

The genus *Dipogon* (Leguminosae—Papilionoideae)

C. H. STIRTON*

ABSTRACT

A taxonomic revision of the genus *Dipogon* Liebm. is presented. Only one variable species, *D. lignosus* (L.) Verdc., is recognized.

RÉSUMÉ

LE GENRE DIPOGON (LEGUMINOSAE—CAESALPINIOIDEAE)

Une révision taxonomique du genre *Dipogon* Liebm. est présentée. Seule, une espèce variable, *D. lignosus* (L.) Verdc., est reconnue.

DIPOGON

Dipogon Liebm. in Index Sem. Hort. Acad. Hauniensi: 27 (1854) and in Annls Sci. nat., sér. 4, 2: 374 (1854); Verdc. in Kew Bull. 24: 406-409 (1971); R. A. Dyer, Gen. 1: 275 (1975).

Dolichos L. sect. *Eudolichos* Taub. subsect. *Barbatae* Taub. in Pflanzenfam. 3: 383 (1894).

Dolichos L. sect. *Pogonodolichos* Harms subsect. *Gibbosi* Harms in Pflanzenw. Afr. 3, 1: 679 (1915).

Verdcourtia Wilczek in Bull. Jard. bot. État Brux. 36: 250 (1966).

Perennial twiner, becoming woody below, thinly pubescent, glabrescent. *Leaves* pinnately trifoliolate, petiolate, stipulate; leaflets ovate-acuminate to oblong-lanceolate, up to 7 cm long. *Flowers* purple, in short dense racemes on peduncles longer than leaves. *Corolla* 1.0-1.5 cm long. *Style* channelled, bearded along its upper margin, strongly curved near base and apex in same direction, the middle part being gently curved in opposite direction. *Legume* straight to falcate, 3-5 cm long, 4-5-seeded, style persistent; seeds black.

A monotypic genus found in the Cape Province from the Cape Peninsula to Grahamstown.

Dipogon lignosus (L.) Verdc. in Taxon 17: 537 (1968); Verdc. in Kew Bull. 24: 406 (1971).

Dolichos lignosus L., Sp. Pl. 726 (1753); Hort. Cliff. 360, t. 20 (1737); Aiton, Hort. Kew 3: 33 (1789); Smith, Specieg. Bot. 19, t. 21 (1792); Curtis's bot. Mag. 11: t.380 (1797); G. Don, Gen. Syst. 2: 237 (1832); Freeman in Bot. Gaz. 66: 512, f.3, 5, 6 & 7 (1918); Burkardt in Rev. Fac. Agron. Vet. Buenos Aires 6: 306 (1929); Burkardt, Las Leguminosas Argentinas, ed. 2: 422, f.128, j-k (1952); Maréchal & Otoul in Bull. Jard. bot. État Brux. 35: 73, f.14, t. F-H, photo. 4 (1965); Verdc. in Regnum veg. 40: 26 Adnot. (1965); Bronkers & de Keyser in Bull. Jard. bot. État Brux. 36: 57 (1966); Maréchal & Otoul in Bull. Rich. Agron Gembloux, nov. sér. 1: 63, 1/2A (1966), non sensu Roxb. nec Prain et al. *Verdcourtia lignosa* (L.) Wilczek in Bull. Jard. bot. État Brux. 36: 254, f. 5-6 (1966). Neotype: t. 21 in Smith, Spicileg. Bot. (1792). For photo. see Bot. Gaz. 66: 520 (1918).

Dolichos gibbosus Thunb., Prodr. Fl. Cap.: 130 (1800); Fl. Cap. 590 (1823); Harv. in Fl. Cap. 2: 244 (1862); Marloth, Fl. S. Afr. 2: t.26 (1925); Levyns, Guide Fl. Cape Penin.: 155 (1929); Phill. in Flower. Pl. Afr. 11: t.402 (1931); Anon., S. Afr. Gdng Country Life 22: 87 (1932); Kidd, Wild Flow. Cap. Penins. t.41, 4 (1950). Lectotype: Cape, 'in collibus montium urbei Cap. b. Spei', Thunberg s.n (UPS-16755, microfiche!).

D. capensis sensu Thunb., Prodr. Fl. Cap.: 130 (1800), non L.,

D. benthamii Meisn. in Hook., J. Bot. 2: 95 (1843). Type: Cape, 'in planitie capensi' (III.E.b.), Krauss 861.

D. gibbosus Thunb. var. *uniflorus* Harv. in Fl. Cap. 2: 244 (1862). Type: Cape, 'in collibus montium urbi Cap. b. Spei', Thunberg s.n. (UPS-16747, microfiche!).

D. jacquinii sensu Piper in Bull. U.S.D.A. 318: 5 (1915), non DC.

The typification of *Dolichos lignosus* L. has caused considerable difficulty and despite attempts by a number of authors to typify it, it has always been left unresolved (Freeman, 1918; Verdcourt 1971; Hutchinson, unpublished note; Dandy, unpublished note). It seems appropriate now that the plant has become quite widely cultivated and has even begun to assume weedy habits in Australia, that its correct status be established. Freeman (1918) and Verdcourt (1971) have given exhaustive accounts of the origin, usage and misuse of this name. I will therefore not repeat their arguments here, but briefly outline why I have chosen t. 21 in Smith's Spicileg. Bot. as the neotype even though the key diagnostic character in Sp. Pl. 726 (1753) 'leguminibus strictis linearibus' is not depicted in t. 21.

The protologue in Sp. Pl. 726 (1753) is as follows:

'lignosus. 9. Dolichos caule perenni,
pedunculis capitatis,
leguminibus strictis linearibus.
Dolichos caule perenni
lignoso. Hort. cliff. 360 t. 20.
Phaseolus indicus perennis,
floribus purpurascens.
Eichr. carol. 36.
Habitat---- h'

The effective diagnostic part of Linnaeus's definition lies in the words 'pedunculis capitatis, leguminibus strictis linearibus' as the first phrase 'Dolichos caule perenni' is repeated for *D. polystachios* the following species. It is also clear that the effective diagnostic part is omitted from Hort. Cliff. 360. There is no specimen of *D. lignosus* in the Linnaean herbarium, so one is forced to look elsewhere for a type. The first possibility is the cited plate in the Hortus Cliffortianus. This cannot be regarded as a lectotype, however, because the figured plant lacks fruit and does not have capitate flowers. Linnaeus actually stated in the text that his specimen did not produce fruit ('Absoluta florescentia absque fructu perit'). There is, however, a specimen in the Hort. Cliff which one might consider as a lectotype, since it is quite sterile. But it shows no sign of having

*Botanical Research Institute, Department of Agriculture and Fisheries, Private Bag X101, Pretoria, 0001.



FIG. 1.—*Dipogon lignosus*. 1, habit; 2, flowering branch, $\times 1$; 3, flower bract; 4, flower; 5, calyx opened out; 6a, standard opened out; 6b, standard closed; 7, wing; 8, keel; 9, vexillar stamen; 10, staminal sheath; 11, discoid floral nectary; 12, gynoecium; 13, stigma; 14a, seed, side view; 14b, seed, marginal view showing hilum.

borne an inflorescence and consists mostly of newly flushed growth; neither does it match the figured plate accompanying the Hort. Cliff. description of *D. lignosus*. The Hort. Cliff. specimen could be a *Dipogon*, but it is very difficult to be sure. For these reasons it is an unsuitable choice for a lectotype. The remaining possibility is Linnaeus's reference to Eichrodt's Hortus Carolusruhensis. However, he does not mention the fruit and, as the phrase name is vague, it also does not satisfactorily resolve the problem.

There are two noticeable changes in Linnaeus's Sp. Pl. and Hort. Cliff. accounts. In Hort. Cliff. he states 'Crescit in America', whereas in the Sp. Pl. he omits the origin of the plant altogether. This may indicate that his view of the species had changed, as it certainly did in the second edition of the Sp. Pl., where he included in synonymy 'cacara. s. phaseolus perennis' (a form of *Lablab purpureus*) and stated for the species as a whole 'Habitat in India'. Verdcourt (1971) has described the subsequent confusion which thence accompanied the names *Dolichos lablab* and *D. lignosus*. The second difference in the Hort. Cliff. and Sp. Pl. accounts is the inclusion in the latter of a description of the fruits.

The whole problem of typification of this species hinges, I believe, on Linnaeus's uncertainty about the nature of fruits in *Phaseolus* and *Dolichos* (*Vigna* was not known at the time as such and was treated by him under *D. lablab* and *D. lignosus*; see note by Linnaeus on p. 1015, Sp. Pl. 2.). It began when Linnaeus's concept of his species *D. lignosus* changed between his Hort. Cliff. treatment and his 1st edition of the Sp. Pl. I am fairly certain that when he added 'leguminibus strictis linearibus' he must have seen a fruit of a *Vigna* and not one of *Dolichos lignosus*. It is not known whence Linnaeus obtained his information about the fruit, neither did it help matters when, in his second edition, he included in the synonymy of *D. gibbosus* the name 'cacara. s. phaseolus perennis' now known to be a variant of *Lablab purpureus* and yet again with a different fruit.

One can either select a neotype and preserve the name *Dolichos lignosus* or abandon it. An acceptance that Linnaeus erred in his addition of the fruit character to his original phrase name in the Hort. Cliff. would allow one to accept one of the two distinctive and unambiguous plates published by Smith (Spicileg. Bot. t. 21, 1792) and by Curtis (Curtis's bot. Mag. 11: t. 380, 1797) shortly thereafter. It was only much later that the identity of *Dolichos lignosus* really became confused. The most parsimonious solution is, therefore, I think, to select Smith's t. 21 as the neotype of *Dolichos lignosus*, the basionym of *Dipogon lignosus* (L.) Verdc.

Voluble perennial arising from underground, vertical, deeply lenticelled rootstock with dichotomously branching laterals. Shoots spirally twisted, up to 3 m long, weak, glabrescent. Leaves trifoliolate; stipules up to 6 mm long, basifixed, oblong-lanceolate, persistent, clasping but patent when old; petioles up to 5 cm long; leaflets 2–7 cm long, 1–4.5 cm wide, laterals smaller, stipellate, eglangular, paler beneath, glabrescent; terminal leaflet ovate-acuminate, laterals gibbous on lower margin. Petiolules up to 3 mm long. Rhachis 1–2 cm long, puberulent, armed with two persistent acrorhachial stipels. Racemes 5–10 (–33)-flowered, axillary, up to 25 cm long, longer than leaves, shortly and densely racemose towards apex, sometimes twisted; pedicels 5–10 mm long,

somewhat flattened, becoming purplish with age, armed with small caducous bracteoles near apex; bracts small, green, persistent until flower abscises. Flowers purple, turning pale mauve, 10–15 mm long, reflexed; bracts persistent; calyx campanulate, lobes 5, short and broad, tube twice longer than lobes, 2 horn (upper) lobes rounded, lateral and keel lobes triangular, ciliate. Standard 10–15 cm long and broad; apex emarginate, base auricled, with prominent appendages (callus lobes, callosities) situated low down extending from auricles to apex of claw, raised to form an entrance against which insects can thrust their thoracic region. Wings longer than keel blade, hanging slightly flared, with upper auricles inserted between appendages, pinkish. Keel blades rostrate, apex incurved, purple tipped. Stamens diadelphous, stamens held at two levels. Pistil sessile; ovary linear, with hairs along upper ridge; ovules 4–5; style channelled, bearded along upper inner margin, strongly curved near the base and apex in same direction, the middle part being gently curved in opposite direction; stigma capitate, fringed with hairs. Discoid floral nectary present. Legume 40–60 mm long, 8–10 mm wide, oblong, attenuate at base and apex, tipped with persistent style. Seeds 4–5, subglobose, 3.5–4.5 mm wide; hilum 2.5–3 mm long, black or speckled. Germination hypogeal, epicotyl absent; primordial leaves ovate, base cordate, opposite, petiole up to 1.8 mm long; stipules 2, undivided, oblong-lanceolate, persistent; acrorhachial stipels present. Chromosome number $2n = 22$. Fig. 1.

D. lignosus is endemic to the Cape Province and extends from the Cape Peninsula as far east as Grahamstown (Fig. 2). Its overall distribution falls within the fynbos. Flowering begins in July, reaches a peak in October then declines rapidly after December. This species grows commonly in scrub forests, along the perimeter of high forests (Galpin 3988 reports one plant overtopping a 6 m tree), and more recently it has been reported from waste places and gardens.

Despite a number of recent investigations into generic affinities in the Phaseoleae, there is still no agreement about the affinity of *Dipogon* to other genera. Lackey (1977a) placed *Dipogon* in the subtribe Phaseolinae Benth. between *Alistilus* N. E. Br. and *Dolichos* L., having suggested earlier (1977b) that *Dipogon* was closely related to *Lablab* Adans. and *Alistilus* and should perhaps be united with them. Baudet (1978), in contrast, placed *Dipogon* in the subtribe Phaseolinae, section Phaseolastrae, but *Alistilus* and *Dolichos* in section Dolichastrae. Maréchal, Mascherpa & Stainier (1978) suggested links with *Lablab*. They included both *Dipogon* and *Lablab* in their numerical analysis of the *Phaseolus* — *Vigna* complex. The peripheral affinity of *Dipogon* and *Lablab* to *Phaseolus* and *Vigna* (Maréchal *et al.*, 1978) would rather suggest, as already alluded to by Lackey (1977a) and Verdcourt (1970), that *Dipogon*, *Alistilus* and *Lablab* may be better considered allies of *Dolichos*. However, until the African representative of *Dolichos* are better known, this problem will have to be deferred.

The following herbarium material is recognized as *D. lignosus*:

SOUTH AFRICA.—Alexander s.n. (2 sheets), 46 (K); Archibald 4836 (PRE); Atherstone s.n. (GRA); Barker 1673 (GRA, PRE); Bayliss 108 (K, PRE), 2963 (PRE); Boucher 821, 1652 (PRE); Britten 78 (GRA), s.n. (Oct. 1946, 2 sheets, (GRA); Burchell 437, 6024, 7012 (K); Cummings 67 (RUH); Dahlstrand 837 (GRA, STE); Drège 278 (GRA), s.n. (K); Dyer 444 (GRA, PRE); Ecklon 1683 (K); Esterhuysen 709 (PRE), 23245 (K); Forest Department

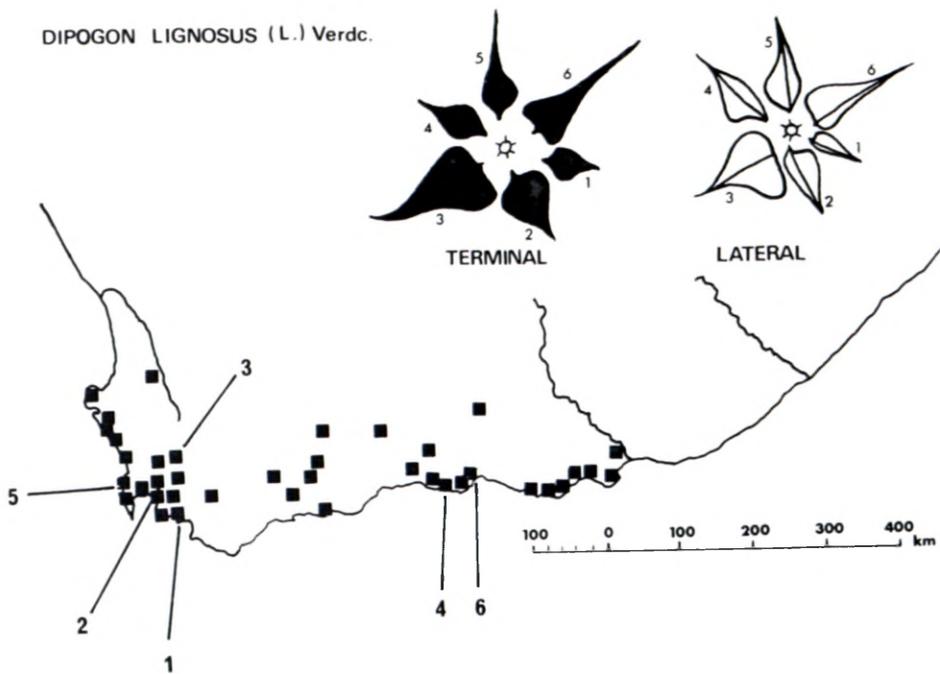


FIG. 2.—Known distribution of *Dipogon lignosus* in southern Africa.

Port Elizabeth 72 (GRA); Fourcade 1630 (GRA), 5739 (STE); Fries, Norlindh & Weimarck 567 (K); Gamble 22052 (K); Galpin s.n. (22.9.1897, PRE), 3988 (GRA); Garside 62 (K); Gerber s.n. (RUH); Gillett 103 (STE), 3376 (PRE, STE); Godfrey s.n. (11.12.1952, PRE); Grobbelaar 333 (PRE); Hafström & Acocks 2306 (PRE); Heeg 92 (RUH); Henry 16 (PRE); Herbarium Harvey 772 (BM, K); Hilner 86 (GRA); Hops 199 (GRA); Hooker 533 (K); Hutchinson 645 (BM, K), 1164 (K, PRE); Jordaan 3910 (STE), s.n. (STE 18592); Joubert 487 (STE); Keet 410 (GRA, STE), s.n. (STE 13499); Kerfoot K5508 (STE); Kies s.n. (5.9.1940, PRE); Kruger 343 (STE); Levyns 40 (BM); Lynes s.n. (BM); MacGillivray 504 (K); Marloth 13047, 13448 (PRE); Marsh 611 (PRE, STE); Miles s.n. (RUH); Morgan 12 (RUH); Muir 91A (PRE), s.n. (STE 10554); Nature Conservation Cape 208 (PRE); Nelson s.n. (BM); Noel 153 (RUH); Oliver 3627 (PRE); Pappe s.n. (K, 3 sheets); Patterson 361 (GRA); Phillips 357 (K); Pienaar K58 (STE); Pillans 3054 (PRE); Rodin 1030 (K, PRE); Rogers 1060, 2052 (BM), 4523 (GRA), s.n. (K), 26436 (PRE); Salisbury 206 (PRE); Salter 2058, 9313 (BM); Scharf 1401 (PRE); Schelpe 4166 (BM); Schlechter 2659 (GRA), 4704 (K), 9321 (BM, GRA, K); Schlieben & Ellis 12399 (K, PRE, STE); Schonland 533 (GRA); Shaw 43 (RUH); Smith 4832, 4930 (K); Story 317, 2593 (PRE); Stirton 6330 (PRE); Strey 797 (PRE); Taylor 4370 (STE); Theron 640 (PRE); Thode A917 (K, PRE), 8358 (STE); Thompson J. B. 56 (PRE); Thompson, M. 854 (K, PRE); Tyson s.n. (9.1916, PRE); Van Breda 17, 351 (PRE), 589 (K); Van Dam s.n. (12.1918, PRE); Van Rensburg 487 (PRE); Wallich s.n. (BM); White 5162 (PRE); Worsdel s.n. (K); Wolley-Dod 12 (BM, K); Zeyher 2413 (GRA, PRE), s.n. (GRA).

Verdcourt (1971) has already listed the cultivated material of *D. lignosus* housed in K. To this can be added Thomson s.n. (K) from Ceylon; Gamble 16999 (K) from India; Symon 9541 (ADW; K), Rodd 1493 (K; NSW) and Constable 7148 (K; NSW) from Australia; and Bangert 5189 (AK; K) from New Zealand. *D. lignosus* has become naturalized in Australia and seems to be increasing its range there.

ACKNOWLEDGEMENTS

For loan of herbarium material I sincerely thank the Directors of the K, GRA, PRE, RUH, STE, and BM. I am especially thankful to Mr D. E. Meikle and Dr B. Verdcourt for the many hours of robust argument with which the typification of *Dolichos lignosus* was pursued. Linda Cowan kindly drew the plate of *Dipogon lignosus*.

UITTREKSEL

'n Taksonomiese hersiening van die geslag *Dipogon* Liebm. is onderneem. Net een veranderlike spesie *D. lignosus* (L.) Verdc., word erken.

REFERENCES

- BAUDET, J. C., 1973. Intérêt taxonomique des caractères épidermiques dans le complexe *Phaseolus* — *Vigna*. *Bull. Soc. bot. Belg.* 106: 53–59.
- FREEMAN, G. F., 1918. The purple hyacinth bean. *Bot. Gaz.* 66: 512–523.
- LACKEY, J., 1977a. A revised classification of the tribe Phaseoleae (Leguminosae: Papilionoideae), and its relation to canavanine distribution. *Bot. J. Linn. Soc.* 74: 163–178.
- LACKEY, J., 1977b. A synopsis of Phaseoleae (Leguminosae, Papilionoideae). Ph. D. thesis, Iowa State University, Ames.
- MARECHAL, R., MASCHERPA, J., & STAINIER, F., 1978. Etude taxonomique d'un groupe complexe d'espèces des genres *Phaseolus* et *Vigna* (Papilionaceae) sur la base de données morphologiques et polliniques, traitées par l'analyse informatique. *Boissiera* 28: 1–273.
- VERDCOURT, B., 1970. Notes on *Dipogon* and *Psophocarpus* (Leguminosae). *Kew Bull.* 17: 537–538.
- VERDCOURT, B., 1971. Studies in the Leguminosae — Papilionoideae. 3. *Kew Bull.* 24: 406–409.