

CRITICAL NOTES ON THE GENUS *DALBERGIA* LINN. F.

K. THOTHATHIRI

Botanical Survey of India, Howrah

INTRODUCTION

During a critical revision of the genus *Dalbergia* Linn. f. a new series 'Pinnatae' has been proposed with *D. pinnata* (Lour.) Prain as the type. The taxonomic status of quite a number of species has been reassessed, necessitating new combinations. Additional distributional records for 3 species have been noted. Fruit characters of 4 species are given for the first time. In a number taxa, lectotypes have been selected by the author.

The genus is divided into 4 sections namely Sect. *Sissoa* Benth., Sect. *Dalbergia*, Sect. *Selenolobia* Benth. and Sect. *Ecastaphylla* Thoth.

Ecastaphyllum P. Br., an american genus with 6 species having almost unifoliate leaves and orbicular pods, was for a long time treated as a distinct genus (Bentham, 1860). But Bentham himself (l.c.) says that he should have certainly divided *Dalbergia* into

3 sections namely, *Dalbergia* with straight, thin, long pods, *Selenolobium* with thicker, lunate or reniform pods and *Ecastaphyllum* with orbicular pods and tendency to corky thickening.

Taubert (1894) reduced *Ecastaphyllum* to *Dalbergia*, endorsing thereby the above views of Bentham, but merged it in Sect. *Selenolobium* instead of according it a distinct sectional status. According to Prain (1904) all species of *Ecastaphylla* of America and Africa belong to Sect. *Dalbergaria* as to flowers but the 2 asiatic species (*Dalbergia albertisii* Prain and *D. beccari* Prain) are to be under Sect. *Triptolemea*.

Ecastaphyllum can therefore no longer continue to be a distinct genus but at the same time its taxonomic position under *Dalbergia* has not been properly evaluated. A critical analysis of the characters makes it necessary to treat *Ecastaphyllum* as a distinct section under *Dalbergia* as per the following key :

KEY TO THE SECTIONS OF THE GENUS *DALBERGIA*

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|--|-----|---------------------------|
| 1a. Stamens monadelphous ; vexillum erect ; pods thin to coriaceous | ... | Sect. <i>Sissoa</i> |
| 1b. Stamens mono to diadelphous ; vexillum erect to deflexed ; pods coriaceous | | |
| 2a. Stamens diadelphous ; pods oblong to orbicular ; | | |
| 3a. Leaves multifoliolate ; vexillum oblong ; pods oblong | ... | Sect. <i>Dalbergia</i> |
| 3b. Leaves mostly unifoliolate ; vexillum erect ; pods round to orbicular | ... | Sect. <i>Ecastaphylla</i> |
| 2b. Stamens mono to diadelphous ; pods falcately oblong and at times lunar | ... | Sect. <i>Selenolobia</i> |

Sect. ***Ecastaphylla*** (P. Br.) Thoth. stat. et comb. nov. *Ecastaphyllum* P. Br. Hist. Jamaica. 288. 1756 ; Benth. in Journ. Linn. Soc. 4 (Suppl.): 50. 1860 ; Benth & Hook. f. Gen. Pl. 1: 545. 1865.

Leaves mostly unifoliate, large. *Inflorescence* short, axillary, congested raceme. *Stamens* diadelphous. *Pods* round to orbicular.

Type : *Dalbergia ecastaphylla* (Linn.) Taub. (= *Hedysarum ecastaphyllum* Linn., *Ecastaphyllum brownei* P. Br.).

The 4 sections of the genus are further subdivided into series. Sect. *Sissoa* has 4 series of which Ser. *Pinnatae* is new to science. A key to the series of Sect. *Sissoa* is as follows :

KEY TO THE SERIES OF THE SECTION *MISSOA*

- 1a. Leaflets 5-9, larger (3.9×3.11 cm) :
 2a. Pods smooth but veined opposite the seeds ... Ser. *Ovatæ*
 2b. Pods suberosely thickened and veined opposite the seeds ... Ser. *Rimosæ*
 1b. Leaflets 5-40, smaller (0.5-8.0×0.3-4.0 cm) :
 3a. Leaflets 5-11; inflorescence usually short and congested ... Ser. *Congestæ*
 3b. Leaflets 9-40; inflorescence usually longer and laxer ... Ser. *Pinnatæ*

Ser. *Pinnatæ* Thoth. ser. nov.

Plerumque plantae volubiles vel frutices scandentes, raro arbores; folia parviflora et plures; inflorescentia longior et laxior; legumina samaroida, ovata-oblonga ad oblonga.

Mostly climbers or scandent shrubs, rarely trees. *Leaflets* smaller and more in number. *Inflorescence* longer and laxer. *Pods* samaroid, ovato-oblong to oblong.

Type : *Dalbergia pinnata* (Lour.) Prain (= *Derris pinnata* Lour.).

Critical studies on some of the Asiatic species of *Dalbergia* have enabled the author to effect the following changes in their status and nomenclature.

Dalbergia millettii Benth. var. ***mimosoides*** (Franch.) Thoth. stat. et comb. nov. *D. mimosoides* Franch. Pl. Delavay 57. 1890; Prain in Journ. Asiat. Soc. Beng. 70: 56. 1901 et in Ann. Roy. Bot. Gard. Calc. 10(1): 49. 1904; Kanjilal *et al.* Fl. Assam 2: 106. 1908. *D. millettii* Prain in Journ. Asiat. Soc. Beng. 66: 446. 1897, *non* Benth. (1860).

Type : Tapin-tze, Yunnan, China, 1855, Delavay 1982 (P).

Distrib. : India (Assam, Sikkim) : China.

D. ovata Grah. ex Benth. var. ***glomeriflora*** (Kurz) Thoth. stat. et comb. nov. *D. glomeriflora* Kurz in Journ. Asiat. Soc. Beng. 42: 70. 1873; Baker in Hook. f. Fl. Brit. Ind. 2: 236. 1876; Kurz, For. Fl. Brit. Burma 1: 345. 1877; Prain in Journ. Asiat. Soc. Beng. 70: 50. 1901 et in Ann. Roy. Bot. Gard. Calc. 10(1): 77. 1904.

Type : Prome, Burma, Kurz 211 (CAL).

Distrib. : Burma (Prome); endemic.

D. pinnata (Lour.) Prain var. ***acaciaefolia***

(Dalz.) Thoth. stat. et comb. nov. *D. acaciaefolia* Dalz. in Kew Journ. Bot. 2: 37. 1850; Benth. in Pl. Jungh. 1: 250. 1852; Prain in Journ. Asiat. Soc. Beng. 70: 48. 1901 et in Ann. Roy. Bot. Gard. Calc. 10(1): 68. 1904; Gamble, Fl. Pres. Madr. 2: 282. 1918. *D. tamarindifolia* Roxb. var. *acaciaefolia* (Dalz.) Baker in Hook. f. Fl. Brit. Ind. 2: 235. 1876; Cooke, Fl. Pres. Bomb. 1: 399. 1902.

Type : Concan, Law s.n. (K, Isotype CAL).

Distrib. : Western and Southern India.

D. rimosa Roxb. var. ***foliacea*** (Wall. ex Benth.) Thoth. stat. et comb. nov. *D. foliacea* Wall. ex Benth. in Miq. Pl. Jungh. 1: 255. 1852 et Journ. Linn. Soc. 4 (Suppl.): 41. 1860; Baker in Hook. f. Fl. Brit. Ind. 2: 232. 1876; Kurz, For. Fl. Brit. Burma 1: 347. 1877; Prain in Journ. Asiat. Soc. Beng. 70(2): 43. 1901 et in Ann. Roy. Bot. Gard. 10(1): 54. 1904; Kanjilal *et al.* Fl. Assam 2: 108. 1938.

Type : Amherst and Maulmyne, 1927, Wall. Num. List. No. 5856A (Lectotype selected, CAL).

Distrib. : Burma (Ava, Martaban, Pegu, Shan Plateau and Tenasserim).

The taxon has so far been reported only from Burma but Gamble (1896) enumerated this plant from Darjeeling district, North Bengal. It was, however, pointed out by Cowan (1929) later that Gamble's *D. foliacea* is actually *D. rimosa*.

In CAL herbarium there is one sheet from Bengal, supposed to have been collected by Helfer in 1936-38. It is highly doubtful whether Helfer collected this plant from Bengal as most of his collections were from Burma and Andamans. Even his Andaman

collections got mixed up with Tenasserim collections of Burma and vice-versa. In all probability this particular sheet might have been collected from Tenasserim but wrongly labelled as 'Bengal'.

D. yunnanensis Franch. var. **collettii** (Prain) Thoth. stat. et comb. nov. *D. collettii* Prain in Journ. Asiat. Soc. Beng. 66 : 445. 1897 pp. et in Ann. Roy. Bot. Gard. Calc. 10(1) : 53. 1904. *Dalbergia* sp. Collett & Hemsley in Journ. Linn. Soc. 28 : 50. 1891.

Type : Kawlo, 1666 m, Shan Hills, April 1988, *Collett* 591 (Lectotype selected, CAL).

Distrib. : Burma (Shan Hills); endemic.

The pod which was unknown so far is described here for the first time, based on a collection of *Lace* 5808.

Pods ovate-oblong, indehiscent, 6.0×2.2 cm,

shortly stalked, acute, narrowed at base, glabrous, 1-seeded, distinctly reticulated opposite the seed.

Specimen examined : Burma : Maymyo Plateau, 1200 m, May 1912, *Lace* 5808 (CAL).

DALBERGIA LANCEOLARIA COMPLEX

Dalbergia lanceolaria Linn. f. and *D. paniculata* Roxb. are closely related species with many characters common among them and it is hardly justifiable to keep them as distinct species. *D. assamica* Benth. is merely the eastern himalayan representative of *D. lanceolaria*. Similarly *D. hemsleyi* Prain and *D. maymyensis* are the burmese representatives of *D. paniculata*.

A critical analysis of the above taxa based on the study of extensive collections has led the author to merge *D. paniculata*, *D. assamica*, *D. hemsleyi* and *D. maymyensis* under *D. lanceolaria* but in different ranks as evidenced by the following keys.

KEY TO THE SUBSPECIES OF *D. LANCEOLARIA*

Leaflets 7-17; vexillum with callosities at its base; inflorescence rachis puberulous, rarely pubescent	...	subsp. <i>lanceolaria</i>
Leaflets 3-13; vexillum without callosities at its base; inflorescence rachis pubescent	...	subsp. <i>paniculata</i>

A key to the varieties of subsp. *lanceolaria* *D. assamica* Benth. as a variety under the will explain the reasons for the reduction of former.

Flowers bluish-white to pink; pods lanceolate, 5.0-14.5 cm, 1-4-seeded	...	var. <i>lanceolaria</i>
Flowers white; pods oblong, 4.0-7.5 cm, 1-2-seeded	...	var. <i>assamica</i>

D. lanceolaria Linn. f. subsp. **lanceolaria** var. **assamica** (Benth.) Thoth. stat. et comb. nov. *D. assamica* Benth. in Miq. Pl. Jungh. 1 : 256. 1852 et Journ. Linn. Soc. 4 (Suppl.) : 45. 1860 pp.; Baker in Hook. f. Fl. Brit. Ind. 2 : 235. 1876; Prain in Journ. Asiat. Soc. Beng. 70 : 52. 1901 et in Ann. Roy. Bot. Gard. Calc. 10(1) : 89. 1904; Kanjilal *et al.* Fl. Assam 2 : 102. 1938; Ohashi in Hara, Fl. East. Himal. 148. 1966.

Type : Assam (without specific locality) *Griffith* (Lectotype selected, K).

Distrib. : India (Assam, W. Bengal, Sikkim, Arunachal Pradesh); Bhutan; Bangladesh.

D. lanceolaria Linn. f. subsp. **paniculata** (Roxb.) Thoth. stat. et comb. nov. *D. paniculata* Roxb. Corom. Pl. 2 : 8 t. 114. 1798; Benth. in Journ. Linn. Soc. 4 (Suppl.) : 45. 1860; Baker in Hook. f. Fl. Brit. Ind. 2 : 236. 1876; Prain in Journ. Asiat. Soc. Beng. 70 : 51. 1901; Cooke, Fl. Pres. Bomb. 1(2) : 399. 1902; Duthie, Fl. Upper Gang. Pl. 1 : 265. 1903; Prain in Ann. Roy. Bot. Gard. Calc.

10(1) : 87. 1904 ; Gamble, Fl. Pres. Madr. 2 : 383. 1918 ; Haines, Bot. Bih. Or. 3 : 295. 1922. *D. nigrescens* Kurz Pegu Rep. App. A. 48. B. 45. 1875 et in Journ. Asiat. Soc. Beng. 45 : 279. 1876 et For. Fl. Brit. Burma 1 : 346. 1877.

Type : Plate 114 of Roxb. Corom. Pl. 1798 (Lectotype selected, CAL).

Distrib. : India (Kumaon, Rajasthan, Gujarat, Madhya Pradesh, Maharashtra, Karnataka, Orissa, Andhra Pradesh, Tamil Nadu, Kerala) ; Burma.

KEY TO THE VARIETIES OF SUBSP. *PANICULATA*

- 1a. Leaflets 7-13, turning black after drying ; pods ovate to ovato-oblong, 4-7 cm long ... var. *paniculata*
 1b. Leaflets 3-10, not turning black after drying ; pods oblong to lanceolate, up to 10 cm long :
 2a. Leaflets 5-9 ; pods oblong ... var. *hemsleyi*
 2b. Leaflets 3-10 ; pods lanceolate ... var. *maymyensis*

D. lanceolaria Linn. f. subsp. **paniculata** var. **hemsleyi** (Prain) Thoth. stat. et comb. nov. *D. hemsleyi* Prain in Journ. Asiat. Soc. Beng. 66 : 450. 1897 et in Ann. Roy. Bot. Gard. Calc. 10(1) : 94. 1904.

Type : Myingyin, Burma, Nov. 1890, Prazer s.n. (Lectotype selected, CAL).

Distrib. : Burma (Shan Hills) ; Thailand.

D. lanceolaria Linn. f. subsp. **paniculata** var. **maymyensis** (Craib) Thoth. stat. et comb. nov. *D. maymyensis* Craib in Kew Bull. 390. 1912.

Type : Maymyo Plateau, 1200 m, Burma, July 1908, Lacey 4134 (Lectotype selected, CAL).

Distrib. : Burma (Maymyo Plateau) ; endemic.

The number and shape of leaflets, colour of flowers, shape and size of pods of *D. stocksii* Benth. and *D. melanoxydon* Guill. & Perr. are identical as could be seen from a study of not only the type and authentic collections of both the taxa but also on the examination of a number of specimens present in different herbaria. *D. stocksii* Benth. (1860) from Concan is therefore reduced to a synonym of *D. melanoxydon* Guill. & Perr., an earlier validly published name (1830).

D. melanoxydon Guill. & Perr. Pl. Senegamb. Tent. 227. t. 33. 1830-33 ; Benth. in Journ. Linn. Soc. 4 (Suppl.) : 24. 1860. Prain in Journ. Asiat. Soc. Beng. 70 :

59. 1901 ; Cooke, Fl. Pres. Bomb. 1 : 396. 1902 ; Prain in Ann. Roy. Bot. Gard. Calc. 10(1) : 46. 1904 ; Hutch. & Dalz. Fl. Trop. Afr. 1 : 515. 1954 (ed. 2). *D. stocksii* Benth. in Journ. Linn. Soc. 4 (Suppl.) : 42. 1860

syn. nov. ; Baker in Hook. f. Fl. Brit. Ind. 2 : 234. 1876 ; Talbot, For. Fl. Bomb. Pres. Sind. 1 : 426. 1907.

Distrib. : India (Maharashtra, Karnataka, Kerala, Tamil Nadu — cultivated) ; Tropical Africa (Senegal, Aethiopia, Abyssinia, Mosambique).

New records of the following species have extended their range of distribution.

D. sericea G. Don has so far been recorded from N. W. Himalaya, Uttar Pradesh, West Bengal and Sikkim. Recent collections of this species from Nagaland and Arunachal Pradesh constitute new records for these areas and thus extend its range of distribution to extreme north-east Himalaya.

Specimens examined : Nagaland, Aka Hills, 1934, Bor 15711 (ASSAM) ; Arunachal Pradesh, Kalaktang, Kameng district, May 1958, Panigrahi 15483 (ASSAM) ; Rahury, 2073 m, Kameng district, May 1957, R. S. Rao 7443 (ASSAM).

D. sissoo Roxb. ex DC. grows from plains to an elevation of 300 m in Eastern Himalayas, and 1000-1300 m in North-West Himalayas and Baluchistan. In other places it

grows either cultivated or planted by the Forest Department. It grows gregariously in alluvial forests, characteristic of gravelly river-beds in the sub-Himalayan tract.

In Calcutta herbarium there is one specimen from Maymyo district, Burma, collected in 1920-25 and doubtfully marked '*D. sissoo*'. This on closer examination was found to be *D. sissoo* and so its occurrence in Maymyo district constitutes a new record for Burma.

Specimens examined: Burma, Moly Lasio road, 1116 m, Maymyo district, *Nighau* 547 (CAL); Ahlone (Monywa) Chindwin river, July 1916, *G. Rogers* 1088 (cultivated, CAL).

Opinions differ as to the native home of *D. sissoo*. It is rather difficult to assess the exact locality where it is truly wild. DeCandolle (1825) and Roxburgh (1832) considered it to be a native of Bengal. Stewart (1869) regarded it to be indigenous to the Kachi forests, Panjab on the islands of Indus opposite to Bannu. Brandis (1874) remarked that it was a native of sub-Himalayan tract. Watt (1890) believed it to be native of sub-Himalayan belt. Lace remarked on one of his collections (Baluchistan, *Lace* 3497-CAL) that the plant was indigenous to Harnai, the Mehrab-Tangi and up to Sharigh (1300 m) in Baluchistan. Similarly Mann observed on one of his collections from Assam (Goalpara — *Mann* 36 — ASSAM) that the occurrence of *D. sissoo* in the eastern Duars of Goalpara district was natural. Such are the varied opinions/reports by earlier workers. From a perusal of the above statements it is clear that *D. sissoo* is indigenous to the gravelly river-beds of the sub-Himalayan tract extending from Assam to Panjab. This was also the view of D. Prain (1904) to which the author agrees in full.

The pod characters of *Dalbergia burmanica* Prain, *D. congesta* Grah. ex Wt. & Arn. and *D. lacei* Prain which were unknown so long are given here for the first time, based on recent collections.

D. burmanica Prain in Journ. Asiat. Soc. Beng. 66: 448. 1897.

Pods indehiscent, narrowly oblong, strap-shaped, 5.0-6.5 × 1.2-1.4 cm, yellowish-brown, entire, rounded at both ends, smooth and glabrous, 1-2-seeded.

Specimen examined: Burma: Thaungvin valley, 600 m, Amherst district, March 1908, *Lace* 4734 (CAL).

D. congesta Grah. ex Wt. & Arn. Prodr. Fl. Pen. Ind. Or. 265. 1834.

Pods oblong, 5.0 × 1.4-1.5 cm, reddish brown, thin flat, entire, rounded at apex and mucronulate, shortly but distinctly stalked, glabrous, 1-2-seeded, reticulated against the seeds; seeds reniform, brownish-black.

Specimen examined: India: Nilgiris, Kotagiri, 1333 m, June 1916, *Sedgewick* 1343 (BLAT).

D. lacei Prain in Kew Bull. 58. 1907.

Pods indehiscent, narrowly oblong, 3.0-5.0 × 1.0-1.2 cm, flat, strap-shaped, acute at apex, narrowed at base into a long stalk, glabrous, more or less smooth, 1-2-seeded.

Specimens examined: Burma: Saingvane reserve, North Loungoo district, *Be Pe* 9496 (DD); Haka, 634-834 m, Apr. 1938, *Dichason* 7469, 7643 (LE).

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