

Anatomical characters and identification of Formosan woods with critical remarks from the climatic point of view, with 300 micrographs

Kanehira, Ryozo

Bureau of Productive Industries Government of Formosa Forest Experiment Station : Director

<https://hdl.handle.net/2324/1524121>

出版情報 : 殖産局出版. 283, 1921-03-31. Bureau of Productive Industries Government of Formosa
バージョン :
権利関係 :

CHAPTER I.

LIGNEOUS VEGETATION OF FORMOSA.

The island of Formosa lies between $25^{\circ} 30'$ and $21^{\circ} 40'$ northern latitude and 119° and $122^{\circ} 10'$ eastern longitude; it possesses an area of 13, 890 square miles.

On the west it is separated from the mainland of China by the Formosan Channel; on the east coast, the waves of the boundless Pacific are constantly washing the bases of the lofty cliffs. On the south, the island is linked to the Philippines through the Bashee Islands, while towards the northeast the Loo-Choo groups form stepping stones to Japan. The area of forest is estimated at 2,866,000 cho (7,024,000 acres) which is about 80 percent. of the total area of the island; about two thirds of the forest area are inhabited by wild peoples.

Topographically the island may be divided into two parts, the mountain district and the plains district, the former being occupied by the central range of mountains which belong for the most part to the paleozoic formation. This range extends from north to south, the highest peaks being often more than 12,000 feet in altitude and almost entirely covered by perennial verdure.

In these mountains are located the so-called savage districts. The plains district lies mostly west of the mountains and is of alluvial formation, irrigated by many rivers and streams, and comprises the most fertile and productive parts of the island. Since the island is located partly in the tropical and partly in the subtropical zone and possesses very many high mountains, the climate is very varied and the flora of trees and shrubs very rich.

Up to the present date¹⁾ the number of plants indigenous to the island comprises 169 families 1,185 genera, 3,608 species and 78 varieties. The flora of Formosa belongs to Drude's Eastern Asiatic Region, although the island is surrounded by sea; geographically it has close relations with China.

Though it is rather difficult to say exactly when the island separated from the Continent, there is much evidence that it was connected with the mainland of Asia until a comparatively recent period. Geographically Japan

1) Up to the 9th volume of HAYATA's *Icones Plantarum Formosantarum*.

has no close connection with Formosa but the ocean current and wind make the Formosan flora quite nearly related, also with the Indo-Malayan flora. Examining the geographical distribution of the woody plants of Formosa, of 998¹⁾ elements, the following results are obtained:

Endemic36%
China18%
Japan14%
India13%
Malaya10%
Philippines 5%
Australia 3%
Africa 1%

From this it appears that exclusive of the endemic, the Chinese, Indian and Malayan elements are strongly represented in Formosa.

As to the forest types represented in the island, three formations may be distinguished, excluding of course the plains district and also summit grass lands, since the former is largely cultivated and the latter mostly open meadows.

These types are (1) broad-leaved ever-green forest of some 2,274,000 acres (2) mixed stand of broad-leaved trees and conifers, of some 424,000 acres (3) purely fine coniferous forest, of some 585,000 acres. In economic value, the coniferous forests come easily first, in spite of their smaller area, since they produce big, straight, and very useful timbers.

The Formosan trees of highest economic value fall into three of the natural families of plants: (1) *Coniferæ*; (2) *Cupuliferæ*; (3) *Laurineæ*. Notwithstanding the existence in Formosa of very rich and extensive forests, only a small part of the entire area has so far been subjected to any form of utilization. This is due not only to the fact that greater parts of these forests are inhabited by savage peoples, but also because the whole region is very difficult of access on account of the steepness of the mountain sides.

The Formosan flora may be divided into four zones from the climatic point of view: (1) *Tropic*, (2) *Warm*, (3) *Temperate* and (4) *Frigid zone*.

1) R. KANEHIRA: *Formosan trees*.

The Tropic zone is confined to below 1,000 feet altitude, the representative trees being *Ficus* in the plains district and mangroves in the coast swamps; the warm zone is included between 1,500 and 6,500 feet altitude, the representative flora being broad-leaved ever-green trees such as *Laurinæ* and *Cupuliferæ*; the temperate zone occurs from 6,500 up to 10,000 feet, and is characterized by three principal species of Conifers: *Tsuga formosana*, *Chamæcyparis obtusa* and *Chamæcyparis formosensis* mixed with *Picea morrisonicola*, *Trochodendron aralioides* and *Pinus Armandi*; the frigid zone occurs upwards of 10,000 feet and has a very simple vegetation, the flora being represented chiefly by *Abies Kawakamii*, and the summits of the high peaks are often covered with *Juniperus squamata* mixed with *Rhododendron spp.*, *Ilex spp.*, *Salix spp.* and *Prinsepia scandens*.

1) Tropic zone.

This zone has two distinct types of vegetation: the vegetation of the plains region and tidal forests, the latter having two subtypes: mangrove and beach forest. The shores of the island are generally sandy or rocky, but sometimes muddy as in the lagoon of Takow and river mouths on the west coast. In Takow, the mangrove is well developed and the following trees are the principal species:

Avicennia officinalis, *Rhizophora mucronata*, *Bruguiera cylindrica*, *Lumnitzera racemosa*, *Ceriops Candolleana* var. *Sasakii*.

Beach forests occur mostly on the sandy shores and are most highly developed on the island of Botel Tobago and also in the two extremities of the north and south parts of the island, but they are very scarce in intervening parts. The principal trees are as follows:

Heritiera littoralis, *Hibiscus tiliaceus*, *Pongamia glabra*, *Pemphis acidula*, *Tournefortia argentea*, *Myoporum bontioides*, *Palaquium formosana*, *Hernandia peltata*, *Buchanania arborescens*, *Terminalia Catappa*, *Calophyllum Inophyllum*, *Barringtonia racemosa*, *B. speciosa*, *Pandanus odoratissimus*, *Morinda citrifolia*, *Clerodendron inerme*, *Sideroxylon liukuense*, *Euphorbia Tirucalli*, *Cerbera Odollam*, *Excoecaria Agallocha*.

As seen in the above list, most of the trees are of Indo-Malayan origin; their spread probably being due to sea currents.

The vegetation of the plains region is very variable, as the land is almost entirely cultivated. In this region the following species are found :

Ficus retusa, *F. Wightiana*, *F. Beecheyana*, *F. vasculosa*, *F. nervosa*, *Celtis sinensis*, *Cordia Myxa*, *Elretia acuminata*, *E. macrophylla*, *Melia Azedarach*, *Ardisia Sieboldi*, *Mallotus japonicus*, *M. philippinensis*, *Rhus javanica*, *Zanthoxylum ailanthoides*, *Stereospermum sinicum*, *Glochidion spp.* *Liquidambar formosana*.

In the south of the island, besides the above species the following trees are found :

Gleditschia formosana, *Diospyros discolor*, *Cinnamomum reticulatum*, *Clausena humulata*, *Gonocaryum diospyrosifolia*, *Elretia longiflora*, *Cordia Kanehirai*.

Within the last years sugar cane and tea plantations became widely spread and large areas are transformed into second growth forests, where *Acacia confusa* thrives well throughout the whole island ; this tree is perhaps wild in certain parts of the south, elsewhere being propagated both artificially and naturally.

Nephelium Longana, which is considered to be introduced from China, also grows well at the foot of the mountains and *Mangifera indica* is scattered in the villages and road sides. In the north of the island *Pinus Massoniana* thrives well in the second growth forests ; there also *Trema orientalis*, *Erythrophloeum Fordii*, *Mallotus cochinchinensis*, *Broussonetia papyrifera*, *Macaranga Tancarius* are to be found. Bamboo forests form a prominent feature throughout the whole island, and especially in the middle part there are many splendid forests. In the south there are extensive barren tracts with nothing but *Phoenix Hanceana* ; and also numerous patches of grass lands are scattered over this part ; this is only the result of a shifting system of agriculture which is present throughout the tropics.

In the plains region, there are many exotic plants ; the most common trees being *Allibizia Lebbek*, *Carica papaya*, *Tectona grandis*, *Eugenia Jambos*, etc.

2) Warm zone.

This region is mostly occupied by broad-leaved ever-green trees with very few scattered Conifers, and comprises a large proportion of forest. Here the *Laurineæ*, *Cupuliferæ*, *Urticaceæ*, *Euphorbiaceæ*, *Leguminosæ*, *Ternstroemiaceæ*

are the principal families met with. In the lower part of this region, the following trees are principal species: *Bischofia javanica*, *Elæocarpus japonicus*, *E. decipiens*, *Heptapleurum octophyllum*, *Eurya japonica*, *Cleyera ochnucea*, *Gordonia anomala*, *Saurauja tristyla* var. *Oldhami*, *Lagerstræmia subcostata* and tree ferns such as *Alsophila* and *Cyathea* intermixed with *Quercus glauca*, *Actinodaphne pedicellata*, *Lindera akænsis*, *Lindera Oldhami*, *Vitex heterophylla* and *Helicia formosana* and *Calamus Margaritæ* intertwining among them. Higher up there appear *Engelhardtia formosana*, *Tetradenia Konishii*, *Cinnamomum Camphora*, *Machilus Kusanoi*, *Meliosma rigida* etc. Farther up the following species predominate:

Michelia Compressa, *Ternstræmia japonica*, *Schima Norolæ*, *Cinnamomum randaiense*, *Meliosma callicarpæfolia*, *Stachyurus himalaicus*, *Fatsia polycarpa*, *Symplocos* spp., *Maclilus arisanensis*, *Castanopsis taiwaniana*, *Quercus Kawakamii*, *Quercus sessilifolia*, *Acer Oliverianum* var. *Nakaharai*, *Pittosporum oligocarpum*, *Rhododendron* spp. *Illicium arborescens*.

In the second growth forests of this zone, pure stands of *Quercus variabilis* and *Alnus formosana* are often found.

3) Temperate zone.

The principal trees of this zone are *Chamæcyparis obtusa* and *C. formosensis* and these are often mixed with broad-leaved trees such as *Trochodendron aralioides*, *Stranvæsia nitakayamensis*, *Oreopanax formosana*, *Skimmia arisanensis*, *Acer Kawakamii*, *Ilex* spp., *Euonymus* spp., *Rhododendron* spp. and small *Juniperus formosana* is found in the under growth. *Taiwania cryptomerioides* is also scattered among the *Chamæcyparis* forests. Higher up, *Tsuga formosana* in huge specimens is found on the cliffs and *Pinus Armandi* in the sunny places; *Cunninghamia Konishii* and *Picea morrisonicola*, though rare, are found in this region.

4) Frigid zone.

The vegetation of this zone is very simple. Here, the pure stands of *Abies Kawakamii* predominate and shrubby broad-leaved trees such as *Cotoniaster morrisonicola*, *Sorbus trilocularis*, *Spiræa morrisonicola*, *Vaccinium Merrillianum*, *Pieris taiwanensis*, *Coprosma Kawakamii*, *Salix transarisanensis* are found. Higher up the mountain, there occur grassy areas often covered with

Juniperus squamata, *Berberis morrisonicola*, *Rhododendron pseudochrysanthum*, *Gaultheria borneensis* and, besides, many gramineous plants.

Local occurrence of trees.

Though Formosa is a small island there are quite a number of plants which are very local. In Conifers, *Keteleeria Davidiana* occurs in the two extremities of south and north, in very small areas at an elevation of 1,000–3,000 feet sea level and not at all in intervening regions.

Libocedrus macrolepis is a very useful timber in Formosa and is only found in the north of the island. *Pseudotsuga Wilsoniana* is a rare tree and appears curiously in very restricted areas in the savage district of Shintiku at an elevation of about 4,500 feet sea level. *Podocarpus*, *Taxus* and *Cephalotaxus* are rather rare in occurrence.

In Dicotyledonous trees, there is quite a difference between the southern and northern floras of the island, the former including the central range of mountains the latter covering the Kōshun Peninsula and extending to southeast plains district of the island; the following species being found only in the north:

Quercus gilva, *Q. uraiana*, *Euscaphis japonica*, *Paulownia Kawakamii*, *Ficus Konishii*, *Acer taiton-montanum*, *Homalium fagifolium*, *Ilex Hanceana*, *Paliurus ramosissimus*, *Brucea sumatrana* etc.

In the south the following species are found:

Quercus sinsuiensis, *Q. dodoniæfolia*, *Q. formosana*, *Q. Championi*, *Q. hypophæa*, *Q. tomentosicupula*, *Castanopsis formosana*, *C. subacuminata*, *Gleditschia formosana*, *Anneslea fragrans* var. *lanceolata*, *Maclilus suffrutescens*, *Cinnamomum reticulatum*, *Astronia formosana*, *Clisocheton kuskusense*, *Reevesia formosana*, *Ficus Kusanoi*, *Salix Kusanoi*, *Garcinia multiflora*, *Schima kankaoensis*, *Aglaiia elliptifolia*, *Cyclostemon hieranense* etc.

There are a number of trees which are found only in very limited areas; *Cornus longipetiolata*, *Platycaia strobilacea*, *Distylium racemosum* and *Carpinus rankanensis* are found on the eastern side of the island, *Ailanthus cacodendron* in Shintiku, *Ormospia formosana* in Horisha, Nanto, *Phellodendron Wilsoniana* in Arisan, *Juglans formosana* and *Sassafras randaiense* in the central range of mountains.

The flora of the island Botel Tobago is distinctly different from that of the main island of Formosa; there are a great number of trees which do not occur in the latter, such as *Myristica heterophylla*, *Pterospermum formosanum*, *Linociera Cumingiana*, *Sterculia luzonica*, *Timonius arboreus*, *Dysoxylum Cumingianum*, *Macaranga dipterocarpifolia*, *Fagaria integrifoliola*, etc.

Oecological distribution.

The author can only briefly refer to the oecological distribution of the flora; the mesophytic is of course the principal element of the ligneous flora and other types are rather poorly represented. Among xelophytes, *Acacia Farnesiana*, *Vitex Negundo*, *Buxus microphylla* var. *sinica*, *Elæagnus Oldhami*, *Dodonæa viscosa*, *Buddleia asiatica* and *Casuarina equisetifolia*, the latter an exotic tree; among hydrophytes, *Salix Kusanoi*, *S. Warburgii*, *Debregeasia edulis*, *Villebruncea frutescens*; of halophytes mangroves may be mentioned.

Comparison of the Formosan flora with the Japanese and Philippine.

In this work, Japanese and Philippine woods have been investigated and a casual comparison of these three floras may be made.

Gymnosperms are represented in Formosa by 14 genera, in Japan 17 and in Philippine only 7.¹⁾ In Japan there are six genera that are not present in Formosa i.e. *Thuja*, *Torreya*, *Ginkgo*, *Cryptomeria*, *Sciadopitys* and *Larix*; compared to this *Libocedrus*, *Taiwania*, *Keteleeria* and *Cunninghamia* have no Japanese representatives. In *Pinus*, Japan with 6 species has the advantage of Formosa, where only 4 species are found. Pine trees are very common in Japan while in Formosa they are only scattered. In *Picea* and *Abies* Japan with 5 species respectively, and *Tsuga* with 2 species has decided advantage over Formosa where each genus is represented by one species only.

Juniperus is represented in Formosa by 2 or 3 species and probably the same in Japan. *Chamæcyparis* is represented by 2 species in each country and *Pseudotsuga* one species each. In *Podocarpus*, Formosa with 3 or 4 species

1) *Agathis*, *Dacrydium*, *Juniperus*, *Phyllocladus*, *Pinus*, *Podocarpus* and *Taxus*.

has the advantage of Japan in which only 2 species occur. In Japan the most valuable and widely distributed trees of Conifers are "Hinoki" (*Chamaecyparis obtusa*) and "Sugi" (*Cryptomeria japonica*) while in Formosa, "Hinoki" and "Benihi" (*Chamaecyparis formosensis*) are the most predominate trees in the Conifer region. There are only 4 species that are common to both countries i. e. *Podocarpus macrophyllus*, *P. Nagi*, *Taxus cuspidata* and *Chamaecyparis obtusa*. It is a rather striking feature of the Formosan flora that the "Hinoki," the most valuable and favorite timber in Japan, is also present. Without "Hinoki" in Formosa, the utilization of the forest would have been at a very great disadvantage.

As to Dicotyledonous trees they embrace so many genera and species that it is impossible to compare the three countries separately for each family or genus, and the appended table will permit the general comparison of floras.

In the Philippines, the ligneous flora has a strong representation of the higher orders and in Japan the lower ones, while Formosa takes an intermediate position, as stated in the summary of this work. The Leguminous plants, which are usually herbaceous forms in cold climates, attain fullest development in the tropics and occupy a very important place¹⁾. The *Dipterocarpeæ* which are predominate trees in Tropical Asia, is the principal family in Philippine forests²⁾, while in Formosa there is no single species of this family though it is rather strongly represented by Malayan elements.

The most valuable families of Dicotyledonous trees in Formosa are as it has been already stated, *Laurineæ* and *Cupuliferæ*, the former with 11 genera and about 63 species, the latter with 5 genera and 52 species.

In Japan the *Cupuliferæ* are also strongly represented, but *Laurineæ* are not abundant as in Formosa, while in the Philippines both families are very poorly represented.

It is a very striking feature contrasted to the largely deciduous forests of Japan, that there is very little tropical deciduous high forest ("Monsoon forest" of Schimper) in Formosa. This is due to the climate which has no prolonged dry season and it is a rather interesting point that in the southern parts of

1) E. C. JEFFREY: *Anatomy of woody plants*. pp. 420-431.

2) H. N. WHITFORD: *Study in the vegetation of Philippines*. Journal of Sci. Vol. IV. 6. C. 1909.

Kōshun where the dry season comes in winter, that there are deciduous trees of the following species :

Terminalia Catappa, *Melia Azedarach*, *Sapindus Mukorossi*, *Evodia meliæfolia*, *Vitex Negundo*, etc.

In Formosa, *Fagus*, a genus of deciduous tree which is very widely spread in Japan, occurs in one species, *Hayatae*, only in a limited district of the northern part of the island.

The deciduous trees are in the tropics of very rare occurrence. In this connection, author desires to quote from a letter, somewhat abridged, from Mr. E. D. Merrill, Director of the Bureau of Science, Manila, which will explain the status in the tropics clearly.

“The term “deciduous” is merely relative in the tropics. “In the Philippines, deciduous trees are naturally very limited in the number of species and in many parts of the Archipelago, deciduous trees scarcely occur. “In all those parts of the Archipelago where the rainfall is more or less evenly distributed throughout all months of the year, the species are all ever-green. “In the provinces subject to a dry season a few species are deciduous, but the leaf fall is apparently caused entirely by lack of available water. “Even in the dry regions deciduous trees are limited to a few species. “*Pterocymbidium tinctorium* Merr. is characteristically deciduous, as is *Gyrocarpus americana* Jacq., both of these being indigeneous species. “Generally *Erythrina indica* Lam. is also deciduous, but not always. “Among the introduced species *Delonix (Poinciana) regia* Raf. is leafless for a period of several months during the dry season, while *Enterolobium saman* Prain produces new leaves almost immediately after the old ones fall so that the trees are practically never leafless.

“As we have somewhere between 2,500 and 3,000 species in the Philippines that would be classified as trees, it is quite safe to say that, with a very few exceptions, deciduous trees do not occur in the Philippines.”

Schimper¹⁾ reports “the tropical forests are usually ever-green but for

1) A. F. SCHIMPER: *Plant-geography upon a physiological basis*. pp. 243-259.

the most part composed of periodically leafless trees” and “there are woody plants that shed their leaves at longer or shorter intervals without any connexion with the season of the year.”

The table showing the presence or absence of all the genera of Dicotyledons in each country and indicating number of species actually investigated in the present work.

Those with # indicate presence, those without mark indicate absence.

TABLE I.

<i>Families and genera</i>	<i>Philippines</i>	<i>Formosa</i>	<i>Japan</i>
DILLENIACEÆ			
Dillenia	# 1	0	0
MAGNOLIACEÆ			
Cercidophyllum	0	0	# 1
Euptelea	0	0	# 1
Illicium	# 0	# 1	# 1
Magnolia	0	0	# 2
Michelia	# 0	# 1	# 1
Trochodendron	0	# 1	# 1
ANONACEÆ			
Cyathocalyx	# 1	0	0
Polyalthia	# 3	0	0
BERBERIDEÆ			
Berberis	# 0	# 1	# 1
Mahonia	# 0	# 1	0
CAPPARIDEÆ			
Capparis	# 0	# 1	0
Crataeva	# 0	# 1	# 0
BIXINEÆ			
Ahernia	# 1	0	0
Casuarina	# 0	# 1	0

<i>Families and genera</i>	<i>Philippines</i>	<i>Formosa</i>	<i>Japan</i>
Hylonocarpus	# 1	0	0
Idesia	0	# 1	# 0
Scolopia	# 0	# 1	0
PITTOSPORÆ			
Pittosporum	# 0	# 4	# 0
GUTTIFERÆ			
Calophyllum	# 2	# 1	# 0
Cratoxylon	# 1	0	0
Garcinia	# 2	# 1	# 0
Kayea	# 1	0	0
TERNSTRÆMIACEÆ			
Adinandra	# 0	# 2	# 0
Anneslea	0	# 1	0
Cleyera	0	# 1	# 1
Eurya	# 0	# 2	# 1
Gordonia	# 0	# 1	0
Saurauja	# 0	# 1	0
Schima	# 0	# 1	# 0
Stachyurus	0	# 1	# 1
Stewartia	0	0	# 1
Ternstroemia	# 0	# 1	# 1
Thea	# 0	# 3	# 1
DIPTEROCARPEÆ			
Anisoptera	# 1	0	0
Dipterocarpus	# 4	0	0
Hopea	# 5	0	0
Pentacme	# 1	0	0
Shorea	# 7	0	0
Vatica	# 1	0	0
MALVACEÆ			
Bombax	# 0	# 1	0
Bombycidendron	# 1	0	0
Cumingia	# 1	0	0
Hibiscus	# 0	# 2	# 0

<i>Families and genera</i>	<i>Philippines</i>	<i>Formosa</i>	<i>Japan</i>
STERCULIACEÆ			
Heritiera	# 1	# 1	# 0
Kleinhovia	# 0	# 1	0
Pterocymbium	# 1	0	0
Pterospermum	# 1	# 1	0
Reevesia	0	# 1	0
Sterculia	# 2	# 2	# 1
Tarrietia	# 2	0	0
TILIACEÆ			
Echinocarpus	# 0	# 1	0
Eleocarpus	# 1	# 2	# 0
Grewia	# 1	# 1	# 0
Tilia	0	0	# 1
LINEÆ			
Reinwardtiidendron	# 1	0	0
GERANIACEÆ			
Averrhoa	# 0	# 1	0
RUTACEÆ			
Acronychia	# 0	# 1	0
Clausena	# 0	# 2	0
Evodia	# 0	# 3	# 0
Fagara	# 0	# 1	# 0
Murraya	# 1	# 1	0
Orixa	0	0	# 1
Phellodendron	0	# 1	# 1
Skimmia	# 0	# 1	# 0
Zanthoxylum	# 0	# 1	# 1
SIMARUBEÆ			
Ailanthus	# 1	# 1	# 0
Picrasma	# 0	0	# 1
BURSERACEÆ			
Canarium	# 5	# 1	0
Santiria	# 1	0	0

<i>Families and genera</i>	<i>Philippines</i>	<i>Formosa</i>	<i>Japan</i>
MELIACEÆ			
<i>Aglia</i>	# 1	# 2	0
<i>Amora</i>	# 1	0	0
<i>Cedrela</i>	# 1	0	# 1
<i>Chisocheton</i>	# 1	# 2	0
<i>Dysoxylum</i>	# 1	# 1	0
<i>Melia</i>	# 1	# 1	# 1
<i>Sandoricum</i>	# 2	0	0
<i>Xylocarpus</i>	# 1	0	0
OLACINEÆ			
<i>Gonocaryum</i>	# 0	# 1	0
<i>Strombosia</i>	# 1	0	0
<i>Urandra</i>	# 1	0	0
ILICINEÆ			
<i>Ilex</i>	# 0	# 6	# 5
CELASTRINEÆ			
<i>Euonymus</i>	# 0	# 4	# 2
<i>Otherodendron</i>	0	# 1	# 0
<i>Perrottetia</i>	# 0	# 1	0
RHAMNEÆ			
<i>Hovenia</i>	0	0	# 1
<i>Paliurus</i>	0	# 1	# 0
<i>Rhamnus</i>	# 0	# 2	# 0
<i>Zizyphus</i>	# 1	# 0	# 0
AMPELIDEÆ			
<i>Leea</i>	# 0	# 1	0
SAPINDACEÆ			
<i>Acer</i>	# 0	# 7	# 6
<i>Aesculus</i>	0	0	# 1
<i>Allophylus</i>	# 0	# 1	0
<i>Dodonæa</i>	# 0	# 1	# 0
<i>Euscaphis</i>	0	# 1	# 0
<i>Koerleuteria</i>	0	# 1	# 0
<i>Nephelium</i>	# 1	# 1	# 0

<i>Families and genera</i>	<i>Philippines</i>	<i>Formosa</i>	<i>Japan</i>
Pometia	# 1	# 1	0
Sapindus	# 0	# 1	# 0
Turpinia	# 0	# 1	# 0
SABIACEÆ			
Meliosma	# 0	# 4	# 1
ANACARDIACEÆ			
Buchanania	# 1	# 1	0
Dracontomehlm	# 2	0	0
Koodersiodendron	# 1	0	0
Mangifera	# 1	# 1	0
Pistacia	# 0	# 1	0
Rhus	# 0	# 2	# 3
Semecarpus	# 0	# 1	0
Spondias	# 1	0	0
CORIARIEÆ			
Coriaria	# 0	# 1	# 0
LEGUMINOSÆ			
Acacia	# 0	# 2	# 0
Adenantha	# 1	0	0
Albizzia	# 3	# 1	# 1
Cæsulpinia	# 0	# 1	# 0
Cassia	# 1	# 0	# 0
Cladrastis	0	0	# 1
Dalbergia	# 1	0	0
Desmodium	# 0	# 1	# 0
Erythrina	# 1	# 2	# 0
Erythrophloeum	# 1	# 1	0
Gleditschia	# 0	# 1	# 1
Indigofera	# 1	# 0	# 0
Intsia	# 0	0	# 0
Kingiosdendron	# 1	0	0
Leucæna	# 0	# 1	0
Ormosia	# 0	# 1	0
Pahudia	# 1	0	0
Parkia	# 1	0	0

<i>Families and genera</i>	<i>Philippines</i>	<i>Formosa</i>	<i>Japan</i>
Pithecolobium	# 2	# 0	0
Pterocarpus	# 3	0	0
Pongamia	# 0	# 1	# 0
Robinia	0	0	# 1
Sindora	# 1	0	0
Sophora	# 0	0	# 1
Wallaceodendron	# 1	0	0
ROSACEÆ			
Amelanchier	0	0	# 1
Cotoniaster	0	# 1	0
Eriobotrya	# 0	# 1	# 1
Malus	0	# 1	# 0
Parinarium	# 1	0	0
Photinia	# 0	# 2	# 2
Princepia	0	# 1	0
Prunus	# 0	# 2	# 7
Pygeum	# 1	0	0
Pyrus	0	# 0	# 3
Raphiolepis	0	# 1	# 0
Stranvæsia	0	# 1	0
SAXIFRAGEÆ			
Deutzia	# 0	# 2	# 1
Hydrangea	# 0	# 4	# 0
Itea	# 0	# 1	# 0
HAMAMELIDEÆ			
Distylium	0	# 2	# 1
Eustigma	0	# 1	0
Liquidambar	0	# 1	0
RHIZOPHOREÆ			
Bruguiera	0	# 1	# 0
Carallia	# 1	0	0
Ceriops	# 0	# 1	0
Rhizophora	# 0	# 1	# 0
COMBRETACEÆ			

<i>Families and genera</i>	<i>Philippines</i>	<i>Formosa</i>	<i>Japan</i>
Lumnitzera	# 1	# 1	# 0
Terminalia	# 7	# 1	# 0
MYRTACEÆ			
Barringtonia	# 0	# 1	# 0
Decaspermum	# 0	# 1	0
Eugenia	# 3	# 2	# 0
Planchonia	# 1	0	0
Psidium	# 0	# 1	0
Xanthostemon	# 1	0	0
MELASTOMACEÆ			
Astronia	# 0	# 1	0
Blastus	0	# 1	# 0
Medinilla	# 1	# 0	0
Melastoma	# 0	# 1	# 0
LYTHRARIÆ			
Lagerstroemia	# 2	# 1	# 0
Pemphis	# 0	# 1	# 0
Sonneratia	# 1	0	# 0
SAMYDACEÆ			
Homalium	# 1	# 1	0
DATISCEÆ			
Octomeles	# 1	0	0
ARALIACEÆ			
Acanthopanax	# 0	# 0	# 3
Aralia	# 0	# 1	# 1
Fatsia	0	# 1	# 0
Gilibertia	0	# 1	# 0
Heptapleurum	# 0	# 3	# 0
Oreopanax	0	# 1	0
Osmoxylon	# 0	# 1	0
Pentapanax	0	# 1	0
CORNACEÆ			
Aucuba	0	# 0	# 1
Cornus	0	# 1	# 4

<i>Families and genera</i>	<i>Philippines</i>	<i>Formosa</i>	<i>Japan</i>
Marlea	# 0	# 1	# 0
CAPRIFOLIACEÆ			
Viburnum	# 0	# 4	# 2
RUBIACEÆ			
Chomelia	0	# 1	# 0
Diplospora	# 0	# 1	0
Gardenia	# 0	# 1	# 0
Morinda	# 0	# 1	# 0
Nauclea	# 0	# 2	0
Neonauclea	# 1	0	0
Psychotria	# 0	# 1	# 0
Randia	# 0	# 1	# 0
Timonius	# 0	# 1	0
Wendlandia	# 0	# 1	0
GOODENOVIÆ			
Scaevola	# 0	# 1	# 0
VACCINIACEÆ			
Vaccinium	# 0	# 3	# 0
ERICACEÆ			
Andromeda	0	0	# 1
Clethra	# 0	0	# 1
Pieris	0	# 2	# 0
Rhododendron	# 0	# 6	# 1
MYRSINEÆ			
Ardisia	# 0	# 1	# 0
Myrsine	# 0	# 1	# 0
SAPOTACEÆ			
Illipe	# 2	0	0
Mimusops	# 1	0	0
Palaquium	# 2	# 1	0
Sideroxylon	# 1	# 1	# 0

<i>Families and genera</i>	<i>Philippines</i>	<i>Formosa</i>	<i>Japan</i>
EBENACEÆ			
Diospyros	# 4	# 5	# 2
Maba	# 1	# 1	# 0
STYRACEÆ			
Alniphyllum	0	# 1	0
Halesia	0	0	# 1
Styrax	# 0	# 4	# 2
Symplocos	# 0	# 13	# 3
OLEACEÆ			
Fraxinus	# 0	# 2	# 4
Ligustrum	# 0	# 1	# 1
Linociera	# 0	# 1	0
Osmanthus	0	# 2	# 1
APOCYNACEÆ			
Alstonia	# 1	0	0
Kopsia	# 1	0	0
Wrightia	# 1	0	0
LOGANIACEÆ			
Eugenia	# 1	# 1	0
BORAGINEÆ			
Cordia	# 0	# 2	0
Ehretia	# 0	# 5	# 1
Tournefortia	# 0	# 1	# 0
SCROPHULARINEÆ			
Paulowna	0	# 2	# 1
BIGNONIACEÆ			
Catalpa	# 0	0	# 1
Radermachera	# 1	0	0
Stereospermum	# 0	# 1	0
VERBENACEÆ			
Avicennia	# 1	# 1	0
Callicarpa	# 0	# 2	# 0
Clerodendron	# 0	# 1	# 1

<i>Families and genera</i>	<i>Philippines</i>	<i>Formosa</i>	<i>Japan</i>
Premna	# 0	# 2	# 0
Tectona	# 1	0	0
Vitex	# 2	# 2	# 0
MYRISTICACEÆ			
Knema	# 1	0	0
Myristica	# 1	# 1	0
LAURINEÆ			
Actinodaphne	# 0	# 2	# 2
Beilschmiedia	# 1	# 1	0
Cinnamomum	# 1	# 3	# 2
Cryptocarya	# 1	# 2	0
Lindera	# 0	# 3	# 0
Litsea	# 1	# 1	# 1
Machilus	# 0	# 2	# 1
Phoebe	# 1	# 1	0
Sassafras	0	# 1	0
Tetradenia	0	# 3	# 0
HERNANDIACEÆ			
Hernandia	# 0	# 1	# 0
PROTEACEÆ			
Helicia	# 0	# 2	# 0
THYMELEACEÆ			
Daphne	# 0	# 1	# 0
Gonostylus	# 1	0	0
Wikstroemia	# 0	# 1	# 0
ELEAGNACEÆ			
Elengmus	# 0	# 4	# 1
SANTALACEÆ			
Champercia	# 0	# 1	0
EUPHORBACEÆ			
Acalypha	# 0	# 1	# 0
Antidesma	# 1	# 1	# 0
Aporosa	# 1	0	0

<i>Families and genera</i>	<i>Philippines</i>	<i>Formosa</i>	<i>Japan</i>
Bischofia	# 1	# 1	# 0
Bridelia	# 0	# 1	0
Buxus	# 0	# 1	# 1
Croton	# 0	# 1	# 0
Cyclostemon	# 1	# 0	0
Daphniphyllum	# 0	# 2	# 1
Endospermum	# 1	0	0
Euphorbia	# 0	# 1	# 0
Excoecaria	# 0	# 2	# 0
Gelonium	# 0	# 1	0
Glochidion	# 0	# 1	# 0
Macaranga	# 0	# 2	# 0
Mallotus	# 0	# 3	# 1
Sapium	# 0	# 2	0
URTICACEÆ			
Aphananthe	# 0	# 0	# 1
Artocarpus	# 3	# 1	0
Broussonetia	0	# 1	# 0
Celtis	# 0	# 4	# 1
Cudrania	# 0	# 1	# 0
Debregeasia	# 0	# 1	# 0
Ficus	# 3	# 7	# 2
Maoutia	# 0	# 1	0
Morus	# 0	# 1	# 1
Pipturus	# 0	# 1	0
Trema	# 0	# 1	# 0
Ulmus	0	# 2	# 3
Zelkova	0	# 1	# 1
JUGLANDEÆ			
Engelhardtia	# 1	# 1	0
Juglans	0	# 1	# 1
Platycarya	0	# 1	# 1
Pterocarya	0	0	# 1
MYRICACEÆ			
Myrica	# 0	# 2	# 1

<i>Families and genera</i>	<i>Philippines</i>	<i>Formosa</i>	<i>Japan</i>
CASUARINEÆ			
Casuarina	# 0	# 1	# 0
CUPULIFERÆ			
Alnus	0	# 1	# 3
Betula	0	0	# 5
Carpinus	0	# 2	# 4
Castanea	0	0	# 1
Castanopsis	# 0	# 4	0
Fagus	0	# 1	# 2
Ostrya	0	0	# 1
Pasania	# 0	# 0	# 1
Quercus	# 1	# 23	# 11
SALICINEÆ			
Populus	0	0	# 2
Salix	# 0	# 3	# 3