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PRESERVATION OF DALBERGIA L.f. IN KERALA BY ESTABLISHMENT OF A GERMPLASM BANK

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Summary

This is the final report of the project Preservation of Dalbergia L.f. (Fabaceae) in Kerala by establishment of a germplasm bank sponsored by the Department of Environment and Forests, Government of India. In this study, a total of 18 species and one variety of the genus Dalbergia is reported from the State. In the introductory part of this report, information on the taxonomic background of the genus is given in addition to details on geographical distribution, endemism, cytology, palynology, phenology, uses and conservation status of various taxa known from Kerala with specific recommendations on those which deserve protection measures for their continued survival. The taxonomtc part constitutes a detailed systematic account of all the 19 taxa of the genus recorded In Kerala with their up-to-date nomencln-ture, revised descriptions, illustrations, distribution maps and details of distribution. Further, to facilitate easy identification of each taxon, a dichotomous key also is provided at the species level in the beginning of the systematic part.

I. INTRODUCTION

1.1. History of the genus

Carl von Linnaeus filius (1781) erected the genus Dalbergia L.f. and named it after the Sweedish botanists Nile and Carl Gustav Dalberg, to accommodate two species namely D. lanceolaris L.f. from Sri Lanka and D. monelaria L.f. from Surinam. But prior to younger Linnaeus (1781), P. Browne (1756) distinguished the genus Amerimnon P. Br. and Dennstedt (1818) in his bibliography to van Rheede's Hortus Halabaricus (1678–1703) identifLed Rheede's plate Ana-mullu as Amerimnon horridum Dennst. which is a Dalbergia species. The generic name Amerimnon was subsequently used instead of Dalbergia by Persoon (1806) and A.P. de Candolle (1825). Soon after, it was realised that Amerimnon is congeneric with Dalbergia and there were proposals by C.E.O. Kuntze (1891) and others to substitute Dalbergia by the earlier valid name Amerimnon along with the genus Ecastaphyllum P.Br. (1756) to accomodate both the samaroid and nummular fruited species known to belong to the genus Dalbergia at present. However this propsal never gained support from taxonomists of that time, reason being that it was partial in concept and hence incorrect. Acouroa Aublet (1780) is yet another earlier name for Dalbergia which is also not accepted because of the fact that it includes only those species of the genus with nummular pods whereas members of the genus Dalbergia possess both nummular and somaroid types of fruits.

Drakensteinia Neck. (1790), Endespermum B1. (1823), Someonotis Schott. (1829), Hecastophyllum HR &K. (1834), Miscolobium Vog. (1837), Triptolemea Mart.(1837), Leiolobium Renth. Podiopetalum Hochst. (1841) and Drepanocarpus Kurz (1875) are all later synonyms of the generic name Dalbergia. Being published subsequent to Species Plantarum Supplementum (1781) of younger Linnaeus wherein the name Dalbergia was validly published, such names deserve no consideration as far as the valid name of the genus is concerned. Presently the generic name Dalbergia is included in the list of conserved names

(Ricket & Stafleu,1959) to warrant any further change due to the presence of those earlier names Acouroa, Amerimnon and Ecastaphyllum.

1.2. Review of literature

Prior to younger Linnaeus (1781) who identified the genus Dalberglavan Rheede (1678–1703) dealt with two species of it from 'Malabar region of Peninsular 'India, namely Karin-tagera(Hort. Malab. 6:45.t.25.1688)and Ana-mu1 l u (Hort.Malab: 8. 73.t.40.1688) which recentlY Thothathci and Nair (1981) tdentified as D. candenatensis (Dennst.) Prain and D. horrida (Dennst.) Mabberley,respectively. As mentioned earlier, in the begining of 19th century generic names like Amerimonon,Ecastaphyllum and Acouroa were also widely used to include various Dalbergia species. Towards the close of eighteenth century when the genus was validly published, there were only two species known, namely D. lanceolaria and D. monelaria. Subsequently,Roxburgh (1798) dealt with the genus as occurring in the Coromandel coast of Penninsular India and added three more species, i.e.D.latifolia - Roxb.,D.rubiginosa Roxb.and D. volubilis Roxb. to the original list. Further, in his work Hortus Benghalensis (1814), Roxburgh enumerated 21 species of the genus which were either grown in Calcutta Botanic Garden or represented as herbarium specimens in the Calcutta Herbarium (CAL). However, out of them five species later turned out to belong to the genus Derris Lour. and one to Ougeinia Benth. Species of Dalbergia enumerated in Roxburgh'e Hortua Benghalensis (1814) and Flora Indica (1832) are D. latifolia Roxb., D. sissoo Roxb., D. emarginata Roxb., D.frondosa Roxb.,D.paniculata Roxb., D. zeylanica Roxb., D. tamarindifolia Roxb., D. stipulacea Roxb., D. rimosa Roxb., D. renifo–rmis Roxb.,D parviflora Roxb., D.ferruginea Roxb., D. rubiginosa Roxb., D. spinoea Roxb. and D. volubilis Roxb.At least 10 species among them were new and hence these two publications of Roxburgh (1814, 1832) made substantial contribution to our present knowledge of the genus tn India. 'In fact, A.P. de Candolle (1825) also dealt with all those species from India which Roxburgh (1814, 1832) enumerated and the only addition he made there was Dalbergia timorensis DC. which is nothtng but D. lanceolaria already known.

Nathaniel Wallich (1832) added eight species to the then existed list of Indian Dalhergias namely D. ovsta Grah., D. foliacea Wall., D. cans Grah., D. cultrata Crah., D. rostrata Ctsh., D.stipulacea Wall., D. torta-Grah. and D. sissoides Grah. Wallich's (1832) 1ist also included Dalbergia ougeinensis Roxb. which is the present Ougelnla ougeniensis (Roxb.) Hocht. and also D. robusta Roxb. and D. scandens .Roxb. which are spectes of Derris. Wight and Arnott (1834) eventhough maintained Derris scandens(Roxb.) Renth. as a Dalbergia, clearly circumscribed the genus and also for the first time subdivided it into two distinctsubgenera namely, Brachypterumand Eudalberg ia, where in Derris scandens las Dalbergia scandens Roxb.) solely represented the subgenus Brachypterum and all other spectes at present known to belong to the genus Dalbergia were classified under the subgenus Eudalbergia.

Substantial contribution to our knowledge of the genus was made by George Rentham (1851, 1860). In 1851, Bentham reduced the then independantly known genera Endespermum B1. (Malayan) Podiopetalum Hochst. (African) and Triptolemea Mart. (American) to Dalbergia for the first time, wherein he subdivided the genus into three sections namely Sissoa, Selenolobium and Dalbergaria, based on stamen and pod characters. This classification of Bentham (1851) was later followed by Miquel (1852) who attempted to study the genus for Malaya. In 1860, when Rentham brought out the revision of the tribe Dalbergieae, he divided it into three sections namely Pterocarpeae, Lonchocarpeae and Geoffrayeae and kept the genus Dalbergia under the section Pterocarpeae. Further in the 'technical synopsis' of the genus, Dalbergia was subdivided into six sections namely Triptolemeae Americanae, Triptolemeae Gerontogeae, Sissoae Americanae, Sissoae Gerontogeae, Dalbergiariae Cerontogeae and Selenolobia and'enumerated 64 species from the warmer parts of Asian, African and American continents. The major conceptual advance which Bentham (1860) put forth this study was that the pod characteristics which were formerly much relied upon in identifying the genus Dalbergia from other legumes was proved to be of little diagnostic value.

In 1876, Kurzdealt with the genus for Burma and in that he failed to recognise the section Triptolemea of Bentham (1860) and distributed various species under two subgenera i.e. Dalbergaria and Sissoa and the section Selenolobfun of Bentham (1860) was taken to the genus Drepanocarpus. Raker (1876) also shared the concept of Kurz (1876) and accordingly enumerated various species of the genus found in th former British 'India. However these two systems basically reflected Bentham's (1860) and Miquel's (1855) concepts on the classification of the genus.

Taubert (1894) in his world monograph of the family Leguminosae, reduced the genus Ecastaphgllum to Dalbergia and kept it under the section Selenolobium. Further he rejected Baker's (1876) concept of treating Triptolemea and Sissoa as one and the same.

In the beginning of 20th century notable contribution to our knowledge of the genus for Asia was made by David Prain (1897, 1901, 1904). In 1901,Prain enumerated 74 species of Asiatic and Malaysian species of the genus with descriptions of a few new taxa like D. beccarii Prain from Malaya, D. albertesii Prain from New Guinea, D. curtesii Prain from Malaya, D. multiflora Heyne var. glabrescens Prain, D. coromandeliana Prain and D. malabarlca Prain from South India and D. benthamii Prain from Hongkong. Here, there was no attempt to classify the genus nor a key wa's provided to identify various species. However his illustrated work of 1904 dealing with species of Dalbergia in South-East Asia is of a semimonographtc nature which incorporated all available taxonomic knowledge on the genus for the region and also proposed a revised classification of it after evaluating the conccepts of Bentham (1870), Kurz (1876) and others. Here, Prain (1904) divided the genus into two subgenera namely Sissoa with sections Triptolemea and Podiopetalum, and Amerimnon with sections Endespermum, Miscolobium and Dalbergaria.

Apart from enumerations in regional Floras Like Cooke (1903), Bourdillon (1908), Rama Rao (1914),Gamble (1918) and others, the remaining part of this century is practically devoid of any

significant study on the genus for this part of the country. However several pub1ications of Thothathri (1971, 1972a, 1972h, 1973, 1975, 1976, 1978, 1983a, 1983b), Thothathri and Nair (1981) end Nair(1986) described quite a few new taxa or elucidated the identity and distribution of certain others. Hutchinson's (1967)treatise of the. genus in its present circumscription and synonymy is yet another contribution at the generic level after that of Bentham and Hooker (1862).

1.3.Systematic position

The genus Dalbergia belongs to the family Fabaceae, subfamily Papilionoideae and solely represents the tribe Dalbergieae in Hutchinson's (1967) account of the family. When compared to earlier treatments like that of Bentham (1860) and Bentham & Hooker (1863) wherein there were 20–25 genera in the tribe, this concept of Hutchinson (1967) appears to be rather narrowly conceived. Rut, in fact Hutchinson (1967) distributed all other genera other than.Dalbergia formerly included in the tribe to three different tribes, viz. Pterocarpeae, Milletieae and Geoffroeae. Further in their systematic position they were all kept close to Dalbergieae and hence to the genus Dalbergia, thereby not affecting their relative phylogenetic positions, often involved in such tribal separations.

In general, members of the tribe Dalbergieae are characterised by imparipinnate leaves and flowers having the two upper calyx lobes broadest, keel petals connate at apex, uniform didymous anthers which are not versatile, glabrous style and fruits of the samaroid and indehiscent type. When a critrical evaluation of the characters that differentiate the tribes Dalbergieae, Pterocarpeae, Milletieae and Ceoffroeae was done, It became evident that the Classial concept of Rentham (1860) and Bentham and Hooker (1862) reflects their natural affinities better, eventhough from a classifactory point the taxonomic groups as recognised by Hutchinson (1967) with regrad to the distribution of various genera of the former composit tribe Dalbergieae is more or less

I.4. Endemism and geographical range of distribution

The genus Dalbergia with more than 120 species in the world is well represented both in the tropics and subtropics and also South-east temperate Asia and North Australia (Hutchinson, 1967). Within the South-east Asian region, Tndia is the abode for about **30** species which comes to more than 30% of the total number of South-east Asian Dalbergias.

During the present study, 18 species and one variety of the genus has been recorded from Kerala. They are D. acaciifolia Dalz., D. beddomei Thoth., D. benthamii Prain, D. candenatensis (Dennst.) Prain, D. congesta Grah. ex Wt. et Arn., D. horrlda (Dennst.) Mabberly ,D horrida var. glabrescens (Prain) Thoth. et K.K.NNair, D. 1anceolaria L.f.,D latifolia Roxb., D. malabarica Prain, D. melanoxylon Guill. et Perr., D. paniculata Roxb., D. pseudo-sissoo Miq., D. rubiginosa Roxb., D.sissoides Grah. ex Wt. et Arn., D. sissoo Roxb., D. spinoea Roxb., D. travancorlca Thoth. and D. volubilie Roxb. Among them, species like D.candenatensis and D. melanoxylon are transcontinental in their geographical range, i.e. the former in Asian and Australian continents and the Latter in African countries and also in India (Fig. **1).** But a majorityof the species found in Kerala are South-east Asian in their distribution as exempliffed by spectes like D. benthamii (South India, Hongkong), D. congesta (India, Burma, Indo-China), D.latifolia(Indian suhcontinent, Indo-China), D, pseudo-si ssoo (India, Sri Canka, Borneo, Celebes, Java, Malaysia), D. rubiginosa (India, Burma, Indo-China), D spinosa (India, Indo-China, Philippines) and **D.** volubilis (India, Burma Indo-China). This group of species represent about 40% of the Dalbergia spectes present in Kerala. Among the group of South-east Asian Dalbergias, D. benthamii deserves special mention. This species so far kno n only from Hongkong is reported. from Kerala for the first time (Fig. 2) and there exists no record of tts occu-rrence anywhere in between these two far away regions of the contfnent.

Representation of Peninsular Indian endemics of the genus in Kerala is also very high and as many as 7 taxa accounting for about 35% of the total number of species in the State belong to thts group (Fig- 3). They are D, acaciifolia, D. beddomei, D. horrida, D. horrida var. glabrescens, D. malabarica, D. sissoides and D. travancorica. Among them D. beddomei and D. travancorica are highly endemic, the former confined to Silent Valley in North Kerala and the latter to the hills of South Kerala (Travancore hills). With regard to D. sissoides, eventhough it is noted to be present in Java by Prain (1904), it has not been tncluded in the recent Flora of Java by Rakerand Bakhulizen Jr. (1964) and hence considered here as endemic to Peninsular India, The remaining two speciesnamely D. lanceolaria (india, Sri Lanka) and D. sissoo (India, Burma, Pakistan, Afghanistan and Baluchistan) are found only in the Indian subcontinent.

Within Kerala, D. latifolia, D. horrida, D. sissoides and D. volubilis are distributed almost throughout, whereas the remaining species are restricted to very few localities. Rut D. rubiginosa, eventhough very restricted in its distribution in the State is recorded both from the southern and northern most parts namely Kotur in Trivandrum district and along the sides of Chandragiri river at Bevinji in the Kasaragod district. Another notable feature in the distribution of Dalbergia species in the State is the lack of species concentration characteristic to any region and those species of limtted phytogeographical range are rather scattered throughout the State in almost equal proportions.

1.5. Characters

I. 5.1. Vegetative parts

All examined species from the State are either trees or woody climbers. Most of the lianas possess thorns, hooks or curled branchlets that Facilitate their climbing or straggling habit. Species like D. horrida, D. latifolia, D. melanoxylon, D. paniculata and D. sissoo are recorded to produce root nodules (Allen & Allen,

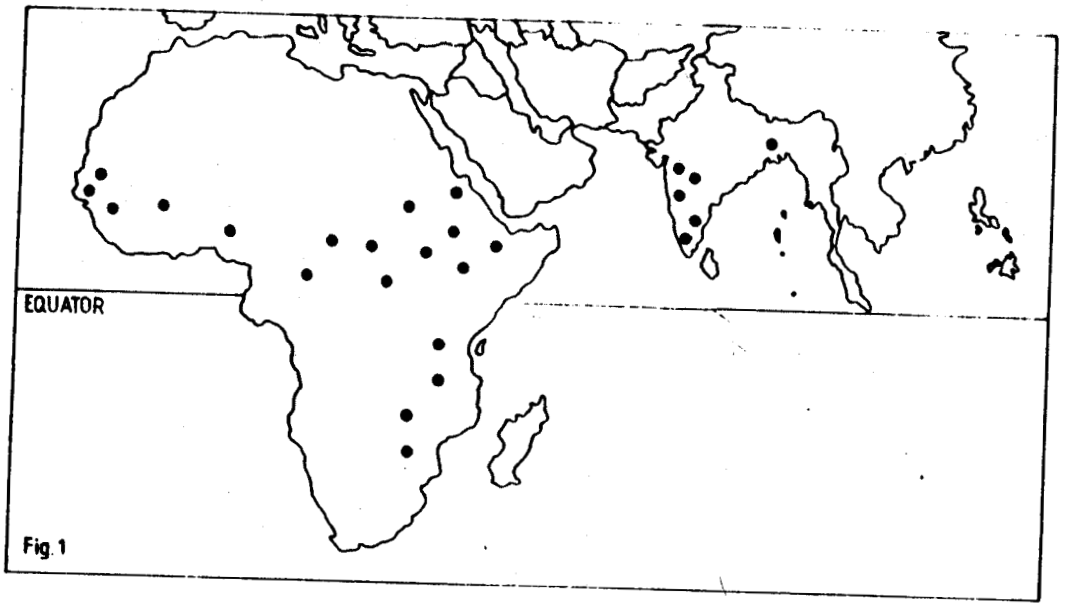


Fig. 1

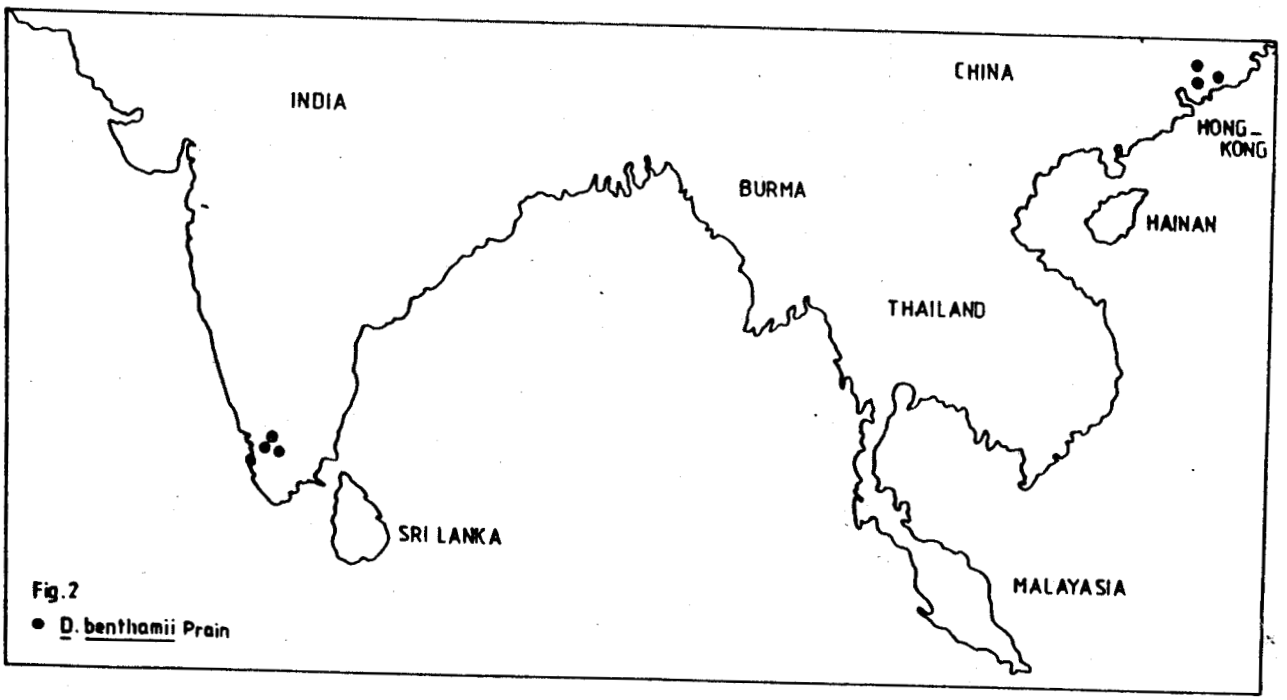


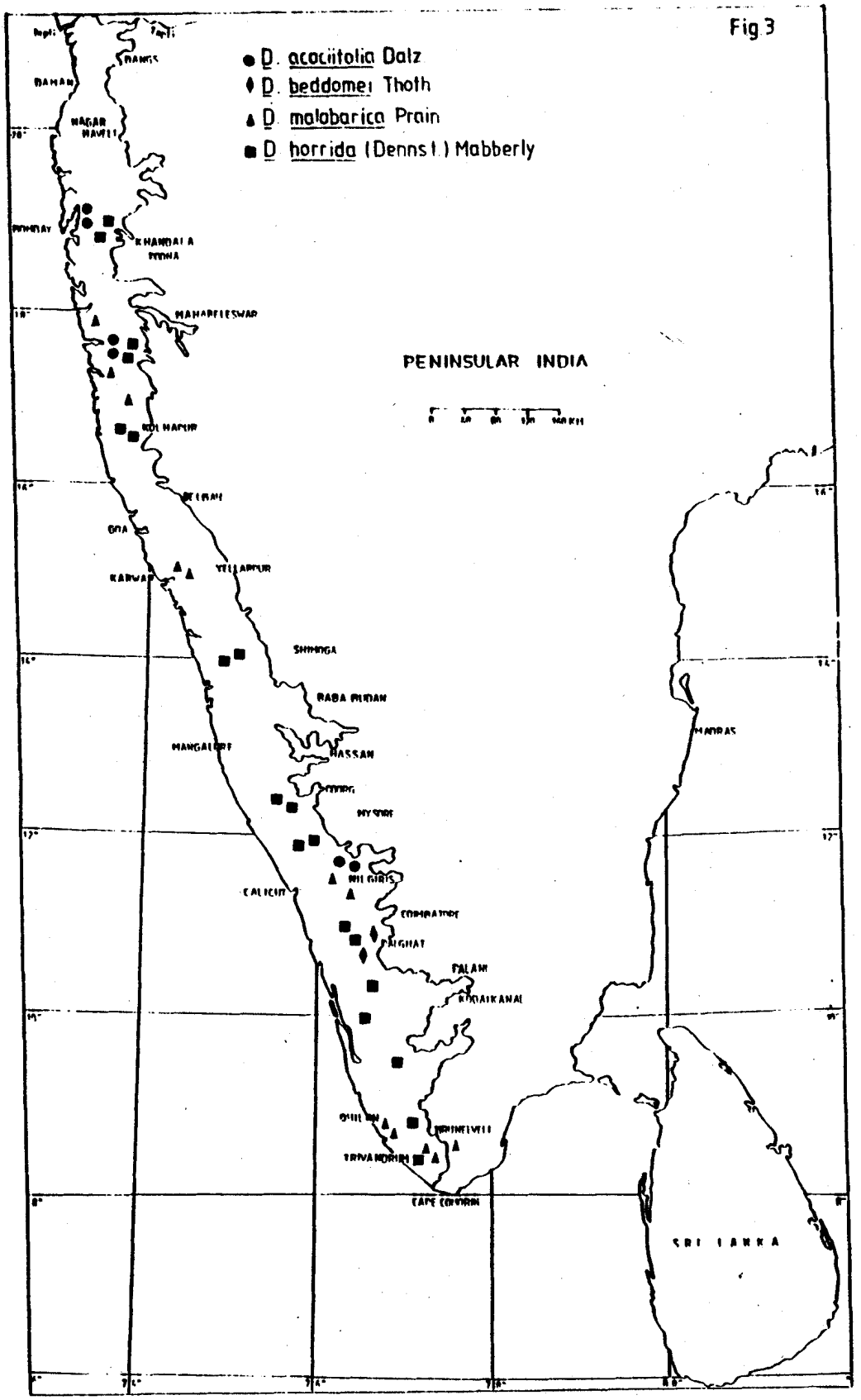
Fig. 2

• D. benthamii Prain

Leaves are compound and imparipinnate with somettmes as many as 51 leaflets per leaf as in the case of D. acaciifolia. Usually it varies from 5-11 per leaf, eventhough rarely 3 leaflets are also recorded in D. latifolia or 2 or even eolitary as recorded by Prain (1904) in the case of D. pseudo-sissoo. The rachis which is uniformly pulvinate is either glabrous orpubescent to hairy in various degrees. Petiolules are either distinct (0.2-0.4 cm long) or reduced to a maximum, rendering the leaflets almost subsessile as seen in D. acaciifolia and they are either glabrous or pubescent. In all cases they are much shorter than the leaflets and are pulvinate. Stipules are mostly very cauducous or are rarely persfstent as inthe case of D. travancorica where they are prominent measuring to about 0.7–0.9 cm in length, oblong-acuminate and pubescent. Stipels are absent in all the species dealt with here.

Leaflets are invariably alternate on the rachis and they are disposed at almost equal intervals or as pairs with a larger distance between two such pairs. The shape of the leaflets show maximum variation from linear to ovate, cuneate–ovate, elliptic, broadly–ovate, suborbicular, elliptic–oblong, obovate, ovate–oblong or ovate–lanceolate (Fig. 4). However, within a species variations are always between narrower limits. The leaf margins are always entire and the apex and base vary in shape depending upon the species. Secondary nerves are distinct in many cases like that of D. latifolia and D. sissoo whereas In others only the midrib is clear. In texture, coriaceous leaflets are often characterlstlc of smalt–leaved spectes like D. acaciifolia and D malabarica eventhough species like D. beddomef with comparatively larger leaflets also possess coriaceous leaflets. Varying degrees of pubescence and also glaucous and glabrous nature may be noticed in different species, eventhough this character is quite uniform within a species. Kothari and Shah (1974) studied the stomata of D. lanceolaria and D. latifolia and recorded that leaflets of those spectes are hypostomatic whereas in the case of D. sissoo, D volubilis and D. spinosa it is amphfstomattc with a few stomata near the vein regions on the adaxial surface. Electron microscopic studies conducted during this study also ehowed that stomata are rather unifo-

Fig 3


● D. acociitolia Dalz
♦ D. beddomei Thoth
▲ D. malabarica Prain
■ D. horrida (Dennst.) Mabberly
PENINSULAR INDIA
DAMAN
NAGAR HAVELI
BOMBAY
KHANDALA
PUNA
MAHABLESWAR
KOLHAPUR
GOA
KARWAR
YELLAPUR
SHIMOGA
MANGALORE
HASSAN
MYSORE
CALICUT
NILGIRIS
COIMBATORE
PALAKKAD
KODAIKANAL
TIRUNELVELI
TRIVANDRUM
CAPE COMORIN
MADRAS
SRI LANKA

rmly distributed without any pattern in **D.** latifolia and **D.** sissoides, eventhough they differ in their appearence (Fig. 5). Eglandular hairs with a basal cell, a terminal cell and 1–3 stalk cells are also present on the leaf surface of D. lanceolaria, D. melanoxylon, D. paniculata and D. sissoo, as recorded by Kothari and Shah (1974).

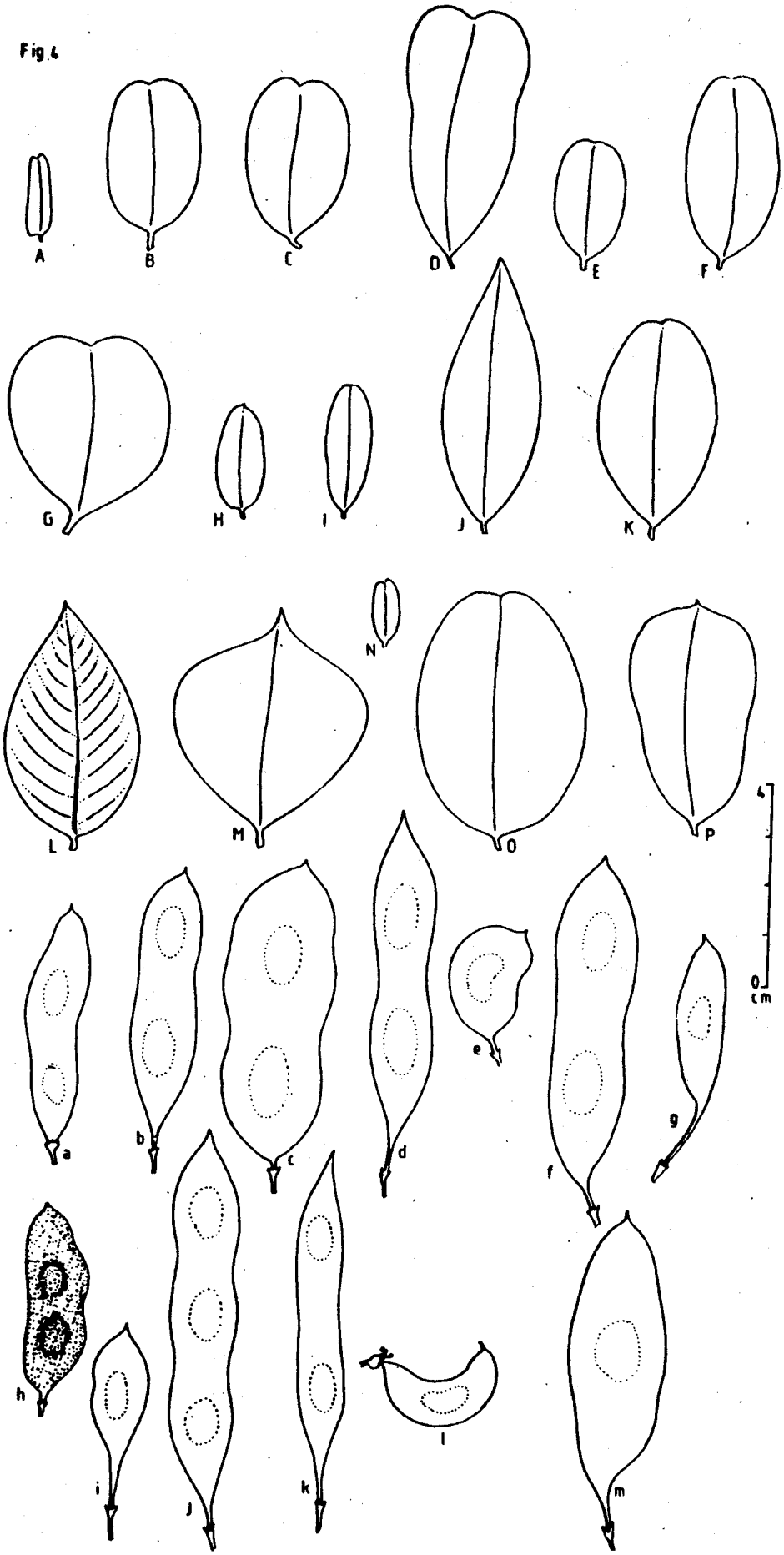
1.5.2. Inflorescence

Flowers are produced either in terminal or axillary panicles with.racemose, corymbose or cymose branches varying much in their size. 'If congested inflorescence is characteristic of species like D. congests, **D.** malabarica, **D.** rubiginosa, D. spinosa and D. candenatensis, flowers are borne on lax branches in D. acaciifolia,D.paniculata, **D.** sissoides and so on. Further a subsecund arrangement of flowers is often seen in species like D. melanoxylon and D. sissoo and the inflorescence can be few flowered also as in the case of D. benthamii. Flowers are often white **or** rarely pinkish, bluish **or** yellowish and In D. latifolia and D. sissoides they are scented also. Bracts and bracteoles are present in almost all species studied and they are either minute and cauducous or upto 0.4 x 0.2 cm and 0.3 x 0.3 cm in size respectively, ovate, pubescent and persistent as noted in D. beddomei. Bracteoles often cover the lower third of the calyx tube in species like D. acaciifolia, D. congesta and D. rubiginosa.

1.5.3.Flowers

All species under the genus possess papilionaceous flowers charcteristic of the family, measuring 0.3-0.7 in cmlength. Calyx tube is campanulate, gibbous as **in** the case of D. acaciifolia or not, 5-teethed, the upper two teeth being subconnate and the lowest lanceolate and longer. Calyx–teeth vary in shape from triangular to obtuse, ovate or lanceolate. The calyx as a whole may be rusty or pubescent externally as in the case of **D.** malabarica or it may be typically glabrous. Corolla comprises of an odd standard petal (vexillum) and the paired wing and keel petals. Vexillum is mostly clawed, ovate, orbicular or oblong, mostly reflexed and markedly auriculate at the

Fig. 4

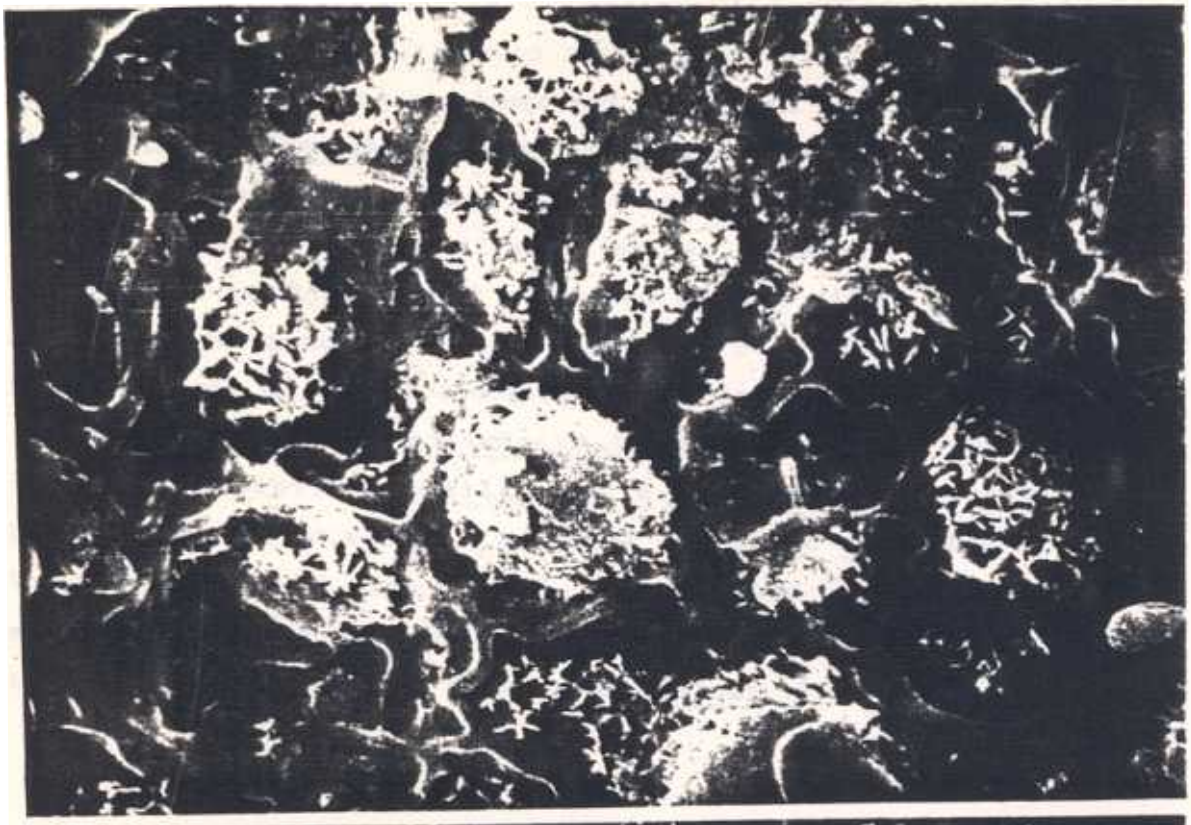


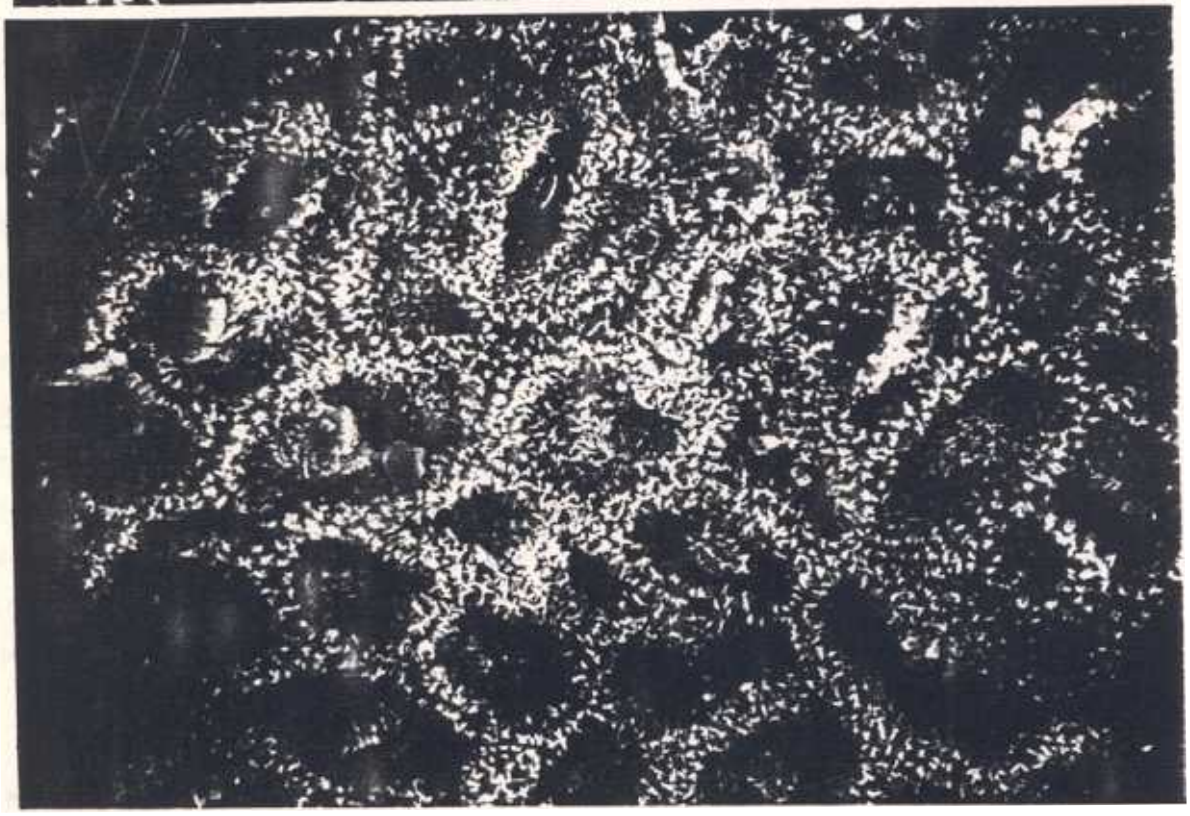
base of the limb. The limb may be emarginate or obtuse and faintly or prominently reticulately veined. Wings and keels are clawed and auricled. Keel petals may be often connate towards their apex. Stamens are 9 in number inmost of the species recorded from Kerala with the exception of D. acaciifolia and rarely D. siesoides (Prain, 1904) where it is 10, monadelphous with the sheath split on the vexillar (adaxial) side. Staminal column is split towards the upper third or fourth of its length and the uniformly didymous anthers are produced either in one level or on altenately shorter and longer stalks and are basifixed. Ovary is stipitate and glabrous in most of the species or hairy along the upper suture (D. malabarica, D. sissoo)or pubescent (D. horrida. D. travancorica, D. volubilis)or puberulous (D. rubiginosa) or pilose (D. epinosa). Style is glabrous, often recurved and the stigma terminal and capitate. Ovules vary from 1,2,3 or upto 7 per ovary which develop into usually 2-4 seeded pods. But in npecies like D. epinosa and D. candenatensis ovary is uniformlyl-ovuled and pods l-seeded.

I. 5.4.Fruits

The pods are samaraid and indehiscent. They are flat, oblong or linear in most of the taxa, but are reniform-falcate or falcately recurved along the upper suture (crescent shaped) in D. candenatensis and D. spinosa in which case the fruits are uniformly l-seeded, rigidly cartaceous and thick. Pods are often narrowly ligulate, apiculate, acute or obtuse at apex and reticulately veined throughout or prominently so opposite the thickened seed portion. In D. acaciifolia reticulations are indistinct throughout or in species like D. benthamii it is confined to the thtckened seed portion alone. In D. horrida the fruits are velvetty-pubescent when young, becoming glabrous as and when It matures. In a few cases like that of D. candenatensis, reminiscents of the stamens may be seen at the base of the stipe, even after the fruits get matured and dried up .(Fig. 4).

Seeds are plena-compressed and rentform or subreniform In shape, brown, reddish-brown or yellowish in colour, smooth and often shining.





They are ecarunculate and ex-albuminaous. Ovules are of the campylotropus type with an elongated hilum Endosperm is absent and the embryo is recurved with an inflexed radicle. Cotyledons are of thin walled cells with deposits of starch (Corner, 1951).

I .5.5.Seedlings

According to'vogel's (1980) classification, seedlings nf the genus Dalbergia belong to the Solanea subtype 2a characterfsed by an elongated epigeal hypocotyl with cotyledons borne above the soil level. Compton (1912) had elaborated the structural aspect of this type of seedlings with illustrations.

I.6.Cytology

Atchinson (1951), Patil (1958), Nanda (1962), Mallick and Chosh (1968), Mehra and Hans (1969), Bir and Santhosh Kumari (1975), Sarkar et al. (1974, 1975), Sanjappa and Dasgupta (1977, 1981) and Sinha and Kumar(1977) had made chromosome counts of the following Dalbergia species known from Kerala, namely D. lanceolaria, D. latifolia, D. melanoxylon, D. paniculata, D. sissoo, D. spinosa and D. volubilis. Invariably they have either reported the diploid number as 20, or 10 as the haplold number. Most of these reports based on Indian materials and also covering both tree and climbing species show that the genus is quite consistent with regard to its chromosome number even-though on a world basis, Goldblatt (1981) noted that the haploid number may vary from 10–11 in the tribe Dalbergieae. In terms of phylogeny this is a comparatively high basic chromosome number among paplionaceous species and is characteristic of major tropical groups which had a separate origin from the polyploid tribe Sophorea of the Papilionaceae family.

1.7.Palynology

The tribe Delbergieae, according to Ferguson and Skvarla (2981) possess rather uniform and unspecialised pollen. The pollen grains

are small and trtcalporate wtth only minor variations in tectum and endoappertores.

Palynological studies of Vishnu Mtttre and Sharma (1962) on Indian legumes covered spectes like D. volubilie, D. sissoo, D. latifolia, D. horrida and D. lanceolaria. Among them D. sissoo, D. latifolia and D. lanceolaria possess pollen of 3-Zonicolporate Lathyrus pratensis type showing much variation with regard to the shape, size and also exine ornamentation. In the case of the two climbing species namely D. horrida and D. volubilis, it is again 3–Zonicolporate pollen belonging to the Crotalaria albida type. Details regarding the shape, size, sexine pattern, etc. of the pollen of the above mentioned species are given in Table 1 (after Vishnu Mittre & Sharma, 1962).

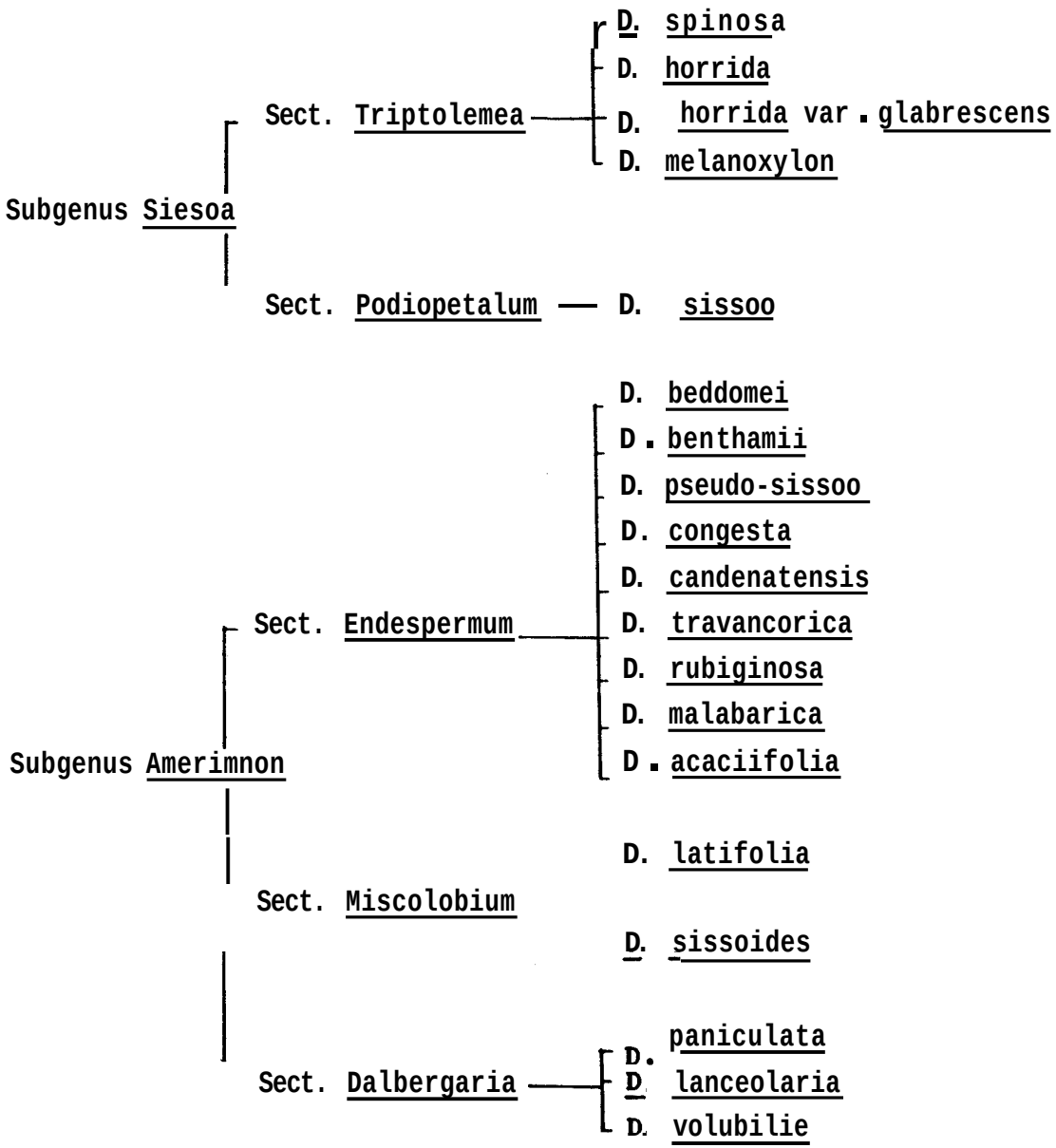
Table 1. Pollen characteristics of Dalbergia spp.

Species	Apperture	Shape	Size(/) P*	Size(/) E*	Sexine pattern	Remarks
D. volubilis	3–Zonicol–porate	Subprolate	18–20	14–16	Faintly reticulate	
D. sissoo		"	26–28	22–24	Psilate	Bervi-colpate
D. latifolia			20–24	16–20		
D. horrida		Prolate–spher.	20-22	28–20	Faintly reticulate	
D. lanceolaria		Subpro-late	14-18	12–14	Psilate	

*P & E relate to the two diameters of grains (the longest and the respecttvely).

18. Taxonomy

Dalbergia is a tropical woody genus distributed mainly in South America and well repreeented in the continentu of Asia and Africa. Estimates as to the total number of species belonging to the genus throughout the world varies from 100-120 (Prain, 1904, Hutchinson, 1967) with few more species added recently.



In the past, several authors attempted to subdivide the genus mainly for taxonomic convenience and among them Wight and Arnott (1834), Rentham (1851, 1860), Kurz (1876), Baker (1876), Taubert (1894) and Prain (1901, 1904)deserve special mention. Among such .attempts, the more recent Prain's (1904) subdivisfon of the genus for South-east Asia broadly classified it into two subgenera namely Sissoa and Amerimnon. The subgenus Sissoa is further subdivided into subsec-tions Triptolemea and Podiopetallum and the subgenus Amerimnon into Endespermum, Miscolobium and Dalbergaria. Species dealt with in this account belong to the Subgenera and sections given above.

Eventhough recent, the classificationproposed by Thothathti (1983) is again one in line withthat of Rentham (1860) except for reducing Ecastaphyllum P. Br., an American genus with unifoliate leaves and orbicular pods, to Dalbergia. Bentham (1860) treated Ecastaphyllum as a separate genus, allotting it a sectional status, i.e. sect. Ecastaphylla under Dalbergia, along with sections Sissoa, Dalbergia and Selenolobia. In this classification of Thothathri (1983), species of Dalbergia recorded from Kerala belong to all the three sections of Indian Dalbergias namely Sissoa, Dalbergaria and Selenolobia.

1.9. Phenology

Out of the 18 species of Dalberg is In Kerala, flowering and fruiting periods of only 13 species could be gathered during the present study. For the remaining 5 species namely D. acaciifolia, D. congesta,D.melanoxylon D. spinosa, and D. travancorica, this informa tion was not available as they could not be located in the field or as the specimens examined for their inclusion here lack in such detaile. A monthwise analysis of the available data had shown that a maximum number of Dalbergia species of Kerale flower in the month of February and it is the minimum during August and September when South–eaet monsoon is in full force. With regard to fruiting, during the month of April it is the maximum whereas in September end November there are only four species in fruits marking the minimum.

The tahle (Table I I and graph (Fig. 6) gives the and fruiting periods of various Dalbergia species in Kerala.

Table 11. Phenology of 13 species of Dalbergia.

Species	JAN		FEB		MAR		APR		MAY		JUN		JUL	AUG		SEP		OCT		NOV		DEC	
	fl	fr	fl	fr	fl	fr	fl	fr	fl	fr	fl	fr	fl	fr	fl	fr	fl	fr	fl	fr	fl	fr	fl	fr
1. D. beddomei	+	-	+	+	+	+	-	t	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-
2. D. benthamii	-	-	-	-	t	-	+	+	-	+	-	+	-	+	-	-	-	-	-	-	-	-	-	-
3. D. candenatensis	+	-	+	-	-	+	-	t	-	+	-	+	-	+	-	+	-	+	-	+	-	+	+	-
4. D. horrida	+	+	+	+	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	+	+
5. D. lanceolaria	-	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	-	+	-	+	-	+	-	+
6. D. latifolia	t	+	+	t	+	+	+	-	+	-	+	-	+	-	-	+	-	+	-	+	+	-	+	-
7. D. malabarica	+	-	+	+	+	+	+	+	-	-	-	+	-	+	-	+	-	+	-	+	-	+	+	+
8. D. paniculata	-	+	t	+	+	+	+	+	+	+	+	+	+	-	+	-	+	-	+	-	+	-	t	+
9. D. pseudo-sissoo	-	-	+	-	+	-	+	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
10. D. rubiginosa	+	-	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11. D. sissoides	+	+	+	+	+	+	+	+	-	+	-	+	-	+	-	-	-	-	-	+	-	+	+	+
12. D. sissoo	+	+	+	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	t	-
13. D. volubilis	+	-	+	+	+	+	+	+	+	+	+	+	+	+	-	+	-	-	-	-	+	-	+	-

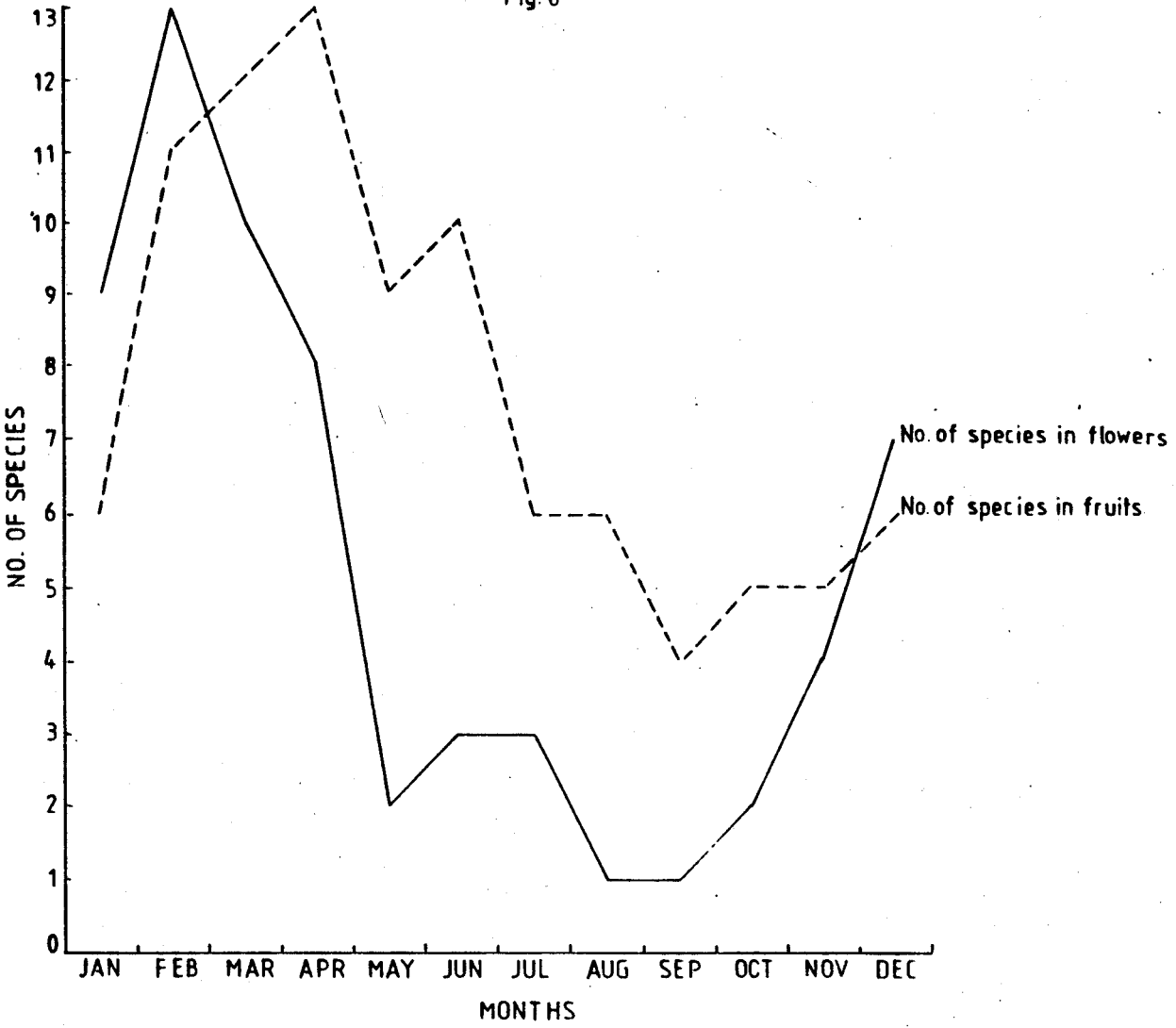
1.10. Uses

Many species of Dalbergia recorded from Kerala are of economic value mainly as timber species, medicinal plants, forage sources and as plants that yield gums, resins, oils, etc. Few species are also reported to possess various types of chemical extratives in their bark, wood or seeds, uses of which are yet to be ascertained.

1.10.1. Wood

The genus is reputed throughout the world for a dozen or so species that yield the rosewood of commerce. Out of them four species recorded from Kerala, namely D. latifolia, D. sissoides, D. sissoo and D. melanoxylon yield valuable timber. Among the four species, both D. latifolia and D. slssoides yield the rosewood of commerce and Bourdillon (1905) and Kadambi (1949) prefers to name the former as Bombay Rosewood and the latter as Malabar Blackwood, eventhough Quraishi (1954) is of the opinion that the name Balckwood should be applied to D. latlfolia and that D. sissoides must be called the Rosewood, reason being that the authors who erected these two taxa used them accordingly. Rosewood, Blackwood and Sissoo are the best known woods of India for high class furniture and cabinet making, of which the former two are exported to Europe and other foreign countries also where they are employed as decorative timber. All the three above mentioned species yield wood suftable for marine and aircraft grade p1ywood and being highly ornamental are in great demand for use as veneers. They are very suitable for all types of construction work including the making of doors, wfndows, railway sleepers, carriges, wagons and also for building lorry bodies. Heavy agricultural implements like ploughs, harrows, rollers, clod crushers, etc. and cart and carriages are also often built of Rosewood and Sissoo. Sissoo in North India and Rosewood and Blackwood in South India are most popular woods for carvingand engraving and also for making printing blocks. Brushbacks, turney articles like bed-legs, hookahs, walkingsticks, shoelasts, umbrella handles and several other bentwood articles are a1so made of Rosewood and Sissoo. Parts of musical instruments like

Fig. 6


13
12
11
10
9
8
7
6
5
4
3
2
1
0
NO. OF SPECIES
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
MONTHS
No. of species in flowers
No. of species in fruits

violins, flutes, guitars, ctc. are made mainly of Rosewood and Blackwood whereas Sissoo is used for making drums, tobacco pipes, etc.

D. melanoxylon, the ebony of ancient Egypt, also yield a much valued timber known in European countries as China Blackwood. It is mainly used for making costly surgical tool handles, walking sticks, paper cutters, combs, hair pins, fancy articles, musical instrument parts, in pattern making, etc. The timber in this case is dark-purple to brownish-black in colour, hard, close and fine grained and takes beautiful polish.

Gamble (1922) reported that wood of D. lanceolaria is used for building purposes. Pearson and Brown (1932) also considers it to be suitable for boards, rafters, scantlings and for general construction works. It is also reported (Rameeh Rao & Purkayastha, 1972) to be used in Bombay for making tool handles. Wood in this case is greyish or yellowish-white turning yellowish-brown with age and is devoid of heartwood. It is moderately hard and heavy, straight or interlocked grained and medium coarse-textured. It is easy to saw and work, but is apparently not durable. Eventhough wood of D.lanceo1aria is suitable for packing cases and crates, it is not much in use at present.

Due to the presence of intruded phloem in the wood of D. paniculata trees, it of any use, even as firewood.

1.10.2. Medicine

Amongthe 18 species of the genues found in the State, six are of known medicinal value, name1y. D. horrida, D. lanceolaria, D. latifolia, D. sissoo, D. spinosa and D. volubilis. Watt (1890) and also Wealth of India (1952) reported that seed oil of D. lanceolarla is used in rheumatic affections and that of **D.** sissoo in curing cutaneous diseases. Plant parts **of D.** latifolia are recorded to be useful as stimulents and appetizers and is also used to curedyspepsia, diarrhoea, leprosy, obesity and also worm Infectins. The bark of **D.** lanceolaria trees mixed with that of Flacourtia sp. is used for exter-

nal application during intermi ttent Fever (Anonymous, 1976) and an lnfusion of it is consumed to cure dyspepsia. Leaves of D. horrida, D. sissoo, D. lanceolaria and D. volubilis are medicinal as alteratlvee, stlmulents and also as curatives for leprosy and other skin diseases a'nd against apthane. A decoctton of the leaves of D. sissoo i sknown to be useful against gonorrhoea and vomitting (Watt, 1890) and a paste of the leaves of this species mixed with sweet oil is reputed as a curative For excoriation. A paste made of the bark of D. horrida is a curative €or pimples, and pills made from the hark–paste of D. sissoo mixed with aromatics like ginger is used to check cholera (Watt, 1890). Further, D. sissoo raspings isregrded as an alterative and is also used against leprosy, boils, eruptions and vomitting.

Juice of the roots of D. volubilis mixed with cummin and sugar is used in the treatment of gonorrhoea and toot extract of D.lanceolaria and D. sissoo is used to cure cutaneous diseases and also ulcers (Watt, 1890). Powdered roots of D. spinosa as reported by Watt (1890) absorb alcohol and it is said that a spoonful of powder mixed with a glass of water can destroy in less than half an hour such alcoholic effects.

I.10.3.Gums, tannins and oils

Both D. latifolia and D. paniculata yield gum (Watt, 1890) and the bark of D. latifolia and pods of D. sissoo contain about 2% tannin (Anonymous, 1952). It has also been reported that the seeds of D. lanceolaria, D-latifolia and D. sissoides and the heartwood of D. sissoo contains extractable oils of medicinal value.

I. 10.4 .Fodder, manure, etc.

Among the various species of Dalbergia found in the state, leaves of D. latifolia, D. sissoides, D. sissoo and D. volubilis are relished by cattle and goats. In Tamilnadu, D. paniculata twigs are used as

green manure called Pachilan. Planting, of D sisoo near homesteads is elm considered to besacred by the Hindus.

T.11. Conservation status and recommendations

This study was primarily aimed to locate varioius species of the genus Dalbergia in Kerala and to establish their live-collection. As the work progressed, it was understood that a few species recorded from the State in literature are not represented by herbarium specimens .showing their locality of occurrence within the State and hence it was not possible to locate them and to raise their live-collections. Similarly a few endemtc species are represented by their type specimens only, collected From the State more than a century ago, lacking in details on their specific locality. Such species which could not be located during this study are without any Iive-collection established. However, in this chapter conservation status of various species of the genus in the State is given and opecific recommendations are made based on field observations so that action can be initiated In future to ensure their preservation.

l.D. acaciifolia Dalz.

This species endemic to Western Ghats of India is known only from a century old collection of it from Bramaghirries in the Wynad district of the State. It is now probably extinct from that area as shown by the present field studies. Hence, efforts shall he made to protect its natural populations elsewhere on the country. Steps may also be taken to establish a viable population of it in the Brumghirry area of the State where it existed once.

2. D. beddomei Thoth.

This highly endemic species of Silent Valley was relocated during the present study after more than a century of its first and only collection. At prsent there is an endangered population of it near South Walappara in Silent Valley forests and steps shall be taken

to conserve the species in situ and efforts shall be made to multiply its existing natural population. Efforts to raise an ex situ collection of this evergreen species during thts study is only partially successful as the seedlings are not coming up well.

3. D. benthamii Prain

This is an endangered species reported for the first time from India during this study. It was known only from Hongkong earlier and only very few plants of it were found in Central Kerala in a disturbed sacred grove. Only way to protect this species is to safeguard the sacred grove from further disturbances. It is also recommended to initiate immediate steps to multiply its natural population and also for ex situ conservatton.

4. D. candenatensis (Dennst.) Prain

In Kerala, the species is in an endangered state due to severe habitat disturbances. Being habituated to backwater banks, its conservation can only be effectively done insitu and protectton of the backwater-bank vegetation at Quilon ts the only viable solution, even though some plants are raised ex situ during this study.

5. D. congesta Grah.

This speceis is included here based only on Rama Rao's (1914) record of it from the former Travancore. No herbarium specimens of it could he located, nor any plant in the field. More extensive survey to locate this species in the State is needed before arriving at any conservation strategy.

6. D. horrida (Dennst.) Mabberley

This is an endemic species of Peninsular India, now very rare and endangered in the State. Eventhough an ex situ collection of it is estblished during the present study, it is recommended that the

species be preserved. In situ by protecting the vegetation of areas like Eringole sacred grove near Perumbavoor in Central Kerala, forest around Malabar Cement Factory at Walayar, Dhoni forest block in Palghat district and Kallada dam catchment in Thenmala Forest Division of the State.

7. D. lanceolaria L.f .

This is rather a common species in the forests of the State and as such it can survive without any conservation measures in the present condition. An ex situ collection of it has also been raised during the present study.

8. D. latifolia Roxb.

The natural population of this species in Kerala is fairly good. However being the rosewood species, over-exploitation can render it vulnerable in the near future. A live-collection of it has been eetblished during this study.

9..D. malabarica Prain

This species endemic to South India was collected by Rama Rao (1914) about a century back from Paruthipally forests near Trivandrum and there is no herbarium record of its subsqeuent collection. Efforts to locate this species during the present study was also not successful and as such Paruthippally forests are now completely degraded, resulting in the possible extinction of this species from there. Hence it is recommended that further search be made in the State to locate this endangered species and existing populations of it elsewhere in the country be protected. Efforts to raise it in its earlier known habitat in the State, i.e. Paruthippally forests near Trivandrum, shall also be made.

10. D. melenoxylon Guill. et Perr.

Herbarium and literature studies had shown that this species existed at Quilon towards the end of 19th century. Efforts to locate it during the present study was not successful. However an ex citu collection of it is established during the present study with propagules procured from Dharwar in Karnataka state. This economically important timber species shall he introduced in the State on a large scale.

11. D. paniculata Roxb.

Vtable populations of this species exist at present in Kerala forests and a live–collection of tt has been also raised during the present study.

12. D.rubiginosa Roxb.

This species exists in an endangered state at Kasaragod and an ex situ collection of it has been established during the present study. However, It is recommended that its only natural habitat in Kerala at Bevinji–Methumganarn area near Kasaragod be protected.

13. D. pseudo-sissoo Miq.

This species is reported here from Kerala for the first time as recorded from Thekkuthode,Ranni and Paruthippally near Trivndrun, based only on earlier collections. Filure to locate the species during this study points to the fact that it is either extinct or has become very rare in the State. Further efforts to locate this species and steps to preserve it both in situ and ex eitu is recommended.

14. D. sissoides Grah. ex Wt. et Arn.

Fairly good natural populations of it exist now in the forests of the State and if judiciously exploited this commercially important

timber species shall survive without much protection. A live- collection of thin endemic species has been estblished during this study.

15, D. sissoo Roxb. ex DC.

Only two trees of this species exist as introduced in Kerala from North India, in an abandoned mixed plantation of 1958 at Keerappady near Parambikulam. An ex situ live-collection of it has been established during this study and it has been observed that it comes up very well in Kerala conditions. It is recommended that this timber species be introduced in Kerala on a large scale so that pressure on the two rosewood species can be reduced.

16. D. spinosa Roxb.

This species is reported from Kerala based only on the authority of Rama Rao (1914). No herbarium specimens are available for it from the State in any of the herbaria consulted. Further search to conclude whether this species occur in the State is recommended.

17. D. travancorica Thoth.

Only the type specimen of this species collected from Travancore hills, about a century before is the basis to include the species here. Being highly endemic, further field survey is required to locate it and if available a live-collection of it shall be established ex situ and the area where it grows shall be portected to conserve the species in situ.

18. D. volubilis Roxb.

This species is widely distributed in the State and as such it can survive without any conservation measure. A live-collection of it has also been established during the present study.

1.12. General format

In the systematic part that follows, a brief description of the genus comes first followed by a dichotomous key to various species recorded from the State. Further, species are treated in an alphabetical order according to their up-to-date botanical names. In the nomenclature part of each species, what has been considered aa the correct name in accordance with the rules in the International Code of Botanical Nomenclature (1983) is given first; this is followed by the basionym if any, and some of the synonyms pertaining to the national and regional floras, representative icones, monographs, revisions, etc. with relevant citations. Details of the types of various species are also provided wherever known before the exhaustive description of each taxon drawn from fresh and herbarium specimens and also literature. In the species descriptions, all measurements are given in the metric system. For each species an illustration with vegetative and floral details and fruit and leaf variation diagrams are provided and their distribution in Kerala plotted on maps. Details pertaining to the general habitat, flowering and fruiting periods, local name(s), distribution within and outside the State, critical notes and also a list of representative specimens examined from the State are also given subsequent to the species description. Following abbreviations are used to indicate the herbaria from which specimens are cited.

CAL Central National Herbarium, Botanical Survey of India, Howrah- 711 103, India.

MH .. Herbarium, Southern Circle, Botanical Survey of India, Coimbatore- 641 002, India (Madras Herbarium).

FH . Herbarium, Dept. of Botany, Presidency College, Madras, India (Fyeon Herbarium).

HSFRC.. Herbarium, Southern Forest Rangers College, Coimbatore, India,

HUC . Herbarium, Department of Botany, University of Calicut, India.

MUCT .. Herbarium, Dept. of Botany, University College, Trivandrum, India.

MKFRI .. Herbarium Kerala Forest Research Institute, Peechi, India.

BM .. Herbarium British Museum (Natural History), London.

K .. Herbarium, Royal Botanic Gardens, Kew.

G .. Herbarium, Conservatoire et Jardin botaniquee, Geneva.

P .. Herbarium, Museum Phanerogamia, Paris.

Dalbergia L.f. Suppl. Pl. 52. 1781 nom. gen. cons.; Wt. et Arn, Prodr. 1:265. 1834; Benth. J. Proc. Ltnn. Soc. Bot. Suppl. 4: 28. 1860; Benth. et Hook.f. Cen. Pl. 1:544. 1865; Taubert in Engl. et Prantl (ed.), Pflam. 3(3): 333. 1894; Prain, Ann. Roy.Bot. Gardn. Calcutta 10(1):31. 1904; Hutch. Gen.F1. Pl. 1:359.1964; Raretta-Kuipers, Acta bot. Neerl. 20: 655. 1971; Pothill et Raven(ed.), Adv. Legum. Syst. 1:240. 1981. -- Amerimnon P. Rr. Hist.Jamaic. 288. 1756.-- Salken Adans. Fam. 2:322. 1763. -- Solori Adans. Fam. 2: 327. 1763. -- Ptero-carpus Rerg. Vent. Acad. Handl. Stockh. 116. 1769(non L.1753). -- Acouroa Aubl. Bl. Guian. 753. t. 301. 1775. -- Dsrakenstenia Neck. Elem. 3:33. 1790.--Endespermum Bl. Cat. Gew. Buitenz. 23. 1823. -- Hecstaphyllum H.R. et K. Nov. Gen. Sp. 6: 387. 1823. --Amerimnum DC Prodr. 2:421. 1825. -- Semeonotis Schott, Wien. Zeitchr. 3: 804. 1829. --Miscolobium Vog. Linnaea 11: 200. 1837.--Triptolemea Mart.Flora 20:Beibl. 122. 1837.--Leiolobium Benth. Ann. Wien. Mus. 2: 94.1838. -- Podiopetalum Hochst. Flora 24: 657. 1841.--Endospermum Endl. Gen. 1304. 1841.--Salkea Steud. Nom. (ed.2) 2:500. 1841.

TYPE: Da1bergia lanceolaria L.f. Suppl. Pl. 52. 1781, India(Lecto-type)

Trees, lianas or straggling shrubs, sometimes thorny. Leaves alter-nate,imparipnnate, usually 5 or more foliate, rarely 1-foliate; leaf-lets a1ternate or very rarely subopposite ,subcoriaceous; stipules small, often deciduous; stipels absent. Flowers white, purple or violet, small, often numerous in terminal or axillary cymes or pani-cles; bracts small, persistent or subpersistent; bracteoles 2, usually minute, generally deciduous. Calyx campanulate, 5-teethed, the upper two teeth subconnate and hroader, lowest often the longest. Corolla papilionaccous, exserted; vexillum ovate, oblong or orbicular, often nouched at apex with a long or short claw; wing petals oblong, cuneate, truncate or hastate at the hase of the blade, often long-clawed; keel petals obtuse, more less connate at apex behind, long-

clawed, often unilaterally hastate at base; rtamens 10 or 9, all connate into a sheath split on the upper side or in 2 lateral bundles of 5 each or with only 4 on each ride and the vexillry stamen free or absent or very rarely 9 in a sheath with a free vexillary filament; anthers basifixed, small, erect, didymous with the locules placed back to back, dehising by short, apical or rarely longitudinalchinks. Ovary stipitate; style slender or stout, incurved; stigma terminal, ccapftate, small; ovules few to one. Fruits samaroid, indehiecent, oblong **or** linear end strap–shaped, rarely falcate,flat, thin, 1-reeded in the middle or rarely few–seeded, often harder and reticu–lated around the reed, neither margined nor winged; reeds reniform, plano–compressed; hilum small; radicle inflexed.

Species about 120 in the tropics and subtropics and also temperate parts of South–east Asia and North Australia.

Key to species

1a. Trees

2a. Plants armed with thorne; branches spreading, drooping or straggling. ..... D. melanoxylon

2b. Plants unarmed; branches not drooping or straggling

3a. Flowers bluish, purplish or white with blue colour inside; heartwood absent

4a. Wood with bands of intruded phloem; leaves usually drying black ..... D. paniculata

4b. Wood without intruded phloem; leaves drying brown ..... D. lanceolaria

3b. Flowers white or yellowish-white; heartwood present

5a. Infloresence few flowered, rusty- pubescent or hairy; leaves mostly acuminate at apex ..... D. sissoo

5b. Inflorscencc many-flowered, glabrous; leaves acute, obtuse or emarginate at apex

6a. Leaflets mostly obtuse or emarginate at apex; panicles subterminal, congested D. latifolia

6b. Leaflets mostly acute at apex; panicles terminal, lax ..... D. sissoides

1b Lianas or straggling shrubs

7a. Plants armed with thorns

8a. Pods reniform-falcate, uniformly 1-seeded; ovary aubglobosc ..... D. epinosa

8b. Pods strap-shaped, 1-4 reeded; ovary, linear ..... D. horrida

7b. Plant not armed

9a. Plants with hooked or curled terminal branchlcts

10a. Pods falcately recurvcd, uniformly one seeded ..... D. candenatcnrir

10b. Pods strap-shaped, 1-4 seeded

lla. Lcaflcte cunneate-ovate, rhalowly nouched at apex. ..... D. congcsta

lib. Leaflets ovate, lanccolate or elliptic, acute, obtuse or emarginate at apex

12a. Ltaflctr thick,coriaceous and emarginate at apex; main stem cylindrical, rmooth ..... D. rubiginosa

12b. Leaflets thin, rmooth and acute at apex; main stem longitudinal ly ridged. D. volubilis

9b. Plants without hooked or curled branchlets

13a. Leaflets more than 20 per leaf

14a. Base of the leaflets oblique; branchlets finely puberulous ..... D. acaciifolia

14b. Base of the leaflets not oblique; branchlets yellowsh fcrrugenous–pubescent ..... D. malabarica

13b. Leaflets 3-14 per leaf

15a. Inflotescence many–flowered with persistent bracts; leaflets usually elliptic and emarginate at apex

16a. Inflorescence of short axillary panicles ..... D. travancorica

16b. Inflorescence of long, terminal panicles ..... D. beddomei

15b. Inflorescence few–flowered without prominent persistent bracts; leaflets usually acute at apex

17a. Branches pubescent; vexillum deflexed ..... D. benthamii

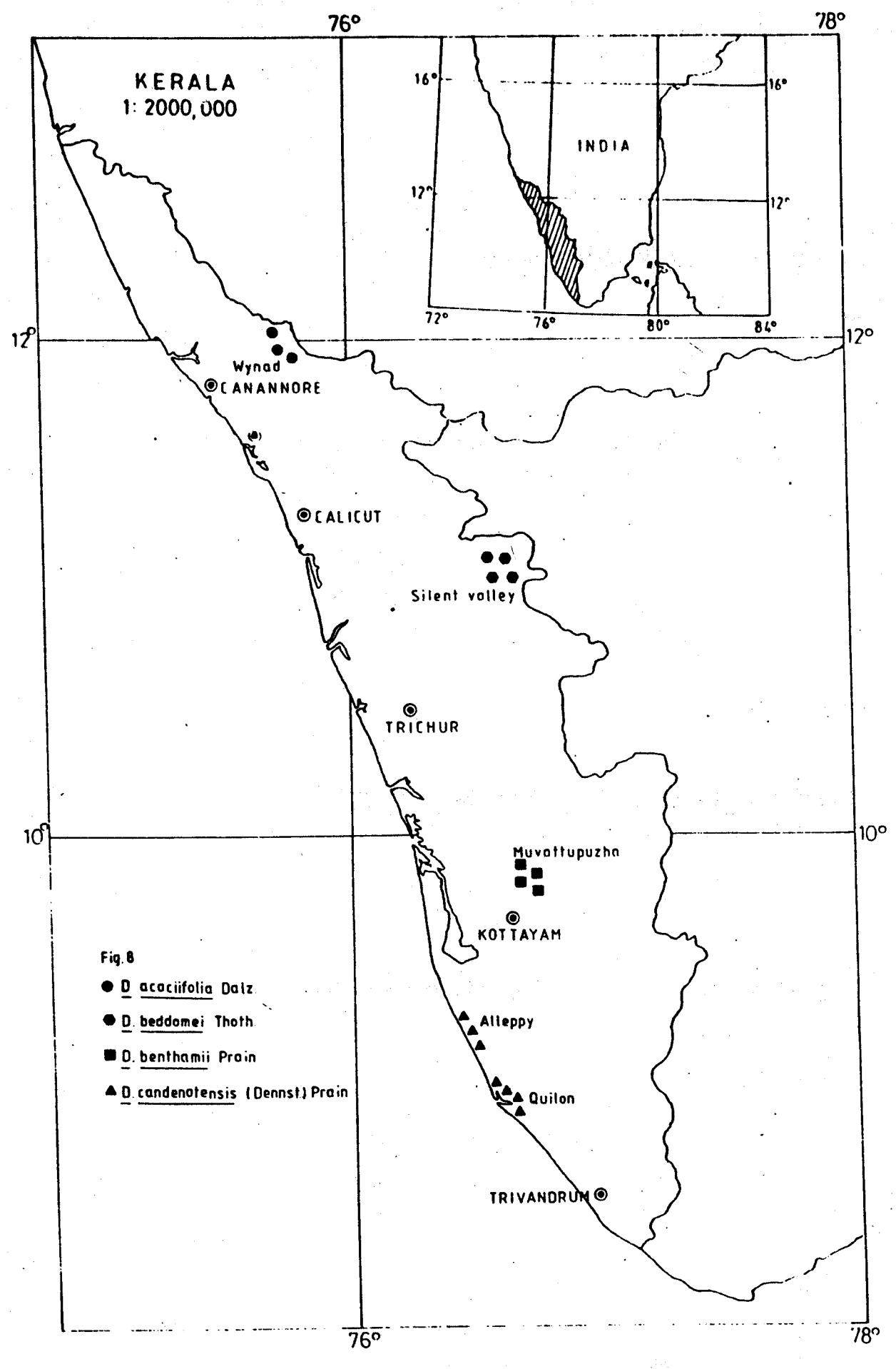
17b. Branches glabrous; vexillum not deflexed ..... D. pseudo-sissoo

1. Dalbergia acaciifolia Dalz. in Hook.J.Bot. Kew Card. Miac. 2:37. 1850: Prain, Ann. Roy. Bot. Cardn. Calcuttr lO(1): 68 pl. 47.1904; Gamble, Fl. Presid. Madras 1:269 1957 (repr.ed.); Nair ct Henry (rd), F1.Tamilnadu 1:102,1983; K.K.N. Nair, J. Eco. &Tax. Bot. 7: 730. 1986.- D.tamarindifo1ia Benth. J. Proc.Linn. Soc. Bot. Suppl. 4:44. 1860 (pro parte non Roxb. 1832)-- D.tamarindifolia Roxb. var. acaciaefolia (Dalz.)Baker in Hook.f.Flt.Brlt.india 2:235.1876.–v.pinnata (Lour.)Prain var. acaciaefolia (Dalt.)Thoth. Rull. bot. Surv. India 25:170. 1983 (1985).

TYPE: Chura, Cancan, 1850,Law s.n.(K,Isotype, CALI).

Climbing shrubs or trees; branches week, twisting or spreading; branchlets finely puberulous. Leaves imparipinnate, 7–16 cm long; rachis 11-13 cm long, puberulous; leaf lets sessile or subsessile, very oblique, 41-51, thick, chartaceous, glabrous or glaucous above, finely pubescent beneath, 1.5-2 x 0.4-0.6 cm, linear–oblong, obtuse or retuse at apex, obliquely truncate at base; petiolules very 'short, puberulous. inflorescenceaxf 1lary,paniculate with corymbose branches, 0.3-0.5 cm long; peduncles, branches and pedicels finely pubcrulous; bracts upto 0.3 x 0.1 cm, ovate, puberulous; bracteoles upto 0.1 cm long, ovate, puberulous. Flowers white, 0.4-0.6 cm long; calyx 0.2-0.3 cm long, campanulate, slightly gibbous, rusty–pubescent, 5-lobbed, the upper two lobes subconnate, obtuse, the lowest one longer and narrower; corolla with 5 long–clawed petals; vexillum 0.3-04 cm long, orbicular–oblong, distinctly auriculate at base.with a reflexed limb; wings 0.3-04 cm long, auriculate, obtuse; keels upto 0.3 cm long, auriculate, subcannate at apex; stamens 10 in one sheath, 0.3-0.4 cm long, split above, slightly gibbous at base, glabrous; ovary 0.2-0.3 cm long, stipitate, glabrous; style filiform, glabrous; stigma capitate. Pods 5-6 x 1-1.5 cm long, stipitate, ligulate, finely coriaceous, thickened opposite the seeds, obscurely veind; seeds reniform, compressed(Fig. 7 & 8).

Habitat: In dry forests.


KERALA
1: 2000,000
INDIA
76°
78°
16°
12°
72°
80°
84°
Wynad
CANANNORE
CALICUT
Silent valley
TRICHUR
Muvattupuzha
KOTTAYAM
Alleppy
Quilon
TRIVANDRUM
Fig. 8
D. acaciifolia Dalz
D. beddomei Thoth
D. benthamii Prain
D. candenotensis (Dennst) Prain

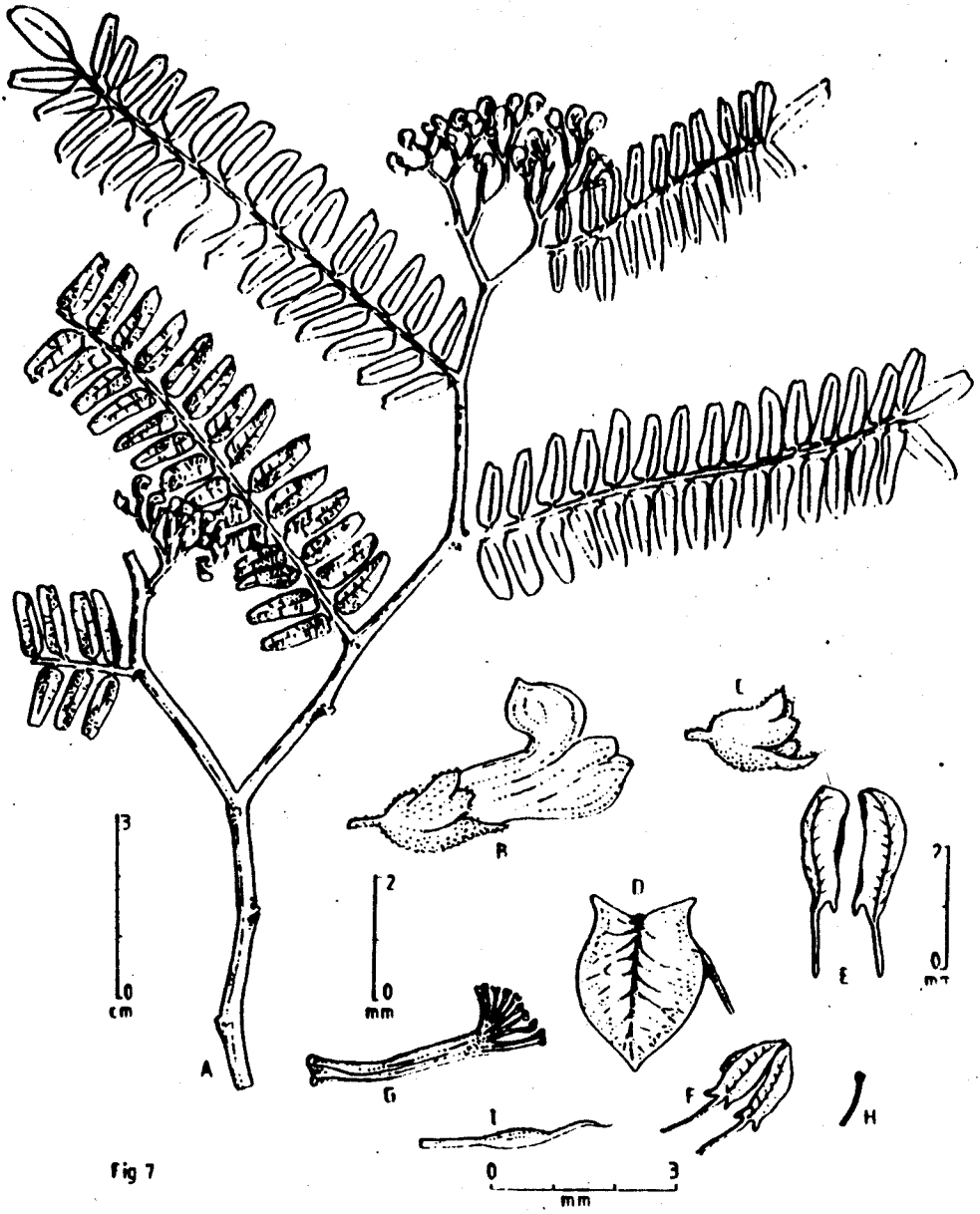
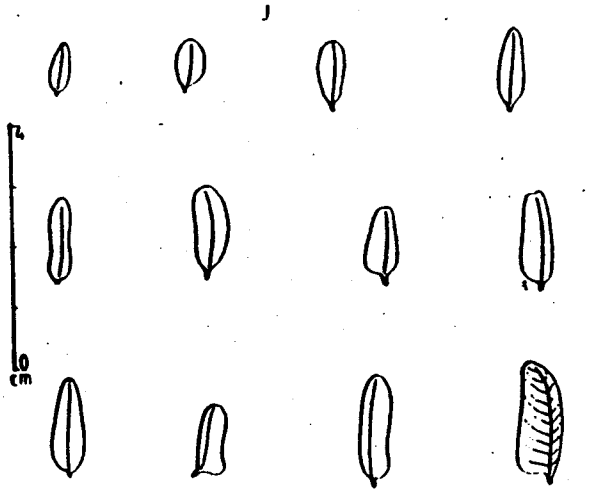


Fig 7



flowers: March. Fruits:May.

Distribution: Kerala: Brumaghirries in Wynad; India: Tamilnadu, Karnatake, Maharashtra.

Notes: This is the first record of the occurrence of this species in Kerala State. However, efforts to re-locate it during this study from Wyned region was not successful.

Specimens examined: Foot of Brumagherries, Wynad, Without collector's name and number(Acc. No. 17040, MH).

2. Dalbergia beddomei Thoth. Proc. Indian Acad. Sci.(Pl. Sci.) 92 (1): 23-24. fig. 1. 1983.

TYPE: India, Silent Valley(Malabar), Kerala, 1000 m, Beddome 2459A, 2460 (BM).

Unarmed, climbing shrubs, upto 6 m high; stem cylindrical, upto 6 cm in diameter, smooth; branches white-spotted, rarely hooked; branchlets twining or straggling, brown-pubescent when young. Leaves imparipinnate, 5-20cm long; rachis 5-18 cm long, pubescent; leaflets 5-14, ovate, elliptic or obovate, glabrous and bright green above, yellowish brown pubescent beneath, 2-6.5 x 1-3.5 cm, rounded, acute or slightly nouched at apex, acute, obtuse or rounded at base;pettolules 0.2-0.5 cm long, stout, pubescnet; stipules 0.4-0.8 cm long, ovate or ovate-oblong, pubescent, cauducous. Inflorescence axillary and terminal much branched,pubescent panicles, 5-10 cm long; peduncles, branches and pedicels pubescent; bracts 0.2-0.4 x 0.1-0.3 cm, ovate, acute, pubescent; bracteoles 0.2-0.3 cm long, ovate, acute, pubescent, persistent. Flowers yellowish-white with a tinge of green, 0.7-1 cm long; calyx 0.5-0.8 cm long, campanulate, pubescent, 5-lobed, upper two lobes subconnate, prominently reticulately veined inside; corolla of S petals; vexillum long-clawed, 0.4-0.6 em long, ovate, cleft at epex, glabrous; wings 0.5-0.7 em long, rubconnate, oblong; stamens 9, monadelphous, stamina1 column 0.5-0.6 cm long, longitudinally split

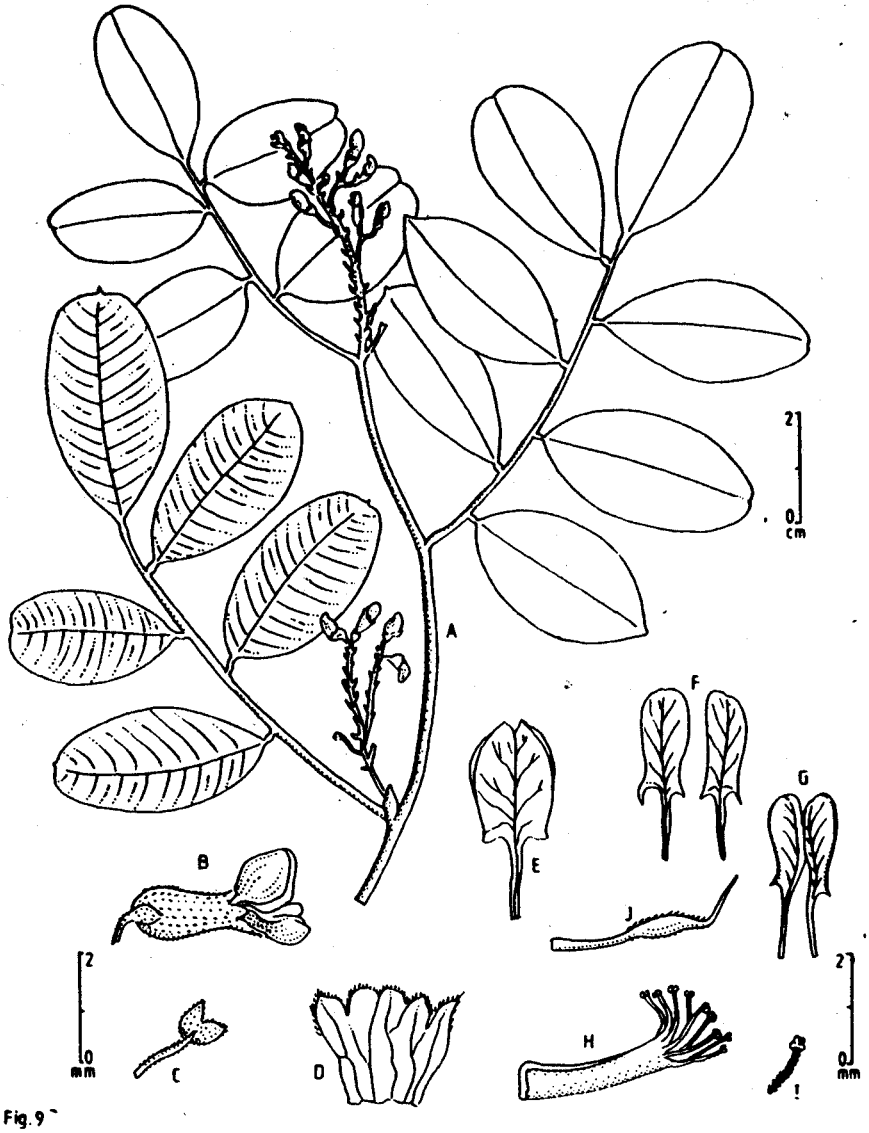
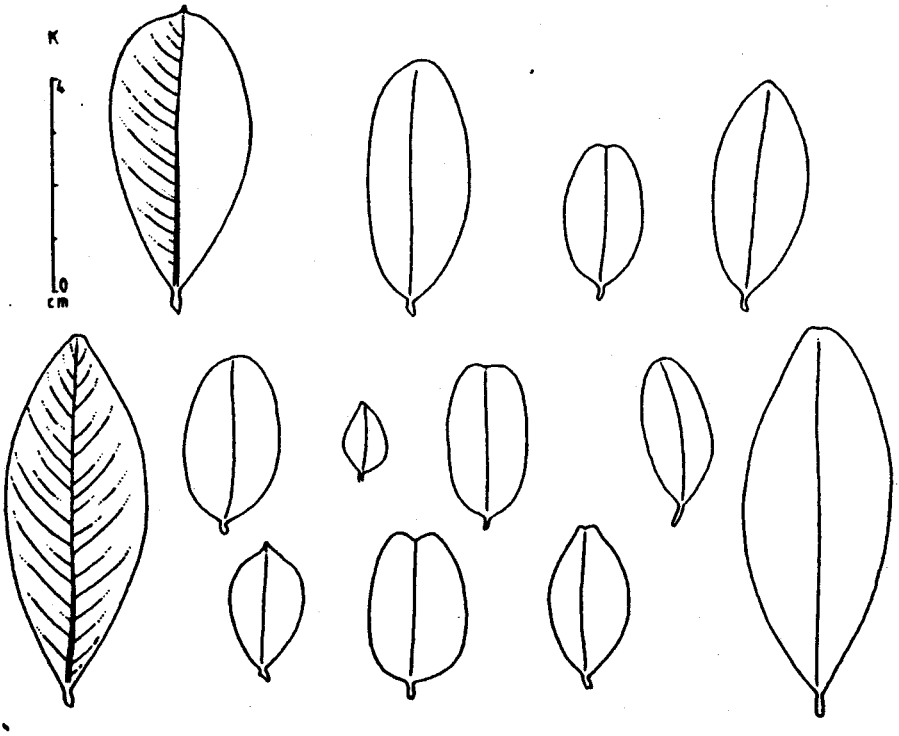


Fig. 9



above, slightly scabrid or pubescent; filaments scabrid; anthers stellate; ovary 0.5-0.6 cm long, stipitate, prominently hairy along the upper suture; etyle slender, glabrous; stigma minute, capitate. Pods 4-6 x 1.2-1.8 cm, Oblong, 1-2 reeded, shortly etalked, reticulately veined, acute with a ehort apiculae at apex, narrowed at base (Fig. 9 x 8).

Habitat: Evergreen forests, along the sides of mountain streams.

Flowers: January–February. Fruits: March-May.

Distribution: Kerala: Silent Valley, Palghat District.

Notes: This species was described in 1983 based on a century old collection of Beddome from Silent Valley. It was re–located during this study and the description given here is based on field observatios and critical studies of fresh specimens, which deviates from the protologue in certain characters listed here.

Original descriptionn	Amended description
1. Creepers	1. Climbers upto 6 m high
2. Leaflets 5	2. Leflets 5-14
3. Inflorescence axillary	3. Inflorescenc both axillary and terminal
4.	4 Ovary hairy along the upper suture
5.	5. Anthers star–shaped
6.	6. Calyx tube prominently reticulately veined inside —

Specimens examined: Between Valiyaparathode and South Walappara (1200 m) Silent Valley, Kerala, 15-2-85, K.K.N.Nair 3236 (HKFRI).

3. Dalbergia benthamii Prain, J. Asiat. Soc. Bengal 67(2):289. 1869; J. Asiat.Soc. Rengal 70(1): 461. 1901 & Ann. Roy. Bot. Gardn. Calcutta l0(1): 62-63.pl.39.1904.-- D. rubiginosa Benth.J. Proc. Linn Soc. Rot. Suppl. 4:43.1860(pro parta);Forbes et'Remsl. J. .Linn. Soc; Bot. 23: 198. 1887(non Roxb.).

TYPE: Not seen.

Lianas or rarely erect shrubs, 0.5-5.5 m high; branches black with white spots, twining or straggling; branchlets brownish–pubescent, rarely curled or hooked. Leaves imparipinnate, 8–15 cm long; rachis 5–12 cm long, slightly pubescent; leaflets 5-7 or rarely 8, glabrous above, slightlypubescent; leaflets 5-7 or rarely 8,- glabrous above, slightly brown–pubescent beneath especially along the nerves, 1.2-7 x cl-3.5 cm, ovate, orbicular or elliptic, obtuse or rarely acute at apex, rounded or narrowed into the petiolule at base; petiolules 0.2-0.4 cm long, finely pubescent;stipules 0.2-0.3 cm long, narrowly lanceolate, pubescent, cauducous; stipules 0.2–0.3 cm long, narrowly lanceolate, pubescent,cauducous. Inflorescene axillary, racemose panicles, 2-4 cm long; peduncles, branches and pedicels rusty tomentose; pedicels 0.2–0.3 cm long, rusty–tometose; bracts 0.1-0.2 cm long, oblong, pubescent, deciduous; bracteoles 0.1–0.2 cm long, ovate-lanceolate, pubescent, persistent, adpressed to the calyx tube; Flowers white, 0.3–0.5 cm long; calyx 0.2-0.3 cm long, campanulate, rutys tomentose,5-1obed, upper 2 lobes subconnate,subequal, almost triangular; corolla with 5,long-clawed petals; vexillum 0.2–0.3 cm long, suborbicular, entire, emarginate, reflexed; wings 0.1–0.2 cm long, oblong, nuricled; keels connate towards apex, 0.1–0.2 cm long; stamens 9,monadelphous, column 0.2–0.3 cm long, split on the uper side; filaments free in their upper third, alternately longer and shorter, glabrous; pistil 0.3–0.4 cm long, glabrous; ovary stipitate, 1-3 ovuled; style slender; stigma capitate. Pods 5–7.5 cm long, thin, light, reticulately veined above seeds, stipitate, ligulate; seeds reni form, compressed (Fig.l0 68).

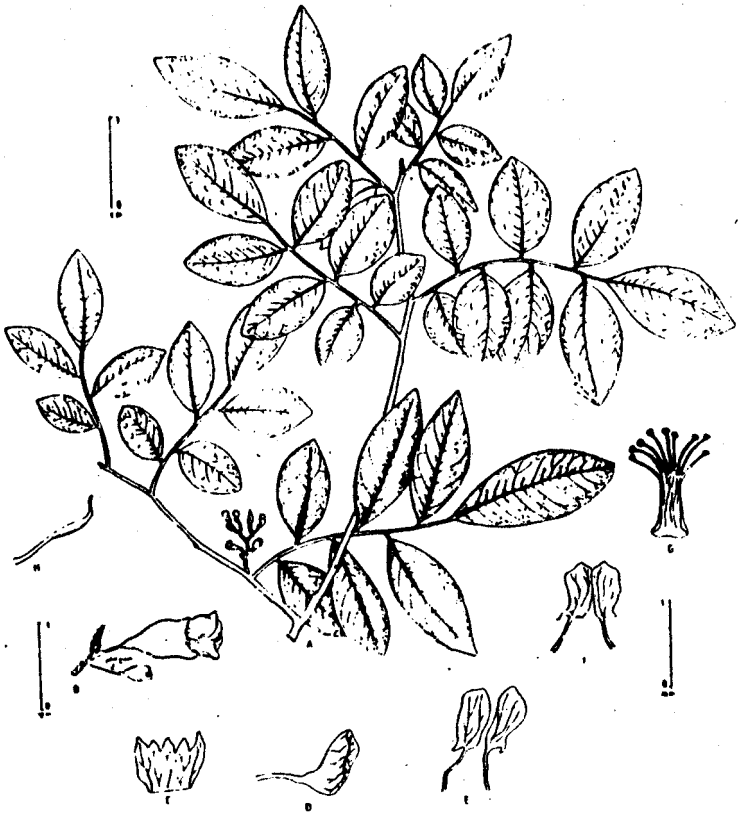
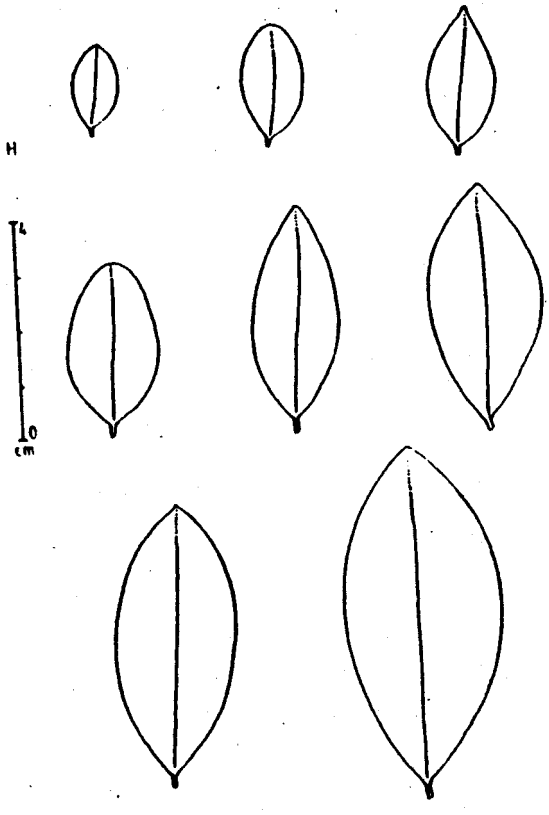


Fig.10



Habitat: Among bushes in dry but shaded areas, often straggling or tending to climb.

Flowers: January–March. Fruits: March–May.

Distribution: Kerala: Muvattupuzha, Pooyamkutty; World: Hongkong.

Notes: The confusion that exists in literatute on the identity of this species and Dalbergia rubiginosa Roxb. is due to theft resemblence in general habit, flower colour and several floral morphological characters. However the two species differ distinctly in leaf and fruit characters, as tabulated.

D. benthamii Prain	D. rubiginosa Roxb.
1. Leaflets ususally 7, rarely 5 or 8, thin, not coriaceoue;apical leaflet conspicuously larger.	1. Leaflets uaually 5, rarely 4,6 or 7, thick, coriaceous; leaflets equal or subequal in size,
2. Apex of leaflets acute or obtuse.	2. Apex of leaflets clearly retuse.
3. Leaflets drying green or brown.	3. Leaflets drying reddish brown eepecially on the lower side.
4. Secondary nerves faint on both surfaces of the leaflet.	4. Secondary nerves clear on the upper side and faint on the lower side of the leaflet.
5. Inflorescence axillary on mature stems, few–flowered.	3. Inflorescence termina1 or axillary towards the apex of branchlets with large number of flowers.
6. Pods 1–2 seeded, 5–7.5 cm long, shortly stipitate, ligulate, faintly reticulate–veined opposite	6. Pods one or rarely 2 seeded, upto 3 cm long, long–stipitate, non-ligulate, prominently reticulate–veined opposite the seeds.

Specimens examined: Puliyampuli sacred grove, Memmuri, Muvattupuzhe, Kerala, K.K.N.Nair 3237 (HKFRI); Peruntha, beyond Manikantanchal, Pooyamkutty, 14–5–86, K.K.N. Nair 4417(HKFRI).

5. Dalbergia candenatensis (Dennst.) Prain, J. Asiat. Soc. Bengal 70(3):49.1901 & Bengal Pl. 1: 411.1903; Gamble, Fl. Presid. Madras 1: 269. 1957(repr.ed.); Thoth. et K.K.N. Nair, Taxon 30:45. 1981.--Cassia candenatensis Dennst. Schul. Hort. Malab. 12.1818.— Dalbergia monosperma Dalt. In Hook.J. Bot Kew Gard. Misc. 2: 36.1850; Benth. J. Proc. Linn. Soc. Bot. Suppl.. 4: 48. 1860; Baker in Hook.f. Fl. Brit. India 2: 337. 1876; Woodr.J.Bombay nat. Hist. Soc. 6:436. 1897; Rama Rao, Fl. Pl. Travancore 130. 1914.— D.torta Grah. (Wall. Cat. 5873. 1832 nom. nud.) ex Gray, Bot. Walkee Exped. 1:458. 1854; Prain,

Soc. Bengal 66(2):120. 1897 & Ann. Roy. Bot. Gardn.Calcutta 10(1):64. p1. 42. 1904.--Drepanocarpus nonorpermus Kurz, J. Aslat. Soc. Bengal 65(2):281.1876.–Amerimnon tortum(Grah.) 0. Ktze. Rev. Gcn. P1. 1: 159. 1891.

TYPE: Plate 25,Karin-Tagera in Rheede, Hort. Malab. 6:45. 1686 (Lectotype K, CAL)

Much branched lianas, 3-10 m high; main stern cylindrical,. 10-20 cm In diameter, smooth; .branches straggling, often black in colour; branchlets green, glabrous, much twisted and rarely hooked. Leaves Imparipinnate, 5-8'cm long; rachia 3-7 cm long, black, finely pubescent or glabrous; leaflets 4-7, shortly petiolulate, thin, glabrous and dark green above, glaucacent and pale. beneath, 1-3 x 0.5-2.2 cm, obovate–oblong, cuneate or rounded at base, emarglnate **or** rarely obtuse at apex; petColules 0.1-0.3 cm long, slightly pubescent; stipules 0.2-0.3 cm long, ovate–lanceolate, acute, cauducous. Inflorescence axillary in congested subcymose panicles, 2-4 cm long; peduncle, branches and pedicels pubescent; bracts about 0.1 cm long, ovate–lanceolate or sub–orbicular, concave, obtuse, covering the lower third of the calyx. Flowers white, about 0.2 cm long, subsesstle; calyx almost 0.2 cm long, campanulate, pubescent, 5–lobbed, lobes ovate–acute, subequal, the upper two eubconnate; corolla with 15,clawed petals; vexillum about 9.7 **cm long,** oblong, long–clawed, ematginate at apex, faintly reticulate–veined; wings upto 0.2 cm long, auricled, faintly reticulate veined, acute at apex; keels upto 0.2 cm long, subconnate at apex, oblong, auricled; stamens 9, monadelphous, stamina1 column 0.3–0.4 cm long, longitudinaly spilt above, glabrous; filaments glabrous, 0.1-0.2 cm long; pistil almost 0.4 cm long, glabrous; ovary glabrous, stipitate; style subutate; stigma minute, capltate. Pods 1.5-2.5 x 0.5-1 cm, falcatelyrecurved along the upper suture, stipitate, thick-walled reticulated throughout, but faint above the seeds, shortly apiculate at apex, 1 or 2 seeded; seeds 0.5-0.8 x 0.3-0.4 cm, reniform, compressed (Fig.ll& 8).

Habitat: Litteral Forests and their relicts along the backwater

banks, as climbers on mangrofve trees like Rhizophora sp.The species regenerate well with a lot of seedlings sproutfng from the sha11ow, submerged sol1.

Flowers: December-June. Fruits: March-November.

Distribution:Kerala:Quilon, Alleppy; 1ndia:West coast from Bombay southwards, Sunderbans in West and East Bengal, Andaman Islands; World: Sri Lanka, Burma, Indo-China, Malaysia, New Guinea, Philippines, China, Australia.

Notes: Both Cooke(1903) and Prain (1904) recorded 10 stamens also for this species whereas in the flowers examtned here,there were only 9 stamens consistently.

Specimens examined:Quilon Herb.Robert Wight, December, 1835 (CAL); Quilon,L1-1893 Coll.? No.?(Ace. No. 17013,MH); Qullon, Nov. 1910, A. Meebold 12752(CAL); Quilon, low country in the banks of backwater canais, 23–5–1913, M.Rama Raoll59(HUCT); Bank of Ashtamudi lake, Asra-inam, Qui lon,23-6-1983, K.K.N.Nair 2804(HKFRI); Beach near Asramam Rest House, Quilon, 18–12–1984, K.K.N.Nair 3215(HKFRI); A1leppey, 20–11-1893,Coll.? No. ?(Acc. No. 17014 ,MH); A1leppey, Travancore, 20-8-1893, Coll. ? No.?(MH).

4. Dalbergfa congesta Grah.(Wall. Cat. 5872 1832, nom. nud.) ex Wt. et Arn. Prodr. 265. 1834; Benth.J. Proc. Linn. Soc.Bot.Suppl.Bot. 4:43, 1860; Baker in Hook.f. F1. Brit. India 2: 232–233. 1876; Praln, Ann. Roy. Bot. Gardn. Calcutta 10(1):66.p1.43. 1904; Gamble, F1. Presid. Madras 1: 269. 1957 (repr.ed.); Nair et Henry(ed.), F1. Tamilnadu 1: 102. 1983. --D.gardneriana sensu Prain, J. Asiat. Soc. Bengal 70(2):47.1901; Rama Rao, F1. P1. Travancore 129. 1914.

TYPE: Graham, Wall. Cat No. 5872, Neelghirries,Noton s.n.(K).

Woody climbers of erect shrubs, upto 9 m high; branches spreading; branchlets brown–pubescent. Leaves imparipinnate, 7-13 cm long;

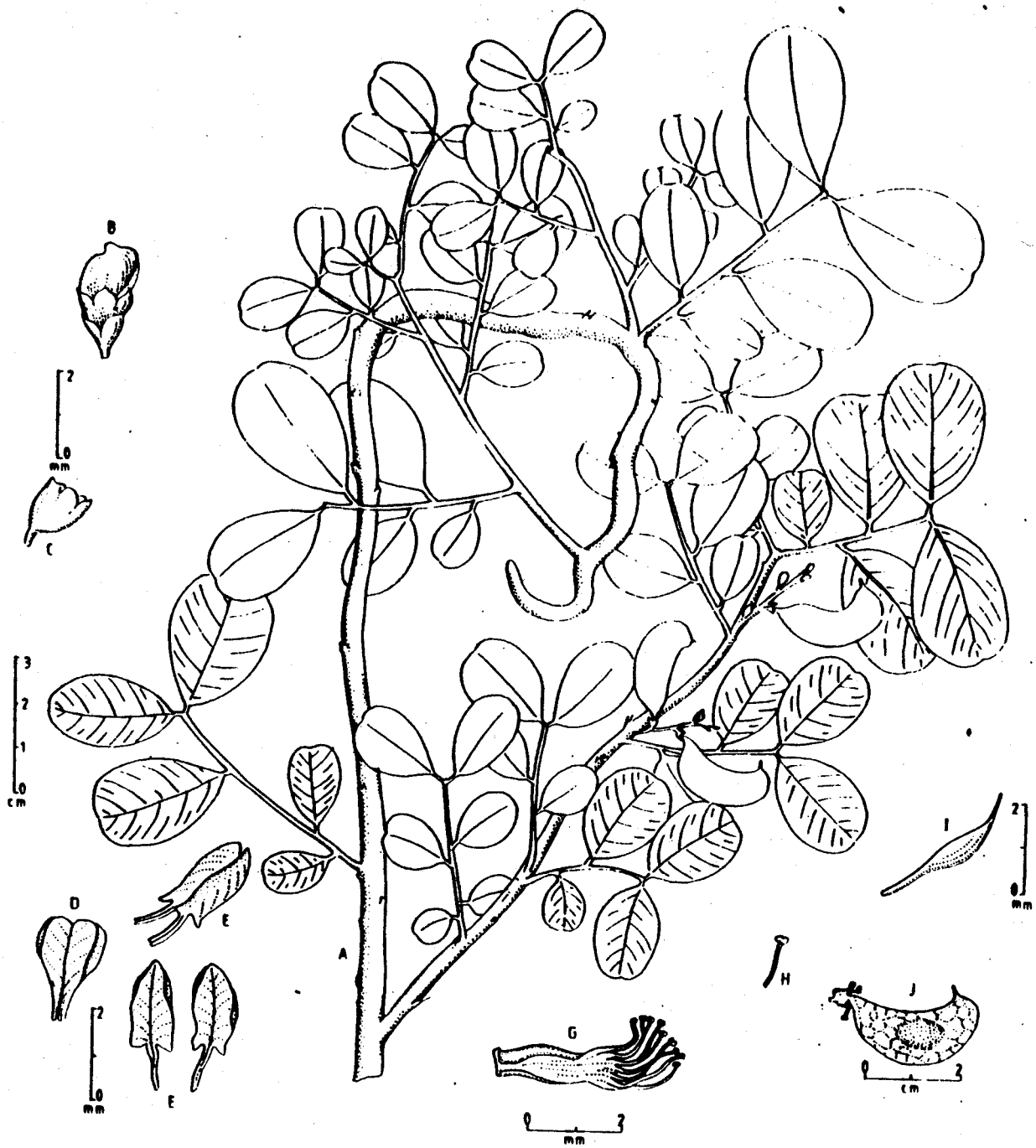


Fig 11

5-7.5 cm long, densely brown-pubescent; leaflets 5-11, the distal one the largest, thinly coriaceous, prominently nerved and sparsely adpressed pubescent above, densely brown-pubescent below, 1.5-2 x 1-2.5 cm, cuneate-ovate, emarginate at apex, cuneate at base; petiolules 0.2-0.4 cm long, pubescent. inflorescence in axillary congested or open panicles, 1-5 cm long; peduncle, branches and pedicels rusty-pubescent; bracts upto 0.2 cm long, ovate, pubescent; bracteoles upto 0.3 cm long, ovate-acute, adpressed to the calyx, 0.2-0.3 cm long. Flowers white, 0.3-0.4 cm long; calyx 0.2-0.3 cm long, campanulate, glabrescent, slightly gibbous at base, subequally 5-lobbed, the upper two lobes subconnate, obtuse, the lowest longer, acute; corolla with 5 long-clawed petals; vexillum 0.3-0.4 cm long, orbicular, emarginate, reflexed; wings 0.3-0.4 cm long, hastate or sagitate at base, obtuse at apex; keels upto 0.3 cm long, hastate at base; stamens 9, monadelphous, staminal column 0.4-0.5 cm long; pistil 0.4-0.5 cm long, glabrous, 2 ovuled; ovary stipitate; style subulate; stigma capitate. Pods 3-5 x 1-1.5 cm, firmly coriaceous, shortly stipitate, prominently reticulate-veined opposite the seeds, 1-2 seeded; seeds reniform, compressed, brownish black (Fig. 12).

Distribution: Kerala: Travancore; India: Nilgiris in Tamilnadu; World: Burma, Indo-China.

Notes: It is only on the authority of Rama Rao (1914) that the species is included here wherein there are no details about the locality, phenology, etc. of the species. The species was not located during the present study and there is no herbarium record of it from Kerala in various Indian herbaria consulted. The description provided here is mainly based on specimens from Nilgiris at MH&CAL.

6. Dalbergia horrida (Dennst.) Mabberley, Taxon 25: 538. 1977. quod basionym, excl. synonym D. spinosa Roxb.; Thoth. et K.K.N. Nair, Taxon 30: 46. 1981.--Amerimnon horridum Dennst. Schult. Hort. Malab. 3: 4. 1818.--Dalbergia aympathetica Nimmo in Grah. Cat. Bombay Pl. 55. 1839; Benth. J. Proc. Linn. Soc. Bot. Supl. 4: 42. 1860; Baker fn Hook.f. Fl. Brit. India 2: 234. 1876; Rama Rao, Fl. Travancote 129.

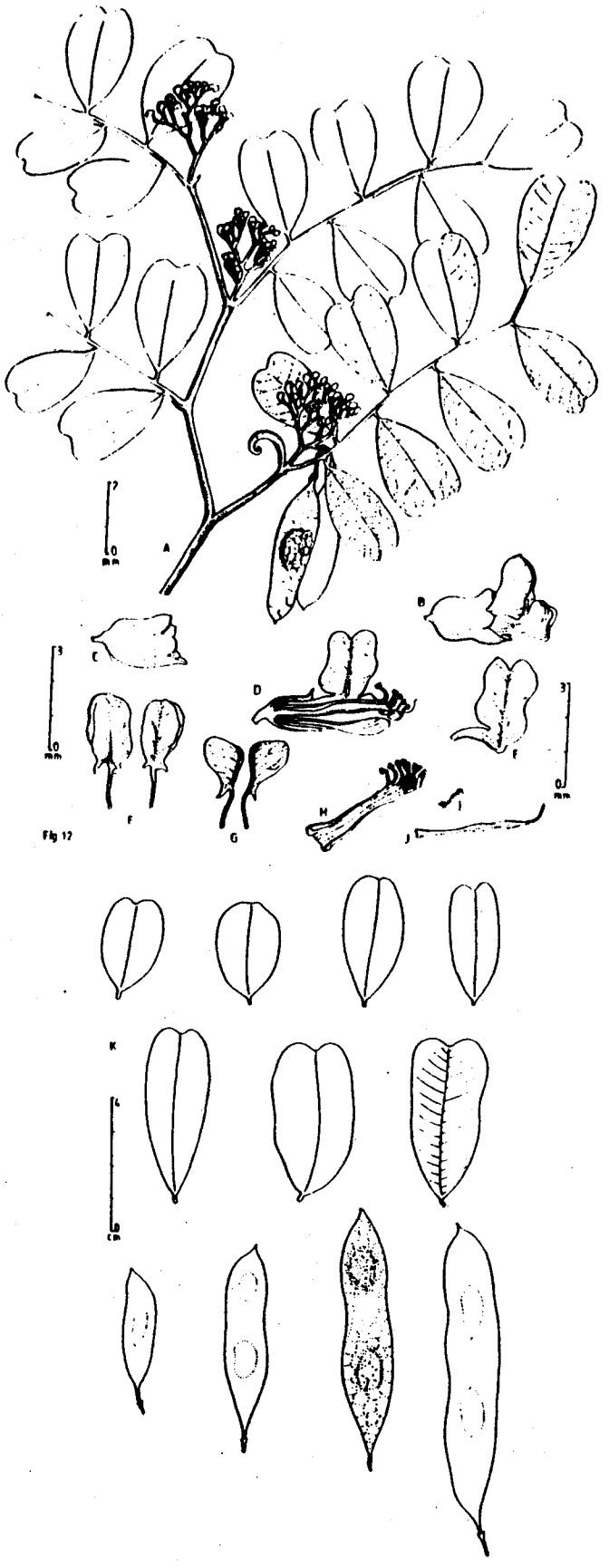


Fig 12

1914.--D. multiflora Heyne (Wall. Cat. 5848 B.1832 nom. nud.) ex Prain, J. Asiat.Soc. Bengal 70(2): 59, 1901 6 Ann. Roy.Bot. Card. Calcutta lO(1): 43. pl. 18. 1904; Gamble, F1. Presld. Madras 1: 269. 1957 (repr.ed.).--D. ferruginea Hohenack ex Baker in Hook.f. F1. Brit. India 2: 234, 1876,

TYPE:Plate 40, Ana-mullu in Rheede, Hortus Malabaricus 8: 73. 1688(Lectotype K, CAL!).

Armed lianas upto 30 m high with occasionally prostrate branches; main stem stout,upto 30 cm in diameter with 6-18 cm long, branched or unbranched thornes or hooks; branchlets sub-bifarious,pubesccnt, green when young. Leaves imparipinnate, 6-12 cm long; rachis 4-10 cm long, pubescent or glabrous; leaflets 5-17, pubescent when young, glabrous or sparsely pubescent when mature, 0.5-2.5 x 0.3-1.5 cm, elliptic, oblong, obtuse, truncate or emarginate at apex, cuneate or rounded at base; petiolules about 0.1 cm long, slightly pubescent or glabrous; stipules minute, pubescent, cauducous. Inflorescence axillary, in cymose panicles towards the apex of branchlets, 10-30 cm long; peduncles, branches and pedicels rusty pubescent; bracts minute, oblong, obtuse; bracteolea about 0.1 cm long, oblong obtuse. Flowers white,upto 0.3 cm long; calyx campanulate, upto 0.1 cm long, pubescent, 5-lobbed, the upper two lobes subconnate, acute; corolla with 5, clawed petals; vexillum about 0.2 cm long, shortly clawed, ovate, oblong or obovate, emarginate at apex, reticulately veined on the blade; wings upto 0.2 cm long, shortly clawed, oblong, prominently single nerved, obtuse at apex; keels about 0.2 cm long, shortly clawed, auricled, reticulately veined; stamens 9, monadelphous, staminal column 0.2-0.3 cm long, split along the upper side, glahours; pistil about 0.2 cm long, pubescent; ovary stipitate; style short, obscure; stigma blunt. Pods 5-8.5 x 1.5-2 cm, velvetty-pubescent when young, almost glabrous when mature, thick above seeds, finely reticulately veined throughout, 1-3 seeded, shortly stalked, obtuse at apex, acute at base; seeds 0.5-1 x 0.3-0.5 cm, reniform, compressed (Fig. 13 & 14).

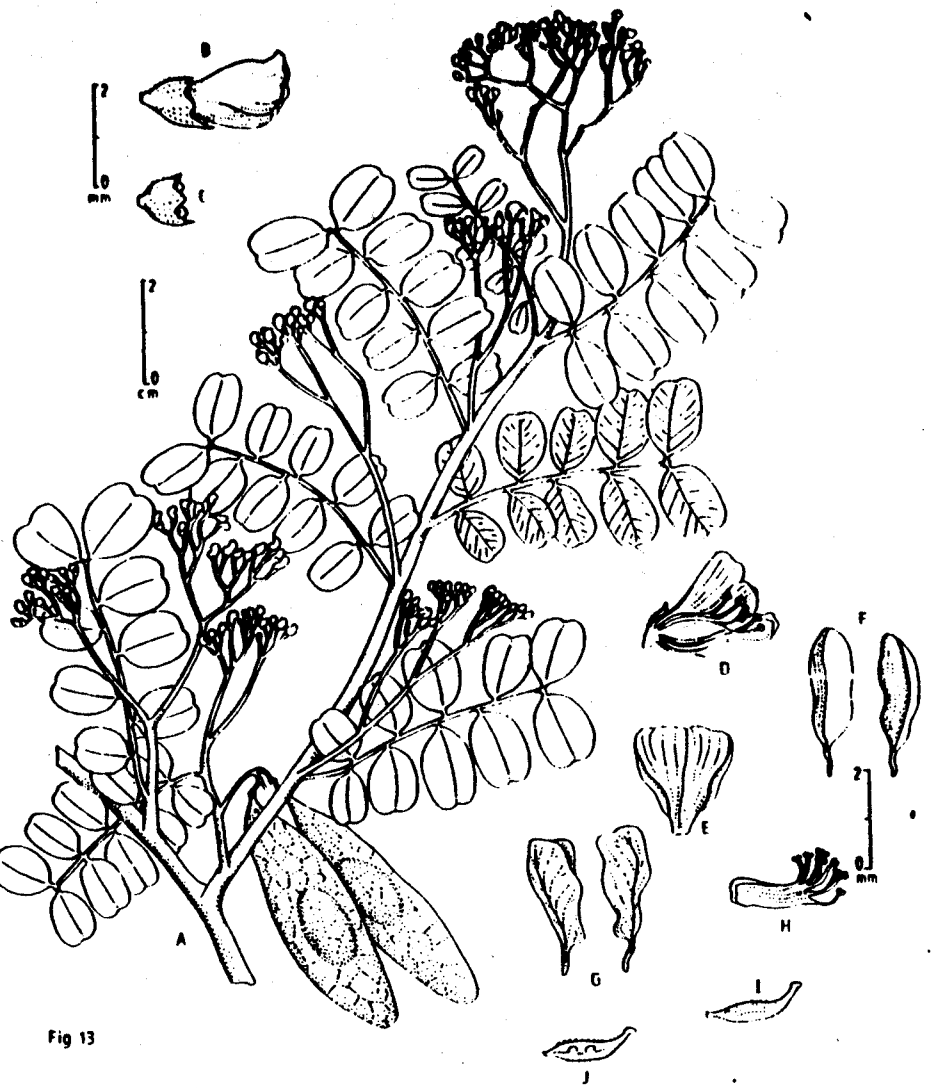
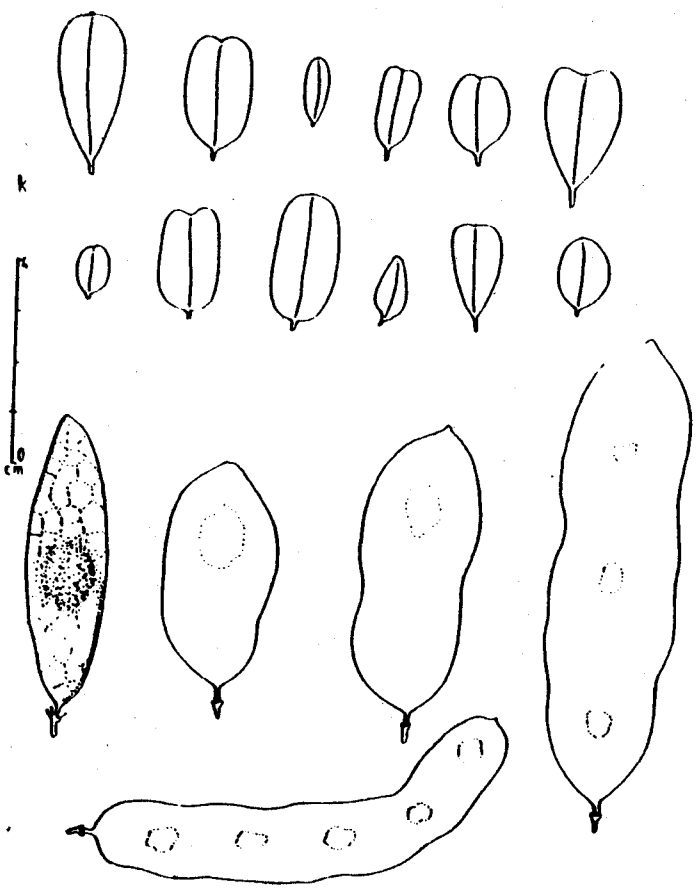


Fig 13



Habitat: Deciduous forests at low elevations (50-500 m).

Flowers: November–February. Fruits: December–Apri 1.

Local name: Ana-mullu.

Distribution: Kerala: Almost throughout; India: Tamil Nadu, Karnataka, Coa,Maharashtra.

Notes: There are only 9 stamens in the flowers of specimens examined here eventhough 10 stamens were also recorded (Cooke, 1903). Similarly 3–5 seeded fruits are aleo rarely seen as against the record of possessing only 1 or 2 seeds per fruit (Cooke, 1903).

Specimens examined: Thaliparambu, Malabar, 16–12–1913, CA. Barber 9861(MH); Palghat, S. Malabar, 21–12–1916, (Coll.? No. 14201 (MH); Kannoth,Malabar Dt., 13–12–1912, Coll. ? No. 0609 (MH); Sides OF Walayar cement Quary, 30-10-1984, K.K.N.Nair 2896(HKFRI); Dhoni Beat, Dhoni RF, Palghat Divison, 19–3–1984,K.K.N. Nair 2834 (HKFRI); Kodamuratti, way Perumthenaruvi, Ranni Range, 31–5–1984, K.K.N. Nair2858 (HKFRI); Muthikulam RF, 30–10–1984, KKN. Nair 2898 (HKFRI); Mukkali, K. Swarupanandan 71/8(HUC); Calicut University Campus, 21–1–72, M Sivadasan 683 (HUC); Kunhimangalam, Calicut, 18–1–70, S. Nambiar 262 (HUC); Kottaparamba,Calicut, 18–3–70, V.V. Sivarajan 907 (EUC); Nooradippalam, -Nemmara, 23–4–76, A Jose 18242 (HUC). --

7. Dalbergia horrida(Dennst.) Mabberley var. glabrescens(Pra&n) Thoth. et K.K.N.Nair, Taxon 30:46. 1981.

TYPE: Nagerkoil, South India, Nov. 1893, Lawson 218 (Lectotype designated,CAL!);Robert Wight 267, 259, 819 (Syntypes, CALI).

The variety differs from the species proper by glabrous or leaves.

Flowers: November–February. Fruits: December–Apri1.

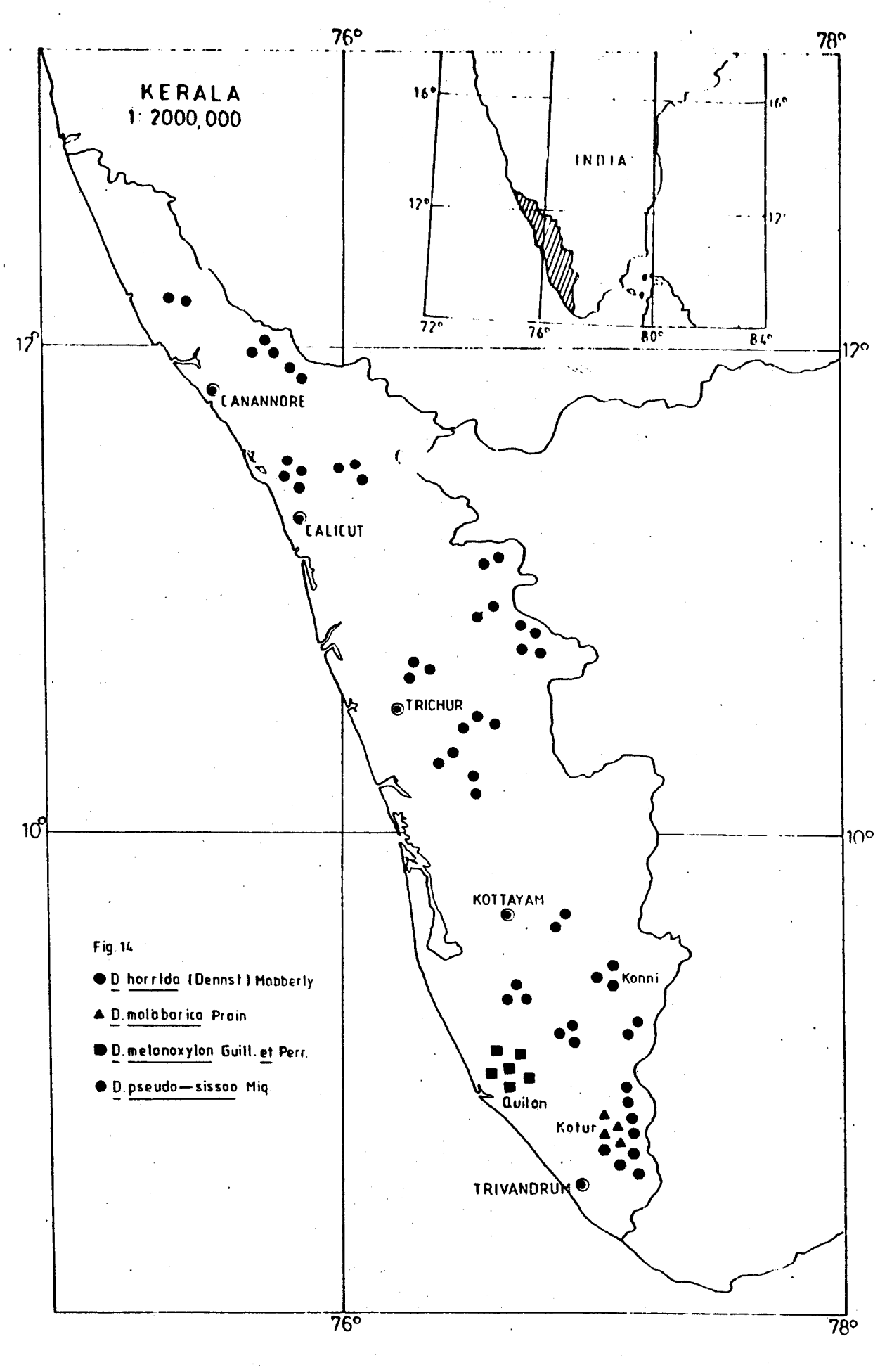
Distribution: Kerala: Thenmala, Nilambur, Palghat; India: Tamilnadu.

Specimens examined: Katlappara, Thenmala, 18–7–1984, K.K.N Nair 2880 (HKFRI); Nilambur, Edacode, 21–6–1984, K.K.N Nair 2857 (HKFRI); Dhoni beat, Dhoni RF, Palghat, 19–3–1984, K.K,N. Nair 2834 (HKFRI).

8. Dalbergia lanceolaria L.f. Suppl. P1. 316. 1781; Benth. J. Proc. Linn. Soc. Bot. Suppl. 4: 45. 1860; Baker in Hook.f. **F1.** Brit. India 2: 235. 1576; Prain, J. Asiat. Soc. Bengal 70(2): 52. 1901 6 Ann. Roy. Bot. Gardn. Calcutta lO(1): 93. p1.76. 1904; Bou'rdillon, Trav. Trees 118. 1908; Rama Rao, F1. P1. Travancore **130.** 1914; Gamble, F1. Presid. Madras **1:** 270. 1957 (repr.ed.); Nair et Henry(ed.)Fl. Tamilnadu 1: 103. 1983.0-D, frondosa Roxb. (Hort. Beng. 53. 1814 nom. nud.) ex DC. Prodr. 2: 417. 1825; Wt. Ic. ***t.*** 266. 1850.--D. zeylanica Roxb. (Hort. Beng. 53. 1814 nom.nud.),Fl. Ind. 3: 228. 1832.-D. arborea Neyne ex Roth, NOv. Sp. P1. 330. 1821.–D. hircina Ram. in Wall. Cat.5871A. 1831–32 (nom.nud.).--Amerimnon lanceolarium (L.f.) 0. Ktze. Rev. Gen. P1. 1: 159 1891.

TYPE: Koenig s.n.(Isotype, photograph BM!).

Much branched trees upto 30m high;bark rough,flaking;main trunk 30-60 **cm** in diameter; branchlets sub–bifarious, glabrous or rusty puberu–lous; leaves imparipinnate, 6–15 cm long; rachis 6–13 cmlong, glabrous; leaflets 5-14, elliptic, ovate–oblong or rarely suborbi–cular, firmly reticulate–veined, rigidly subcoriaceous, 0.7-6.5 x 0.4-3.5 cm, acute, obtuse **or** rounded at base, obtuse, retuse or rarely emarginate at apex, bright green above, paler beneath; petiolules 0.2-0.5 cm long, pubescent when young; stipules 0.2–1 cm long, subfalcate, lanceolate, cauducous. Inflorescence terminal and exillary in lax, rusty–pubescent panicles, 10-25 cm long. flowers pinkish–blue, yellowish **or** white with blue colour inside, 0.8–1 cm long; pedicels upto 0.3 cm long, rufus–hairy; bracts minute, lanceolate, cauducous; bracteoles minute, oblong, cauducous; calyx campanulate, 0.2-0.3 cm long, yellow or brown, pubescent or hairy, 5–lobed with the upper two


KERALA
1: 2000,000
INDIA
76°
78°
17°
12°
10°
16°
72°
80°
84°
CANANNORE
CALICUT
TRICHUR
KOTTAYAM
Konni
Quilon
Kotur
TRIVANDRUM
Fig. 14
D horrida (Dennst) Mabberly
D. malabarica Prain
D. melanoxylon Guill. et Perr.
D. pseudo—sissoo Miq

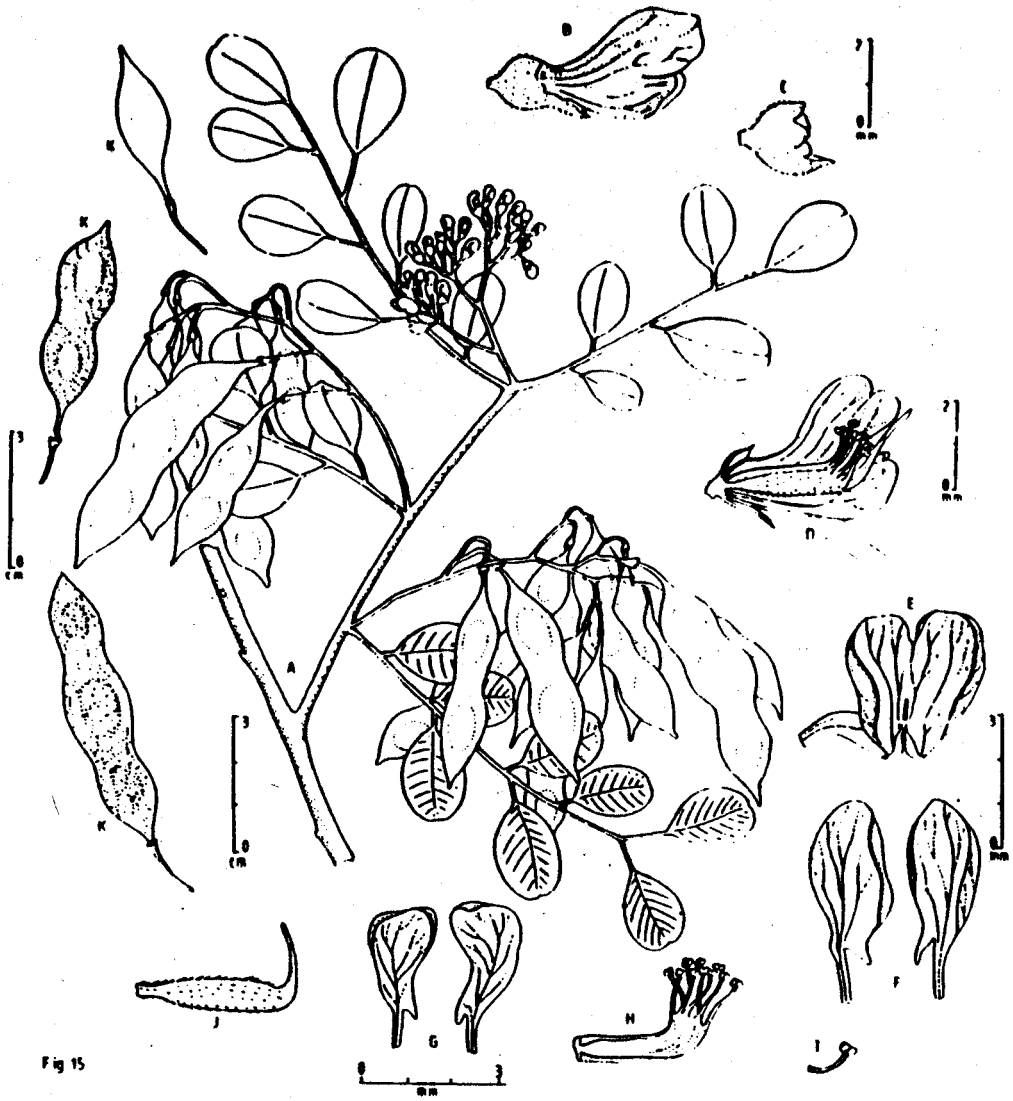


Fig 15

lobes rubconnate and other ovate, obturc or mute, the lowest longert, linear-lanceolate, acute; corolle with 5, clawed petals; vexi llum 0.4-1 cm long, long clawed, orbicular, emarginate at apex, reticulate-velned, thickened at base; wings 0.4-0.7 cm long, oblong, auricled, reticulate-veined with often reflexed margins, rounded or ovate at apex; keels 0.4-0.6 cm long, oblong, auricled, faintly reticulate-veied, broadly rounded at apex; stamens 10, monadelphous, stamina1 column split on the upper side, glabrous; filaments equal or subequal; pistll 0.6–1 cm long, pubescent; ovary stipitate, usually 3-ovuled; style slender; stigma minute, capitate. Pods 3-12.5 x 0.8-2 cm, oblong, stipltate, faintly reticulate-veined throughout, 1–4 seeded, tapering towards both ends; seeds 0.4-0.7 x 0.3-0,4 cm, reniform, compressed (Fig. 15& 16).

Habitat: Deciduous forests from sea level upto about 500 meters.

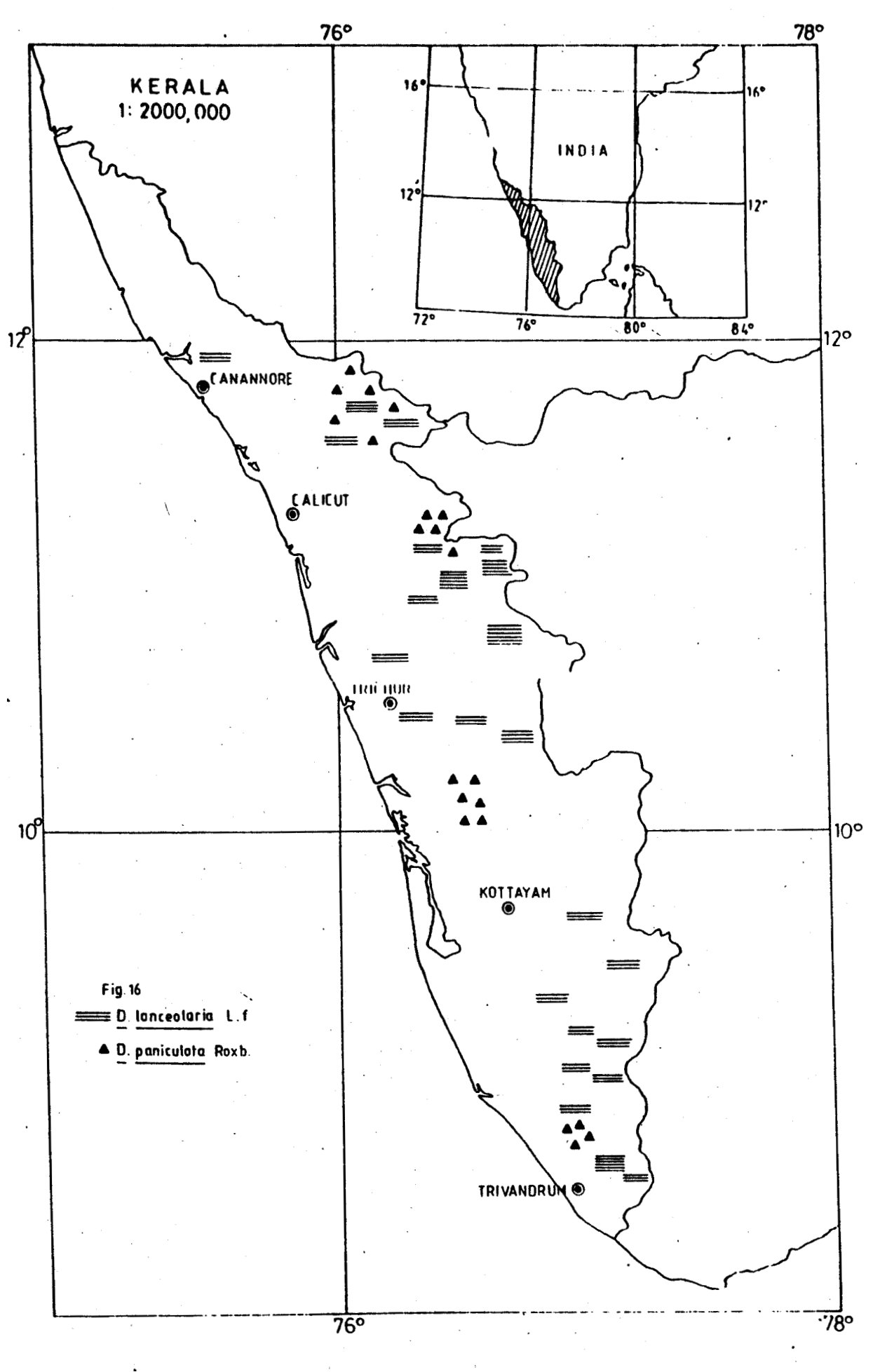
Flowers: March–July. Fruits: July–December.

Local names: Velvetti, Malamuringa, Pymkanni, Vellaveetti, Erigei, Mennavitti.

Distribution: Kerala: Almost throughout; India: Throughout; World: Pakistan, Bangladesh, Sri-Lanka.

Notes: D. lanceolaria Moon from Sri Lanka is quite a different species which in current nomenclature is Pericopsfs mooniana(Thw.) Thw.(Vel va E. Rudd, Revis. F1. Ceylon, 1980).

Specimens examined:Tholpetty, near forest checkpost, Wynad Division, 11–4–1984, K.K.N.Nair284O(HKFRI); Kurichiad, Chethleth range, Wynad Division, 12–4–1984, K.K.N. Nair2845 (KFRIH); Thalipramba, Malabar Dt. Way, 1906, C.A. Barber 7750 (CAL&MH); Mananthody, Wynad, Coll. ? s.n.(MH); Varali beat, Walayar, 30–10–1984, K.K.N.Nair2895 (KFRIH); Walayar,beyond cement factory, 30–10–1984, K.K.N. Nair2892(KFRIH); Dhoni, 20-7-1963,J. Joseph 17235 (CAL 6MH); Pottikkal RF, near Mukkali, Palghat, 14–2–1985, K.K.N,Nair3233 (KFRIH); Chindaki,


KERALA
1: 2000,000
INDIA
16°
12°
72°
76°
80°
84°
76°
78°
12°
10°
CANANNORE
CALICUT
KOTTAYAM
TRIVANDRUM
Fig. 16
D. lanceolaria L.f
D. paniculata Roxb.

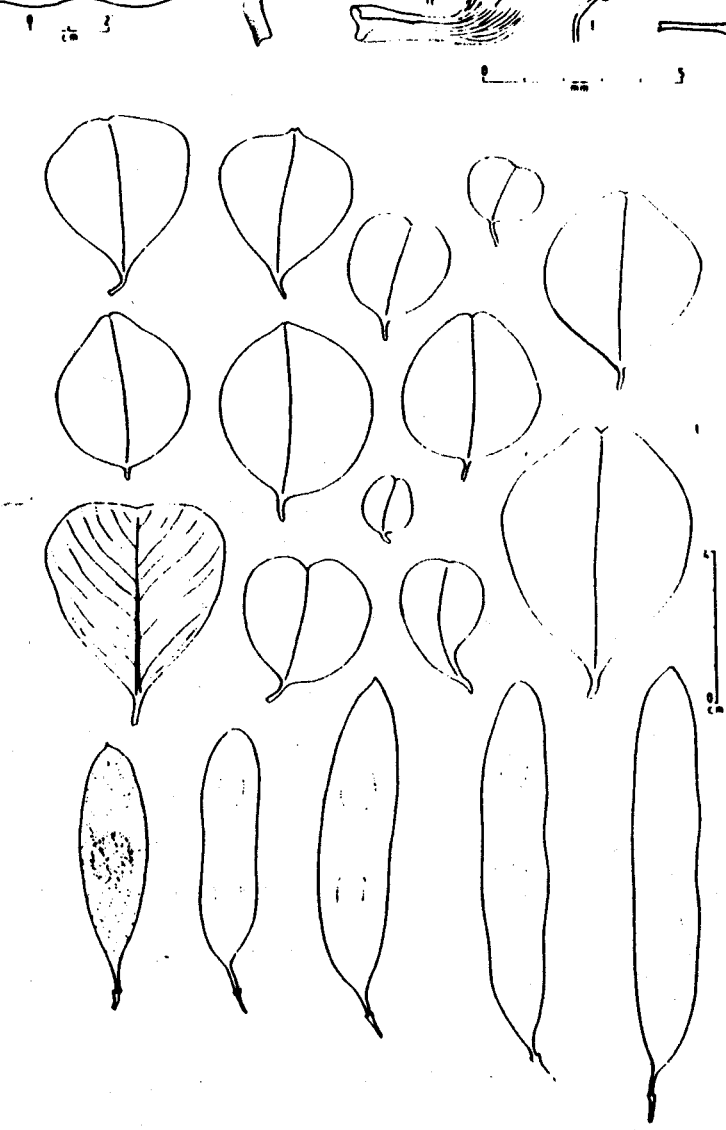
Palghat, 1–6–1966, E. Vajravelu 27759 (MH); Below Ayyappan Kovil, Palghat, 19–4–1977, E. Vajravelu 49715 (CALLMH); Karivara, Palghat Dt. (575 m), 12–3–1975, E. Vajravelu 46280 (MH); Walayar near Railway station (75 m), 23–5–1964, E.Vajravelu19057 (MH]); Pullimanpatti, Walayar, 4–9–1975, K.N. Subramanian5280 (HSFRC); Walayar, near School, 29-12-1973 ,K.N.Subramanian 4722 (HSFRC); Dhunakadavu , Parambikulam , K.K.N. Nair2810HKFRI); Nelliampathy,Nemmara, 12–3–84,K.K.N. Nair 2828(HKFRI); Moolappara area, Vazhani dam catchment, Nemmara, 5–S–84, K.K.N. Nair 2847 (HKFRI); Near Wadakkancherry (50 m), 9–9–1976, K.Ramamurthy 48434 (CAL & MH); Adirappally, Trichur (330 a), 19–3–1966, K. Ramamurthy27012 (MH); Ettyani, Vazhachel, 7–5–84, K.K.N. Nair2851 (HKFRI); KFRI Campus, Peechi, 16–8–83, K.K.N.Nair2805 (HKFRI); Machad, Trichur 25–10–83,K.K.N.Nair 2807(HKFRI); Madathara, Punalaur, 17–7–84 K.K.N.Nair 2878 (HKRI); Aryankavu, Thenmala, 18–7–84, K.K.N. Nair 2888 (HKFRI-);Vayakkara, Konni, 1–6–84, K.K.N. Nair2864 (HKFR1);Forest near Neyyar dam (175 m), 16–4–1973, J. Joseph 44169 (MH); Thenmala, October 1920, P.F.Fyson 5989 (FH).

9.Dalbergia latifolia Roxb. Corom. P1. t. 113. 1799 & Fl. Ind. 3: 221. 1832; Wt-etArn. Prodr. 264. 1834;Benth. J. Proc. Linn. Soc. Bot. Suppl. 4: 38. 1860; Wt. Ic. t. 1156. 1838- 53; Bedd. F1. Syvat. 1:24 (excl.main fig.). 1869;Baker in Hook.f., F1. Brit. India 2: 231. 1876; Prain, J. Asiat. Soc. Bengal 70(2): 41. 1901 & Ann. Roy Bot. Gardn. Calcutta lO(1): 80. pl. 62. 1904; Bourdillon, Trav. Trees 117. 1908; Rama Rao, Fl. P1. Travancore 129. 1914; Gamble, F1. Presid. Madras 1: 270 1957 (repr. ed.); Nair et Henry, F1. Tamilnadu 1: 103. 1983.–– D. emarginataRoxb. Hort. Beng.53,1814(nom.nud.) & F1. Ind.3:224. 1832.–– Amerimnon latifolium(Roxb.) O.Ktze. Rev. Gen. P1. 1: 159. 1891.

TYPE: Roxburgh,Coromandel Plants t. 113.1798 (Lectotype, CAL!).

Trees, 10-30 m high; bark flaking; main trunk upto 1 m in diameter; branches spreading; branchlets sub–bffarious, sometimes pendulous, glabrous. Leavee imparipinnate, compact on twiggy branchlets, 10–22 cm long; rachis 7–10 cm long, slender, glabrous; leaflets 3-8, often 5–7, broadly-ovate or suborbicular, glabrous above, pale or subglaucacent

Fig 17



beneath, 3-10.5 x 1.5-9 cm, rounded, obtuee, emarginate or rarely subacute at apex, obtuse, rounded or cuneate at base; petiolules 0.5-1 cm long, slender; stipules small, cauducous. Inflorescence axillary or extra-ax1llary,lax, divaricate, corymbose panicles, 5-15 cm long, usually produced from the axils of fallen leaves; bracts minute; brctcoles membraneous, very cauducous. Flowers white or slightly yellowish, scented, 9.4-0.7 cm long; pedicels 0.2-0.5 cm long, fil I-form; calyx 0.3-0.5 cm long, campanulate, slightly puberulous when young, 5-lobed with the upper two lobes subconnate; corolla with 5 distinctly clawed petals; vexillum 0.4-0.6 cm long, sub-orbicular, reflexed, emarginate at apex, reticulate-veined; wings 0.4-0.5 cm long, auricled, reticulate-veined, acute at apex with often reflexed margins; keels 0.4-0.6 cm long, auricled, reticulte-veined, subconnate at apex; stamens 9, monadelphous, staminal column 0.3-0.5 cm long, 1ongitudinally split above filaments, free in their upper third, indistinctly shorter and longer; pistil 0.2-0.4 cm long, glabrous; ovary 3-5 or upto 7 ovuled, stipitate; style slender; stigma capitate. Pods 3-12 x 1-1.5 cm, strap-shaped, reticulate-veined throughout, obtuse at apex with or without a short apiculae, 1-3 or rarely 4 seeded; seeds 0.6-0.8 x 0.4-0.5 cm ,reniform compressed, brown (Fig. 17& 18).

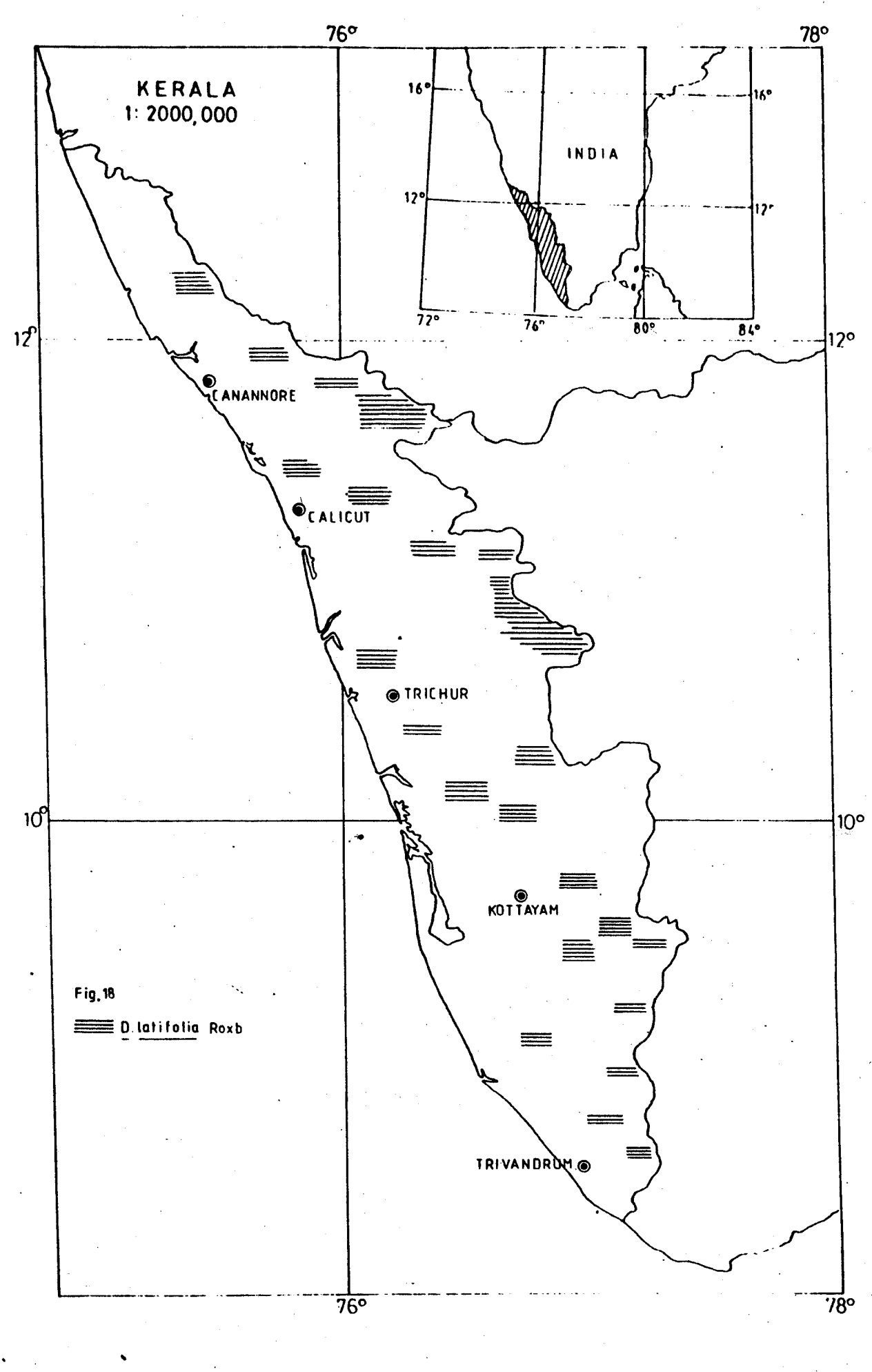
Habitat:Deciduous forests from about 50-1000 meters.

Flowers: January-March, rarely August-October. Fruits: November-February, occasionally in June?

Local names: Eeetti, Veetti, Chola-veetti, Kolavitti.

Distribution: Kerala: Almost- throughout; India: Almost throughout; World: Pakistan, Nepal, Sikkim, Burma, Malaysia, Indo-China.

Specimens examined: Cannanore, Kaimaram Road, Tholpetty, 13-11-1978, V.S. Ramachandran 58721 (MH); Walayar, 30-10-1984,K.K.N. Nair 2806 (HKFRI); Agali , 30-12-1983,K.K.N.Nair2819(HFR1);Attappadi 27-8-1966, E. Vajravelu 27857 (CAL& MH); Palghat Dt.,Chittoor-Agali (650 m), 25-


KERALA
1: 2000,000
INDIA
16°
12°
72°
76°
80°
84°
76°
78°
12°
10°
CANANNORE
CALICUT
TRICHUR
KOTTAYAM
TRIVANDRUM
Fig. 18
D. latifolia Roxb

2-1979, E. Vajravelu 60667 (HH); Walayar RF (175 m), 26-10-1963, J. Joseph 17891 (MH); Palghat, Agali (575 m), 17–10–1965, E.Vajravelu 26313(MH).kaIeyar, January 1919, K.Kunhiram Menon s.n. (FH); Mandampatty forests (550 m), IS–4–1978, N.C. Nsir56841 (CAL); Kartvara slopes, Pelghat, 19–2–1979, E.Vajravelu 60543 (CAL); Mukkall(750 m), 16–2–1975, T.Surendran8690 (HUC); Chindaki, Palghat, 16–10–1979, N.C. Nair 64678 (HH); On the way to Parambikulam dam (1200 m), 12–3–1978, A.A. Ansari s.n.(CAL); Dhunakedev, Parambikulam, 22–11–1983, K.R.N.Nair 2809(HKFRI); Anappady, Dhunakadav, 16–11–1984, K.K.N. Nair3211 (HKFB1);- Ueerappady, Parambikulam, 17-1 1–1984, K.R.N. Nair 2873 (HKFRI); Nilambur; KFRI Campus, 21–6–84, K.K.N.Nair2871(HKFRI): Mangalam dam catchment,2-3-1975,E.Vajravelu 46140(MH);Vazhani dam catchment,Trichur,24-10-1983,K.K.N.Nair 2806 (BKFRI); Chiyyaram, Trichur 7-8-1977, V.P.K. Nambiar79 (HKFRI); Idukki Dt., Thekkedy (825m), 23–12–1974, K.Vivekandandan 45677 (MH); Kallada dam catchment, 19–7–1984, K.K.N.Nair 2890 (HKFRI); Kallar Valley Rosewood plantation, Achenkovil, 19–7–1984, K.K.N. Nair 2868,2867 (HKFRI); Mu1lumala, Mannarappara, 1–6–1984, K.K.N. Nair 2867 (HKFRI); Achenkovil,Alappadi , Travancore 9–10–1928, V. Narayanaswami 77826 (MH); Travancore,7-1-1893, T.F. Bourdillonl559 (HUCT); Between sea–level to 4000 ft., Travancore, T.F. Bourdillon 1599 (HSPRC).

1O.Dalbergia malabarica Prafn, J. Asiat. Soc. Bengal 70(2): 48. 1901 & Ann. **Roy.** Bot. Gardn. Calcutta 10(1):67.p1.46.1904; Gamble, F1. Presid. Madras I: 269. 1957 (repr.ed.);. Nair et Henry(ed.),Fl. Tamilnadu 1: 1-3. 1983.-D.tamarindifolia Roxb. var. pubescens Baker in Hook.f. F1. Brit. India 2:235. 1876.

TYPE: Concan, Stocks s.n. (K, photograph!).

Shrubby climbers; branchlets densely yellowish–brown,ferruginous pubescent. Leaves imparipinnete, 7-10 cm long; rachis 7.5-9 cm long, densely pubescent; leaflets 25–41, crowded, moderately firm, 1-1.5 x 0.3-0.5 cm, elliptic-oblong or linear-oblong,ferruginous and rusty–pubescent beneath, acute or obtuse at apex with a short pappillae, rounded, ovate or rarely oblique at base; petiolules about 0.1

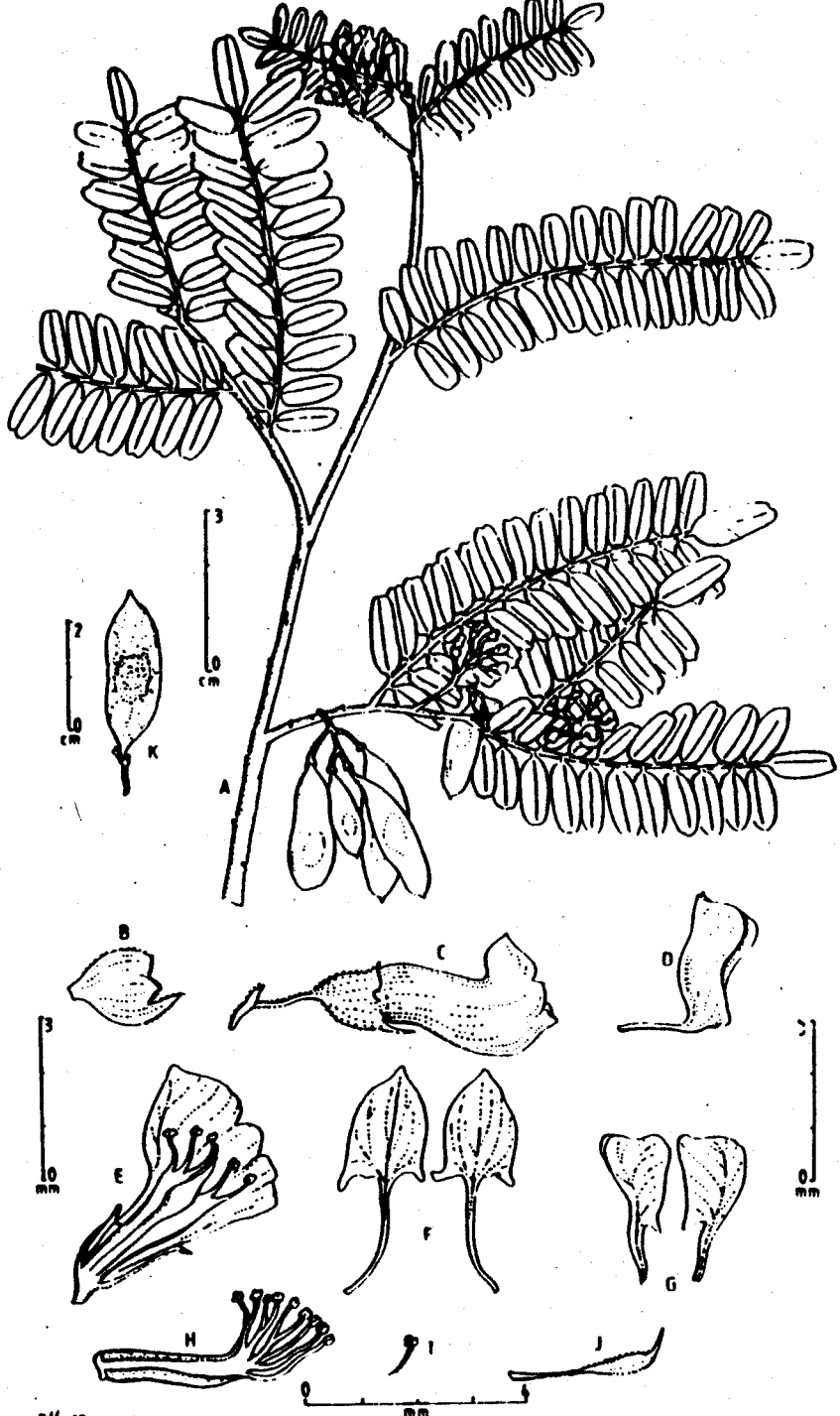
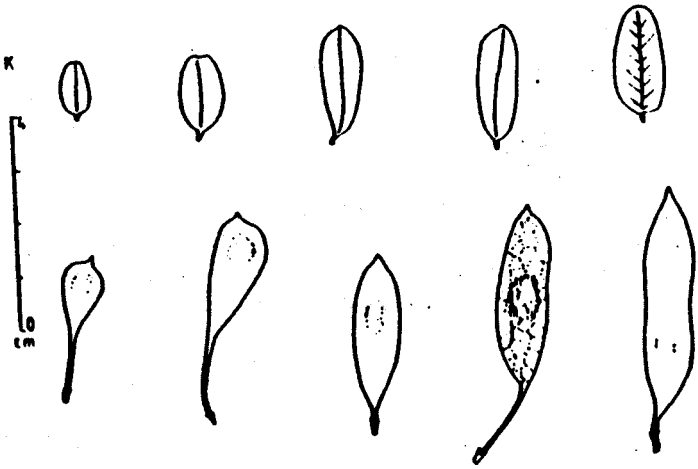


Fig 19



long, lanceolate, rusty- pubescent. inflorescence densely congested, axillary corymhs, 1-1.5 cm long; peduncle, branches and pediceis densely pubescnet. Flowers white, 0.3-0.4 cm long; bracts less than 0.1cm long, triangulare-ovate, persistent; bracteoles about 0.1 cm long, ovate–lanceolate, obtuse,persiestent; calyx campanulate, upto 0.2 cm long ,S–lobed, lobes pubescent along the margins, the upper two subconnate, obtuse, the lowest narrowly lanceolate and longest; corolla with 5, long–clawed petals; vexillum about 0.3 cm long, ovate, blade reflexed; .wings 0.2-0.3 cm long, ovate, auriculate, acute; keels upto 0.2 cm long, truncate, auriculate; stamens 9, monadelphous, stamina1 column about 0.3 cm long split along the upper side; filaments free in their upper third; pistil about 0.3 cm long; ovary pubescent along the upper suture, stipitate, stipe pubescent throughout; style filfform; stigma minute, capitate. Pods upto 3 x 13 cm, 1-2 cm long stipitate, ovnte ob1ong,thinly-coriaceous, prominently reticulate–veined especially above seeds, usually 1-seeded;seeds reniform, compressed(Fig.19 &14).

Habitat: Low country (dry forests).

Flowers: December - February. Fruits: December -February.

Distribution: Kerala: Trivandrum; India: Tamilnadu Karnataka, Maharashtra.

Notes: Eventhough checked thoroughly, this species could not be located in Kerala during the present study. But it was collected from the forests of Trivandrum and Quilon a century before. An endemic species of Peninsular India, now probably extinct from the State.

Specimens examined: Paruthippally, 18–12–1913, M. Rama Rao 886 (CAL & HUCT).

11. Dalbergia melanoxylon Guill. et Perr. F1. Seneg. Tent. 2274. 53. 1832; Benth. J. Proc. Linn. Soc. Bot. Suppl. 4: 47. 1860; Prain, J. Asiat. Soc. Bengal 66(2): 446. 1897, lbid 70(2): 59. 1901 6 Ann. Roy. Bot. Gardn. CalcuttalO(1): 46, pl. 22. 1904; Brandis, Ind. Trees 235. 1906; Nair et Henry(ed;),Fl. Tamilnadu 1: 103. 1983.--D. stocksii

Benth. J. Proc. Linn. Soc. Bot. Suppl. 4: 12. 1860; Baker in Hook.f. Fl. Brit. India 2:234. 1876; Rama Rao, Fl. P1. Travancore 129. 1914.- Amerimnon aelunoxylon (Cuill. et Perr.) O.Ktze. Rev. Cen. P1. 1: 159. 1891.--A.stocksii(Benth.) O. Ktte. Rev. Gen,Pl. 1: 159. 1891.

TYPE: Senegambia, Collector s.n.(Pphotograph).

Stunted trees, 4-6 m high; branches highly spreading, drooping or straggling, armed with occasional, stout spines; branchlets sub-bffa-rious, puberulous. Leaves imparipinnate, 10-20 cm long; leaflets 9-15, petfolulate, ovate, obovate or ovate-oblong, sparsely adpressed-pube-scent when young, thinly subcoriaceous, finely reticulate-veined, 1-1.5 x 0.5-1, cm, acute or obtuse at base, obtuse-emarginate or retuse at apex; petiolules 0.1-0.3 cm long, glabrous or finely puberulous; stipules very cauducous. Inflorescence axillary and terminal in subse-cund panicles, 3.5-8 cm long; peduncle, branches and pedicels finely puberulous; bracts and bracteoles, minute, linear, puberulous, subper sistent. Flowers white or yellowish-white, 0.4-0.6 cm long; calyx about 0.2 cm long, campanulate, pubescent, 5-lobed, short lobes obtuse except the linear, lanceolate, acute lowest, ciliolate; corolla with 5 shortly-clawed petals; vexillum 0.3-0.4 cm long, slightly auricled, oblong-ohovate, slightly emarginate, thin, reticulately veined; wings upto 0.3 cm long, margins reflexed, faintly reticulate-veined, ovate at apex; keels upto 0.3 cm long, faintly reticulate-veined, obscurely auricled, acute or obtuse at apex; stamens 9, monadelphous, staminal column 0.3-0.4 cm Long, Longitudinally split above or in two lateral bundles; fllaments glabrous, central ones longer; pistil about 0,3 cm long, glabrous; ovary stipitate, 1-2 or rarely 3-ovuled; style short; stigma minute. Pods 2.5-6.5x 1-1.5 cm, ovate or shortly-oblong, stipi-tate, uniformly widely-reticulated throughout, 1-2 seeded, shortly apiculate or blunt at apex; seeds upto 0.8 x 0.5 cm, reniform, compre-ssed (Fig. 14 & 20).

Habitat: A species more often planted than wild in India. Long back this species was collected from Quilon which is not present there now.

Fruits:April.

Local names:China blackwood (English).

Distribution: Kerala: Quilon(cult.); India:Tamilnadu to Maharashtra, Calcutta (cult.); World:Tropical Africa from Senegal to Ethiopia, Mozambique.

Notes: There were 10 stamens in the specimens examined here as against 9 recorded in the protologue of the species and also by Bentham (1860). This confirms the observation of Prain (1897).

Specimens examined: Low country, Quilon, 24-4-1915, Venkoba Rao 3098(HUCT) .

12.Dalbergia paniculataRoxb. Corom. P1, t. 114. 1799; Wt. et Arn. Prodr.265.1834; Benth.. J. Proc. Linn. Soc. Bot. Suppl. 4: 45. 1860; Bedd. F1. Sylvat. t. 88. 1869;Baker in Hook.f. F1. Brit. Ind. 2: 236. 1876; Prain, J. Asiat. Soc. Bengal 66(2): 449. 1897 6 Ann. Roy. Bot. Cardn. Calcutta lO(1): 87.p1.68. 1904; Rama Rao, F1. P1. Travancore 13. 1924; Gamble,F1.Presid. Madras 1: 270. 1957 (repc. ed.); Nair et Henry(ed.), F1. Tam-ilnadu, 1: 103. 1983.--D. nigrescens Kurt, Pegu Repr. App. A. 48. B. 45. 1875 &J.Asiat. Soc. Bengal-45: 279. 1876.-- Amerimnon paniculatum(Roxb.) 0. Ktze. Rev. Gen. P1, 1.159. 1891.-- Dalbergia lanceolaria L.f. subsp. paniculata (Roxb,) Thoth. Bull: bot. Surv. India 25: 171. 1983 (1985). --

TYPE: Plate 114 of Roxburgh's Coromandel Plants vol. 2. 1798 (Lecto-type CAL,!).

Trees, 10–20 m high; bark flaking; main stem upto 70cm in diameter; branchlets sub–bifarfous, greyish–brown pubescent, often turntng black on drying. Leaves 10–15 cm long, imparfpinnate; rachis 8-12.5 cm long, g1abrous;leaflets 9–13, obovate, oblong or elliptic, 2–2.5 x 1-1.5 cm, rounded or truncate at base, obtuse, emarginate or retuse at apex, rigidl y subcor iaceous, ftnely reticulated, sparse1y pubescent

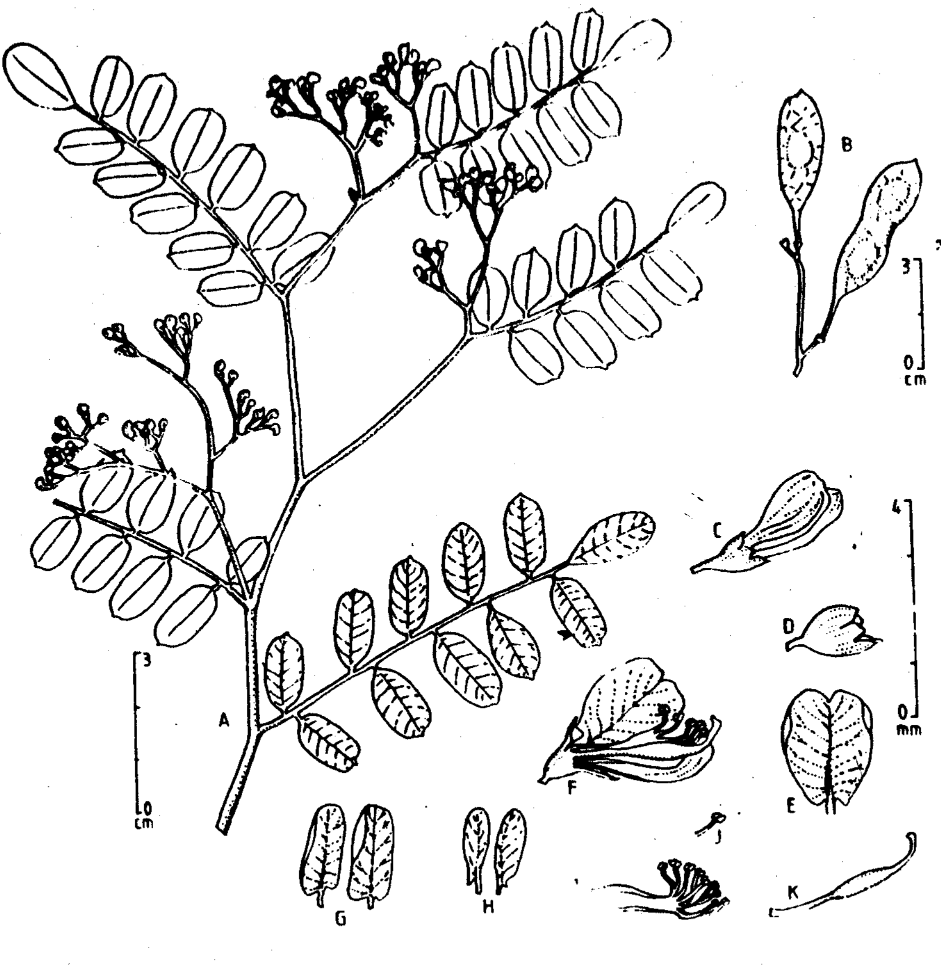
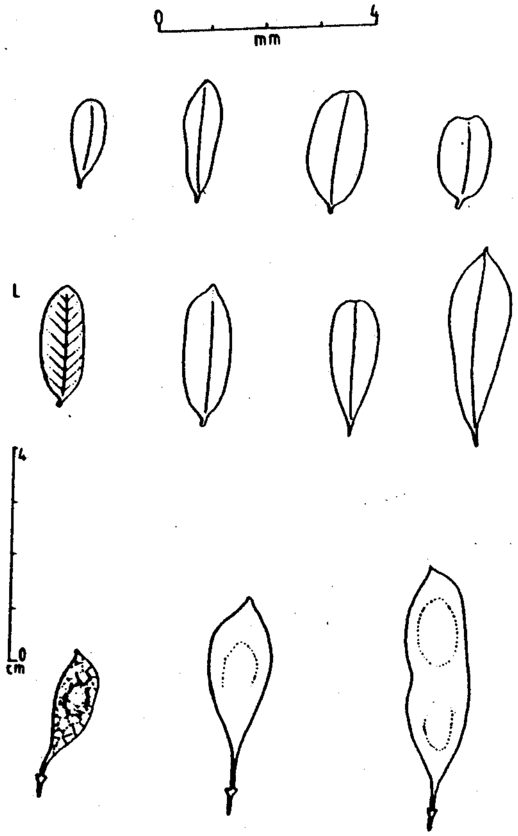


Fig 20



when young; petiolules 0.2-0.3 cm long, puberulous; stipules lanceolate, pubescent, cauducous. Inflorescence rusty or tawny-tomentose, terminal or rarely axillary panicles, 5–15 cm long; flowers white or bluish-white, 0.4-0.7 cm long; bracts oblong, hairy, cauducous; bracteoles ovate, pubescent, deciduous; calyx 0.2-0.4 cm long, campanulate, densely silky purplish, 5–lobed with the lobes subdeltoid, acute, subequal with the lowest the longest; corolla with 5,long-clawed petals; vexillum, ovate– oblong, slightly auricled at base, 0.3-0.5 cm broad, emarginate at apex, subcuneate at base with a long claw; wings 0.3-0.6 cm long, oblong, auricled, .rounded or ovate at apex; keels 0.4-0.6 cm long, oblong, auricled, rounded at apex; stamens 10, isodiadelphous with occasionally only the upper side completely divided, .glarous; pistil 0.5-0.8 cm long, pubescent; ovary stipitate; style slender; stigma capitate. Pods 6-18 x 1–1.5 cm, narrowly oblong, coriaceous, reticulated except above seeds, taperig to both ends; seeds 0.4-0.8 cm x 0.3– 0.4 cm, reniform,- compressed (Fig. 21 & 16).

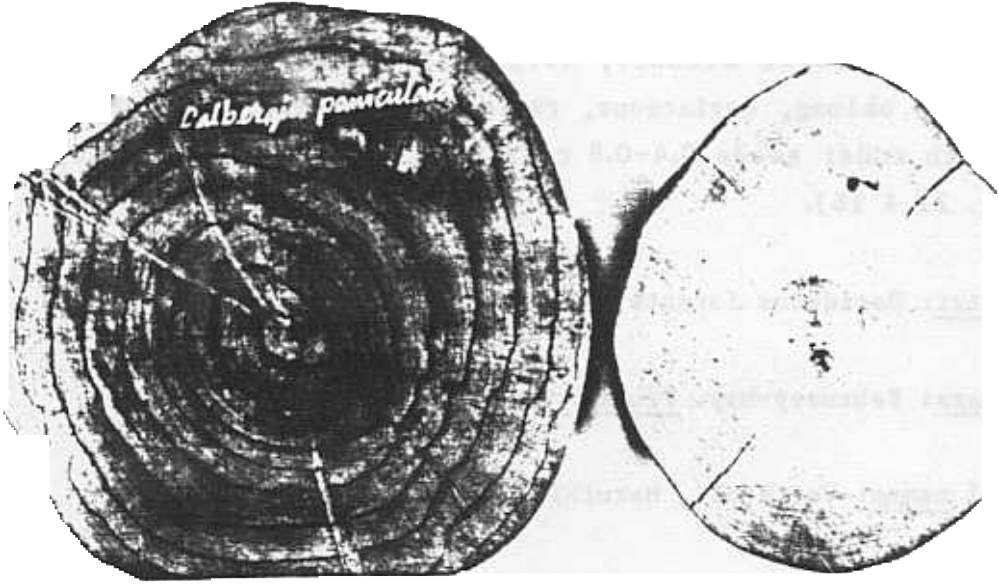
Habitat: Deciduous forests, from sea-level 800 meters.

Flowers: February–May. Fruits: April–October.

Local names: Vettatoli, Maruthi, Pannivagai.

Distribution: Kerala: Palghat, Malayattoor, Trivandrum; India: Peninsular India extending to Orissa; World: Indo–China.

Notes: Recently Thothathri (1983) noted that D. lanceoleria L.f., D. paniculata Roxb.,D assamica Benth., D. hemslepi Prain and D. maymyensis Cralb are all-closely related taxa and hence he treated them all as subspecies and varieties of D.lanceolaria, i.e. **D.** lanceolaria L.f. subsp. lanceolaria var. assamica (Benth.) Thoth., **D.** lanceolaria L.f. subsp. paniculata (Roxb.) Thoth., ***D.*** lanceolaria L.f. subsp. paniculate var. hemsleyi(Prain)Thoth. and **D.** lanceolaria L.f. subsp. paniculata (Roxb.) Thcth var. maymyensis (Craib) Thoth. respecttvely. However **in** this study D. lanceolaria and **D.** paniculata are kept as


Calborgia paniculata

distinct species mainly for the reason that there are distinct rings of intruded phloem in the wood of **D.** paniculata (Fig.21) whereas it Is totally absent in the wood of **D .**lanceolaris. Apart from this, the author also agrees to Thothathri's (1983) obsevetion that they are closely related or rather difficult to be identified, eventhough he (Thothathri, 1983) had given certain other characters also to distinguish the two taxa (as subspecies) in line with those given by Prain (1904).

Specimens examined: Near Walayar Railway station (76 n), 23–5–1964, E Vajravelu 19057 (CAL); Malayattur, near Kurusumudi, 26–12–1983, K.K.N. Nair 2811, 2812 (HKFRI); Veli, Trivandrum, 6–10–1895, T.F. Bourdillon s.n. (HUCT).

13. Dalbergia pseudo–sissoo Miq. F1. Ind. Bat. 1: 128. 1855; Prain, J. Asiat. Sac. Bengal 66(1): 118. 1897; Thoth.Proc. Ind. Acad. Sci. (Pl. Sci.) 92(1): 25. 1983; K.K.N.Nair, J. Econ. & Tax. Bot. 7: 732–33. 1983.–– D. rostrata Grah. (Wall. Cat 57. 1832 nom. nud.) ex Prain, J. Asiat. Soc. Bengal 70(2): 45. 1901 &Ann. Roy. Bot. Gardn. Calcutta 10(1): 60–61.p1.36. 1904; Rama Rao, F1. P1. Travancore 131. 1914; Gamble, F1. Presid. Madras 1: 392. 1957 (repr.ed.).-- D. championii Thw. Enum. P1. Zeyl. 94. 1859; Baker in Hook.f. F1. Brit. India 2: 231. 1876. Amerimnon chmpionii (Thw.) 0. Ktze. **Rev.** Gen. P1. 1: 159. 1891.–– D. nitida Zipp. ex Prain,J. Asiat. Soc. Rengal 70(2): 46. 1901.

TYPE: Not seen.

Shrubby climbers or lianas, 3–8 m high; branches twining, glabrous. Leaves imparipinnte; rachis 5-7.5 cm long, glabrous; leaflets 3-4 or rarely 2 or 5, glabrous,thin, oblong, 5–10 x 2.5-5.5 cm, slightly narrowed from beyond the middle to the cuneate or rounded base, widely rounded and abruptly cuspidate and retuee at apex; petilules 0.5-1 cm long, glbrous; stipules cauducous. Inflorescence lax, axillary pani–cles with subcorymbose branchlete, S–10 cm long, grey–downy; bracts ovate, cauducous; bract lies slender, subulate. Flowers creamy-white,

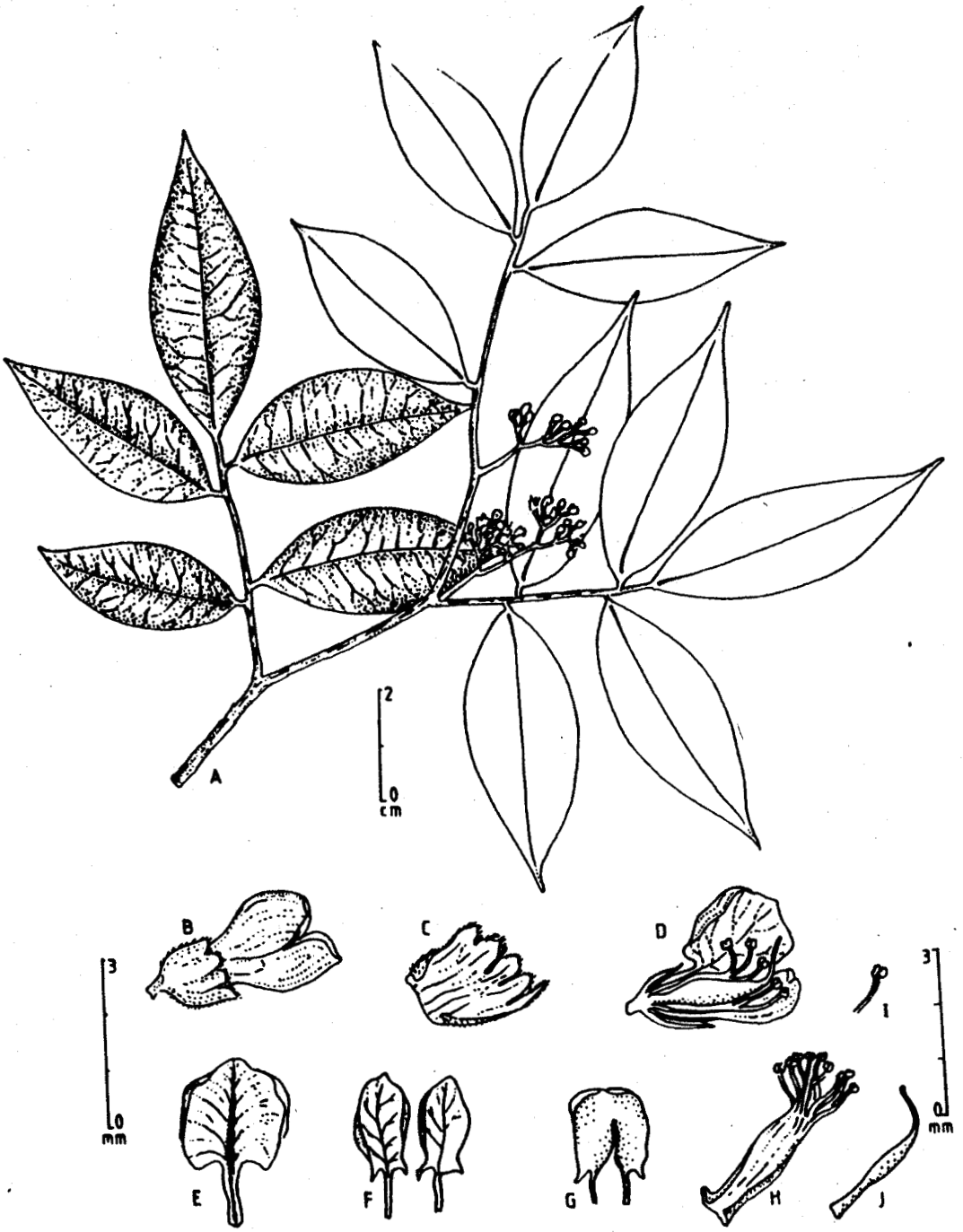
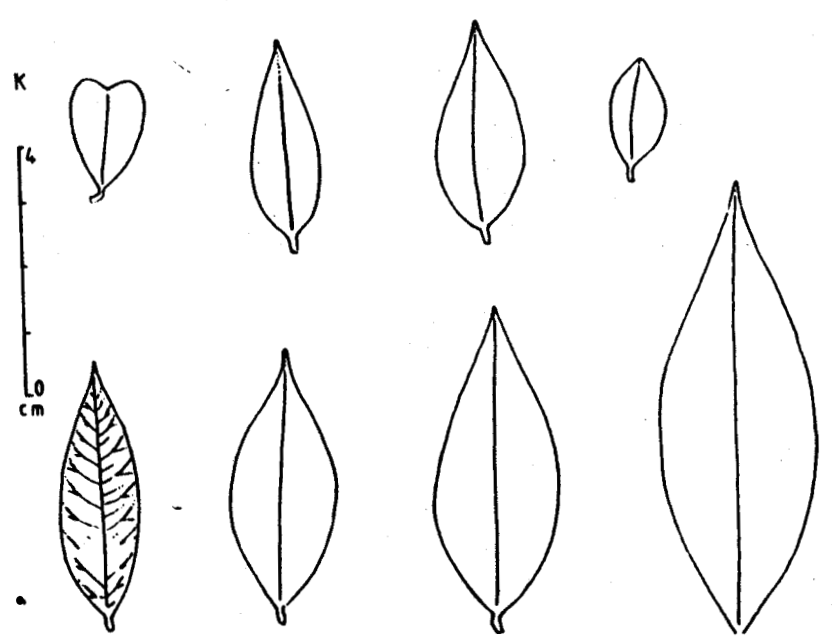


Fig 22



0.5-0.8 cm long; calyx 0.3-0.5 cm long, puberulous, externally, 5-lobed, lobee subequa1,upper two eubconnate, wide-triangular, the lowest narrow; corol la with 3, slender long-clawed petals; vexillum upto 0.3 cm long, irregularly orbicular-oblong with reflexed limb; wings upto 0.2 cm long, oblong, retuse, auricled; stamens 10, monade-lphoue, stamina1 column 0.3-0.4 cm long, split above; filaments free in their upper third, alternately shorter and longer,slender; pistil 0.3-0.4 cm long, slender, glabrous; ovary densely pubescent, stipi-tate, 2-ovuled; style slender, incurved; stigma minute. Pods 7-10.5 x 1-1.5 cm, broadly ligulate, obtuse, firmly coriaceous, puberulous, reticulately veined especialy opposite the seeds; seeds 1.5-2 x0.4-0.5 cm, oblong, reddish-brown, shining (Fig. 22 6 14).

Habitat: Deciduous forests at about 300 m altitude.

Flowers:February-April. Fruits:April-June.

Distribution: Kerala: Ranni, Trivandrum; Thirunelveli in Tamil-nadu; World: Sri Lanka, Borneo, Celebes, Malaysia.

Notes:specimens examined here are in the flowering stage and Beddomes specimen in British Museum bears only fruits which Thotha-thri (1983) had described and illustrated.

Thothathri(l983) reinstated the binomial D. peudo-sissoo Miq. as the correct name for this species, where in only one specimen of Beddome (Coll. No. 2424) collected from the banks of Thambraparni river, Thirunelveli, now available in the Rerbarium, British Museum (BM), London, is cited to authenticate the occurrence of the species in South India. However, the specimens of Rama Rao and Mohan referred here are subsequent collections and they show an extended phytogeogra-phical range of distribution of the species in the western side of the Western ghats.

Specimens examined: Paruthippally, 18-2-1913, H. Rama Rao 894 (HUCT); Thekkuthodu, Ranni Division, 9-4-1978, C.N.Mohan 54966 (MH).

14. Dalbergia rubiginosa Roxb. Corom. P1. 2:9. t. 115. 1798; Wt. ct Am. Prodr. 1: 265 1834; Baker in Rook f. F1. Brit. India 2: 232. 1876; Prain, J. Asiat. Soc. Bengal 66(2): 443. 1897 & Ann. Roy. Bot. Gardn. Calcutta l0(1): 63. pl. 40. 1904; Rama Rao, F1. pl. Travancore 129 1914; Gamble, F1. Presid. Madras 1: 269. 1957 (repr. ed.); Nair et Henry (ed.), F1. Tamilnadu 1: 103. '1983.- Amerimnon rubiginosum (Roxb.) 0. Ktze. Rev. Gen. P1. 1: 59. 1891.

TYPE: Plate 115 in Roxburgh's Coromandel Plants, 1798 (Iconotype, CAL!).

Straggling or erect shrubs, 2-3 m high ; stem and branches brown with white spots, very rough; branchlets finely puberulous, rarely hooked. Leaves imparipinnate, 3–14 cm long; rachis 1–6.5 cm long, apprcssedly pubescent; leaflets 3-6 or rarely 7, coriaceous, glabrous and shiny above, pale, minutely pubescent or glaucous beneath, 1–7.5 x0.5-2.5 cm, ovate or elliptic-oblong, obtuse, acute or ovate at base, obtuse or emarginate at apex, oscurely veined; petiolule 0.2-0.4 cm long, finely pubescent; stiputes small, cauducous. Inflorescence congested, axillary, pubescent racemes or panicles upto 3 cm long; peduncle and branches pubescent; bracts about 0.2 cm long, ovate–oblong, persistent, pubescent; bracteoles 0.2–0.3 cm long, ovate, obtuse. Flowers white, about 0.4 cm long; pedicelsupto 0.2 cm long, slender, pubescent; calyx about 0.2 cm campanulate, ciliolate, subequally 5-lobed; lobes ovate–obtuse, the lower narrower and longer; corolla with 5, long-clawed petals; vexillum about 0.3 cm long, ovate–oblong, emarginate at apex reflexed, faintly reticulated; winge about 0.3 cm long oblong, obtuse at apex, auriclcd; stamens 9, monadelphous, staminal column about 0.3 cm long, split above; filaments alternately shorter and longer, glabrous; pistil 0.2-0.3 cm long, slightly puberulous; ovary stipftate; style subulate; stigma minute. Pods 1.5-3.5 x 0.7–1.5 cm strap–shaped or oblong, stipitate, reticulated, 1–3 seeded, shortly apiculate or rounded at apex, acute or obtuse at base; seeds about 1.2 x 0.7 crn, subrenlform, compressed (Fig. 23& 24).

Habitat: Bushy areas along the fringes of deciduous forests.

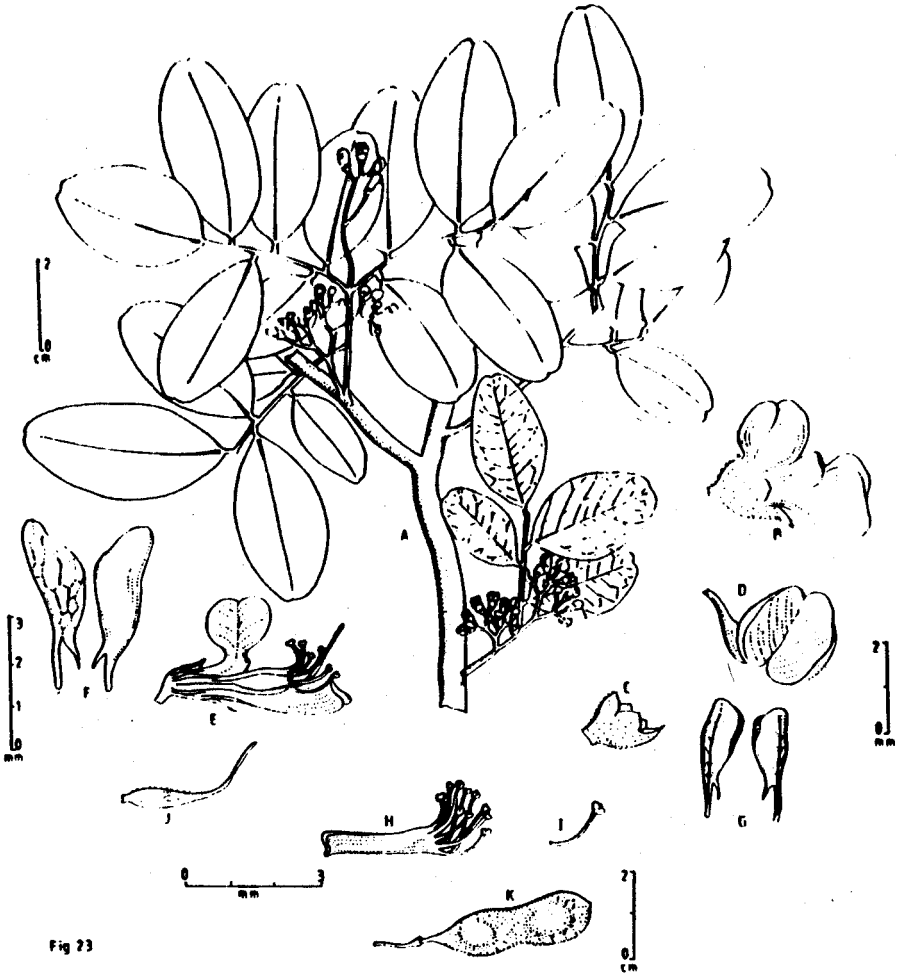
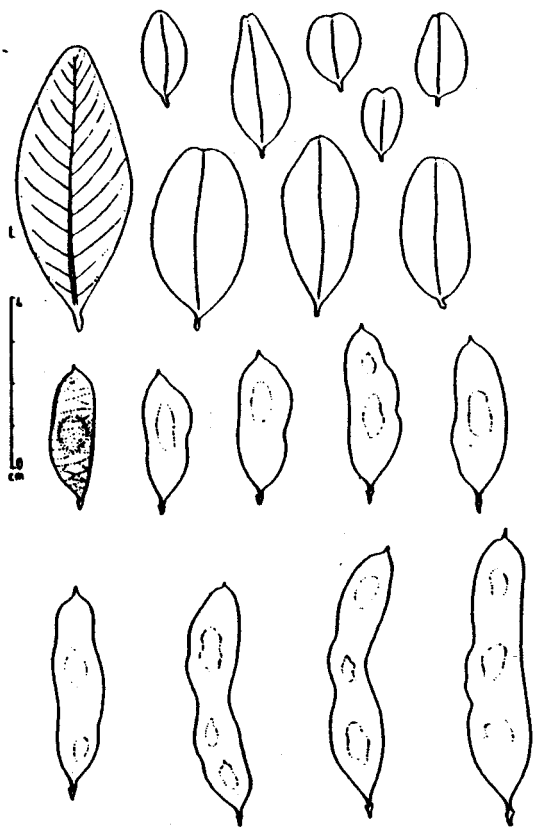
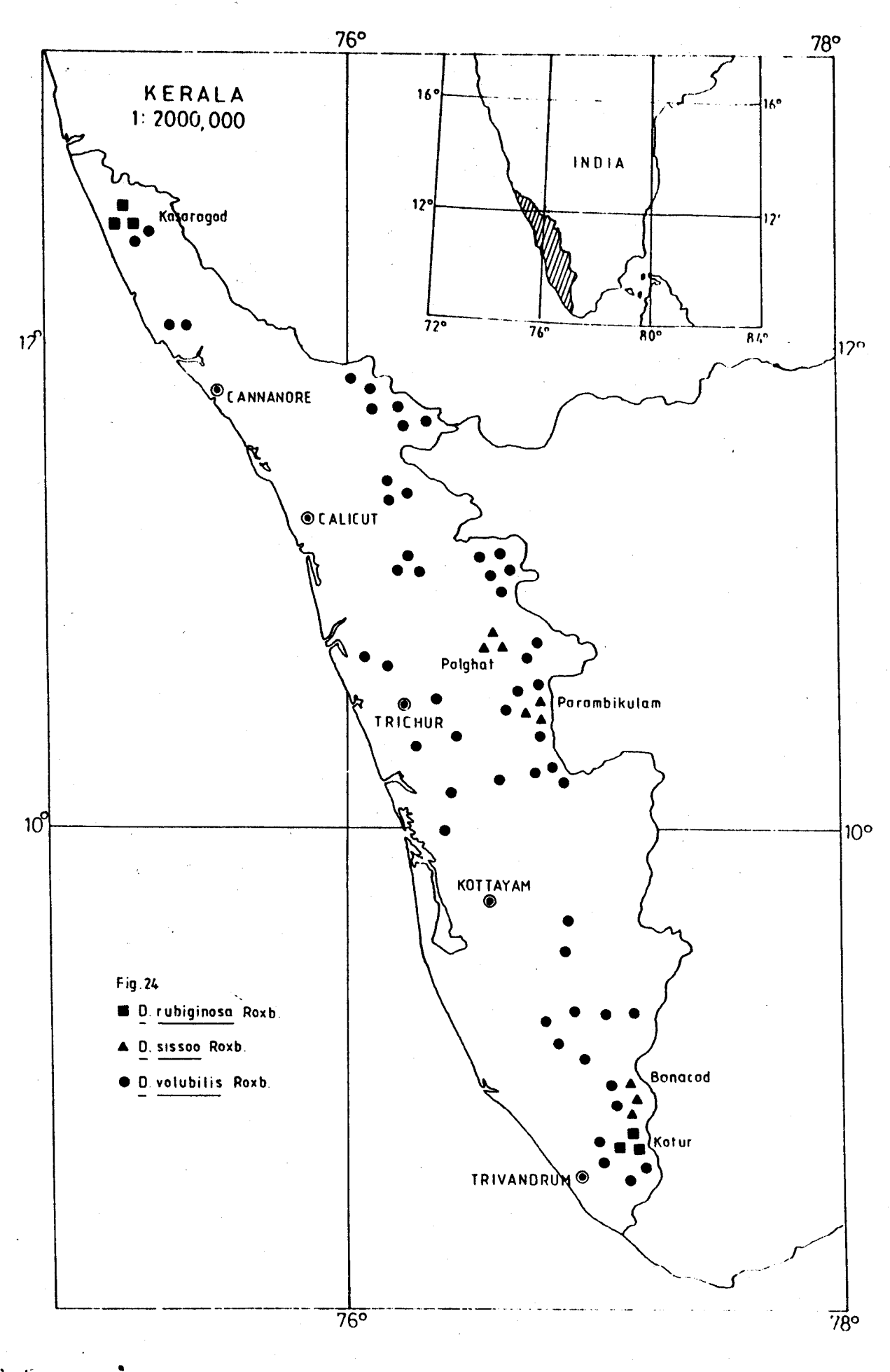


Fig 23




KERALA
1: 2000,000
INDIA
16°
12°
72°
76°
80°
84°
76°
78°
17°
12°
10°
Kasaragod
CANNANORE
CALICUT
Palghat
TRICHUR
Parambikulam
KOTTAYAM
Bonacad
Kotur
TRIVANDRUM
Fig. 24
D. rubiginosa Roxb.
D. sissoo Roxb.
D. volubilis Roxb.

Flowers: January–April. Fruits: February-May.

Local name : Anal valen valll (Kanl name).

Distribution,: Kerala: Kasaragod, Trivandrum; India: Peninsular India extending to Maharashtra and Orissa; World: Burma, South China.

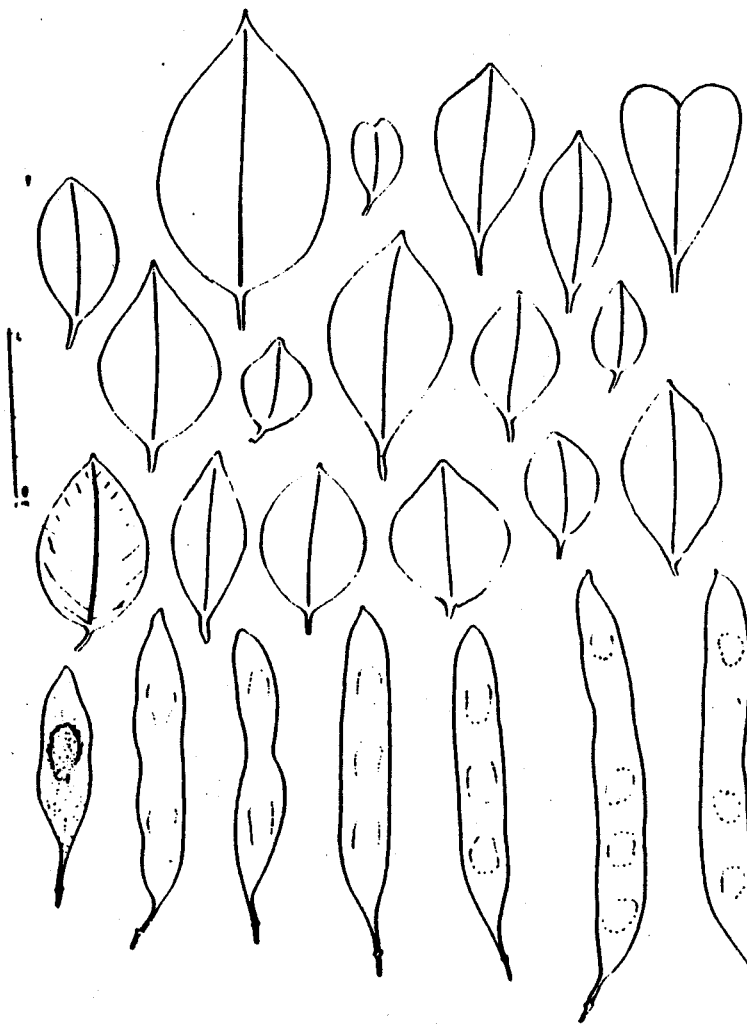
Notes: The leaves when dry become reddish–brown in colout which is a diagnostic character of this taxon.

Specimens examined: Kotur reserve, evergreen forests on the banks of streams, 18-2-1913, M. Rama Rao 878 (HUCT, HSFRC); Near waterfalls, Bevinge, Kasargod, 23-2-1913, C.A. Barber 8821 (MI); Bevinji at Methu–nganam, Kasaragod, 20–2–1984, K.K.N. Nair 2824(HKFRI); Beyond Bevinji bridge at Thekkal, Kasaragod, 20-2-84, K.K.N. Nair2821(HKFRI).

15. Dalbergia sissoides Grah. (Wall. Cat. No. 5876 1832 nom. nud.) ex Wt. et Arn. Prodr. 265. 1834; Benth. J. Proc. Linn.Soc. Bot. Suppl. 4: 39. 1860; Prain, Ann. Roy. Bot. Gardn. Calcutta lO(1): 81. pl. 63. 1904; Rama Rao, F1. P1. Travancore 130. 1914; Kadambi, Indian For. 75: 168. 1949; Gamble, F1. Presid. Madras 1: 270 1957 (repr. ed.); Nair et Henry (ed.), F1. Tamilnadu 1: 103. 1983. --D. latifolia Roxb. var. sissoides (Grah. ex Wt. et Arn.) Baker in Hook.f. Fl. Brit. Ind. 2: 231. 1876.--I). latifolia sensuWt. Ic. t. 1153. 1546 (non Roxb. 1798); Redd. F1. Sylvat. t. 24. 1869.--D.javanica Miq. F1. Ind. Bat. 1: 132. 1855.-- Amerimnon sissoides(Grah. ex Wt.et Arn.) O.Ktze,Rev. Gen. PI. 1: 159. 1891.––A. Javanicum (Miq.) 0. Ktze. Rev. Gen. P1. 1: 159 1891.--D. emarginata Prain, J. Asiat. Soc. Bengal 70: 41. 1901 (non Roxb. 1832).

TYPE: Nilgiri, Noton Wall. Cat. No. 5876 B (K, photograph!).

Much branched trees, 20–30 m high; bark smooth, sometimes peeling off .from the main trunk; branches spreading; branchlets subbifarious, sometimes subpendulous. Leaves imparipinate, 15-25 cm long, ye1lowish-



green when young; rachis 10-15 cm long, glabrous; leaflets usually 7-10, rarely 5 or 6, elliptic, ovate or obovate, rarely suborbicular, glabrous on both sides, green above, glaucacent beneath, pale green when young ,dark green when mature, 3-9 x 2.5-5.5 cm, eub-acute or very rarely obtuse at apex, more or less cuneate at base; petiolules 0.4-0.7 cm long. Inflorescence in large panicles 10-20 cm long, in the axils of upper leaves. Flowers milky-white, fragrant,0.6-0.9 cm long; pedicles 0.2-0.5 cm long; bracts minute; bracteoles memraneous, very cauducous; calyx 0.3–0.4 cm long, campanulate, 5-lobed slightly puberulous when young; lobes eubequal, the upper two subconnate, lower three sub-equal, oblong, obtuse or subacute; corolla with 5-petals, slenderly clawed except the vexillum; vexillum 0.4–0.6 cm long, cuneate, reflexed, reticulately veined, wavy along the margins; wings 0.4-0.5 cm long, obovate, clawed, reticulate-veined, obtuse or rounded at apex; keels 0.3-0.4 cm long, auricled, reticulate-veined, oblique or blunt at apex; stamens 9 or rarely 10, monadelphous; staminal column 0.4-0.6 cm long, split along the upper side; filaments free in their upper third, subequal, glabrous; anthers blunt or cleft at apex; pistil upto 0.6 cm long, glabrous; ovary long-stipitate, glabrous, usually 1–4 ovuled; style slender, narrowed into the ovary; stigma small. Pods 3-9.5 x 0.8-1.6 cm, reticulate-veined throughout, firmly coriaceous, 1-3 or rarely 4-seeded, gradually cuneate towards base, acute at apex with often a short apiculae; seeds 0.5-0.8 x 0.3-0.5 cm, reniform, compressed, smooth (Fig. 25 & 26).

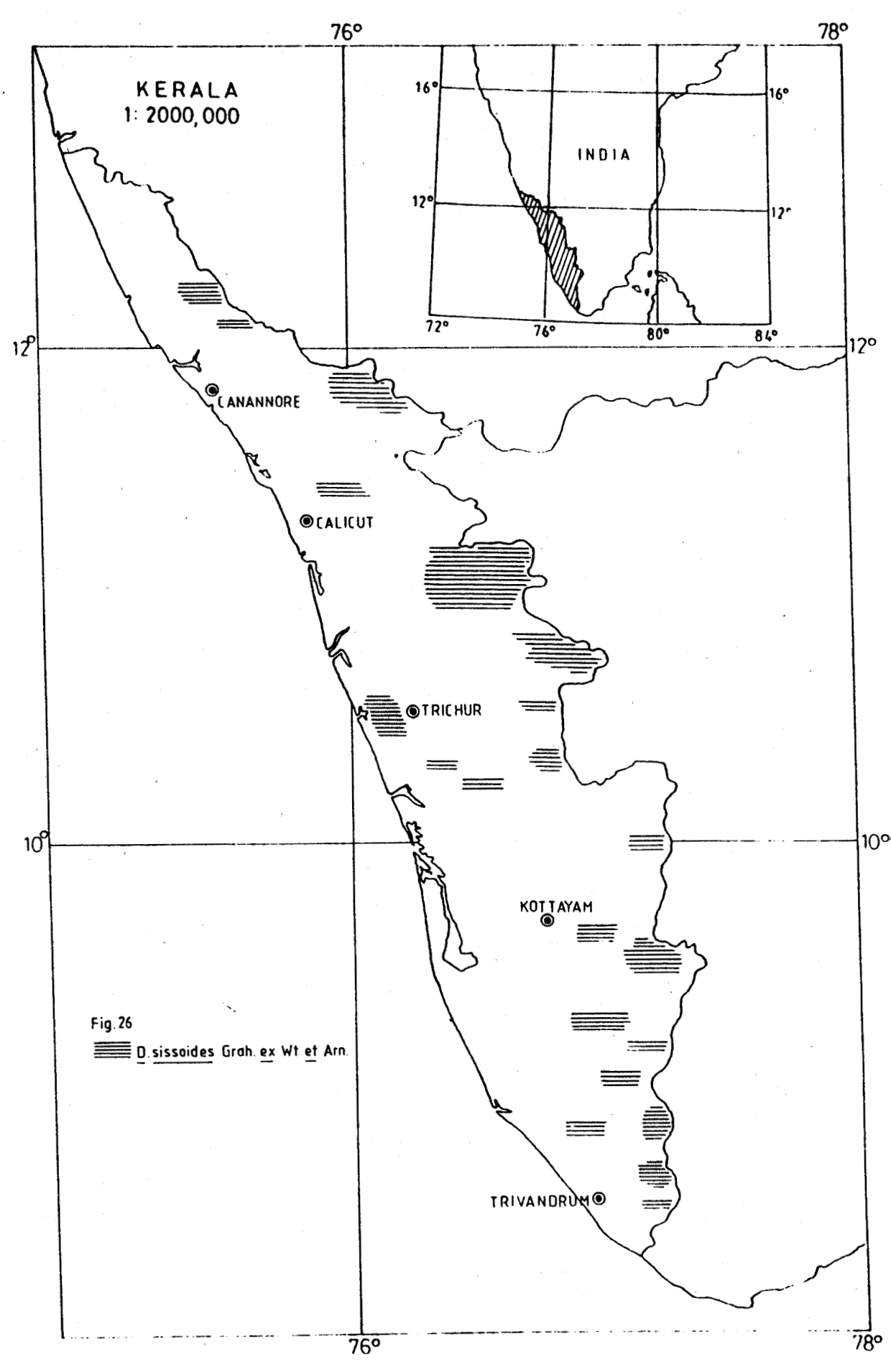
Habitat: Deciduous forests and plantations from sea-level upto 1000 meters.

Flowers : December-Apri1. Fruits: March–August, sometimes persistent throughout the year.

Local names: Eetti, Veetti, Kar-etti, Eruputu, Velleetti.

Distribution: Kerala: Almost throughout; India:Tamilnadu, Karnataka.

Notes: The specimens K.K.N. Nair 2857 from Peerumedu, Kerala possess


KERALA
1: 2000,000
INDIA
16°
12°
72°
76°
80°
84°
76°
78°
12°
10°
CANANNORE
CALICUT
TRICHUR
KOTTAYAM
TRIVANDRUM
Fig. 26
D. sissoides Grah. ex Wt et Arn.

very small leaflets measuring only upto 2 x 1 cm.

The concept of Prain (1904), Bourdillon (1905) and Kadambi (1949) is accepted here to consider this taxon as a distinct species.

Specimens examined: Tholpetty, Cannanore, 8–2–1971, V.S. Ramachandran 66839 (MH); Cannanore District, 24–11–1977, V.S. Ramachandran52336 (MH); Tholpetty, near Kaimaram, Mananthody, 11–4–1984, K.K.N. Nair 2838(HKFRI); Kuppady, Wynad, 12–4–1984, K.K.N. Nair 2843(HKFRI); Kurichiad, Chethleth range, Mananthody, 12–4–94, K.K.N. Nair2844 (HKFRI); Thirunelli, Wynad division, 11–4–84, K.K.N. Nair 2841 (HKFRI); Begur, Mananthody, 11–4–84, K.K.N. Nair 2836 (HKFRI); Sultan's Battery (900 m), 29–10–1965, J.L. Ellis 24029 (MH); Cannanore dt., Begur,3-3-1979, V.S. Ramachandran 62018 (MH); Wynad, 1885, M.A. Lawson s.n.(MH); Palghat District, Yandampatty, 15–4–1975, N.C. Nair 56841 (MH); Palghat, Atappady (575 m), 19–7–1969), E. Vajravelu 32193 (CAL); Palghat, Mukkali (525 m), 23–2–1979, E. Vajravelu 60638(MH);Palghat, Karivara slopes (725 m), 19–2–1979, E. Vajravelu *60543* (MH); Chindaki 16–10–1979, N.C. Nair 64671 (MH); Dhoni, Palghat dt., 19–3–1984, K.K.N. Nair 2831 (HKFRT); Between Dhoni and Olavakod, 19–3–1984, K.K.N. Nair2831 (HKFRI) Panakadan R.F., Mannarghat range, 21-10-1984, K.K.N. Nair 1900 (MH); Agali Palghat, 30–12–1983, K.K.N.Nair 2822 (HKFRI); Chidaki near Silent va11ey,29-12-1983, K.K.N. Nair 2816(HKFRI); Karivara, near Silent valley, 29-12-1983,K.K.N.Nair 2813 (HKFRT); Walayar, August,B.V. Patil 6.n. (HSFRC); Karulai, Nilambur, 21–6–84, K.K.N. Nair 2869 (HKFRI); Nilambur, KFRI Campus, 23–1–1985 K.K.N. Nair 3219 (HKFRI); Near Sirvani dam, Muthikulam, 31–10–84, K.K.N. Nlair 3216 (HKFRI); Thellikkal, Dhunakadav, 16–11–84, K.K.N. Nair3209 (HKFRI); Kuriarkutty, Parambikulam, 15–11–1985, K.K.K. Nair 3208 (HKFRT); Catchment of Pothundidam, Nemmara division, 12–3–84, K.K.N. Nair 2877 (HKFRI); Vazhani dam catchment, 5–5–84, K.K.N. Nair 2849 (HYFRT); Vilangannur, Peechi,l0-1-85, K.K.N. Nair3216 (IIKFRT); Sholayar, 11–3–1951, N.G Nair 1516 (HKFRI); Thumbermuzhi, Adirappally, 7-5-1984, K.K.N. Nair 2855(HKFRT); Thenmalai, 23-3-191 5, Venkoba Rao 2335 (HUCT); Kulathupuzha 16–2–1904, Venkoba Rao s.n.(HUCT); Colaturpolay, 6–3–1895, T. F. Bourdillon 535 (MH&HUCT); Tdukki Dist.,

Mu1lakkudy (850 m),14-3-1973, B.D. Sharma 43847 (MH); Between Pambanar and Vandi periyar, 6–12–1983, K.K.N. Nair 2857 (HKFRI); Vayakkarai, Naduvathumuzhi, Konni division, 1–6–1984, K.K.N. Nair 2863(HKFRI); Tadikarakonam, 10–11–1904, Bourdillon 1500 (HUCT); Island in the Neyyar dam, 22-6-1983, K.K.N. Nair 2802 (HKFRI).

16. Dalbergia sissoo Roxb. (Hort. Reng. 53. 181 4-nom. nud.)ex DC. Prodr. 2: 416. 1825; Benth. J. Proc. Linn. Soc. Bot. Suppl; 4: 40. 1860; Redd. Fl. Sylvat. t. 25. 1860; Baker in Hook.f., F1. Brit. Ind. 2: 237. 1876; Prain, J. Asiat. Soc. Bengal 70(2); 40 1901 & Ann. Roy Rot. Gardn. Calcutta lO(1): 57 t. 34. 1904; Gamble, F1. Presid. Madras 1: 270. 1957 (repr. ed.); Nair et Henry (ed.) , F1. Tamilnadu 1: 103. 1983; Thothathri, Rull. bot. Surv. India 25: 172–73. 1983 (1985). -- Amerimnon sissoo(Roxb. ex DC.) 0. Ktze. Rev. Gen. P1. 1. 150.1891.

TYPE: Roxhurgh's Tcone (in ed.) 970 (K, photograph!).

Crees, 10–20 m high;main trunk upto 80 cm in diameter; bark rough, grey; branches spreading; hranchlets subpendulous, brown–pubescent or tomentose. Leaves imparipinnate, subbifarlous, 10–15 cm long; rachis zig–zag, 5–14 cm long, pubescent; leaflets 3-5, suborbicular or ovate–lanceolate with a very distinct cusp, puberulous when young, glabrous and bright green above, paler beneath, 3.5-8 x 1–5.5 cm, acuminate or rarely cuspidate or obtuse at apex, rounded or cuneate at base; petio–lules 0.3–0.8 cm long, very dawny when young; stipules lanceolate, cauducous. Inflorescence densely pubescent or hairy in subcorymbose panicles of short subsecund spikes, 3–8 cm long; bracts 0.3-0.4 cm long, linear–subulate, hairy, cauducous; bracteoles 0.3–0.4 cm long, ovate–lanceolate, acute, pubescent. Flowers creamy—hite or yello–wish, 0.5–1 cm long; calyx 0.4–0.5 cm long, campanulate, pubescent or hairy, 5–lobed; lobes lanceolate, the upper two connate towards base, acute, the lateral and lowest linear; corolla with 5 long–clawed petals; vexi llum 0.4–0.8 cm long, ovate–orbicular, faintly reticula–tely veined, glabrous, ematginate at apex; wings 0.4-0.5 cm long, oblong, reticulately veined; keels 0.3-0.4 cm long, reticulate–veined; keels 0.3-0.4 cm long, reticulate–veined, oblong;stamens 9, monade–

lphous, stamina1 column 0.4–0.8 cm long, longitudinally split ahove,glabrous; filaments free in their upper fourth, alternately shorter and longer; pistil 0.4-0.6cm long, hairy; ovary stipitate; style ohort; stigma blunt. Pods yellowish–green when mature, 3-8.5 x 0.6- 1.3 cm, coriaceous, reticulately veined throughout, but less prominently above the seeds, stalked, 1–3 seeded, obtuse or acute at apex; seeds 0.4-0.7 x 0.2-0.3 cm, reniform, compressed (Fig. 27 & 24).

Habitat: Deciduous forests, planted earlier but now growing wild.

Flowers: November–July. Fruits: January–August.

Local name : Truvil.

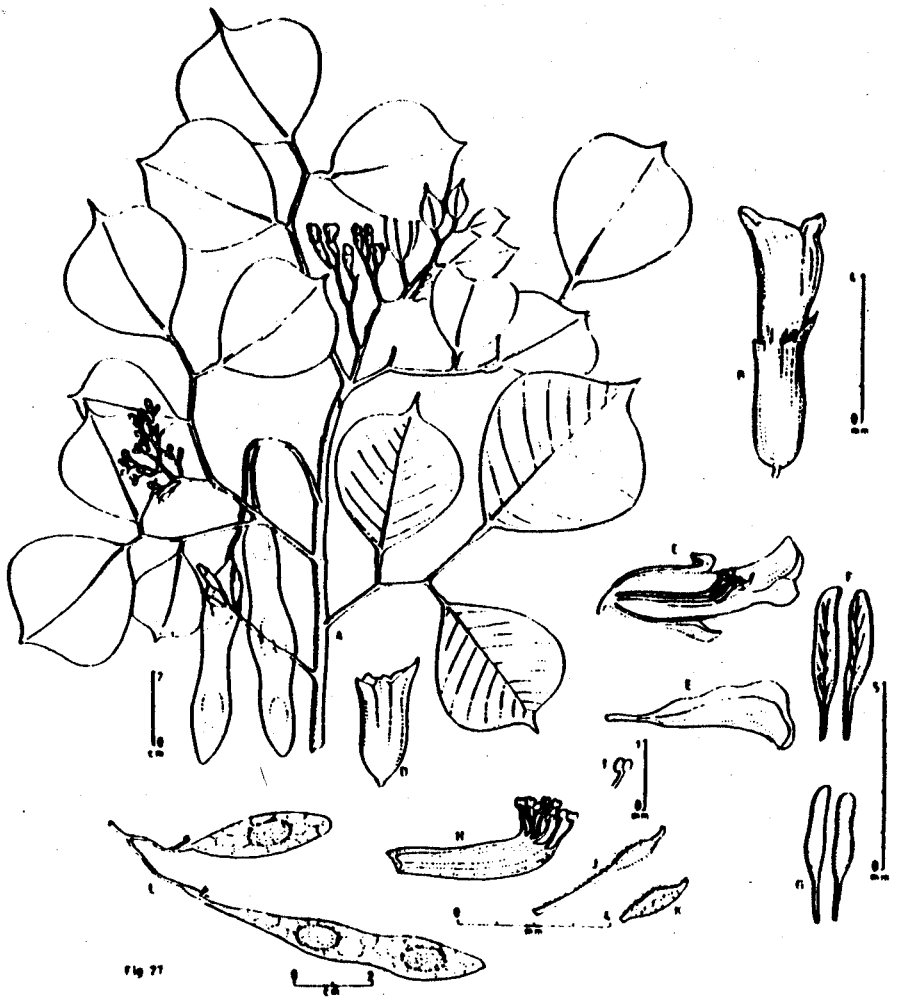
Distribution: Kerala: Bonacaud near Trivandrum, Palghat, Parambikulam (cult.); India: Throughout (wild or cult.); World: Persia, Traq, Baluchistan, Afghanistan, Pakistan, Sikkim, Burma.

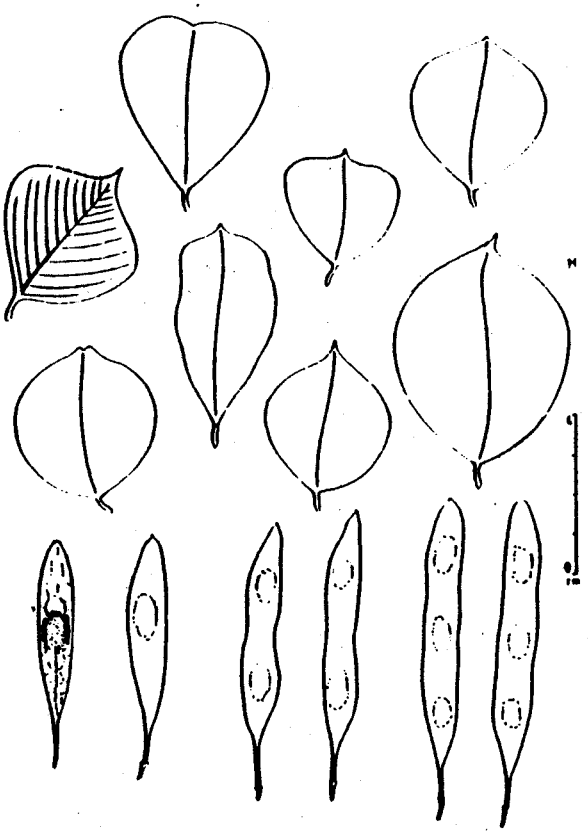
Notes: Eventhough the species was known as introduced at Palghat and Bonnacaud in Kerala, at present it is not available in those two localities. At Parambikulam, it was located during thts study at Keerappady where It flourishes well in an abandoned mixed plantation of the State Forest Dept.raised in 1958.

Thothathri (1983) had discussed on the nativity of D.sissoo and has concluded that it is indigenous to the gravelly river beds of the sub-htmalayan tract extending from Assam to Punjab and this agrees with the conclusion of Wain (1904) also.

Specimens examined: Keerappady, Parambiku lam, 17–11–1984, K.K.N. Nair 3212 (HKFRI); Palghat, July 1884, T. Krishnaswamy Naidu. s.n. (CAL); Bonaccad Estate (550 m), 14–9–1971, Supt. Bonaccard Estate s.n.(CAL).

17.Dalbergia spinosa Roxb.(Hort. Beng. 98. 1814 nom. nud.) F1. Ind. 3: 233. 1832; Wt. et Arn. Prodr. 266, 1834; Benth. J. Proc. Linn. Soc. Rot . Suppl. 4: 49. 1860; Baker in Hook.f. F1. Brit. India 2: 238.





1876; Prain, Ann. Roy. Rot. Gardn. Calcutta l0(1); 35. t. 1904;Rama Rao, F1. PI. Travancore 130. 1914; Gamble, F1. Presid. Madras 1: 269. 1957 (repr. ed.); Thoth. et K.K.N. Nair, Taxon 30: 47. 1981; Nair et Henry (ed.), F1. Tamilnadu 1: 103. 1983. D. horrida Grah. Wall. Cat. No 5817 1832 (nom. nud.,non Amerimnon horridum Dennst. 1818).-- hmerimnon spinosum (Roxb.),O. Ktze. Rev. Gen.Pl.1: 159.1891.-- Drepanocarpus spinosus (Roxb.) Kurz, J. Asiat. Soc. Bengal 45: 281. 1877.

TYPE: Chittagong, Roburgh s.n. (G).

Erect or climbing shrubs; branches stiff, straight, hooked or with pungent thorns; branch1ets subhorizontal, short, glabrous. Leaves imparipinnate, 3.5-4 cm long, scattered on the branches or crowded at the nodes of thorny branchlets; rachis 1.5-4 cm long, glabrous; leaflets 7–11, ovate, obtuse or rounded, glabrous, 0.5–1.2 x 0.2-0.5 cm, obtuse or retuse at apex, rounded at base; petiolules very short, glabrous. Inflorescence congested racemes, corymbs or panicles, 2.5-3.5 cm long; peduncle and branches glabrous; pedicles 0.2–0.3 cm long, glabrous; bracts and bracteoles ovate, minute, very deciduous. Flowers white, 0.3–0.4 cm long; calyx about 0.2 cm long, campanulate glabrous, 5–lobed; lobes ovate, obtuse, except the narrowly-lanceolate,acute lowest; corolla with 5 shortly–clawed petals; vexillum upto 0.3 cm long, elliptic, oblong or obovate–retuse, glabrous; wings upto 0.3 cm long, cuneate,truncate or hastate at base, obtuse at apex; keels about 0.2cm long, cuneaic or linniaic at base, obtuse or rounded at apex. Stamens 10 in two bundles of 5 ech or rarely monadelphous with the stamina1 column split along the upper stde; stamina1 column 0.2-0.3 cn long, glabrous; Filaments about 0.2 crn long; pistil 0.2–0.3 em long, pilose or glabrous; ovary subglohose, 1–2 ovuled, stipitate; style short, narrowed towards apex; stigma capitate. Pods 2.5–3.5 x 1-1.5 cm, reniform–falcate, thickened, rigidly coriaceous, long stipitate, l or rarely 2 seeded; seeds upto 1.5-0.7 cm, reniform, falcate (Fig. 28).

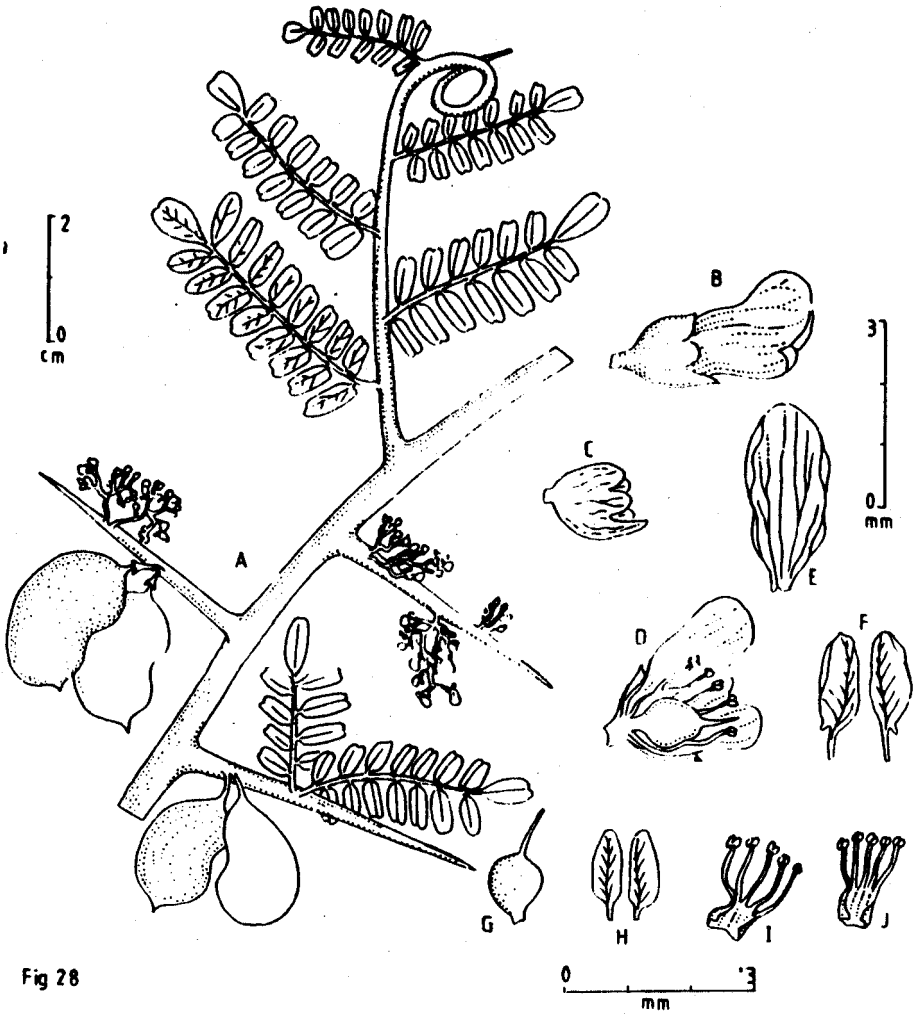
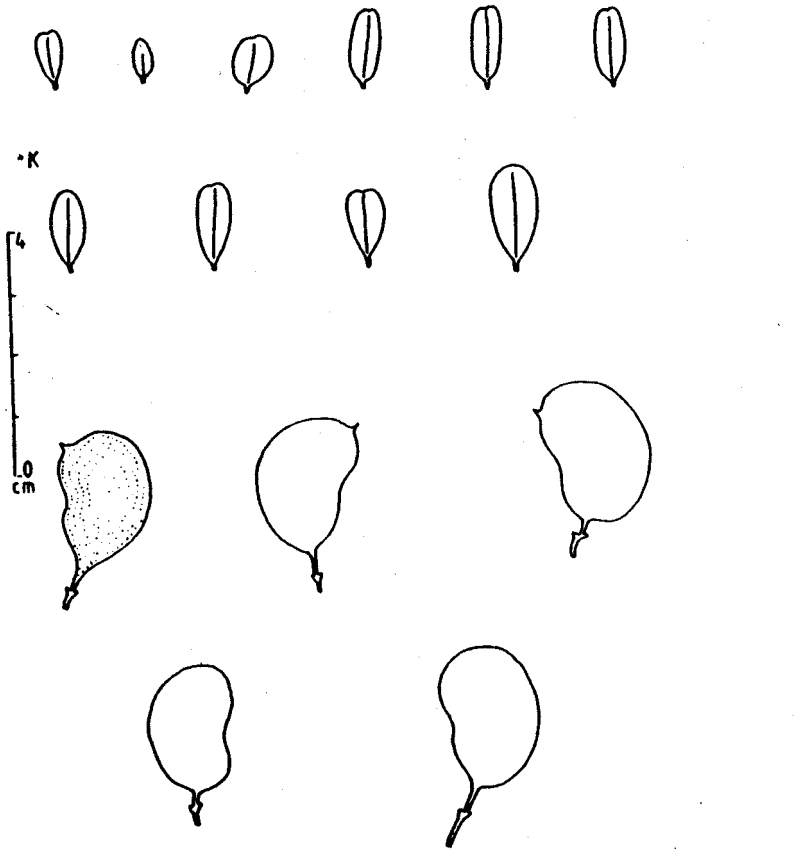


Fig 28



Flowers: May-June (Bandis, 1907).

Distribution: Kerala: Travancore; India: Tamilnadu, Karnataka, Maharashtra, Sunderbans In West Bengal; World: Bangladesh, Burma, Indo-China, Philippines.

Notes: The species is included here only on the authority of Rama Rao (1914) as it could not be located in Kerala during the present studies and as there is no herbarium record of it from the State in any of the herbaria consulted. The description of the species given here is based on literature and specimens available at MH and CAT, herbaria.

18. Dalbergia trnvancorica Thoth. Reinwardtia 8(2): 329-331. 1972.

TYPE: Travancore hi 11s (without specific locality), Collector? s.n.(Acc. No. 17025,MH!).

Scandent shrubs; branchlets puherulous, younger parts rusty-pubescent. Leaves imparipinnate, 8–11 cm long; rachis puberulous; leaflets mostly 5, rarely 7, elliptic, coriaceous, glabrous above, brown puberulous to pubescent below, rounded at base, obtuse to retuse or rarely acute at apex with Indistinct lateral veins; petilules 0.2-0.4 cm long, silky-pubescent; stipules 0.7-0.9 cm long, oblong, brown-pubescent, shortly acuminate. Inflorescence short, axillary, panicles, 2.5-5 cm long; peduncle and branches pubescent. Flowers 0.7-0.8 cm long, pedicellate; pedicles 0.4-0.5cm long, pubescent; bracts 0.2–0.3 cm long, glbbous, ovate- triangular, pubescent externally; bracteoles ovate–oblong, pubescent externally, covering the sides of the calyx tube; calyx 0.4-0.5 cm long, cnmpanulate, pubescent, 5–lobed; lobes anterior 3 triangular-ovate, smal ler, posterior 2 ovate-rounded, larger than the anterior; vexillum 0.6-0.7 cm long, ovate–oblong or ovate-orbicular, deflexed, auricled, retuse at apex, distinctly clawed; wings ovate-oblong, clawed; keels boat–shaped, clawed, connate apex; stamens 9, monadelphous, staminal column 0.6-0.7 cm long,, split abovc; filaments free to their upper one fourth; ovary 05-4.7 crn long, oblong, distinctly stipitate, glabrous, except the pubescent dorsal suture, 3-


TYPE

ovuied; style slender; stigma minute, Pods 3-7 cm long, oblong, flat., glabrous, smooth, long-stalked, I–seeded (Fig. 29 & 30).

Habitat: Hills of Trnvnncore (South Kerala).

Distributiton: Kerala : Travancore Hills.

Notes: The species is known only from its type specimen and the description provided here is solely based on it. Due to lack of details as to where exactly the spectes occurs within the Former Travancorc, its collection was not possible during the present study.

Specimens examined: Travancore hills (without specific locality), Collector, s.n.(Acc. No. 17025, MH).

19. Dalbergia volubilis Roxb. Corom. Pl. t. 191. 1805 & F1. Ind. 3: 231. 1892; Wt. et Arn. Prodr. 1: 265. 1834; Renth. J. Prnc. Linn. Soc. Bot. Suppl. 4: 46 1860; Baker in Hook.f. Brit. India 2: 235. 1876;Prain, .T. Asiat. Soc. Bengal 66(2): 114. 1897 & Ann. Roy. Bot. Gardn. Calcuta 10(1): 100. pl. 85. 1904; Rama Rao, F1. PI. Travancore 130. 1924; Gamble,F1. Presid. Madras 1: 270. 1957 (repr. ed.); Nair et Henry (ed.), F1. Tami lnadu 104. 1983. ––Amerimnon volubile (Roxb.) 0. Ktze. Rev. Cen. P1. 1: 159. 1591.

TYPE: Plate 191 in Roxburgh's Coromandel Plants,1798 (Lectotype, CAL!).

Lianas or stragglilng shrubs, 2-30 m high; main stem longitudinally ridged, upto 25 cm in diameterwith rough irregular bark; branches weak, subifarious; branchlets green, glabrescent when young. Leaves Imparipinnate, 10-20 cm long; rachis 8–18 cm long, glabrescent; leaf-lets 7–11, ovate, ovate-oblong or obovate, often slitghtly emarginate, mucronulate, bright green above, paler beneath, glabrous, 1.5-7.5 x 0.6-5 cm, acute, obtuse, rounded or emarginate at apex, acute, obtuse or rounded at base; pettolules 0.2-0.5 cm long, brown-pubescent or glabrous; stipules 0.2–0.5 cm long, ovate-lancolate, cauducous.

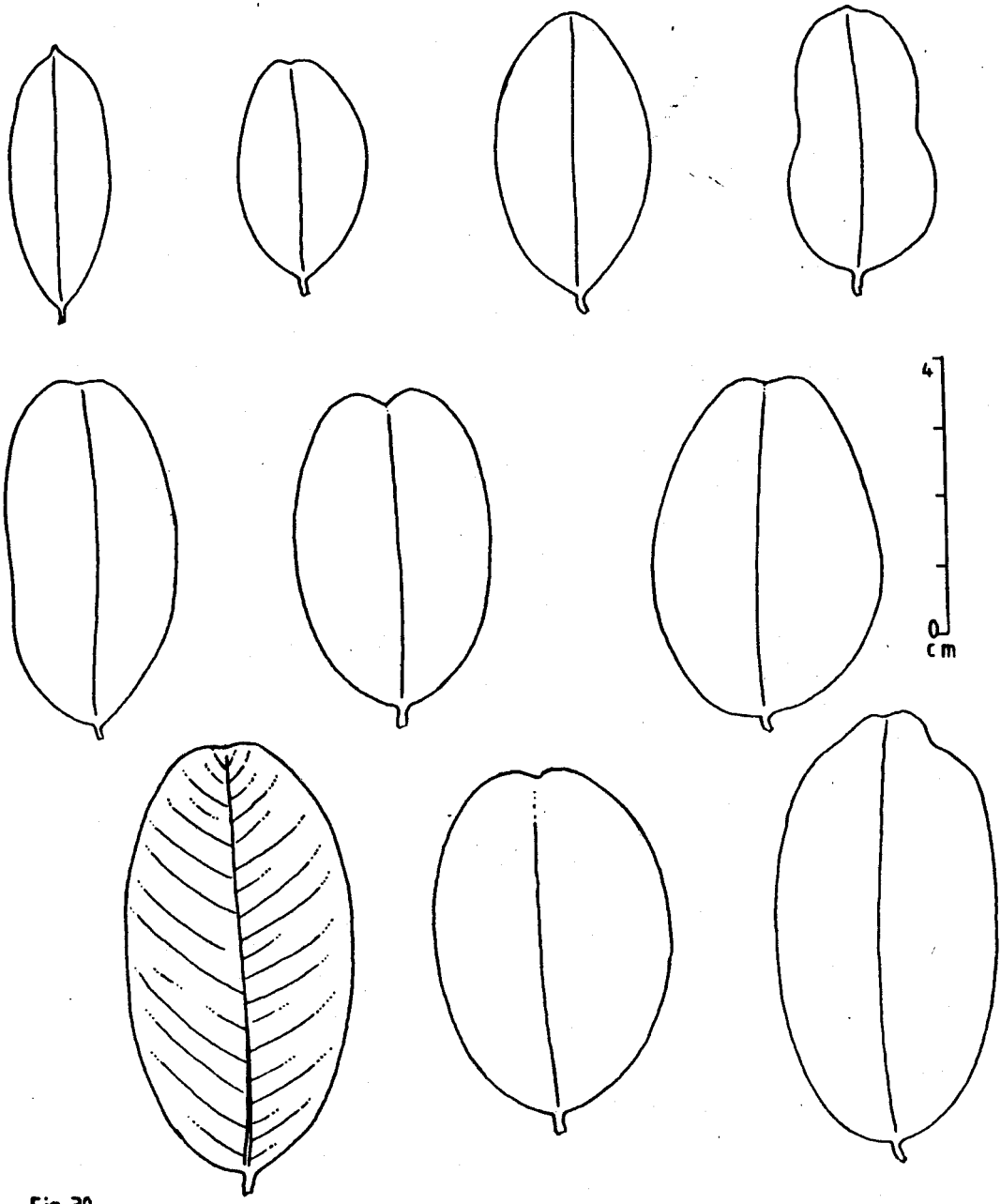


Fig. 30

Inflorescence terminal or axillary coryrnbose, brown–pubescent panicles, 10-30 cm long,; peduncle, branches end pedicles brown–pubescent; hracts 0.2-0.3 cm lane, ovate, cauducous or subpersistent, ciliolate; bracteoles about 0.2 cm long, lanceolate or ovate, persistent, glabrous; pedicles 0.2–0.4 cm long, glabrous or slightly pubescent. Flowers white with a bluish or pinkish tinge, 0.5–1 cm long; calyx 0.2-0.4 cm long, campanulate, pubescent, 5–lobed; lobes ovate or lanceolate the upper two subconnate; corolla of 5, clnwed petals; vexillum 0.3-0.5 cm long, long–clawed, suborhicular reflexed, glabrous, reticulate veined, emarginate at apex;.,wings 0.4-0.5cm long, oblong, auricled, reticulte-veined, reflexed along the margins; keels 0.3–0.4 cml ong, connate towards apex, oblong, sub–auricled, reticulate–veined; stamens 9, monadelphous; stamina1 column, 0.3–0.4 cm long, tongitudinally split along the upper side, g1abrous;filaments almost half the length of the stamina1 column; pistil 0.3-0.6 cm lon pubescent; ovary stipitate, 1–4 ovuled; style slender; stigma capitate, minute, Pods 5-8 x 1.5-3 cm , stipitate, reticulated throughout, 1–4 seeded, acute **or** obtuse with often a short apicula at apex; seeds 0.7–1.2 x 0.4-0.7 cm, reniform, compressed (Fig. 31 & 24).

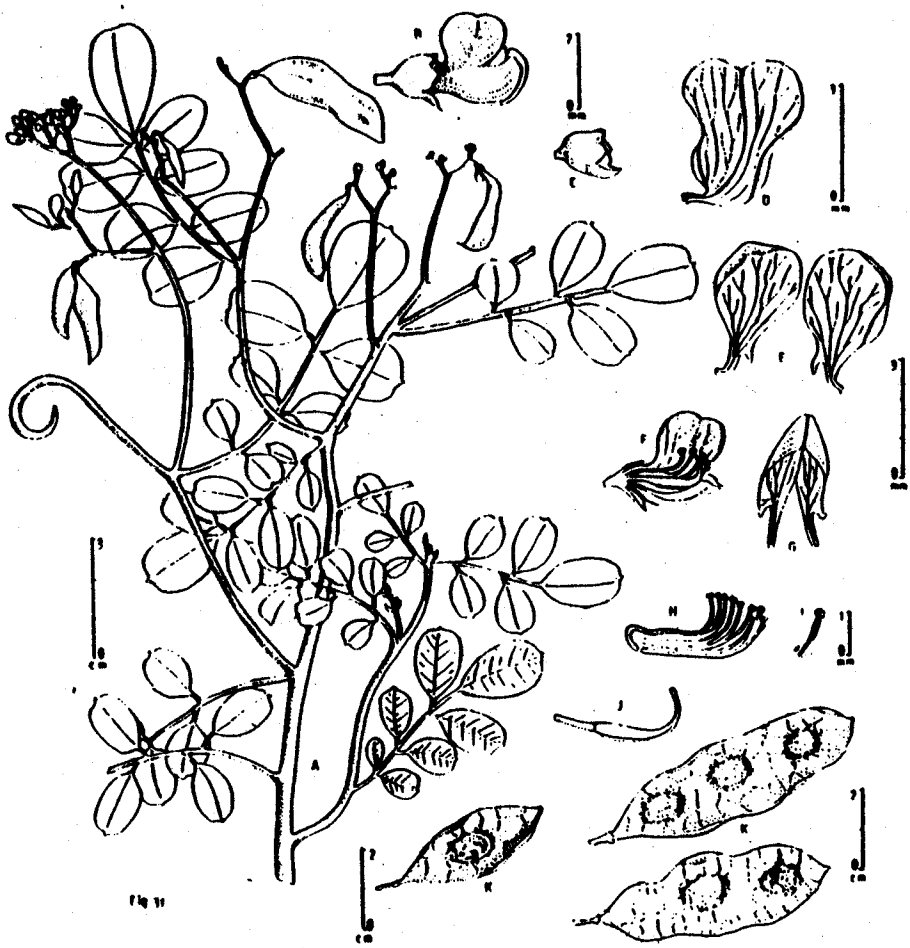
Habitat: Deciduous forests from sea–level upto 1000 meters;common in forest plantations, along forest road sides, etc.

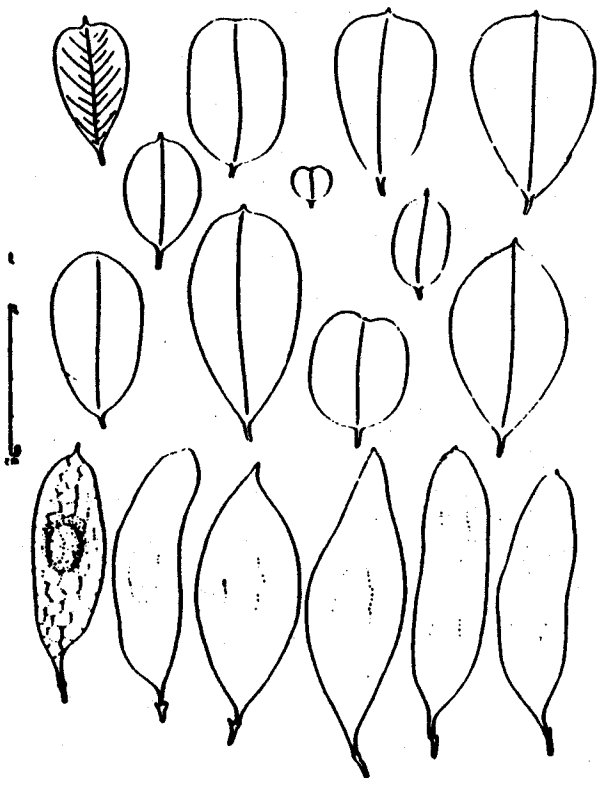
Flowers :November- July. Fruits: February–June.

Local name: Cherumullu.

Distribution:Kerala: Almost throughout; India: Almost throughout; World: Burma, Sri Lanka, Indo–China.

Specimens examined: Bevinje, Kasaragod, 20–2–84, K.K.N. Nair 2823 (HKFRI); Wynad, Collector?s.n.(Acc. No. 17181 ,MH); Thaliparamba farm, Malabar, 14–12–1913, C.A. Barber8731 (MH); Border of Dhoni and Sappal beats, 19-3-84,K.K.N. Nair 2832 (HKFRI); Karivara, Silent Valley, 29-12–1983, K.K.N. Nair 2814 (HKFRI); Agali–Chittoor, Mannnaghat Range, 30–12–1983, K.K.N. Nair 2828 (HKFRI); Mandampatty, Silent Valley, 14-





2-1985, K.K.N. Nair 3235 (HKFRI); Olipara riverside, Palghat, 27-2-1975, E. Vajravefu 45766 (HH); Chindakf, 1–6–1960, E. Vajravelu 27755 (MH); Mukkali slopes, 20–2–1979, E. Vajravelu 60561 (MH); Dhoni, S. Malabar, 191.1.1910, C.E.C.Fischer 1592 (CAL,); Nelli ampathy, 12–3–84, K.K.N. Nair 2835 (HKFRI); Edacode, Nilambur, 21-6-84, K.K.N. Nair 2856 (HKFRI); Nel I ikutha,Nlambur, 22–6–84, K.K.N.Nair 2874 (HKFRI); Dawson bridge, Karul at ,Nilambur, 21–6–84, K.K.N. Nair2872 (HKFRI); Kadannaka–damba, Nilambur, 28–3–84, K.K.N. Nair 2835 (HKFRI); Kuriarkutty, Para–mbikulam, 15–11–84, K.K.Nair 3207 (HKFRI); Thunakadav, 10–3–1965, K.M.Sebastine22866 (CAL & MH); Parambikulam, 14–2–1963, K.M Seba–stinel5650 (CAL&MH); Vazhani catchment, 5-5-.84, K.K.N. Nair2850 (HKFRI); Yeroor RF, Punalur, 17–2–84, K.K.N.Nair 2877 (HKFRI); Chakku–para reserve, Ranni range, 31–5–84, K.K.N.Nair 2859 (HKFRI); Katla-ppbra, Thenmala, 18–7–84, K.K.N. Nair2881 (HKFRI); Kallar Valley, Achenkoil, 19-7-84, K.K.N. Nair 2886 (HKPRI); Madathara Hill Triva-ndrum, 28–2–54, K.K.N.Nair2886 (HKFRI); Colaturpolay, 25–11–1893, MA. Lawson282 (CAL & MH); Mukkunny, Trivandrum, 22–2–1913, M. Rama Rao908 (HUCT); Mankayam hills, 31–1–1913, M. Rama Rao 805 (HSFRC).

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(Synonyms are underlined)