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CONSERVATION OF DIPTEROCARPACEAE IN PENINSULAR MALAYSIA

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SAW, L. G. & SAM, Y. Y. 2000. Conservation of Dipterocarpaceae in Peninsular Malaysia. In Peninsular Malaysia, the family Dipterocarpaceae comprises 157 species. Being the most important timber family in Malaysian forestry, the family should be the subject of greater scrutiny in relation to species conservation. However, due to their ubiquitous presence in the Malaysian forests, the spesies are often assumed not to be threatened. Examination of the distribution patterns of the dipterocarps in Peninsular Malaysia indicated that over 57% of the species have distribution patterns restricted to specific zones within the Peninsula. There are also 30 dipterocarp species that are endemic to Peninsular Malaysia. The conservation strategy for the family is discussed.

Keywords: Conservation - Dipterocarpaceae - distribution

SAW, L. G. & SAM, Y. Y. 2000. Pemuliharaan Dipterocarpaceae di Semenanjung Malaysia. Di Semenanjung Malaysia terdapat 157 spesies dalam famili Dipterocarpaceae yang merupakan kumpulan kayu balak yang terpenting di dalam hutan di negara ini. Dengan itu, aspek pemuliharaan spesies kumpulan tersebut sepatutnya mendapat perhatian yang teliti. Walau bagaimanapun, pokok-pokok dipterokarpa jarang dianggap terancam kerana taburannya yang meluas di dalam hutan Malaysia. Pemeriksaan ke atas corak taburannya di Semenanjung Malaysia menunjukkan 57% daripadanya mempunyai taburan yang terhad pada zon-zon tertentu sahaja. Antaranya, 30 spesies dipterokarpa adalah endemik kepada Semenanjung Malaysia. Strategi pemuliharaan famili dipterokarpa turut dibincangkan.

Introduction

The family Dipterocarpaceae is the most important timber family in the lowland forests of Malaysia. They form the dominant trees in the forests and may comprise over 30% of the basal area of the trees in the lowland and hill forests or close to or over 40% of the emergents (Manokaran & Swaine 1994). Ecologically, they form the main structure and support for the other life forms that develop in the complex rain forest ecosystems. Due to their dominance and their good wood working properties, they are featured strongly in the timber trade. For example in 1997, the dipterocarps contributed 38.2% (2.8 million cubic metres) of the total log production for Peninsular Malaysia (Anonymous 1997).

In the past, conservation of the dipterocarps was not an important issue as the family is seen as common and it has been assumed that none of the species are in anyway threatened. However, changing land-use patterns, increasing demands on forestry resources and Malaysian commitment to sustainable utilisation of the forest resources now require that the whole issue of the conservation of all species be looked into. This is particularly so for the members from the family Dipterocarpaceae.

Threats

Over the last few decades in Peninsular Malaysia, land development schemes have seen the loss of much of the lowland forest areas to the agricultural sector. At the turn of this century, over 90% of the land area in Peninsular Malaysia was covered with native forest. After gaining independence, one of the main resources that fuelled national development was the conversion of the forest land to agriculture, particularly rubber and subsequently oil palm cultivation. By 1960 there was still over 70% of the land area under natural forest cover. The massive land development schemes started in the late 1960s and 1970s. This trend is seen in the loss of forest cover over the period; in 1970 only *c.* 60.9% forested land remained and by 1980, 49.4% (Forest Statistics Peninsular Malaysia 1979-1985). This has now stabilised at *c.* 44.5% in 1997 (Anonymous 1997) as most of the land more suitable to agriculture has already been taken, leaving now the more marginal lands in the hills and mountains, and protected areas in National Parks and Wildlife Sanctuaries. The loss of the lowland areas to agriculture also sees the shift of forestry activities to the hills. Furthermore, increasing demand and rising timber prices in the market also see a greater utilisation of more timber species resulting in almost all dipterocarp species being currently used in the timber trade. Harvesting of the forest in the hills also results in a greater degree of damage in the hills where often natural regeneration is poor (Yong 1990). Such combination of factors is depleting stocks of dipterocarps in logged-over forests. Ultimately, all production forest areas will be logged, if no special attempt is made to allocate conservation or protected areas. Up to 1992, only about 29% remain unlogged in the Permanent Forest Estate in Peninsular Malaysia (Chin *et al.* 1997).

In ascertaining the conservation of any group of plants, some basic information will be necessary for the task. Amongst them are the understanding of population levels (stocking), distribution (where they are found), and some basic understanding of their reproductive biology (breeding systems and dispersal strategies) and genetic make-up (genetic variation within and between populations). With such information known in their natural range, the conservation status can then be assessed accurately. Such information is also necessary when subsequently we want to develop conservation action and strategies on threatened taxa. At the very minimum, the distribution patterns and stocking must be clearly understood. Understanding the reproduction biology and the genetic make-up of a threatened taxon would further help to understand what would constitute viable breeding populations that can sustain the continual existence of a particular taxon. However, very often such information is not available for most taxa. We have in this paper limited the discussion to population levels and distribution patterns only.

Distribution of dipterocarp species in Peninsular Malaysia

Although the dipterocarps are the most dominant trees of the lowland forests of Peninsular Malaysia, not all species are evenly distributed throughout the country. In general, plant distributions are limited by a number of factors. The two obvious factors that are maintaining their present distributions are climate and soil or edaphic influences. These two factors are discussed briefly below but the plant distribution we see today is mainly the net result of the historical interactions between climate

changes, soils, geological changes and natural selection in the geological past and recent human activity. Although this is not obvious, these interactions of many thousands of years in the past have resulted in the ecological framework that is found in our forests today.

Climatic factors

This is the most important demarcation for plant distribution. For Peninsular Malaysia, two main influences determine the climate for the country. First, it is the amount and pattern of rainfall. The vast majority of dipterocarps are confined to areas where the mean annual rainfall exceeds 2000 mm and is about evenly distributed throughout the year. Most parts of Peninsular Malaysia fall within this category. The presence of even a short but regular dry season in northwest Peninsular Malaysia (Perlis and Langkawi) which hardly exceeds a month has a profound influence on both the number and kinds of species present (Ashton 1982). Here, the mainly dominant Red Meranti group of *Shorea* which dominate most of the lowland forest further south is replaced by the abundance of the White Meranti group especially *S. hypochra* and *S. roxburghii* and gerutu, *Parashorea stellata* (Wyatt-Smith 1963, Whitmore 1984).

The second is climatic changes resulting from increasing elevation on mountains. Symington (1943) has very carefully depicted the distribution of dipterocarps along elevation gradients in Peninsular Malaysia. The majority of the dipterocarps are restricted in distribution within the lowland dipterocarp to the hill dipterocarp forests below 830 m elevation. Beyond that elevation, there is a marked decrease in the number of dipterocarp species. At this upper limit of distribution of the dipterocarps, the forest is characterised by *Shorea platyclados*. Other dipterocarps found here in limited members include *S. ciliata, S. submontana, S. maxima, S. ovata* and a few species of *Hopea, Dipterocarpus* and *Vatica*. No dipterocarp is found beyond 1300 m elevation where the montane forests develop.

Edaphic factors

This has been comprehensively summarised by Wyatt-Smith (1963). The major edaphic factors in determining the distribution of the dipterocarps away from the more normal mineral soils include the peat swamps and freshwater swamps, heath soils, limestone hill, riparian fringes and beach (strand) soils. No dipterocarp is found in the mangrove swamp.

General patterns

Above the environmental factors that determine habitat limits for species distribution, the distribution patterns of taxa can also be examined in their natural range within these environmental limits. For the dipterocarps, we have listed them into two broad categories, the widespread species and species with restricted distribution. On a global level, species that are restricted in their distribution in Peninsular Malaysia are also listed in this paper. These are termed endemic taxa.

The general distribution patterns of the species are further examined for their rarity in Peninsular Malaysia. Rare taxa describe those species that are limited in their range within one to three adjacent states in Peninsular Malaysia.

Widespread species

Widespread species in localities where conditions suit the species requirements are those species which are found throughout Peninsular Malaysia except the extreme northwest. They often constitute the most important timber producing species. These ubiquitous species are found in all genera and some examples include *Shorea leprosula, S. bracteolata, S. laevis, S. curtisii, S. acuminata, S. lepidota, S. macroptera, S. ovalis, S. parvifolia* and *S. platyclados.* In all there are about 67 species in Peninsular Malaysia that fit into this category (see Appendix 1). Two further categories are used here. Some taxa are widespread, and are common throughout their range. The other category describes taxa that are found throughout the possible ranges in the country but are normally in low densities. These are widespread but scattered taxa.

Species with restricted distributions

The remaining taxa are somewhat restricted to particular localities in Peninsular Malaysia. These ranges may have some phytogeographic significance for Peninsular Malaysia but for the purpose of this paper, we only indicate that these taxa are not widely dispersed although habitats for the requirements of the taxa may exist elsewhere in the country. We have also included within this group species found in the seasonal and high mountain habitats and some taxa restricted to edaphic ranges which have restricted distributions. Broadly categorised, using mountain ranges, climatic demarcation and swamps as possible barriers, the zones are:

- Perlis and Langkawi Island (including Peninsular Thailand) – Seasonal climate
- Kedah, Perak and Penang (Northwest) – Within Bintang and Keledang Ranges and surrounding areas
- North Malayan (Kedah, Perak, Selangor, Kelantan, Terengganu and Pahang) – Northern element but not of seasonal climate
- West coast (west coast states Kedah till Johor) – West of Main Range
- South Malayan (Negeri Sembilan, Melaka, South Pahang, Johor and Singapore) – South of Main Range
- East coast (east coast states Kelantan to Johor and Singapore) – East of Main Range
- Mountain ranges – Mountain species
- Peat swamp species (mainly in the Selangor, Perak, Pahang and Johor swamp forests) – Habitat restricted
- Single locality distributions

Results

A checklist of species of the Dipterocarpaceae with their distribution patterns and some notes of the taxa is provided in Appendix 1. The information scored in this list

was obtained mainly from herbarium specimen records, Turner (1995), Ashton (1982), Symington (1943), and also personal experiences provided by field staff and the authors. Note that some of these scores are only estimation of distribution zones. Often there are overlapping distributions of species in the broad zones. As these estimations are based on available information and experiences, some of the scorings may change when more information becomes available. However, these patterns as given here will help to highlight that a good majority of dipterocarps have rather restricted distribution ranges. Table 1 summarises the distribution for dipterocarp species perceived in phytogeographical zones in Peninsular Malaysia. In all, 89 species are restricted to some zones.

Rare and endemic species

Together with the restricted distribution patterns discussed above, a sizeable number of Peninsular Malaysian dipterocarps are local endemics. Peninsular Malaysian endemics are defined here as species or taxa that are restricted in their distribution within Peninsular Malaysia. We have included Singapore and southern Peninsular Thailand where the Main Range ends as part of the Peninsular Malaysia endemism range.

In total only 30 species are considered Peninsular Malaysian endemics, this is 19.1% of the total species found here (see Table 2). This is lower than the general tree endemism for Peninsular Malaysia where Ng *et al.* (1990) observed 26.4% endemism.

In Appendix 1, the rare species are also identified. This is also summarised in Table 2. These species are defined as taxa having restricted range, found within one to three adjacent states. Twelve of the endemic species have also such restricted distribution. Among the non-endemic species, 34 are considered rare. Four species

Table 1. Summary of distribution patterns of Dipterocarpaceae in Peninsular Malaysia (for details see Appendix 1). The codes are used in the Appendix 1 to indicate the zones.

Code	Zone	No. of species (including subspecies)
Z1	Perlis and Langkawi Island (including Peninsular Thailand) – Seasonal climate	9
Z2	Kedah, Perak and Penang (North west) – Within Bintang and Keledang Ranges and surrounding areas	20
Z3	North Malayan (Kedah, Perak, Selangor, Kelantan, Terengganu and Pahang) – Northern element	11
Z4	West coast (west coast states Kedah till Johor) – West of Main Range	7
Z5	South Malayan (Negeri Sembilan, Melaka, South Pahang, Johor and Singapore) – South of Main Range	13
Z6	East coast (east coast states Kelantan to Johor and Singapore) – East of Main Range	24
Z7	Mountain ranges – Mountain species	6
P	Peat swamp species (mainly in the Selangor, Perak, Pahang and Johor swamp forests) – Habitat restricted	9
X	Single locality distributions	4
W	Widespread and common	49 (50)
S	Widespread but scattered	18

Table 2. Dipterocarpaceae in Peninsular Malaysia indicating endemic and rare species

Genus	No. of species	Endemic species	Endemic and rare	Rare non-endemic	Endemic and rare non-endemic
Anisoptera	6	0	0	0	0
Cotylelobium	2	0	0	1	1
Dipterocarpus	31	3	2	6	9
Dryobalanops	2	0	0	0	0
Hopea	32	9	4	6	15
Neobalanocarpus	1	1	0	0	1
Parashorea	3	1	0	1	2
Shorea	59	7	4	18	25
Vatica	21	9	2	2	11
Total	**157**	**30**	**12**	**34**	**64**

Rare species are defined as having restricted range, found within one to three adjacent states.

are currently known from single localities. Such species would require special conservation consideration and they are highlighted in Table 3.

Conservation status of Peninsular Malaysian dipterocarps

In developing conservation strategies and action for any group, accurate population information (both stocking and distribution) forms the minimum basis of all levels of decision-making: scoring of conservation status, developing strategies for protection and conservation, and even sustainable utilisation. Lacking accurate population information will result in flawed decision-making processes.

Using data from current inventory methods (the Third National Forest Inventory) in Peninsular Malaysia, e.g. Chin *et al.* 1997, it is not possible to determine stockings of all 157 dipterocarps species. As the inventory method uses only vernacular names, often the rarer species are not named to species but are only put into timber groups. Stocking, however, can be determined for the more common species where they can be named to species level even using vernacular names available in the inventory. For such species, the conservation status can be assessed.

Table 3. Species in Peninsular Malaysia that are only known from single localities

Species	Distribution in Peninsular Malaysia	Distribution elsewhere	Habitat
Dipterocarpus sarawakensis	Terengganu, Kemaman, Sungai Nipah F.R., Sungai Dadong	Borneo, Sarawak and Brunei	Lowland forest
Hopea bilitonensis	Perak, Kinta, Bukit Kinta F.R., Gunung Gajah	Sumatra	Limestone hill
Hopea subalata	Selangor, Gombak, Kanching F.R., Endemic	Nil	Lowland forest
Shorea kuantanensis	Pahang, Kuantan, Bukit Goh F.R., Endemic	Nil	Lowland forest

In the recent publication of 'The World List of Threatened Trees' (Oldfield *et al.* 1998), the conservation status for many timber species was scored. This is a significant survey; for the first time, a sizeable number of tropical timber species are scored for their conservation status. In this list, 958 species were scored for Malaysia including 598 species for Peninsular Malaysia. The Peninsular Malaysian list included mainly endemic tree species (to Peninsular Malaysia). Of these, 413 species were in some categories of endangerment (see Table 4). Dipterocarpaceae was among some of the families that were scored in detail. The scores of threatened taxa in the Dipterocarpaceae for Peninsular Malaysia is given in Table 5. In it, 124 out of the 157 Peninsular Malaysian species were listed in some category of threat. However, there is a strong need to reassess the conservation status of these species in line with good inventory information. This will be discussed in a separate paper (Saw in preparation).

Conservation strategies for Peninsular Malaysian dipterocarps

The aim of any conservation strategy of any plant would be to ensure the continual survival of the taxon into perpetuity. The *in situ* approaches to conservation are generally regarded as the most efficient and fail safe method towards the conservation of naturally occurring species. In tailoring the conservation strategies for any particular

Table 4. Summary of trees evaluated for conservation status in Peninsular Malaysia using the new IUCN categories and criteria (Oldfield *et al.* 1998)

IUCN category	No. of species
Extinct (EX)	0
Extinct in the wild (EW)	0
Critically endangered (CR)	100
Endangered (EN)	61
Vulnerable (VU)	252
Subtotal (under threat)	**413**
Lower risk (near threatened) (LR/nt)	56
Lower risk (conservation dependent) (LR/cd)	105
Data deficient (DD)	24
Total	**598**

Table 5. Summary of IUCN scores of conservation status of Peninsular Malaysian Dipterocarpaceace (see Table 4 for explanation of threat abbreviations)

Genus	EX	EW	CR	EN	VU	Total
Anisoptera	0	0	3	2	0	5
Cotylelobium	0	0	0	1	1	2
Dipterocarpus	0	0	17	4	1	22
Dryobalanops	0	0	1	1	0	2
Hopea	0	0	19	5	3	27
Neobalanocarpus	0	0	0	0	1	1
Parashorea	0	0	1	2	0	3
Shorea	0	0	26	18	1	45
Vatica	0	0	11	6	0	17
Total	0	0	78	39	7	124

group of organism, care should be taken to ensure that not only are the species protected but also that this includes the conservation of their genetic variation and their ecological needs. It is in devising a more holistic approach in conservation that we can be certain that steps taken now would ensure continual survival of any taxon in the future. In a group that is exploited such as the dipterocarps, the conservation strategy should include the protection of contiguous stands of relatively undisturbed or virgin areas within areas that are managed for timber production. Such areas may become important in the future as sources for both seed production and genetic material, if at all there is any failure or breakdown in the recovery processes in the managed area. As information on the genetic diversity of many groups is lacking, it would be prudent to include as many areas as possible that are distributed throughout the country. When such information becomes available, it would be possible to better manipulate distribution and population sizes for optimal protection.

The conservation of a charismatic group like the dipterocarp is of utmost importance, as it would easily garner support for their conservation. In the protection of this family in its natural ecosystems, this would also meant protection of other plant species that are found within such areas. It is hoped that the model developed for the family could at the later stage be extended to other plant species. The range of different conservation needs for the dipterocarps will probably be similar to that for most other tree species of Peninsular Malaysia. It is extremely important that the management agency of the forest (i.e. the Forest Department, Peninsular Malaysia) could use such models and apply them for all plant species in the country.

In developing the conservation strategy for the dipterocarps, different strategies would be required for species with different distribution patterns and threat categories. Taking into account the discussion and the attributes of the dipterocarps, the following proposals would be the logical conservation strategies for the family.

Determination of accurate distribution and stocking information for all taxa

This would be the prerequisite of any conservation activity. Although distribution patterns can be determined by traditional botanical methods, it is not possible to estimate population levels obtained from herbarium specimens and from field information as has been done in this paper. Population levels or stocking information can only be done by actual inventory surveys. Currently, the best channel available to determine stocking of timber species is the National Forest Inventories undertaken by the Forest Department. Attempts should be made to improve the identification levels for the dipterocarps, so that stocking levels of each species can be determined.

Accurate assessment of conservation status of the dipterocarps

There is a need to accurately assess the conservation status of all dipterocarp species for Peninsular Malaysia. If the new IUCN (1994) categories and criteria are flawed, then they should be reviewed and more accurate criteria for scoring be used. The removal of subjectivity on the conservation status scoring should be attempted and replaced with more objective methods based on actual inventory data. For an important timber group such as the dipterocarps, where there are implications of trade in the resultant scores, the scoring mechanism should be done judiciously. It should

involve the experts in the field in consultation with local management bodies that deal with the tree species (e.g. the Forest Departments and forest research institutions). Once accurate conservation assessment of taxa is done, conservation action can then be taken to protect threatened or endangered taxa.

Development of conservation areas for dipterocarps for every state in Peninsular Malaysia

As discussed in this paper, 89 out of the 154 species (57.7%) of the dipterocarps in Peninsular Malaysia are restricted to some geographical zones in the Peninsula. The best strategy to ensure that all species are conserved is the allocation of conservation areas in every state in the Peninsula. A checklist of dipterocarps known in each state should be maintained together with their distribution in the state. Attempts should be made to ensure that all species are captured in conservation areas. If the conservation areas are strategically located, it would be possible to put into conservation areas all species of dipterocarps. The conservation areas would include the present Virgin Jungle Reserves (VJR) already constituted under current forestry management and also possibly new categories of 'Plant Species (or Timber) Conservation Reserve' where there are good tracts of regenerated forests with targeted dipterocarp species where virgin areas are lacking. Species capture in totally protected areas such as the National and State Parks, and Wildlife Sanctuaries should also be listed in each state. The distribution of these protected areas in the state should also be studied; ideally the conservation areas should be evenly distributed throughout the state. The number and size of these areas in each state should be studied so that genetic variations of the species are also captured within the system together with species capture. Such areas should have some legal standing so that "accidental loss" through logging should not occur.

It is hoped that within such a system, all endemic taxa are conserved within the conservation areas. For species that are rare, including the endemic and non-endemic taxa, their distributions should be specifically located and areas zoned for their conservation. For single-locality species, the whole population should be designated as protected status. Such taxa would be very prone to extinction if no special protection is given. For Peninsular Malaysia, this would include *Dipterocarpus sarawakensis, Hopea bilitonensis, Hopea subalata* and *Shorea kuantanensis* (see Table 3 for details).

Management system under production areas

The bulk of the distribution of the dipterocarps will still be under the production areas of the Permanent Forest Estate managed by the Forest Departments of the states. Management practices should ensure that harvesting regimes are sustainable. This is not elaborated in this paper, as the Selective Management System currently used by the Forest Department has elements for sustainable utilisation of the forest resources. However, we would wish to draw attention that in the replanting of poorly regenerated forest areas, state- or locality-native species should be encouraged. This would ensure that the ecological integrity of the area is maintained. If there are already some conservation areas within the poorly regenerated forests, attempts can be made to

source planting material from such areas. Such methods would then maintain not only the species within the area but also the genetic characteristics (provenance) of the local populations.

Continuous monitoring and assessment

There should be institutional set-up to monitor and assess the conservation areas and the populations of the targeted taxa. The continuous monitoring and assessment should be part of the management tool of the Forest Department in its regular tasks. In the production forest areas, national inventory data should be accurate to species level for the dipterocarps. Such information will be critical to assess if current management system is sustainable on the population of the dipterocarps. For taxa with restricted distribution, it may be necessary to conduct regular monitoring of the conservation areas to prevent encroachment and determine the performance of the taxa in the area.

Recovery plans for endangered taxa

For taxa that are in the threatened categories, especially in the "Endangered" and "Critically Endangered" categories, some recovery plans must be developed to ensure protection and restoration of both species and populations. This may entail legislative protection. For Peninsular Malaysia, where no such legislation is available for plant protection, new laws may be required to deal with problems of endangered plants. In the recovery plans for endangered taxa, *ex situ* means may also be employed by planting threatened plants in botanic gardens or special *ex situ* conservation areas. To better understand the survival of such threatened species, special conservation research targeted on these species may be required before good action plans can ensure success. Reintroduction programmes would ultimately be the important outcome of such studies.

Identification of institutional responsibilities in species and ecosystem conservation

As linked with all the proposals above, there should be a permanent body comprising both biologists and forest managers who are responsible towards the care of threatened plants for the country. Some of the functions of this body would include compilation of a list of threatened species, understanding taxonomy of the taxa, gathering data towards understanding the natural distribution of the taxa, conducting studies to understand genetic variation and developing conservation action plans for threatened species. The functions should also include ecosystem conservation, which has not been discussed in detail here.

Conclusion

It is increasingly important that issues of plant conservation are dealt with under current forestry management practices. Although many species of the dipterocarps are still common in the country, there are also many taxa that would require conservation intervention by man. The increasing demands on forestland and

resources also require that the management authority reassess how the stocking of dipterocarps will fare in the future. The setting up of a conservation body for plant species will be the first step towards this end.

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Appendix 1. Checklist of Dipterocarpaceae species in Peninsular Malaysia with indication for distribution. See Table 1 for details of the distribution zones in Peninsular Malaysia. The abbreviations used for the states are Perlis (Ps), Kedah (Kd), Perak (Pk), Penang (Pn), Kelantan (Kl), Terengganu (Tg), Pahang (Ph), Selangor (Sl), Negeri Sembilan (NS), Melaka (Ml), Johor (Jh) and Singapore (Sp). Rare taxa are taxa found in not more than three adjacent states and are marked "R".

Species	Zone	Endemism	Rarity	Notes
Anisoptera costata Korth.	S			Huge tree. Lowland forest. Widespread. Burma, Indochina, Sumatra, Java, Borneo, Philippines.
Anisoptera curtisii Dyer ex King	W			Large buttressed tree. Lowland and hill forests to 700 m. Widespread but more common in the north. Sumatra (P. Singkep).
Anisoptera laevis Ridl.	W			Big tree. Lowland forest. Widespread. Borneo.
Anisoptera marginata Korth.	P			Large tree. Peat swamp and heath forests. Pk and Ph southward. Banka, Sumatra, Borneo.
Anisoptera megistocarpa Slooten	S			Tall buttressed tree. Lowland forest. Pk and Ph southward. Pen. Thailand, Sumatra.
Anisoptera scaphula (Roxb.) Kurz	Z3			Very tall buttressed tree. Lowland forest. NS and Ph northward. S. Indochina, Bangladesh, Burma, Thailand.
Cotylelobium lanceolatum Craib	Z6			Medium to large tree. Lowland forest. Tg southward. Pen. Thailand, Anambas Is, Borneo.
Cotylelobium melanoxylon (Hook.f.) Pierre	Z5		R	Tree. Lowland forest. Jh, ?Sp. Pen. Thailand, Sumatra.
Dipterocarpus acutangulus Vesque	Z4		R	Tree. Hill forest. NS, Perak, rare. Borneo.
Dipterocarpus baudii Korth.	W			Large tree. Lowland forest. Widespread. Indo-China, Burma, Sumatra.
Dipterocarpus caudatus Foxw. ssp. *penangianus* (Foxw.) P.S. Ashton	S			Large tree. Coastal hill forest. Tg, Pn, Kl, Pk, Ph, Jh, Sp. Sumatra, Borneo.
Dipterocarpus chartaceus Symington	P	Endemic		Large tree. Seasonally flooded lowland forest. Ps, Kd, Kl, Tg, Pk, Pn, Ph, Sl, NS, Jh. Pen. Thailand.

Species	Zone	Endemism	Rarity	Notes
Dipterocarpus concavus Foxw.	S			Large buttressed tree. Lowland forest. Kd, Pk, Tg, Ph, Sl, Jh. Sumatra (P. Singkep).
Dipterocarpus coriaceus Slooten	P		R	Tree. Peat swamp forest. Pk, Ph. Sumatra, Borneo.
Dipterocarpus cornutus Dyer	W			Large tree. Lowland and hill forests to 1000 m. Widespread. N Sumatra, Borneo.
Dipterocarpus costatus Gaertn.f.	S			Large tree. Lowland forest. NS northward. Andamans, Chittagong, Burma, Thailand, Cambodia, Vietnam.
Dipterocarpus costulatus Slooten	W			Tree. Lowland forest. Widespread. E Sumatra, W & NE Borneo.
Dipterocarpus crinitus Dyer	W			Tree. Lowland and hill forests to 850 m. Widespread. E Pen. Thailand, Sumatra, Borneo.
Dipterocarpus dyeri Pierre	Z1		R	Large tree. Lowland forest. Ps, Kd. Vietnam, Cambodia, Pen. Thailand
Dipterocarpus elongatus Korth.	Z6			Tree. Lowland forest. Mostly east coast, Kl to Sp, Pk. Lingga Arch., Anambas Is, Borneo.
Dipterocarpus eurhynchus Miq.	S			Tree. Lowland forest. Tg, Ph, NS, Jh. Sumatra, Borneo, S Philippines.
Dipterocarpus fagineus Vesque	S			Tree. Lowland and hill forests. Kd, Pn, Tg, Kl, Pk, Ph. Sumatra, Borneo.
Dipterocarpus gracilis Blume	S			Tree. Lowland forest. Widespread. Andamans, Chittagong, Burma, SE & Pen. Thailand, Sumatra, W Java, Borneo, Philippines.
Dipterocarpus grandiflorus (Blanco) Blanco	W			Very large buttressed tree. Lowland forest. Widespread. Andamans, Mergui, Pen. Thailand, Sumatra, Borneo, Philippines.

Species	Zone	Endemism	Rarity	Notes
Dipterocarpus hasseltii Blume	S			Large tree. Lowland forest. Kl, Ph, Sl, Jh, Langkawi, more common in the north. Pen. Thailand, Sumatra, W Java, L. Sunda Is, Borneo, Philippines.
Dipterocarpus kerrii King	W			Large tree. Lowland forest. Widespread. Andamans, Burma, Pen. Thailand, Sumatra, Sabah, Philippines.
Dipterocarpus kunstleri King	W			Big tree. Lowland forest. Widespread. Sumatra, Borneo, Philippines.
Dipterocarpus lowii Hook.f.	Z2, Z6			Tree. Lowland forest. Scattered, Pk, Jh, east coast. Sumatra (P. Singkep), Borneo.
Dipterocarpus oblongifolius Blume	Z6			Large tree. Banks of fast-flowing rivers. Mostly east of Main Range. S Pen. Thailand, Borneo.
Dipterocarpus obtusifolius Teijsm. ex Miq.	Z1		R	Medium-sized tree. Schima-bamboo forest. Ps, Kd. Burma, Thailand, Indochina.
Dipterocarpus palembanicus Slooten	Z6			Tree. Lowland and hill forests to 650 m. Kd, Tg, Jh, Sp. Sumatra, Borneo.
Dipterocarpus perakensis P.S. Ashton	Z2	Endemic	R	Large tree. Lowland forest on coastal hills. Pn, Pk.
Dipterocarpus retusus Blume	Z7			Medium-sized tree. Hill forest at 800-1300 m. Ph, Pk, Kl, NS, Sl. Assam, NW Burma, SE & Pen. Thailand, Indochina, Sumatra, Java, L. Sunda Is.
Dipterocarpus rigidus Ridl.	Z6			Tree. Coastal hill forest. Tg southward. Sumatra, Borneo.
Dipterocarpus rotundifolius Foxw.	Z2, Z6	Endemic		Tree. Lowland forest. Tg, Ph, Pk, Jh.
Dipterocarpus sarawakensis Slooten	X		R	Tree. Lowland forest. Once from Tg. S Borneo, Sarawak, Brunei.
Dipterocarpus semivestitus Slooten	Z2		R	Large tree. Lowland forest. Pk. Borneo.
Dipterocarpus sublamellatus Foxw.	W			Tree. Lowland forest. Widespread. Sumatra, Borneo.

Species	Zone	Endemism	Rarity	Notes
Dipterocarpus verrucosus Foxw. ex Slooten	W			Tree. Lowland forest. More common in the south. Sumatra (P. Singkep), Borneo.
Dryobalanops aromatica C.F. Gaertn.	Z6			Tree to 50 m tall. Gregarious in sandy lowland forest. Tg, Ph, Sl, NS, Jh. *Sumatra, Borneo.*
Dryobalanops oblongifolia Dyer ssp. *occidentalis* P.S. Ashton	W			Big tree. Swampy lowland forest. Pk northward. Sumatra.
Hopea apiculata Symington	Z2	Endemic	R	Small tree. Lowland forest. Pk, Kl (once), Tg (once), Ph (once). Pen. Thailand, S Burma.
Hopea auriculata Foxw.	Z2, Z6	Endemic		Small tree. Hill forest to 700 m. Ph, Jh, Pk (Pangkor).
Hopea beccariana Burck	W			Large buttressed tree. Lowland and hill forests to 1200 m. Widespread. Pen. Thailand, Sumatra, Borneo.
Hopea bilitonensis P.S. Ashton	X		R	Small stilt-rooted tree. On limestone. Once from Pk. Sumatra.
Hopea bracteata Burck	Z2, Z6			Small tree. Ridges to 650 m. Pn, Pk, Ph, Jh. Borneo.
Hopea coriacea Burck	Z6			Tall buttressed tree. Lowland forest, often near rivers. Kl, Tg, Ph. Borneo.
Hopea dryobalanoides Miq.	W			Tall buttressed tree. Lowland forest. Widespread. Sumatra, Borneo.
Hopea dyeri F. Heim	W			Medium-sized tree. Lowland and hill forests to 1000 m. Tg, Ph, Pk, Sl, NS, Ml, Jh. Borneo.
Hopea ferrea Laness.	Z1		R	Small gnarled tree. Mostly on limestone. Ps, P. Langkawi, Kd. Indochina, Thailand.
Hopea ferruginea Parijs	Z5			Stilt-rooted/buttressed tree. Lowland and hill forests to 750 m. Pk and Ph southward. Sumatra, Borneo.
Hopea glaucescens Symington	S	Endemic		Medium-sized tree. Lowland forest to 500 m. Kd, Pk, Ph, Tg, Jh.
Hopea griffithii Kurz	W			Medium-sized tree. Lowland forest. Widespread. Burma, Borneo.

Species	Zone	Endemism	Rarity	Notes
Hopea helferi (Dyer) Brandis	Z1, Z2		R	Large tree. Lowland forest. P. Langkawi, Kd, Pk. Andamans, Burma, Thailand, Cambodia.
Hopea johorensis Symington	Z5	Endemic	R	Stilt-rooted tree. Lowland forest. East Jh.
Hopea kerangasensis P.S. Ashton	Z6		R	Medium-sized tree. Lowland forest on sandy soils. Tg, Ph. Borneo.
Hopea latifolia Symington	Z4			Medium-sized tree. Lowland forest, including limestone. Kd, NS, Sl, Ph, Jh. Borneo.
Hopea mengerawan Miq.	P			Tall buttressed tree. Swampy lowland forest. Tg, Kl , Ph and Pk southward. Sumatra, Borneo.
Hopea montana Symington	Z7			Medium-sized tree. Lower montane forest to 1200 m. Kl, Pk. Borneo.
Hopea myrtifolia Miq.	S			Medium-sized tree. Lowland forest. Kl, Tg, Pk, Ph, NS, Jh. Sumatra, Borneo.
Hopea nervosa King	W			Medium-sized tree. Lowland forest. Widespread. Borneo.
Hopea nutans Ridl.	P			Largish buttressed tree. Swampy lowland forest. Tg, Ph, NS, Sl, Jh. Borneo.
Hopea odorata Roxb.	Z3			Tall buttressed tree. Lowland forest near rivers. Tg and Pk northward. Andamans, Burma, Thailand, Indochina.
Hopea pachycarpa (F. Heim) Symington	Z6		R	Tree. Lowland forest. Ph, Jh. Sumatra, Borneo.
Hopea pedicellata (Brandis) Symington	Z3			Medium-sized tree. Hill forest to 750 m. Tg, Kl, Pn, Pk, Ph northward. S Indochina, Borneo.
Hopea pierrei Hance	Z4		R	Medium-sized tree. Ridges to 700 m. Ph, Sl, NS. Vietnam, Cambodia, SE Thailand.
Hopea polyalthioides Symington	Z5	Endemic	R	Small tree. Lowland forest. Jh.
Hopea pubescens Ridl.	Z3	Endemic		Medium-sized tree. Lowland forest. Kl, Ph, Sl, Tg.

Species	Zone	Endemism	Rarity	Notes
Hopea sangal Korth.	S			Largish tree. Lowland forest to 500 m. Widespread. Pen. Thailand, Sumatra, Banka, Billiton, W Java, L. Sunda Is (Bali), Borneo.
Hopea semicuneata Symington	S			Tall buttressed tree. Lowland forest to 500 m. Tg, Pk, Ph, NS, Ml, Jh. Sumatra, Borneo.
Hopea subalata Symington	X	Endemic	R	Small tree. Lowland forest. Kanching F.R., Sl.
Hopea sublanceolata Symington	Z3	Endemic		Medium to large tree. Lowland forest. Kd, Kl, Pk, Ph.
Hopea sulcata Symington	Z4, Z5	Endemic		Medium-sized tree. Lowland forest to 400 m. Tg (once), Pk, Sl, Jh.
Neobalanocarpus heimii (King) P.S. Ashton	W	Endemic		Very large buttressed tree. Lowland and hill forests to 1000 m. Widespread. Pen. Thailand.
Parashorea densiflora Slooten & Symington	W	Endemic		Large tree. Lowland forest below 500 m. Scattered widely.
Parashorea globosa Symington	Z2		R	Large tree. Lowland forest. Pk. Sumatra.
Parashorea stellata Kurz	Z3			Medium to large tree, lowland and hill forests to 650 m. Tg and Pk northward. S Burma, Thailand, Indochina.
Shorea acuminata Dyer	W			Large buttressed tree to 50 m tall. Lowland forest. Pk and Tg southward. Sumatra.
Shorea assamica Dyer ssp. *globifera* (Ridl.) Symington	Z3		R	Large buttressed tree. Lowland and hill forests to 1000 m. Pk and Ph northward. Pen. Thailand, Sumatra, ?SE Borneo
Shorea atrinervosa Symington	Z6		R	Large tree. Lowland forest. Tg, Ph, Jh. Sumatra, N Borneo.
Shorea balanocarpoides Symington	Z2, Z6			Small to middling tree. Lowland and hill forests to 700 m. Kd, Kl, Tg, Pk, Ph, Jh. Sumatra, Borneo.
Shorea bentongensis Foxw.	Z4	Endemic	R	Large buttressed tree. Lowland forest. Sl, Ph, Jh.
Shorea blumutensis Foxw.	Z5		R	Large tree. Lowland forest below 500 m. Jh. Sumatra.

Species	Zone	Endemism	Rarity	Notes
Shorea bracteolata Dyer	W			Medium to large tree. Coastal hills to 600 m. Kd, Pn, Kl, Tg, Pk, Ph, Sl, NS, Ml, Jh, Sp. Sumatra, Borneo.
Shorea ciliata King	Z7	Endemic		Medium-sized tree. Hill and lower montane forests to 1200 m. Pn, Tg, Jh and Main Range.
Shorea collina Ridl.	Z6	Endemic		Medium to large tree. Lowland forest. East Coast, Tg southwards.
Shorea curtisii Dyer ex King ssp. *curtisii*	W			Large tree. Ridges to 850 m. Throughout. Pen. Thailand, Sumatra, Borneo.
Shorea curtisii Dyer ex King ssp. *grandis* P.S. Ashton	Z2	Endemic subspecies	R	Large tree. Lowland forest. Pk.
Shorea dasyphylla Foxw.	W			Moderately big tree. Lowland and hill forests to 1000 m. Kl, Tg, Pk, Ph, Sl, NS, Ml, Jh. Sumatra, Borneo.
Shorea dealbata Fowx.	Z6		R	Medium-sized tree. Lowland forest. Tg, Ph. Sumatra, Borneo.
Shorea exelliptica Meijer	Z2, Z6			Tall buttressed tree. Lowland forest. Kd, Tg, Pk, Ph, Jh. Borneo.
Shorea faguetiana F. Heim	W			Medium to large buttressed tree. Mostly in the hills to 700 m. Kd, Pn, Kl, Tg, Pk, Ph, Sl, NS, Ml, Jh. Pen. Thailand, Borneo.
Shorea falcifera Dyer ex Brandis	Z6		R	Medium-sized tree. Coastal hills. Tg, Ph. NE Sumatra, Borneo.
Shorea farinosa C.E.C. Fisch.	Z1		R	Large tree. Lowland forest. Ps, Kl (presence somewhat doubtful). Pen. Thailand.
Shorea foxworthyi Symington	W			Tall buttressed tree. Lowland and hill forests to 700 m. Kd, Kl, Tg, Pk, Ph, Sl, Jh. Sumatra, Borneo.
Shorea gibbosa Brandis	Z5			Very tall buttressed tree. Lowland forest. Ph, Sl, NS, Jh, Sp. Sumatra, Borneo.
Shorea glauca King	W			Medium to large tree. Coastal hills to 600 m. Ps, Kd, Pn, Kl, Tg, Pk, Ph, NS, Ml, Jh. Pen. Thailand, W Coast Sumatra.
Shorea gratissima (Wall. ex Kurz) Dyer	S		R	Large tree. Lowland forest. Kl, Sl, Jn, Sp. Pen. Thailand, Tenasserim, Sumatra, Borneo

Species	Zone	Endemism	Rarity	Notes
Shorea guiso (Blanco) Blume	W			Large buttressed tree. Lowland forest. Widespread. Indochina, Pen. Thailand, Sumatra, Borneo, Philippines.
Shorea hemsleyana (King) King ex Foxw.	Z2		R	Tree. Peat swamp forest. Pk. Pen. Thailand, Sumatra.
Shorea henryana Pierre	Z1		R	Large buttressed tree. Lowland forest. Ps, P. Langkawi, Kd. Lower Burma, SE & Pen. Thailand.
Shorea hopeifolia (F. Heim) Symington	W			Very tall buttressed tree. Lowland forest to 600 m. Kl and Kd southward. Sumatra, Borneo, Philippines.
Shorea hypochra Hance	W			Very large tree. Lowland forest. Sl and Ph northward. Vietnam, Cambodia, Thailand, Sumatra.
Shorea inappendiculata Burck	Z5		R	Large buttressed tree. Lowland forest. Jh. Sumatra, N Borneo.
Shorea johorensis Foxw.	Z5		R	Large buttressed tree. Lowland forest. Jh. Sumatra, Borneo.
Shorea kuantanensis P.S. Ashton	X	Endemic	R	Medium-sized tree. Lowland forest. Bt Goh F.R., Ph.
Shorea kunstleri King	Z2, Z6			Large buttressed tree. Lowland and hill forests to 800 m. Kd, Kl, Tg, Pk, Ph. Sumatra, Borneo.
Shorea laevis Ridl.	W			Vast buttressed tree. Lowland and hill forests to 1000 m. Kd and Ph southward. Pen. Burma & Thailand, N Sumatra, Borneo.
Shorea lamellata Foxw.	Z2		R	Large tree. Lowland and hill forests to 650 m. Pk. Sumatra, Borneo.
Shorea lepidota (Korth.) Blume	W			Large buttressed tree. Lowland forest. Kd, Pn, Tg, Pk, Ph, NS, Ml, Jh. Sumatra.
Shorea leprosula Miq.	W			Large buttressed tree. Lowland and hill forests to 700 m. Kd, Pn, Kl, Tg, Pk, Ph, Sl, NS, Ml, Jh, Sp. Pen. Thailand, Sumatra, Borneo.
Shorea longisperma Roxb.	W			Very large buttressed tree. Lowland to montane forest at 1400 m. Widespread. Sumatra, Borneo.

Species	Zone	Endemism	Rarity	Notes
Shorea lumutensis Symington	Z2	Endemic	R	Medium to large tree. Coastal hills. Pk.
Shorea macrantha Brandis	Z2, Z6		R	Tree of middle size. Peat swamp forest. Pk, Ph, Jh. Sumatra, Borneo.
Shorea macroptera Dyer	W			Large tree. Lowland and hill forests to 900 m. Kd, Pn, Kl, Tg, Pk, Ph, Sl, NS, Ml, Jh, Sp. Pen. Thailand, Sumatra.
Shorea materialis Ridl.	Z6		R	Medium-sized tree. Heath forest. Tg, Ph, Jh. NW Borneo.
Shorea maxima (King) Symington	Z4	Endemic		Small- to medium-sized tree. Lowland and hill forests to 1300 m. Kl, Ph, Sl, NS, Jh.
Shorea maxwelliana King	W			Tall buttressed tree. Lowland and hill forests to 700 m. Pn and Tg southward. Sumatra, Borneo.
Shorea multiflora (Burck) Symington	W			Small- to medium-sized tree. Lowland and hill forests to 700 m. Throughout. Sumatra, Borneo.
Shorea ochrophloia Strugnell ex Symington	W			Large buttressed tree. Lowland forest. Widespread. Sumatra.
Shorea ovalis (Korth.) Blume ssp. *ovalis*	W			Large tree. Lowland forest. Kd, Pn, Kl, Tg, Pk, Ph, Sl, NS, Ml, Jh, Sp. Sumatra, Borneo.
Shorea ovalis (Korth.) Blume ssp. *sericea* (Dyer) P.S. Ashton	W			Large tree. Lowland forest. Widespread. Sumatra.
Shorea ovata Dyer ex Brandis	W			Small- to medium-sized tree. Hills and ridges to 1500 m. Kd, Pn, Kl, Tg, Pk, Ph, Sl, NS. Sumatra, Borneo, Philippines.
Shorea palembanica Miq.	P			Tree, rarely of great size. Swampy lowland forest. Kl, Tg, Pk, Ph, Jh. Sumatra, Borneo
Shorea parvifolia Dyer ssp. *parvifolia*	W			Large tree. Common in lowland and hill forests to 800 m. Kd, Pn, Kl, Tg, Pk, Ph, Sl, NS, Ml, Jh, Sp. Pen. Thailand, Sumatra, Borneo
Shorea parvifolia Dyer ssp. *velutinata* P.S. Ashton	Z5		R	Large tree. Lowland forest. Ph, Jh. Sumatra, Borneo.

Species	Zone	Endemism	Rarity	Notes
Shorea pauciflora King	W			Large buttressed tree. Lowland and hill forests to 700 m. Throughout. Sumatra, Borneo.
Shorea peltata Symington	Z5		R	Small tree. Lowland forest. NE, Jh. Sumatra, Borneo.
Shorea platycarpa F. Heim	W			Large buttressed tree. Swamp forest. Pn, Tg, Pk, Ph, Sl, NS, Ml, Jh, Sp. Sumatra, Borneo.
Shorea platyclados Slooten ex Foxw.	Z7			Large tree. Hill and mountains to 1300 m. Kl, Tg, Pk, Ph, Sl, NS. Sumatra, Borneo
Shorea resinosa Foxw.	S			Large tree. Lowland forest to 500 m. Pk and Kl to Jh. Sumatra, Borneo.
Shorea roxburghii G. Don	Z1		R	Tree, sometimes big. Lowlands, sometimes on limestone. Ps, P. Langkawi, Kd. Pen. India, Burma, Thailand, Indochina.
Shorea scrobiculata Burck	Z3			Medium-sized tree. Lowland and hill forests to 700 m. Kl, Tg, Pk, Ph. Borneo.
Shorea siamensis Miq.	Z1		R	Small gnarled tree. Rocky headlands, limestone. Ps, P. Langkawi. Burma, Indochina, Thailand.
Shorea singkawang (Miq.) Miq. ssp. *scabrosa* P.S. Ashton	Z6	Endemic subspecies	R	Small tree. Forest near the sea. Tg, Ph, Jh.
Shorea singkawang (Miq.) Miq. ssp. *singkawang*	W			Small tree. Lowland forest below 400 m. Kd and Kl to Jh. Pen. Thailand, Sumatra.
Shorea submontana Symington	Z7	Endemic		Large buttressed tree. Mostly hill forest at 800-1000 m. Pn, Tg, Pk, Ph, Sl.
Shorea sumatrana (Slooten ex Thorenaar) Symington ex Desch	S			Medium to large tree. Usually on river banks. Kd, Tg, Ph, Sl, NS, Jh. Pen. Thailand, Borneo, Sumatra.
Shorea teysmanniana Dyer ex Brandis	P		R	Medium-sized buttressed tree. Peat swamp forest. Tg, Pk, Sl. Sumatra, Borneo
Shorea uliginosa Foxw.	P		R	Large buttressed tree. Peat swamp forest. Pk, Sl. Sumatra, Borneo
Vatica bella Slooten	W	Endemic		Tree to 50 m tall. Lowland forest. Pk and Ph southward.

Species	Zone	Endemism	Rarity	Notes
Vatica cinerea King	Z1		R	Small- to medium-sized tree. Lowland and hill forests to 600 m, including limestone. Ps, P. Langkawi, Ps. Pen. Thailand, S Tenasserim.
Vatica cuspidata (Ridl.) Symington	W	Endemic		Medium to large tree. Lowland ridge forest often near the sea. Widespread.
Vatica flavida Foxw.	Z2	Endemic	R	Medium-sized tree. Swampy lowland forests. Pk.
Vatica havilandii Brandis	Z3			Tree. Lowland and hill forests. Tg, Pk, Ph. Borneo.
Vatica heteroptera Symington	Z7	Endemic		Medium-sized tree. Lower montane forest at 1000-1300 m. Kl, Pk, Ph.
Vatica hullettii (Ridl.) P.S. Ashton	Z5	Endemic		Small tree. Lowland forest. NS, Ml, Jh.
Vatica lobata Foxw.	Z6	Endemic		Small tree. Lowland forest near streams. Tg, Ph, Jh.
Vatica lowii King	S	Endemic		Small- to medium-sized tree. Lowland and hill forests to 750 m. Kl, Tg, Ph, Pk, Sl, NS, Jh. Pen. Thailand.
Vatica maingayi Dyer	W			Tree. Lowland forest to 500 m. Widespread. Sumatra, Borneo.
Vatica mangachapoi Blanco	Z3			Tree. Lowland and hill forests. Kd, Kl, Tg, Pk. Pen. Thailand, Borneo, Philippines.
Vatica nitens King	S			Tree. Lowland and hill forests to 600 m. Widespread. Borneo.
Vatica odorata (Griff.) Symington	Z4			Tree. Lowland forest, mostly coastal. West coast. Tenasserim, Thailand, Indochina, S China, Borneo.
Vatica pallida Dyer	Z2	Endemic	R	Small tree. Lowland forest to 350 m. Pn.
Vatica pauciflora (Korth.) Blume	W			Small- or medium-sized tree. Swampy lowland forest. Widespread. Pen. Thailand, Sumatra, Banka.
Vatica perakensis King	Z2		R	Small- to medium-sized tree. Lowland and hill forests to 600 m. Kd, Pk. Sumatra.

Species	Zone	Endemism	Rarity	Notes
Vatica ridleyana Brandis	Z5		R	Medium-sized tree, lowland forest. Jh, Sp. Sumatra.
Vatica scortechinii (King) Brandis	Z3	Endemic		Medium-sized tree. Lowland and hill forests to 1800 m. Tg, Pk, Ph, Sl.
Vatica stapfiana (King) Slooten	W			Medium-sized tree. Lowland forest. Widespread. Pen. Thailand, Sumatra.
Vatica umbonata (Hook.f.) Burck	W			Tree. Lowland and hill forests. Kl, Tg, Pn, Pk, Ph, Sl, NS, Jh. Borneo, Palawan
Vatica venulosa Blume	P		R	Small tree. Swampy lowland forest. Pk, Ph. Sumatra, Borneo, Banka, Billiton, W Java.