species which differed from the common and widespread *D. pentaphylla* L. through their larger capsules (40–50 mm long; not more than 25 mm in *D. pentaphylla*) which do not reflex but are held at right angles to the axis at maturity. In the same year, Prain & Burkill (1936b) described two specimens from Hainan as *Dioscorea scortechinii* Prain & Burkill var. *parviflora* Prain & Burkill. The variety differed in having smaller spikes (partial inflorescences) with greyish, not reddish pubescence, and tepals which were 0.75 mm long and narrower than those of the type variety. Prain & Burkill (1936a) gave the tepal length of the type variety as 1 mm for the outer whorl and “a little shorter” for the inner whorl. Burkill (1951) gave the same distribution of the species as Prain & Burkill (1936a), but stated that the plant from Tonkin (N. Vietnam) was a variety and did not mention

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South-west China as a part of the distribution of *D. scortechinii*. Ding & Gilbert (2000) reported that *D. scortechinii* var. *parviflora* occurred in forests between 200 and 1300 m in elevation Hainan and Vietnam, and possibly also in Yunnan. They did not see any specimens from the mainland South-west China, Thailand, or the southern populations, and thus were unable to be certain about the relative distributions of *Dioscorea scortechinii* var. *scortechinii* and var. *parviflora* or their taxonomic status.

The discovery of several specimens of this species in Thailand during fieldwork towards the Dioscoreaceae treatment for the Flora of Thailand since 1996 allows the distribution range of the species as a whole and the status of its two infraspecific taxa to be clarified.

MATERIALS & METHODS

The Dioscoreaceae treatment for the Flora of Thailand is based on examination of 1220 specimens from Thailand from the following herbaria: AAU, B, BK, BKF, BM, CMU, E, K, L, P, Biology Department, Naresuan University, Phitsanulok (PNU) and QBG. Abbreviations (except PNU) follow Holmgren & Holmgren (1990). Comparative morphology was used to delimit species in all cases.

DESCRIPTION

Dioscorea scortechinii Prain & Burkill, J. & Proc. Asiat. Soc. Bengal 4: 455. 1908; Ridl., Fl. Malay Penins. 4: 314. 1924; Prain & Burkill in Fl. Indo-Chine 6: 725. 1934; Prain & Burkill, Ann. Roy. Bot. Gard. (Calcutta) 14(1): 186. 1936; Burkill in Fl. Males. ser. I, 4: 318. 1951. Type: Peninsular Malaysia, Perak, Maxwell's Hill, E fr. 1884, *Scortechini* s.n., (lectotype K!; isolectotype CAL!, K!, selected by Prain & Burkill, Bull. Misc. Inform. Kew 1936: 494. 1936. — *Dioscorea scortechinii* Prain & Burkill var. *parviflora* Prain & Burkill, Bull. Misc. Inform. Kew 1936: 494. 1936; Ding & Gilbert in Fl. China 24: 290. 2000. Type: China, Hainan, no further data, G fl. 10 Aug. 1933, C. Wang 33578 (K!; NY). Figs. 1, 2.

Large forest climber to 10(–25) m in height. *Underground organs* (Fig. 2K, L) a cylindric to pyriform tuber subtended by a woody crown bearing thicker roots, annually replaced, descending vertically into substrate. *Indumentum* (Fig. 1F) present on all parts except male tepals and inner whorl female tepals, most dense on inflorescence axes, floral bracts and bracteoles, hairs simple, 0.15–0.3 mm long, pale brown to reddish-brown. *Stems* twining to the left, perennial, 5–8 mm in diam. towards base, woody and densely spiny, upper stems 1.5–3 mm, laxly spiny, terete, pale green to dark green, often with scattered small brownish blotches. *Leaves* (3–)5-foliolate, alternate, leaflet blades narrowly obovate to oblanceolate, bases acute to cuneate, apices 3.5–7 mm long, acuminate, single main vein strongly prominent below, secondary veins emerging pinnately from main vein, often anastomosing and appearing to form a submarginal collecting vein (Fig. 1E), coriaceous, pale green to dark green above, paler and densely pubescent below; terminal leaflet blades 8.5–15 by 2.6–6 cm, anterior lateral leaflet blades 6–15 by 2.7–5.5 cm, posterior lateral leaflet blades 6–10 by 2.6–4.8(–7) cm; forerunner tips 2–5 mm long, dark brown, one per leaflet; *petioles* 3.8–8(–17) cm long, terete, often spiny, coloured as stem; *petiolules* 4–14 mm long; cataphylls not seen; bulbils absent. *Inflorescences* pendent, axes terete, coloured

as stem; all bracts chartaceous; tepals inserted on a small, discoid to very shallowly concave torus, erect, free, slightly fleshy in texture, yellowish-green in colour. *Male inflorescences* (Fig. 1A) racemose, compound, 8–35(–70) cm long, 1 per axil; primary bracts (Figure 1B) 1.3–3 by 0.5–1 mm, lanceolate to ovate-lanceolate, apices 0.3–1.3 mm long, acuminate; partial inflorescences (Fig. 1C) 1–4 per axil, peduncles 0.2–0.8 cm long, axes (0.6–)1.2–3.8 cm long. *Female inflorescences* (Fig. 2A) spicate, simple, 1(–2) per axil, peduncles 3.8–7 cm long, axes 9.2–15 cm long. *Male flowers* 0.8–1.6 mm in diam. at anthesis, pedicels 0.4–0.5 mm long; floral bracts (Fig. 1G) 1–1.4 by 1.2–1.6 mm, broadly ovate, apices 0.2–0.3 mm long, acuminate; bracteoles (Fig. 1H) 0.9–1.3 by 1.1–1.5 mm, broadly ovate, apices 0.15–0.2 mm long, acuminate; outer tepals (Fig. 1I) 0.7–1.5 by 0.4–1.1 mm, lanceolate to narrowly elliptic, apex obtuse; inner tepals (Fig. 1J) 0.7–1.2 by 0.3–1.2 mm, oblong, apex obtuse to rounded; stamens 3 (Fig. 1D, I), inserted on outer tepal bases, filaments 0.1–0.25 mm long, anthers 0.3–0.4 by 0.3–0.4 mm, ovate to circular; staminodes 3 (Fig. 1D, 1J), 0.5–0.7 mm long, filiform to flattened-clavate, inserted on inner tepal bases; pistillode (Fig. 1D) 0.4–0.5 by 0.1–0.3 mm, erect, columnar-clavate and 3-angled (formed by 3 fused stylodes), apex 3-lobed. *Female flowers* (Fig. 2B, C) orientated at an angle of 15°–60° to axis when receptive; floral bracts (Fig. 2D) 1.2–1.4 by 0.9–1.3 mm, ovate, apices 0.3–0.5 mm long, acuminate; bracteoles (Fig. 2E) 0.5–1.0 by 0.4–0.8 mm, ovate, apices 0.2–0.25 mm long, acuminate; outer tepals (Fig. 2F) 1.1–1.3 by 0.8–1.0 mm, ovate, apex acute; inner tepals (Fig. 2G) 1.1–1.3 by 0.7–0.8 mm, narrowly obovate, apex obtuse; ovaries (Fig. 2B) 6.5–7 by 2–2.2 mm, (excluding 1.8–2 by 0.6–0.7 mm “neck”) narrowly ovate to ovate-oblong in outline, with 3 shallow longitudinal ridges, brown to red-brown; staminodes 6 (Fig. 2C), 0.15–0.3 mm long, outer whorl staminiform, inner whorl stoutly columnar and not differentiated into filamentodes and antherodes, both whorls inserted on torus; styles (Fig. 2C) 0.4–0.5 by 0.4–0.6 mm, fused to form a stout erect column, stigmatic surfaces 0.2–0.25 mm long, reflexed. *Infructescences* (Fig. 2H) 15–30(–40) cm long; capsules (Fig. 2I) 36–44 by 25–33 mm, oblong, base retuse, sinus 1.5–5 mm deep, apex truncate, capsular stipes 3–5 by 1.5–2 mm, filiform; immature capsule pale green to dark green, mature capsules reflexed at an angle of 120°–160° to axis. *Seeds* (Fig. 2I, J) 6–8 by 7–9 mm, lenticular-ovoid, wing ovate-oblong to narrowly oblong, apex obtuse to rounded, upper seed wings 25–26 by 11.5–12 mm, lower seed wings 22–25 by 11.5–13 mm.

THAILAND.—NORTHERN: Nan [Doi Phukha National Park, Pua Distr., 19°12.43' N, 101°4.40' E, G fl. 22 Sept. 1996, *Wilkin* 897 (AAU, BKF, K)]; Uttaradit [Phu Soi Dao National Park, along trail to pine-rich plateau, sterile 19 Nov. 2001, *Thapyai* 296 (BK, BKF, NU, QBG)]; SOUTH-WESTERN: Phetchaburi [Kaeng Krachan National Park, along the road to Khao Phanoen Thung, 12° 48' 12.5" N, 99° 26' 31.7" E, sterile 6 Dec. 2002, *Thapyai* & *Wilkin* 519 (BK, BKF, NU)].

Distribution.— *D. scortechinii* occurs sporadically from Hainan and Northern Vietnam to Thailand, Peninsular Malaysia and Indonesia (Sumatra).

Ecology.— Appears to be restricted to moist evergreen and lower montane evergreen forests in Thailand at elevations between 600 and 1250 m, possibly at lower elevations elsewhere (Ding & Gilbert 2000). Flowering August–September; fruiting November–January.

Vernacular name.— Not known.

Conservation.— IUCN rating LC (IUCN 2001), because it has a very large area of occurrence.

Notes.— *Dioscorea scortechinii* is most easily differentiated from *D. pentaphylla* by its coriaceous leaflets in which the pinnate secondary veins appear to anastomose and form a submarginal collecting vein. This is never observed in the chartaceous leaflets of *D. pentaphylla*. In addition, the floral bracts of *D. pentaphylla* are 1.6–2.1 mm wide, and the outer and inner tepals are ovate and obovate respectively. In *D. scortechinii*, the floral bracts are 1.2–1.6 mm wide, and the outer and inner tepals are lanceolate to narrowly elliptic and oblong respectively. There is also a difference in capsule size, 36–44 mm long in *D. scortechinii* against 11–21 mm long in *D. pentaphylla*.

The female fruiting collection of *Scortechini* was indicated to be the sole type by Prain & Burkill (1936b) when they published *D. scortechinii* var. *parviflora*. This was 28 years after their publication of the protologue (Prain & Burkill 1908). They may have simply overlooked the other syntypes cited in the protologue (a flowering specimen collected by Scortechini with the lectotype and *Balansa* 4325), but it is clear that this amounts to lectotypification under article 9.8 of the ICBN (St. Louis Code), the word “type” being an error to be corrected to “lectotype”.

DISCUSSION

Dioscorea scortechinii var. *parviflora* was separated from the type variety mainly through having male floral tepals which were 0.75 mm long and narrower. Dissection and measurement of the tepals of specimens from Thailand and Peninsular Malaysia showed that the tepal length range is 0.7–1.5 mm. For example, *Wilkin* 897 has tepals which are 0.7–1.1 mm long. This overlaps to a high degree with specimens from Hainan, for example the type collection (*Wang* 33578), has tepals which are 0.6–0.9 mm long. There is also overlap in the tepal width, which may be as little as 0.3 mm in inner tepals. While it is true that the collections from Hainan have mainly colourless instead of brownish hairs (they appear greyish) this character alone is not sufficient for recognition of a separate variety and therefore var. *parviflora* should be sunk into var. *scortechinii*. It is possible that there is clinal variation in this species, with tepal size decreasing as latitude increases.

The species limits of *D. scortechinii* need to be reexamined with relation to *D. elmeri* Prain & Burkill, *D. cumingii* Prain & Burkill *sensu lato* from the Philippines and *D. blumei* Prain & Burkill from Indonesia. *D. esquirolii* Prain & Burkill and *D. xizangensis* C.T. Ting from China may also form part of the same complex. All of the above taxa are members of *Dioscorea* sect. *Botrysicyos* (Hochst.) Uline with capsules greater than 25 mm long which do not fully reflex, and which often have thicker leaves with very prominent veins on the lower surface. Initial examination suggests that there are possibly fewer species in this group than are currently recognized, but detailed morphological study is needed to test this hypothesis.

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REFERENCES

- Burkill, I.H. 1951. Dioscoreaceae. In: van Steenis, C. G. G. J (ed.), *Flora Malesiana*, Series I, Vol. 4, Djakarta: Noordhoff-Kolff N.V. Pp. 293–335.
- Ding, Z. & M.G. Gilbert. 2000. Dioscoreaceae. In: Wu, Z. & Raven, P.H. (eds), *Flora of China* 24: 276–296, Flagellariaceae through Marantaceae. Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis.
- IUCN. 2001. IUCN Red List Categories: Version 3.1. Prepared by the IUCN Species Survival Commission. IUCN, Gland, Switzerland & Cambridge, UK.
- Holmgren, P.K. & Holmgren, N.H. 1990. *Index Herbariorum*. Part 1: the Herbaria of the World. 8th Edition. NYBG Press, New York.
- Prain, D. & Burkill, I.H. 1908. *Dioscorearum novarum descriptions quaedam*. Journal and Proceedings of the Asiatic Society of Bengal 4: 447–457.
- _____. 1927. The genus *Dioscorea* in Siam. Bulletin of Miscellaneous Information Kew 1927: 225–247.
- _____. 1936a. An account of the genus *Dioscorea* in the East, Part 1. The species which twine to the left. Annals of the Royal Botanic Garden (Calcutta) 14(1): 1–210.
- _____. 1936b. *Dioscorea scortechinii* Prain & Burkill var. *parviflora* Prain & Burkill, Bulletin of Miscellaneous Information Kew 1936: 494. 1936.

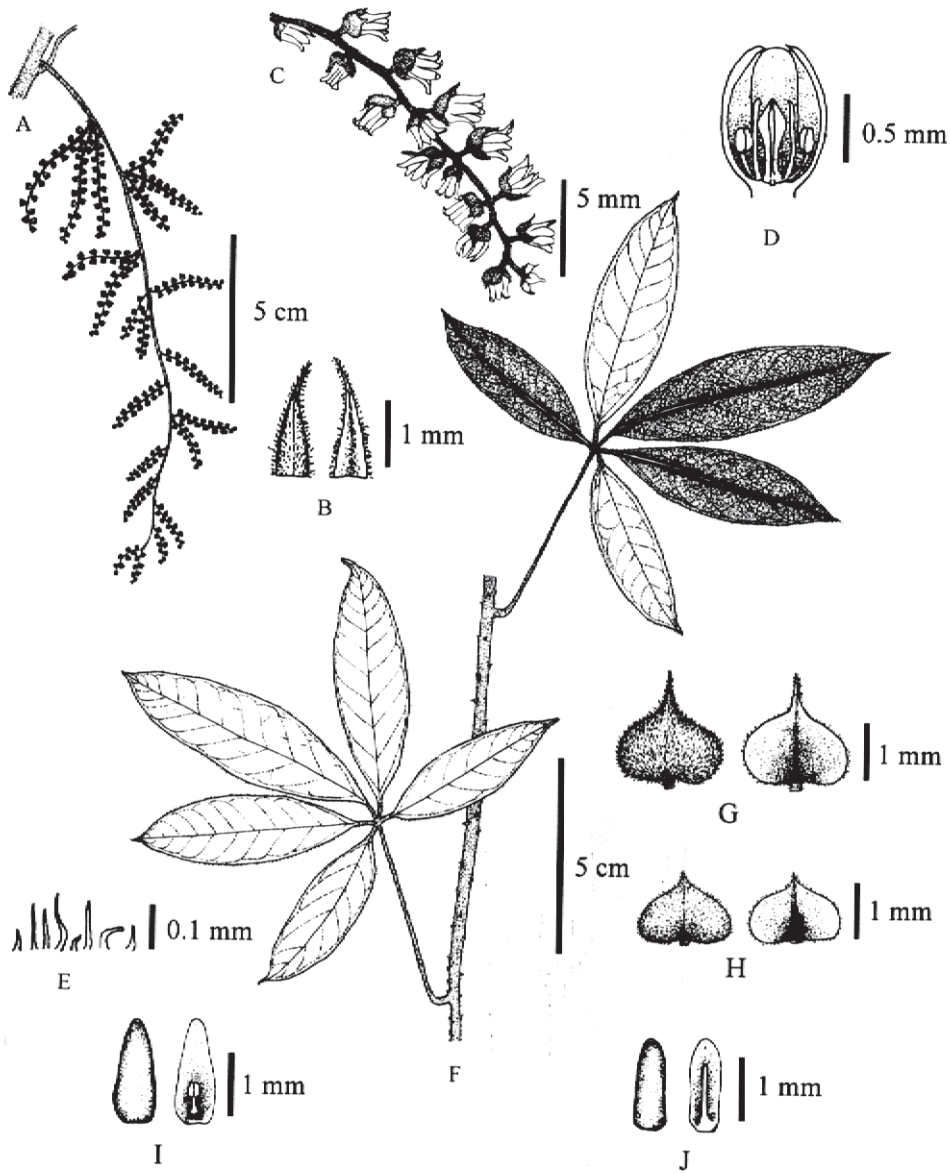


Figure 1. *Dioscorea scortechinii* Prain & Burkill male plant: A. compound inflorescence; B. primary bract, dorsal and ventral surfaces; C. apical part of partial inflorescence; D, G–K. flower; D. longitudinal section showing stamens, staminodes and pistillode; E. habit of lower stem and leaves; F. hairs; G, H. floral bract and bracteole dorsal and ventral surfaces respectively; I–J. outer and inner tepal dorsal and ventral surfaces respectively, showing position of stamen (outer) and staminode (inner) insertion. E. from Wilkin 897; A., B., F. from Burkill & Mohammed Nur 2307; C.–D., G.–K. from Tsang 30023. Drawn by C. Thapjai.

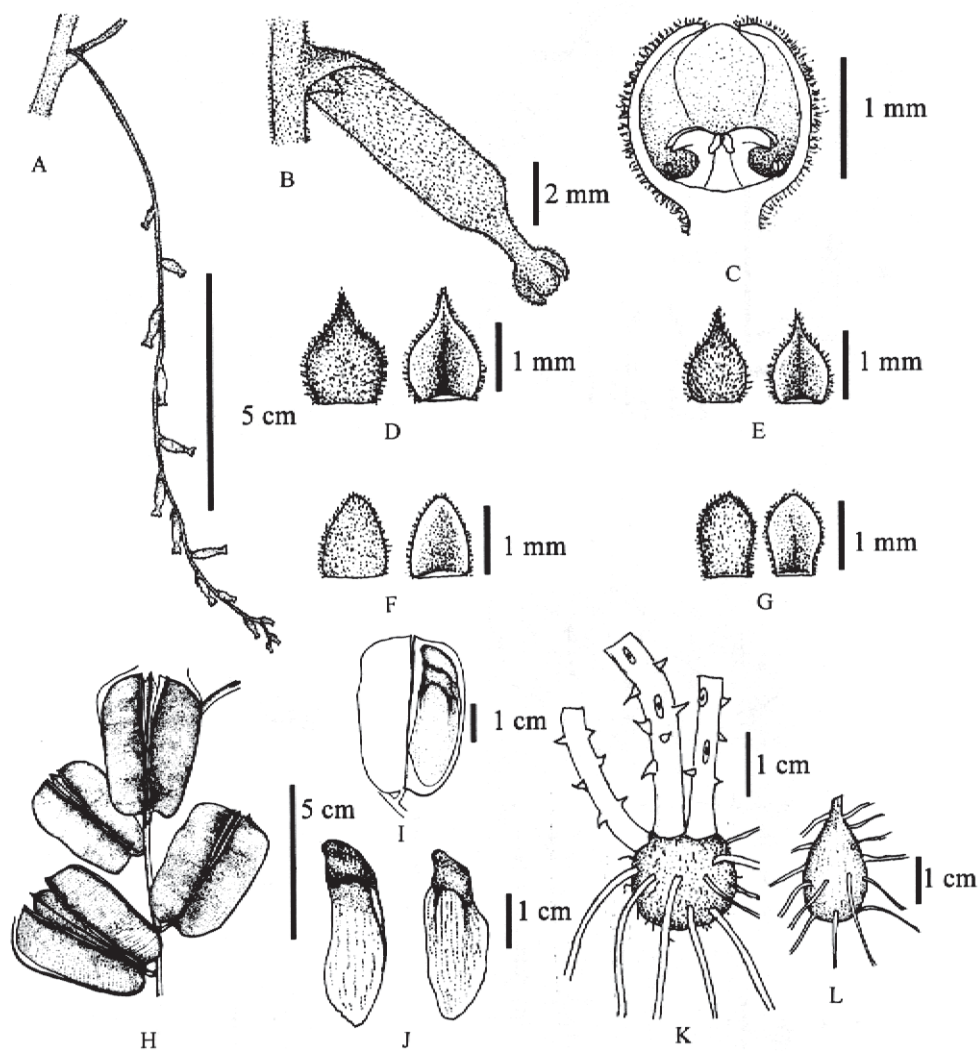


Figure 2. *Dioscorea scortechinii* Prain & Burkill female plant: A. inflorescence; B.-G. flower; B. side view; C. longitudinal section (excluding ovary) showing staminodes, style and stigmas; D., E. floral bract and bracteole dorsal and ventral surfaces respectively; F., G. outer and inner tepal dorsal and ventral surfaces respectively; H. part of mature infructescence with dehiscent capsules; I. mature capsule, longitudinal section showing seed position in locule; J. seeds of one locule; K. upper underground organs, showing spheroidal woody crown with thick roots, and stem bases; L. small tuber with feeding roots. A.-G. from Burkill & Mohammed Haniff 12724; H.-J. from Balansa 4325; K., L. from Burkill & Mohammed Haniff 12763. Drawn by C. Thapayai.