An updated classification of Magnoliaceae

by H. P. Nooteboom

Recently I have given a new classification of Magnoliaceae (Nooteboom, *Blumea* 31. 1985:65-121) which is an emendated version of Dandy's classification in Treseder, Neil G., *Magnolias*, 1978. Upon request I give here a condensed version of my paper for the magnolia votaries interested in the classification of the family.

MAGNOLIACEAE

A. L. de Jussieu, *Gen. Pl.* :280 (1789) (Magnoliae).

Trees or shrubs, glabrous or with an indumentum of single hairs. Leaves spirally arranged, simple, entire or 2-10 lobed, penninerved evergreen or deciduous; stipules present, at first enclosing and protecting the innovations, later caducous and leaving an annular scar around the node. Flowers terminal or pseudo-axillary on a short shoot in the axils of the leaves, bisexual, rarely unisexual, pedunculate. Peduncle bearing 1 or more caducous spathaceous bracts which leave annular scars. Perianth spiral or spircyclic, simple or differentiated in calyx and corolla, perianth members 6 or more, free, imbricate. Stamens numerous, free, spirally arranged; filaments short or more or less elongated; anthers linear, 2-locular, dehiscing introrsely, latrorsely or rarely extrorsely; connective usually more or less produced into an appendage. Gynoecium sessile or stipitate (a gynophore present); carpels numerous to few (rarely one), spirally, free or sometimes concrescent; ovules 2 or more, biseriate on the ventral suture. Fruit apocarpous, sometimes syncarpous; fruiting carpels opening along the dorsal and/or ventral suture, or circumscissile, rarely indehiscent. Seeds 1 or more each fruiting carpel, large, in dehiscent carpets hanging from the elongated spiral vessels of the funiculus, with arilloid testa, rarely, when fruit indehiscent adherent to the endocarp; endosperm copious, oily; embryo minute.

Characters of rare occurrence—Leaves 2-10 lobed in *Liriodendron*. Flowers unisexual in *Kmeria*. Anthers extrorse in *Liriodendron*. Fruit a loculicidal capsule in *Pachylarnax*, samaroid, winged, deciduous, and indehiscent in *Liriodendron*.

Size and distribution—Seven genera in temperate and tropical Southeast and East Asia and from North America southward through the West Indies and Central America to southern Brazil.

I. Subfamily MAGNOLIOIDEAE

Leaves entire or occasionally 2 lobed at the apex; stipules free from the petiole or adnate to it. Anthers introrse or latrorse. Fruiting carpels longitudinally dehiscent or circumcissile, at least the base remaining adnate to the torus, free or concrescent into a syncarp, never samaroid. testa free from the endocarp, externally arilloid.

A. Tribus MAGNOLIEAE

Growth sympodial. Flower buds arising terminal on the twigs, the latter growing in length from an axillary bud of one of the upper leaves.

1. MAGNOLIA

Linnaeus, *Sp. Pl.* 1: 535 (1753); *Gen. Pl.* ed. 5 (1754) 240; Dandy, in Hutch. *Gen. Fl. Pl.* 1 (1964) 55; in Treseder, *Magnolias* (1978) 29;

KEY TO THE GENERA

1. Leaves 2-10 lobed, the apex truncate or widely emarginate. Anthers extrorse. Fruiting carpels samaroid ..... 7. *Liriodendron*
1. Leaves entire or occasionally 2 lobed. Anthers introrse or latrorse. Fruiting carpels dehiscent or circumcissile, not samaroid.
2. Growth sympodial. Flower buds at the end of a flush 3
2. Growth monopodial. Flower buds on brachyblasts in the axil of the leaves 6
3. Flowers bisexual; tepals 9 or more, sometimes the outer whorl forming a calyx 4
3. Flowers unisexual; tepals 6-7, subequal ..... 4. *Kmeria*
4. Ripe fruit a woody loculicidal capsule composed of few (2-8) concrescent carpels. Tepals 9-15, subequal. Ovules about 4-8 in each carpel. Stipules free from the petiole ..... 3. *Pachylarnax*
4. Ripe fruit consisting a few to many separate carpels along the torus 5
5. Ovules 4 or more in each carpel. The hair base replaces a normal epidermal cell, so that the loss of a hair leaves a pore in the cuticle membrane. (Leaf anatomical characters: Sclerified epidermal and hypodermal layers, clerified arm parenchyma in the mesophyll, unlignified lobate vein-sheath cells, absence of either sclerified veinlet terminal cells or a sclerified leaf margin) ..... 2. *Manglietia*
5. Ovules 2 in each carpel (4 in *Magnolia kachirachirai,* 2-5 in Magnolia section Alcimandra), sometimes 4 in the lower carpels. The hair base consists of at least two epidermal cells. The hair does not leave a pore when falling ..... 1. *Magnolia*
6. Gynoecium sessile ..... 5. *Elmerrillia*
6. Gynoecium distinctly stipitate ..... 6. *Michelia*

Nooteboom, *Blumea* 31: 83 (1985)—*Talauma* Juss. (1789)—*Aromadendron* Blume (1825)—*Alcimandra* Dandy (1927)—*Parakmeria* Hu & Cheng (1951)—*Dugandiodendron* Lozano-contreras (1975)—*Manglietiastrum* Law Yuh-wu (1979).

Stipules adnate to or free from the petiole. Flowers solitary, bisexual. Tepals 9-21, spiral or in trimerous whorls, subequal or more rarely the outer ones forming a true calyx. Anthers introrse to latrorse, connective produced into a longer or shorter appendage or rarely unappendaged. Gynoecium sessile or stipitate; carpels many to few, free or connate. Ovules 2 to rarely 4 or 5. About 120 species, of which about one third in the New World from southeast North America to south Brazil, the remainder in temperate and tropical southeast Asia from the Himalayas to China, Japan, Taiwan, and Malaysia.

a. Subgenus MAGNOLIA

Fruits at least finally consisting of free carpels which dehisce along the dorsal suture. Anthers dehiscing introrsely. Flowers not precocious.

Sections 9:

1.1 Sect. *Magnolia*—Magnolia sect. *Magnoliastrum* DC (1824).

Stipules adnate to the petiole, leaving a scar on its upper surface. Leaves deciduous or sometimes persistent. Flower buds enclosed in a single spathaceous bract, peduncle with one scar. Connective produced into a short acute appendage.

Species 1, *M. virginiana* Linnaeus, the type of the genus from the Atlantic coastal plain of the United States, known under the popular

name Sweet Bay. The natural distribution is along the east coast of America from Florida and Texas to Pennsylvania, New Jersey, and locally in eastern Massachusetts. It is a partially evergreen shrub or small tree which, in a number of varieties, is widely cultivated.

1.2 Sect. *Gwillimia* A. DC *Syst. Nat.* 1 (1817) 455, 548; Dandy in *Camellias and Magnolias Conference Report* (1950) 68.—Type: *M. coco* DC.

Leaves evergreen. Stipules adnate to the petiole, leaving a scar on its upper surface. Flower buds enclosed in one or more spathaceous bracts, peduncle with one or more scars. Fruiting carpels shortly beaked, the beak not dorsally flattened.

About 15 species, southeast Asia from southern China to the Malay Archipelago. Only one species is temperate, *M. delavayi* Franchet. The species will flourish in a wide range of soils and situations and has the largest leaves of any evergreen temperate species of Magnolia. The species of this section are so similar to the species of the tropical subg. *Talauma* that, in the absence of fruits, they can, even at species level, sometimes hardly be distinguished from each other. *M. coco* is commonly cultivated in the tropics.

1.3 Sect. *Lirianthe* (Spach) Dandy in *Camellias and Magnolias Conference Report* (1950) 68—*Lirianthe* Spach (1839)—Type: *Lirianthe grandiflora* Spach = *M. pterocarpa* Roxb.

As *Gwillimia* but fruiting carpels long beaked, the beak forming a dorsally flattened coriaceous appendage.

Species 1, central Himalayas through Assam and Bangladesh to Burma. *Magnolia pterocarpa* is a tree of India and Burma and entirely tropical.

1.4 Sect *Rytidospermum* Spach, *Hist. Natur. Veget.*, Phaneroy. 7 (1839) 474; Dandy in *Camellias and Magnolia Conference Report* (1950) 68; Ueda, *Acta Phytotax. Geobot.* 36 (1985) 151—sect. *Tuliparia* Spach, l. c. 477—Type: *M. tripetala* Linnaeus.

Leaves deciduous, crowded into false whorls at the end of the twigs, usually large or very large. Flower buds enclosed in a single spathaceous bract, peduncle with one scar.

Species 9, in Asia as well as in America. Because of the whorl-like arrangement of the leaves the American species have long been known as Umbrella Trees. Except for the tropical *M. dealbata* all the species are in cultivation.

1.5 Sect. *Oyama* Nakai, *Fl. Sylv. Koreana* 20 (1933) 117; Dandy in *Camellias and Magnolias Conference Report* (1950) 70; Ueda, *Acta Phytotax. Geobot.* 36 (1985) 152—*Magnolia* sect. *Cophantera* Dandy (1936)—Type: *M. sieboldii* C. Koch.

Stipules adnate to the petiole leaving a scar on its upper surface. Leaves deciduous, not crowded at the end of the twigs. Differing from sect. *Magnolia* in the blunt or retuse connective.

Species 4, temperate east Asia. All in cultivation and popular on account of the beauty of the flowers. *Magnolia sieboldii* is treated taxonomically by Dr. Ueda in *Acta Phytotax. Geobot.* 31 (1980) 117-125.

1.6 Sect. *Theorhodon* Spach, *Hist. Natur. Veget.*, Phanerog. 7 (1839); Dandy in *Camellias and Magnolias Conference Report* (1950) 70—Type: *M. grandiflora* Linnaeus.

Stipules free from petiole. Leaves evergreen. Tepals subsimilar in texture. Gynoecium sessile.

Species, about 18, all evergreen trees from the New World and, except *M. grandiflora*, tropical. *Magnolia grandiflora* is cultivated throughout the world in soft temperate and tropical climates. It is especially abundant in the Mediterranean region of Europe.

1.7 Sect. *Gynopodium* Dandy, *Curtiss Bot. Mag.* 155 (1948) t. 16; in

KEY TO THE SUBGENERA AND SECTIONS

1. Fruits at least finally consisting of free carpels which dehisce along the dorsal suture 2
1. Fruits with connate carpels. When mature the apical parts of the carpels circumcissile and falling, dehiscing along the dorsal suture or not, the basal parts remaining adnate to the torus, or apical parts falling in irregular masses. 3. Subgenus *Talauma* 13
2. Anthers dehiscing laterally or sublaterally. Flowers precocious and/or with much reduced calyx-like outer whorl of tepals. Leaves deciduous. Fruit cylindric or oblong, usually more or less distorted. 2. Subgenus *Yulania* 3
2. Anthers dehiscing introrsely. Flowers neither precocious nor with a much reduced (calyx-like) outer whorl of tepals. Leaves evergreen or deciduous. 1. Subgenus *Magnolia* 5
3. Tepals subequal. Flowers appearing before the leaves, white to rose-purple. Asian species ..... 2.1 Sect. *Yulania*
3. Tepals very unequal, those of the other whorl forming a true calyx 4
4. Flowers appearing before the leaves. Inner (large) tepals white, sometimes tinged with rose or purple. Asian species ... 2.2 Sect. *Buergeria*
4. Flowers appearing with or after the leaves. Inner (large) tepals purple or green to yellow. Asian and American species ..... 2.3 Sect. *Tulipastrum*
5. Stipules adnate to petiole, leaving a scar on its upper surface 6
5. Stipules free from the petiole, the latter unscarred. Leaves evergreen ... 10
6. Leaves evergreen. Flower buds at first enclosed in one or more spathaceous bracts which leave as many annular scars on the peduncle (terminal brachyblast). Asian species 7
6. Leaves deciduous (sometimes persistent in the American sect. *Magnolia*). Flower buds at first enclosed in a single spathaceous bract which leaves a single annular scar on the peduncle 8
7. Fruiting carpels shortly beaked, the beak not dorsally flattened . 1.2 Sect. *Gwillimia*
7. Fruiting carpels long beaked. The beak forming a dorsally flattened coriaceous appendage and finally becoming more or less recurved ..... 1.3 Sect. *Lirianthe*
8. Leaves crowded into false whorls at the ends of the branchlets, usually large or very large. Asian and American species ..... 1.4 Sect. *Rytidospermum*
8. Leaves not crowded into false whorls at the ends of the branchlets 9
9. Anthers with a connective produced into a short acute appendage. Leaves deciduous or sometimes persistent, glaucous on the undersurface. American species ..... 1.1 Sect. *Magnolia*
9. Anthers with the connective blunt or retuse and not normally produced into an appendage. Leaves deciduous, the under surface pale green or somewhat glaucescent. Asian species ..... 1.5 Sect. *Oyama*
10. Gynoecium stipitate. Carpels with 2-5 ovules. Fruits cylindrical, 1-4 seeds in each carpel. Stamens with short filament and very long anther, hiding the gynoecium, the connectivum produced into a short linguiform appendage ..... 1.9 Sect. *Alcimandra*
10. Gynoecium stipitate or not. Carpels usually with 2 ovules, rarely with 4 and then plant entirely glabrous 11
11. Fruit more or less cylindric. Tepals of the outer whorl much thinner in texture than those of the inner whorls. Asian species ..... 1.8 Sect. *Maingola*

11. Fruit ellipsoid to oblong, sometimes distorted. Tepals subsimilar in texture 12
12. Gynoecium sessile. American species ..... 1.6 Sect. *Theorhodon*
12. Gynoecium usually shortly stipitate. Plants entirely glabrous. Ovules sometimes 4 per carpel. Asian species ..... 1.7. Sect. *Gynopodium*
13. Stipules adnate to petiole, leaving a scar on its upper surface. Connective produced into a short appendage 15
13. Stipules free from the petiole, the latter without scar. Connective produced into a long (setaceous) appendage 14
14. Gynoecium stipitate ..... 3.4 Sect. *Manglietiastrum*
14. Gynoecium sessile ..... 15. Sect. *Aromadendron*
15. Leaf margin thick, sclerified, often including a vein. Asian species ..... 3.2 Sect. *Blumiana*
15. Leaf margin not or only weakly sclerified. American species ..... 3.1 Sect. *Talauma*

Camellias and Magnolias Conference Report (1950) 71—*Parakmeria* Hu & Cheng (1951)—*Micheliopsis* Keng (1955)—Type: *M. nitida* W. W. Smith.

Like section *Theorhodon* but gynoecium usually shortly stipitate. Plants entirely glabrous, ovules sometimes 4 per carpel.

Species, about 5, southeast Asia from southeast Tibet and northeast Burma through southern China to Taiwan. *Magnolia kachirachirai (Kanehira & Yamamoto) Dandy is endemic to Taiwan. Magnolia nitida* W. W. Smith from northwest Yunnan, southeast Tibet, and northeastern Upper Burma in montane forests at an altitude of 2250-3700 meters is the only one in cultivation. *Magnolia omeiensis* (Cheng & Hu) Noot. (*Parakmeria omeiensis* Cheng & Hu) occurs in Szechuan and Kweichau. *Magnolia yunnanensis* (Cheng & Hu) Noot. (*Parakmeria yunnanensis* Cheng & Hu) is found in Yunnan. Also *M. lotungensis* belongs to this section.

1.8 Sect. *Maingola* Dandy in *Curtiss Bot. Mag.* 155 (1948) sub t. 16; in *Camellias and Magnolias Conference Report* (1950) 71—Type: *M. maingayi* King.

Like section *Theorhodon* but fruits more or less cylindric. Tepals of the outer whorl much thinner in texture than those of the inner whorls.

Species probably less than 10 from Assam to Indochina and southward into Malaysia (5 species) as far south as Java. This is, in Asia, the southernmost section. Being entirely tropical the section is not of interest for cultivation in a temperate climate.

1.9 Sect. *Alcimandra* (Dandy) Noot.—*Michelia cathcartii* Hook. f. and Thoms (1855)—*Alcimandra* Dandy (1927)—Type: *Alcimandra cathcartii* (Hook. f. & Thoms.) Dandy.

Stipules free from petiole. Leaves evergreen. Gynoecium stipitate. Carpels with 2-5 ovules. Fruits cylindrical. Stamens with very short filament and very long anther, hiding the gynoecium, connectivum produced into a short linguiform appendage.

Species 1, *Magnolia cathcartii* (Hook. f. & Thoms.) Noot. (1985)—*Michelia cathcartii* Hook. f. & Thoms. (1855)—Type: *Alcimandra cathcartii* Dandy (1927). Sikkim to Assam and Upper Burma, and Tonkin. Entirely tropical.

b. Subgenus YULANIA

Subg. *Yulania* (Spach) Reichenbach, *Der Deutsche Botaniker* 1 (1841) 192; Dandy in Treseder, *Magnolias* (1978) 33—*Yulania* Spach (1839)—*Magnolia*

subg. *Pleurochasma* Dandy (1950)—Type: *Yulania conspicua* Spach = *M. heptapeta* (Buchoz) Dandy.

Fruits at least finally consisting of free carpels which dehisce along the dorsal suture. Anthers dehiscing (sub)laterally. Flowers precocious and/or with a much reduced calyx-like outer whorl of perianth.

Sections 3:

2.1 Sect. *Yulania* (Spach) Dandy, in *Camellias and Magnolias Conference Report* (1950) 72; Ueda, *Acta Phytotax. Geobot.* 36 (1985) 153.

Tepals subequal. Flowers appearing before the leaves, white to rose-purple.

Species, about 7, temperate east Asia from central Himalayas to eastern China. For the gardener the finest section of Magnolia with precocious showy flowers. *M. heptapeta* (formerly *M. denudata*) is native in eastern China but of old cultivated in many parts of China and Japan. Its Chinese name is Yulan. *Magnolia sprengeri* comes from central China and *M. campbellii* from western China. Other species of this section are *M. sargentiana, M. dawsoniana, M zenii,* and *M. amoena.*

2.2 Sect. *Buergeria* (Sieb. & Zucc.) Dandy, in *Camellias and Magnolias Conference Report* (1950) 73—*Buergeria* Sieb. & Zucc. (1846; Ueda, *Acta Phytotax. Geobot.* 36 (1985) 154—Type: *Magnolia stellata* (S. & Z.) Maximowicz (= *M. tomentosa* Thunb.).

Flowers appearing before the leaves. Tepals very unequal. Inner (large) tepals white, sometimes tinged with rose or purple.

This section, too, is very popular in cultivation. There are more then five species in temperate east Asia, of which the following in Japan and all commonly cultivated. *Magnolia tomentosa* Thunb. (the valid name for *M. stellata* (Sieb. & Zucc.) Maximowicz according to Dr. Ueda), *M. praecocissima* Koidz., the correct name for *M. kobus* DC. According to Treseder *M. kobus* var. *borealis* Sargent is the same as *M. kobus* DC. It appears, however, that *M. kobus* var. *borealis* is a synonym of *M. praecocissima* Koidz. which is the species formerly indicated with the name *M. kobus*, while the name *M. kobus* is a synonym of *M. quinquepeta* (Buchoz) Dandy. See Ueda, *Acta Phytotax. Geobot.* 36 (1985) 150-161. *Magnolia salicifolia* (Sieb. & Zucc.) Maximowicz, a 'willow-leaved' species. Ueda adds the following: *M. pseudokobus* Abe & Akasawa, *M.* × *proctoriana* Rehder, a putative hybrid between *M. salicifolia* and *M. tomentosa*, and *M. praecocissima* × *M. salicifolia.*

2.3 Sect. *Tulipastrum* (Spach) Dandy, in *Camellias and Magnolias Conference Report* (1950) 74—*Tulipastrum* Spach (1839)—Type: *M. acuminata* Linnaeus.

Flowers appearing with or after the leaves. Tepals very unequal. Inner (large) tepals purple or green to yellow.

Species 2, one in southeastern North America and one in eastern China, both having been long in cultivation. *Magnolia acuminata* ranges from the north shore of Lake Erie, Canada, to Louisiana and northern Florida. *Magnolia quinquepeta*, to which (see Ueda) also the type of *M. kobus* DC belongs, and which used to be known as *M. liliflora*, has been cultivated in China and Japan since time immemorial, and is not known in the wild. In China the species is known as Mulan.

c. Subgenus TALAUMA

Subg. *Talauma* (Juss.) Pierre, *Fl. Forest. Cochinch.* 1 (1881) sub.t. 1—Type: *Magnolia plumieria* Schwarz

Fruits with connate carpels. When mature the apical parts of the carpels circumcissile and falling, dehiscing along the dorsal suture or

not, the basal parts remaining adnate to the torus, or apical parts falling in irregular masses. All *Talauma* are tropical and therefore not interesting for cultivation outside the tropics.

Sections 4:

3.1 Sect. *Talauma* Baill., *Adansonia* 7 (1866) 3, 66, p.p.—*Talauma* sect. *Richardianae* Blume (1829).

Stipules adnate to the petiole leaving a scar on its upper surface. Connective produced into a short appendage. Leaf margin not or only weakly sclerified.

Species, about 12, in tropical America from southern Mexico and Cuba through the Lesser Antilles and Central America to Brazil.

3.2 Sect. *Blumiana* Blume, *Fl. Java Magn.* (1829) 32—*Blumia* Nees (1825)—Sect. *Blumia* Baill. (1866)—Type: *Talauma candollei* Blume.

Leaf margins thick, sclerified, often including a vein. Species 6, one with five varieties in tropical and subtropical southeast Asia from central Himalayas to Indochina and through Malaysia into New Guinea. The other species confined to Malaysia.

3.3 Sect. *Aromadendron* (Bl.) Noot.—*Aromadendron* Blume (1825)—*Talauma* sect. *Aromadendron* Miq. (1868)—Type: *Aromadendron elegans* Bl.

Stipules free from petiole. Connective produced in a long setaceous or a short appendage. Gynoecium sessile.

Species 4, confined to western Malaysia, in Sumatra, Malay Peninsula, Banka, Java, and Borneo.

3.4 Sect. *Manglietiastrum* (Law) Noot.—*Manlietiastrum* Law, *Acta Phytotax. Sinica* 11 (1979) 72—Type: *Magnolia sinica* (Law) Noot.

As section *Aromadendron* but gynoecium stipitate. Species 1, *Magnolia sinica* (Law Yuh-wu) Noot. Yunnan.

2. MANGLIETIA

Bl. Verh. Bat. Genootsch. 9: 149 (1823); Nong Van Tiep, *Feddes Repert.* 91: 497 (1980); Nooteboom, *Blumea* 31: 91 (1985)—*Magnolia* sect. *Manglietia* (Bl.) Baill. (1866)—*Paramanglietia* Hu & Cheng (1951)—Type: *M. glauca* Bl.

Trees. Stipules adnate to or free from petiole. Flowers terminal, solitary, bisexual. Tepals 9-13, 3-merous, subequal. Anthers introrse, connective produced into a short or long appendage. Gynoecium sessile. Carpels many, free, or often connate when young; ovules 4 or more in each carpel. Fruiting carpels free, crowded, dehiscent along the dorsal and sometimes also the ventral suture.

About 25 species in tropical and subtropical Asia from the eastern Himalayas eastwards to southern China and Malaysia (not in the Moluccas and New Guinea). Only few species, among which *Manglietia insignia*, can be regarded as hardy and because of its beauty is worth while cultivating. Other species that might be worth cultivating are *M. szechuanica* from western Szechuan and *M. duclouxii* from northeastern Yunnan.

3. PACHYLARNAX

Dandy, *Kew Bull.* (1927) 260; in Hutch., *Gen. Fl. Pl.* 1: 55 (1964); Nooteboom, *Blumea* 31: 97 (1985).

Stipules free from the petiole. Flowers solitary, bisexual. Tepals 9-15, 3-5-merous, subequal. Anthers introrse; connective produced into a short appendage. Gynoecium sessile; carpels few (2-8), concrescent; ovules about 4-8 in each carpel. Fruit a thick-walled woody loculicidal capsule, the carpels dehiscent along the dorsal suture and sometimes separating towards the apex.

Species 2, of which 1 is Assam and 1 in Indochina and in Malaysia (Sumatra and the Malay Peninsula).

4. KMERIA

(Pierre) Dandy, *Kew Bull.* (1927) 262; in Hutch., *Gen. Fl. Pl.* 1: 56 (1964); Nooteboom, *Blumea* 31: 98 (1985)—*Magnolia* subg. *Kmeria* Pierre (1879).

Stipules adnate to the petiole. Flowers solitary, unisexual, with a very short torus. Tepals 6-7, 3-merous, subequal. Anthers intorse, the connective produced into a short or moderately long appendage. Gynoecium sessile; carpels comparatively few, concrescent; ovules 2; fruiting carpels woody, separating on dehiscence, dehiscing completely along the ventral suture and partly along the dorsal suture, thus finally becoming bifid.

Species 1 in Cambodia and adjacent Thailand, according to Dandy a second species in China, Kwangsi.

B. Tribus MICHELIEAE

Law Yuh-wu, *Acta Phytotax. Sinica* 22: 106 (1984).

Growth monopodial. Flower buds arising on brachyblasts in the axils of the leaves. Fruiting carpels free or concrescent. Genera: *Michelia* (incl. *Paramichelia* and *Tsoongiodendron*) and *Elmerrillia.*

5. ELMERRILLIA

Dandy, *Kew Bull.* (1927) 261; Noot., *Blumea* 31: 100 (1985)—*Elmerrillia* sect. *Pseudoaromadendron* Dandy (1974).

Stipules free from petiole. Flowers solitary (-2-3 nate), bisexual. Tepals 9-c. 16, 3-5-merous, subequal. Anthers introrse, connective produced into a short appendage. Gynoecium sessile, carpels many, ovules 2-6 in each carpel.

Species 4, all in Malaysia.

6. MICHELIA

Linnaeus, *Sp. Pl.* 1: 536 (1753); Noot., *Blumea* 31: 108 (1985), in press.—*Paramichelia* H. H. Hu (1940)—*Tsoongiodendron* W. Y. Chun (1963)—*Michelia* sect. *Anisochlamys* Dandy (1974)—*Michelia* sect. *Dichlamys* Dandy (1974)—*Michelia* sect. *Micheliopsis* (Baill.) Dandy (1974).

Stipules adnate to or free from petiole. Flowers solitary, bisexual; tepals 6-21, 3-6-merous, subequal or rarely the outer whorl different. Anthers latrorse or sublatrorse (to introrse), connective produced into short or elongated appendage. Gynoecium stipitate, carpels many to few (rarely 1), ovules 2-many.

Species, about 30, southeast Asia from India and Sri Lanka eastwards to southern Japan and Taiwan and southeastwards into Indonesia (not in Celebes and New Guinea).

II. Subfamily LIRIODENDROIDEAE

(Barkley) Law Yuh-wu, *Acta Phytotax. Sinica* 22: 105 (1984)—*Liriodendraceae* Barkley (1975).

Leaves 2-10 lobed, the apex truncate or widely emarginate; stipules always free from the petiole. Anthers extrorse. Fruiting carpels indehiscent, samaroid, produced at the apex into a long wing-like beak, caducous. Testa adherent to the endocarp.

Only one genus.

7. LIRIODENDRON

Linnaeus, *Sp. Pl.* 535 (1753)—Type: *L. tulipifera* L.Southern Ontario and eastern United States. A second species, *L. chinense* (Hemsl.) Sarg., in southern China and northern Vietnam (Tongking).