THE DISTRIBUTION OF THE DIPTEROCARPACEAE IN THAILAND

by

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ABSTRACT

The family *Dipterocarpaceae* is represented in Thailand by 9 genera and 63 species, and can be classified into 2 groups, evergreen and deciduous or xerophytic.

The majority belong to the evergreen, which is scattered all over the country either in gallery forest (*Dipterocarpus alatus*, *Vatica cinerea* and *Hopea odorata*), along the hill streams (*Dipterocarpus oblongifolius* and *Vatica odorata*), in the low-lying land (*Dipterocarpus baudii*, *D. dyeri*, *D. gracilis*, *D. chartaceus*, *D. kerrii*, *Shorea* and *Hopea* spp.), or on hill slopes (*Dipterocarpus costatus*, *D. grandiflorus*, *D. retusus*, *D. turbinatus*, *D. macrocarpus*, *Hopea odorata*, *Hopea ferrea* and *Shorea talura*).

Only 5 xerophytic species are represented (*Dipterocarpus obtusifolius*, *D. tuberculatus*, *D. intricatus*, *Shorea obtusa* and *Pentacme suavis*), occupying either the high plateau or ridges, and forming a climatic forest type, the Dry Deciduous Dipterocarp forest.

The highest elevation reached by the Dipterocarps is 1300 m.a.s.l. (*Dipterocarpus tuberculatus*, *D. obtusifolius*, *Shorea obtusa* and *Pentacme suavis*).

Parashortea stellata and *Shorea rogersiana* follow the Tenesserim tract, while *Cotylelobium lanceolatum*, *Balanocarpus heimii*, *Shorea curtisii*, *S. assamica* var. *globifera*, *S. guiso*, *S. faguetiana*, *S. hemsleyana*, *S. sumatrana*, *S. macroptera*, *S. glauca* *S. parvifolia*, *Hopea pedicellata*, *H. latifolia*, *Vatica stapfiana*, and *V. lowii* are confined to the Peninsular region not beyond the latitude 10°N. Species found only in the Northeastern region are *Hopea reticulata* and *H. sp. nov. Hopea avellanea* is found only at Koh Chang in the Southeastern region.

Introduction

The family DIPTEROCARPACEAE is represented in Thailand by 9 genera and 64 species : ANISOPTERA (4), DIPTEROCARPUS (17), VATICA (6), HOPEA (14), BALANOCARPUS (1), COTYLELOBIUM (1), SHOREA (19), PARASHOREA (1), and PENTACME (1). The dipterocarps are all important timber species, except *Vatica diospyroides* and *Dipterocarpus oblongifolius;* the

former, being a small tree with very fragrant flowers, is often grown in temple gardens, whereas the latter, whose stem is frequently crooked and twisted, is of less commercial value (SYMINGTON 1941).

The dipterocarps in Thailand can be easily divided into two groups based on their physiological characters; evergreen and deciduous or xerophytic; the former is represented by the majority of the family, while the latter can be enumerated by 5 species: *Dipterocarpus intricatus, D. obtusifolius, D. tuberculatus, Shorea obtusa* and *Pentacme suavis*, which form a unique climatic forest type, the Dry Dipterocarp or Deciduous Dipterocarp forests, covering an extensive area in the dry regions of the country from a peneplain of 150-300 m. elevation to slopes and ridges of up to 1300 m. elevation.

The evergreen species occur in the type of forest historically classified as the Monsoon or Rain or Tropical Evergreen forest covering as great an area as the former group, and also in the peneplain of the country from the sea level up to an elevation of 100 m. The classification of rain forests with reference to the dipterocarps can be generally based on SYMINGTON (1941). Ecological aspects of the dipterocarp forests in the Tropical Rain forest can be readily referred to in SYMINGTON (1941) and ASHTON (1964).

Geographical distribution

Thailand is situated almost in the middle of continental Southeast Asia, and thus is the crossroads of the geographical migration of the dipterocarps, as pointed out by CROIZAT (1962) and confirmed by ASHTON (1964). Among the dipterocarps of Thailand the Malesian elements preponderate, as illustrated in Table I.

It is evident that the common Indo-Burmese elements (*Dipterocarpus kerrii, D. dyeri, Hopea odorata, Shorea talura, Shorea farinosa, Parashorea stellata* and *Pentacme suavis*) and Indo-Chinese elements (*Dipterocarpus baudii*) migrate into the Malesian realm.

Endemism is very small and only three species are at the present thought to be restricted to Thailand: *Cotylelobium lanceolatum* whose closely related species is the Malayan *C. malayanum*; *Hopea avellanea* and, *Hopea sp. nov.* a species closely related to *H. cordifia* of Laos.

The following species are little known in Thailand and have so far been collected only once:– *Dipterocarpus oblongifolius, D. retusus, D. crinitus, Vatica lowii, Shorea hemsleyana, S. macroptera, S. sumatrana, S. rogersiana* and *S. assamica* var. *globifera*. They all belong to the Malayan element except the last two species.

TABLE I

Geographical Distribution of Thai Dipterocarps in S.E. Asia Mainland

Floristic elements	Anisoptera	Balanocarpus	Cotylelobium	Dipterocarpus	Hopea	Parashorea	Pentacme	Shorea	Vatica
Indo-Burmese	oblonga, scaphula	—	—	alatus, costatus, gracilis, macrocarpus, obtusifolius, tuberculatus, turbinatus	helferi, minutiflora, oblongifolia, odorata	—	suavis	assamica, farinosa, obtusa, rogersiana, sericeiflora, talura	cinerea
Indo-Chinese	costata	—	—	baudii, dyeri, intricatus,	pierei, recopei, reticulata	—	—	henryana, thorelii,	—
Malesia	curtisii	heimii	—	chartaceus, crinitus, grandiflorus, hasselttii, kerrii, oblongifolius, retusus	ferrea, latifolia, pedicellata, sangal	stellata	—	curtisii, faguetiana, glauca, gratissima, guiso, hemsleyana, hypochra, leprosula, macroptera, parvifolia, sumatrana	diospyroides, lowii, odorata, stapfiana, wallichii
Endemic	—	—	lanceolatum	—	avellanea, sp. nov.	—	—	—	—

Local distribution

SMITINAND (1959) tentatively studied the plant geography of Thailand and divided the country into 7 regions, (Fig. 1) the regional distribution of the *Dipterocarpaceae* in Thailand is shown in Table II.

TABLE II

Local distribution of Thai Dipterocarps

Species	N	NE	E	SE	C	SW	PEN
Anisoptera							
costata	X	X	X	X	X	X	X
curtisii							X
oblonga				X			X
scaphula						X	X
Balanocarpus							
heimii							X
Cotylelobium							
lanceolatum							X
Dipterocarpus							X
alatus	X	X	X	X	X	X	X
baudii				X		X	X
chartaceus						X	X
costatus	X	X	X	X			X
crinitus							X
dyeri				X		X	X
gracilis			X	X		X	X
grandiflorus		X				X	X
hasseltii						X	X
intricatus	X	X	X	X		X	
kerrii							X
macrocarpus		X	X				
oblongifolius							X
obtusifolius	X	X	X	X	X	X	X
retusus							X
tuberculatus	X	X	X			X	
turbinatus	X	X	X	X		X	
Hopea							
avellanea				X			
ferrea			X				X
helferi	X		X				X
latifolia							X
minutiflora							X
oblongifolia							X

Species	N	NE	E	SE	C	SW	PEN
Hopea							
odorata	X	X	X	X	X	X	X
pedicellata							X
pierrei		X		X			X
recopei				X			
reticulata		X					
sangal							X
sp. nov.		X					
Parashorea							
stellata				X		X	X
Pentacme							
suavis	X	X	X	X	X	X	X
Shorea							
assamica var. globifera							X
curtisii							X
faguetiana							X
farinosa							X
glauca							X
gratissima							X
guiso							X
hemsleyana							X
henryana var. rigida				X			
hypochra				X		X	X
leprosula				X			X
macroptera							X
obtusa	X	X	X	X	X	X	X
parvifolia							X
rogersiana							X
sericeiflora			X	X	X	X	X
sumatrana							X
talura	X	X	X	X	X	X	X
thorelii	X	X	X	X			
Vatica							
cinerea	X	X	X	X		X	X
diospyroides							X
lowii							X
odorata				X		X	X
stapfiana							X
wallichii							X

Ecological distribution

The 5 xerophytic species, *Dipterocarpus intricatus*, *D. obtusifolius*, *D. tuberculatus*, *Shorea obtusa* and *Pentacme suavis*, prefer poor, sandy and lateritic soil of both granitic and sandstone formation.

The ecological distribution of evergreen dipterocarps in Thailand with reference to soil has not yet been thoroughly studied. The studies of ASHTON (1964) for Brunei State can be well applied to Thai species of the Tropical Rain forest. An attempt has been made to illustrate the ecological distribution of Thai dipterocarps following SYMINGTON (1943) with modification as shown in Table III.

SYMINGTON's forest type is more applicable to the Tropical Rain forest in Peninsular Thailand; for application to Thailand the Dry Deciduous Dipterocarp forest type (150-1300 m.) has been included. The Malayan Upper Dipterocarp forest (850-1300 m.) here embraces the Hill Evergreen or Lower Montane forest in the hinterland of Thailand, whose minimum altitudinal limit is at 1000 metres a.s.l. (ROBBINS & SMITINAND 1966); according to present knowledge no Thai evergreen dipterocarps ever occur above 1000 metres.

The Malayan Hill Dipterocarp forest (350-850 m.) includes the Dry or Semi-evergreen forest of Thailand, of which the maximum elevation is 1000 m. Within this type of forest *Dipterocarpus costatus*, *D. macrocarpus* and *D. retusus* reach the 1000 m. level.

Species recorded as inhabits limestone are more or less the same as reported by SYMINGTON (1943), i.e. *Hopea ferrea*, *Vatica cinerea*, *Shorea talura*, *S. assamica* and *Pentacme suavis;* these species are also found growing on other types of rock formation.

Dipterocarpus macrocarpus follows the San Kamphaeng Range, a sandstone formation from Phetchabun along the Pasak River southwards and ends up at the Khao Yai Range in Nakhon Ratchasima.

The higheast elevation reached by Thai dipterocarps is about 1300 metres a.s.l. in an intrusion of the Dry Deciduous Dipterocarp forest on a spur of the Doi Suthep Range in Chiang Mai, N. Thailand, where all 5 xerophytic species are present.

TABLE III

Ecological distribution of the dipterocarps in Thailand after Symington (1943) with modification

	Anisoptera	Dipterocarpus	Hopea	Vatica	Cotylelobium & Balanocarpus	Shorea	Pentacme & Parashorea	Remarks
Upper dipterocarp forest 850-1000 m.		D. costatus D. macrocarpus D. gracilis D. retusus				S. talura		No record of any species listed reach beyond 1000 m. elevation.
Hill dipterocarp forest 350-850 m.	A. curtisii	D. alatus D. costatus D. crinitus D. gracilis D. obtusifolius D. turbinatus	H. pierrei H. pedicellata H. sp. nov.	V. lowii V. cinerea V. stapfiana	B. heimii	S. curtisii S. glauca S. hemsleyana S. hypochra S. leprosula S. macroptera S. sumatrana S. talura S. thorelii S. parvifolia	Parashorea stellata	D. alatus, though occurs at 350 m. elevation, is confining to the peneplain by waterways.
Dry deciduous dipterocarp forest 150-1300 m.		D. intricatus *D. obtusifolius *D. tuberculatus				*P. obtusa *S. talura	*Pentacme suavis & vars.	*At Doi Suthep, Chiengmai, N. Thailand these species reach the elevation of 1300 m.

TABLE III (*continued*)

	Anisoptera	Dipterocarpus	Hopea	Vatica	Cotylelobium & Balanocarpus	Shorea	Pentacme & Parashorea	Remarks
Lowland dipterocarp forest 0-350 m.	A. oblonga A. costata A. curtisii A. scaphula	D. alatus D. baudii D. crinitus D. chartaceus D. dyeri D. grandiflorus D. hasseltii D. kerrii D. obtusifolius	H. avellanea H. ferrea H. helferi H. minutiflora H. oblongifolia H. oblongifolia var. grandis H. reticulata H. recopei H. sangal H. latifolia	V. cinerea V. diospyroides V. odorata V. stapfiana V. wallichii	Cotylelobium lanceolatum	S. assamica var. globifera S. curtisii S. farinosa S. faguetiana S. gratissima S. guiso S. hypochra S. leprosula S. macroptera S. parvifolia S. sericeiflora S. talura	Parashorea stellata	
Riparian fringe		D. alatus D. oblongifolius D. turbinatus	H. odorata H. recopei H. sangal	V.cinerea V. wallichii		S. farinosa		
Limestone rocks			H. ferrea	V. cinerea		*S. assamica S. talura	Pentacme suavis	*A sterile material was collected from a limestone hill in Surat, Peninsular Thailand.
Coastal hills	A.curtisii	D. alatus D. costatus D. gracilis D. grandiflora	H. avellanea H. ferrea H. pedicellata H. pierrei	V. cinerea V. odorata		S. curtisii S. gratissima S. glauca S. hypochra S. henryana var. rigida S. sericeiflora	Pentacme suavis	

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PROVINCES AND DISTRICTS OF THAILAND

as indicated on the map opposite

I. NORTHERN

1. Chiang Mai
2. Chiang Rai
3. Mae Hong Son
4. Lampang
5. Lamphun
6. Phrae
7. Nan
8. Uttaradit
9. Phitsanulok
10. Sukhothai
11. Tak
12. Nakhon Sawan
13. Phichit
14. Kamphaeng Phet

II. NORTHEASTERN

15. Phetchabun
16. Loei
17. Nong Khai
18. Nakhon Phanom
19. Udon Thani
20. Sakon Nakhon
21. Maha Sarakham
22. Kalasin
23. Khon Kaen

III. EASTERN

24. Chaiyaphum
25. Nakhon Ratchasima
26. Buri Ram
27. Si Sa Ket
28. Surin
29. Roi Et
30. Ubon Ratchathani

VI. CENTRAL

31. Chai Nat
32. Sing Buri
33. Lop Buri
34. Ang Thong
35. Saraburi
36. Suphan Buri
37. Phra Nakhon Si Ayutthaya
38. Pathum Thani
39. Nakhon Nayok
40. Bangkok
41. Nonthaburi
42. Thon Buri
43. Nakhon Pathom
44. Samut Prakan
45. Samut Sakhon
46. Samut Songkhram

V. SOUTHEASTERN

47. Prachin Buri
48. Chon Buri
49. Chachoengsao
50. Rayong
51. Chanthaburi
52. Trat

VI. SOUTHWESTERN

53. Uthai Thani
54. Kanchanaburi
55. Ratchaburi
56. Phetchaburi
57. Prachuap Khiri Khan

VII. PENINSULAR

58. Chumphon
59. Ranong
60. Surat Thani
61. Phangnga
62. Krabi
63. Phuket
64. Nakhon Si Thammarat
65. Trang
66. Phatthalung
67. Songkhla
68. Satun
69. Yala
70. Narathiwat
71. Pattani

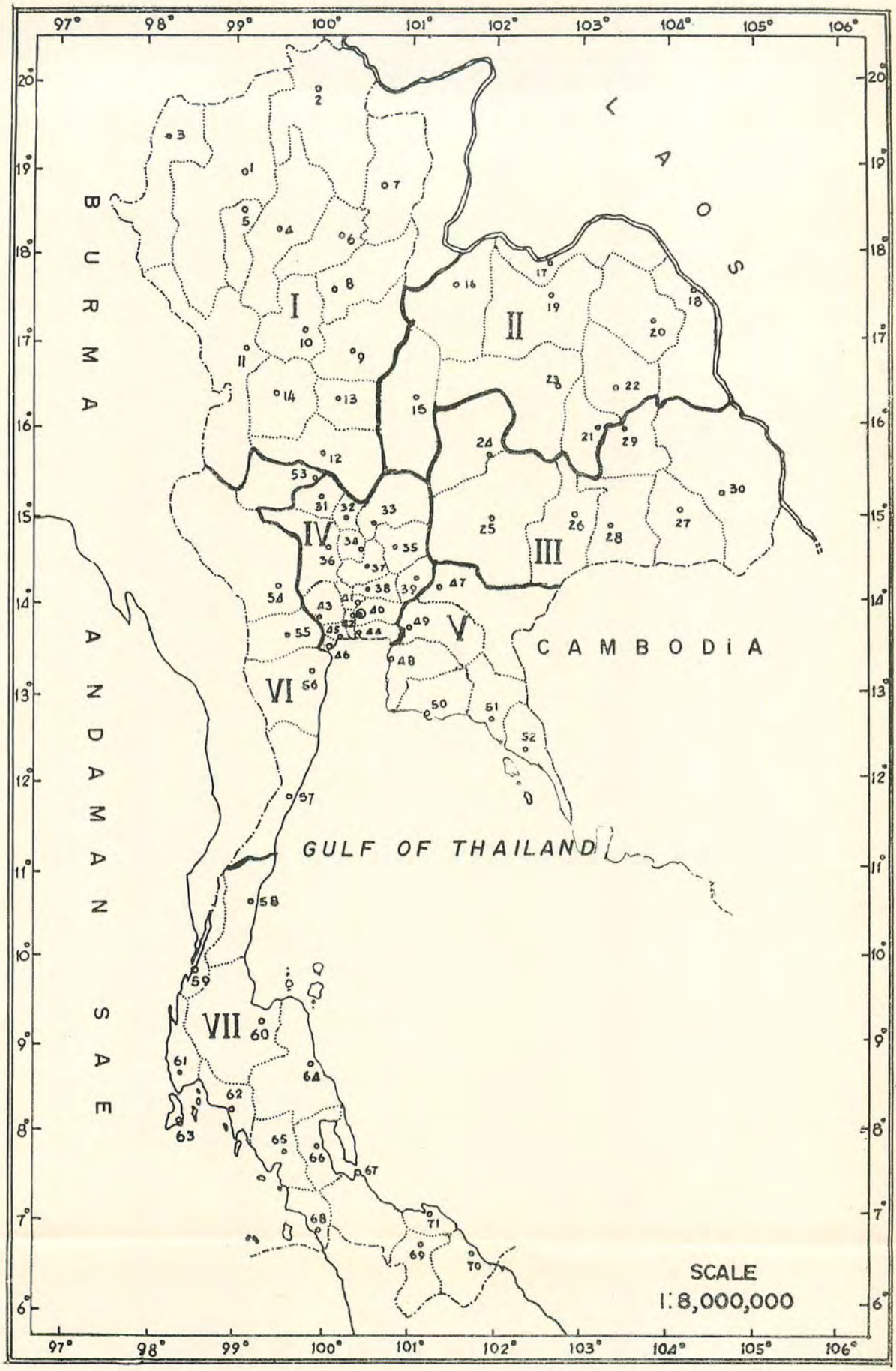

Fig. 1. Map showing phytogeography of Thailand.