ANALYTICAL KEY TO THE GENERA OF THAI EUPHORBIACEAE

PETER C. VAN WELZEN*

SUMMARY

A new analytical identification key to the genera of the Euphorbiaceae found in Thailand is presented. It keys out 82 genera and includes genera like *Antidesma*, *Daphniphyllum*, *Galearia*, *Microdesmis*, etc., which are often referred to other families. The key is still highly technical and the presence of a technical vocabulary might be useful, just like the presence of a dissecting microscope or at least a handlens, because due to the smallness of the flowers most details are microscopical. Care has been taken to create the possibility to identify incomplete material (e.g., either with flowers or fruits, sterile material will present a big problem, also for a specialist) without the use of a reference collection. Good luck with its use and please report errors to the author.

INTRODUCTION

The present identification key is not the first table to identify the genera of Thai Euphorbiaceae. Airy Shaw already constructed one in 1972. Unfortunately, one needs complete material, with especially staminate flowers and fruits, to be able to find the correct name with his key. The first half of the key presented here roughly follows the structure of Airy Shaw's key. Whenever possible, vegetative characters are used in the questions, but the use of (difficult) generative questions could not be avoided. The present key has become much longer, 163 couplets of questions, compared to roughly 85 in Airy Shaw's key (1972). This is partly caused by the fact that more exceptions are keyed out (e.g., *Croton colobocarpus* Airy Shaw, which lacks stellate hairs) and because questions are split into ones for flowering material and others for fruiting material. The questions concerning flowers ask information on staminate and pistillate flowers, at least as far as possible. This should enable users to identify single specimens.

Two genera treated by Airy Shaw (1972) are omitted from the present key, because these taxa are not found in Thailand: *Lasiococca* Hook.f. and *Neoscortechinia* Pax & K.Hoffm.

* Rijksherbarium/Hortus Botanicus, University of Leiden P.O. Box 9514, 2300 RA Leiden, The Netherlands.

The key is based on the taxa treated by Airy Shaw (1972), generic descriptions as found in Backer & Bakhuizen van den Brink *f.* (1963), Whitmore (1973), and the material present in the Bangkok Forest Herbarium (BKF). The key in Whitmore (1973) has the same structure as the one constructed by Airy Shaw (1972).

The present key is meant to be tested, because I expect that it is still incomplete. Probably not all specimens will key out correctly. Users are, therefore, kindly invited to send me notes on problems encountered while using the key (see address above, or e-mail: welzen@rulrhb.leidenuniv.nl). These notes will be used to improve the key. A final and completely functional key will be published in the account on the Euphorbiaceae in the Flora of Thailand.

Characters

Some characters are difficult to use. One should carefully examine the following characters:

Leaves opposite or in whorls versus alternate: the majority of the leaves should be opposite or in whorls. Take care with *Mallotus* section *Hancea*: these species have opposite leaves, but one leaf is reduced to an (early caducous) bract. Pay attention to scars of fallen off leaves.

Glands. Questions about glands or black glandular areas concern glands or areas present in the basal part of the leaves, often at or near the apex of the petiole on upper or lower surface. Always check several leaves and use a microscope if one is available, otherwise a handlens is a prerequisite.

Stellate hairs and glandular scales are usually very small and they sometimes appear very infrequently. Again, check several parts, especially the young parts of the branchlets and the lower surface of the leaves close to the basal part of the midrib. Use a microscope or a handlens.

KEY TO THE GENERA

1. Flowers in cyathia (flowers contracted into dense heads with minute staminate flowers outside the pistillate flowers, surrounded by calyx-like and glandular bracts). Plants herbs, small shrubs, or often succulent and even cactus-like (latter usually ornamental). Rich in latex. Leaves opposite or not
   2. Cyathia actinomorphic, spreading, nectary scales surrounding flowers. Native or cultivated, succulent, sometimes cactus-like or not, usually not deciduous **Euphorbia** L.
   2. Cyathia zygomorphic, shoe- or boat-shaped bracts enveloping flowers, upturned bract with a scale-like nectary inside at its base. Cultivated, succulent stem, deciduous **Pedilanthus tithymaloides** (L.) Poit.

1. Plants herbs, shrubs or trees. Succulent stem, thorns, and cyathia absent. Latex present or not. Leaves opposite or not
   3. Plants grown as ornamental shrub. Leaves variegated (2-coloured, especially nerves), part of leaves purplish, usually lobed **Codiaeum** Juss.
   3. Plants grown as ornamental, cultivated, or wild. Leaves 1-coloured, leaves (except young ones often) green, lobed or not
      4. Plants herbs/shrubs with stinging hairs (check especially the calices) or twining: climbers or prostrate herbs
         5. Leaves deeply lobed or trifoliolate. Inflorescences capitate, enveloped by 2 large membranous external bracts **Dalechampia** L.
         5. Leaves simple, not lobed. Inflorescences not contracted into heads, not enveloped by large bracts

6. Leaves coriaceous. Inflorescences with more than 2 cm long floral bracts. Stamens connate
Omphalea bracteata (Blanco) Merr.
6. Leaves papery. Inflorescences with short, less than 1 cm long green bracts. Stamens free
7. Petiole with 2 raised glands apically, upper side. Stamens 8–13. Capsule 4-locular, winged or horned
Pterococcus corniculatus (Sm.) Pax & K.Hoffm.
7. Petiole without apically raised glands. Stamens 2 or 3. Capsule 3-locular, not appendaged
8. Inflorescences terminal, but sometimes on leafless side branches and appearing laterally. Staminate flowers with 4 or 5 lobes. Stamens 2, subsessile; filaments slender; connective not thickened, nor elongated above anther cells. Pistillate flowers with 2 mm long lobes
Pachystylidium hirsutum (Blume) Pax & K.Hoffm.
8. Inflorescences axillary or leaf-opposed. Staminate flowers with 3 calyx lobes. Stamens 3; filaments thickened; connective thick, appendaged above anther cells. Pistillate flowers with lobes more than 2 mm long, especially in fruit
9. Leaves broadly cordate, widest at leaf insertion. Calyx of pistillate flowers with 6 lobes, more than 1 cm long in fruit. Styles connate with a clavate non-papillate stigma, not persistent
Megistostigma burmanicum (Kurz) Airy Shaw
9. Leaves cordate to obovate with a narrow emarginate base, widest above leaf insertion. Calyx of pistillate flowers with 3 lobes, less than 1 cm long in fruit. Styles free, stigmas papillate, persistent
Cnesmone Blume

4. Herbs, shrubs or trees, stinging hairs absent
10. Leaves palmate or palmatifid to at least the upper third of the lamina; basal nerves palmate, 3–9, supporting lobes or leaflets.[1]
11. Leaflets completely free, 3-foliolate
12. Margin of leaflets serrate or crenate **Bischofia** Blume
12. Margin of leaflets entire **Hevea brasiliensis** (Willd. ex A.Juss.) Müll.Arg.
11. Leaflets at least basally united, 3–9 nerves
13. Leaf base/end petiole with two raised glands. Petals more than 1 cm long **Vernicia** Lour.
13. Leaf base without raised glands or basal part of leaf margin occasionally with a few raised glands (*Baliospermum*), but then petals absent. Petals absent or less than 1 cm long
14. Margin of leaves entire, without glands at end of nerves or with numerous large glandular hairs all-over
15. Leaves divided till lower third, either peltate (> 2 mm) and without glandular hairs or basally attached and with glandular hairs **Jatropha** L.
15. Leaves almost completely divided, basally attached or slightly (2 mm) peltate, without glandular hairs **Manihot** Mill.
14. Margin of leaflets serrate (with glands on the teeth) or entire but then with several glands at end of nerves protruding from margin (*Macaranga pruinosa*)
16. Leaves with 7 or 9 lobes **Ricinus communis** L.
16. Leaves with 2, 3 or 5 lobes
17. Leaves never peltate. Glandular scales absent. Inflorescences bisexual
Baliospermum Blume
17. Leaves often peltate. Glandular scales present esp. at lower surface leaves. Inflorescences monosexual, dioecious **Macaranga** Thou.
10. Lamina not palmate or palmatifid to more than the upper third; nerves pinnate or with 3–5 basal nerves
18. Leaves (sub)opposite or in a pseudo-whorl (N.B. this pertains to most leaves!, not a single one or a few)
19. Leaves in a pseudo-whorl; base emarginate, equal; margin entire. Petiole less than 1 cm long. Leaves slender, obovate **Epiprinus** Griff.
19. Leaves opposite or in a pseudo-whorls; base emarginate to acute, equal to unequal; margin serrate/crenate to entire. Petiole absent to much longer than 1 cm

---

[1] *Baliospermum* may occasionally have a palmatifid leaf, but the lobes are **not** supported by the basal nerves.

20. Leaves opposite; base emarginate, unequal; margin crenate. Petiole usually red. Staminate flowers on long thin pedicels united in catkins; below every catkin one pistillate flower with leaf-like sepals **Erismanthus** Wall. ex Müll. Arg.
20. Leaves opposite to in pseudo-whorls; base emarginate to acute, equal; margin serrate/crenate to entire
    21. (All) leaves in pseudo-whorls; margin entire or apically with a few minor teeth only. Stellate or bundled hairs absent
        22. Monoecious. Petals present. Sepals 5, often very enlarged. Staminate flowers with disc or separate disc glands, stamens 3–6. Fruit a capsule with persistent calyx
            23. Petals smaller than sepals. Stamens 3-6, free. Two ovula per locule **Actephila** Blume
            23. Petals larger than sepals. Stamens 3-5, united into a column. One ovule per locule **Trigonostemon** Blume
        22. Monoecious or dioecious. Petals absent. Sepals 2-5, not enlarged. Staminate flowers without disc or with separate disc glands. Fruits capsules or berries, without persistent calyx
            24. Monoecious. Nerves closed and looped near margin, basal nerves very distinct. Sepals 3–5. Staminate flowers with 14–35 stamens and little glands between their bases. Pistillate flowers with a disc, 2- or 3-locular. Fruit a woody capsule **Blumeodendron kurzii** (Hook.f.) J.J.Sm.
            24. Dioecious. Nerves only apically indistinctly closed and looped near margin, basal nerves less distinct than other nerves. Sepals 2. Staminate flowers with 12–16 stamens, no glands. Pistillate flowers without disc, 2-many locular. Fruit a leathery berry **Pimelodendron griffithianum** (Müll.Arg.) Benth.
    21. Leaves (sub)opposite (sometimes few in pseudo-whorl); margin entire and then stellate or bundled hairs present or margin completely crenate to serrate
        25. Stellate or stellately bundled hairs absent. Margin of leaves serrate or crenate. Either herb without bract glands or shrub to tree, usually with bract glands
            26. Herb. Leaves with basal glands **Mercurialis leiocarpa** Sieb. & Zucc.
            26. (Shrubs or) trees. Leaves without basal glands
                27. Leaves entire. Stamens 4, free. Seeds with sarcotesta **Austrobuxus nitidus** Miq.
                27. Leaves serrate. Stamens 8 and joined at base or 3 to many and free. Seeds naked
                    28. Stamens many. Pistillate flowers single per axil, on long pedicel (up to 9 cm long), style and stigmas long (each more than 10 mm) **Cleidion spiciflorum** (Burm.f.) Merr.
                    28. Stamens 3 or 8. Pistillate flowers several in inflorescences, shortly pedicelled, with short styles and stigmas
                        29. Dioecious. Leaves with or without stipellae at apex of petiole. Bracts not glandular. Stamens 8, joined at base. Sepals of staminate flowers (3)–4(–6). Fruits pilose **Alchornea** Swartz
                        29. Monoecious. Leaves without stipellae. Bracts glandular. Stamens 3, free. Sepals of staminate flowers 3. Fruits glabrous **Excoecaria** L.
        25. Stellate or stellately bundled hairs or glandular scales usually present. Margin of leaves entire, serrate or crenate. Shrub to tree, without bract glands
            30. Margin entire, without glands. Indumentum with long stellately bundled hairs. Leaves never peltate, nor white below, without domatia. Fruits indehiscent drupes. Staminate flowers 7 mm or more in diam. when flat. Pistillate flowers 1–4 per inflorescence **Trewia nudiflora** L.
            30. Margin entire to usually serrate (or crenate), though often very minute, glands in teeth or undulations. Indumentum usually with (minute) stellate hairs and/or glandular scales. Leaves sometimes peltate and/or with basal glands, sometimes white below, often with domatia. Fruits dehiscent capsules. Staminate flowers less than 7 mm in diam. when flat. Pistillate flowers more than 4 per inflorescence **Mallotus** Lour.
18. Leaves alternate, sometimes densely contracted

31. Leaves peltate. Stellate hairs or glandular scales absent. Leaves below with 2 to several subbasal submarginal glandular areas (black when dry) **Balakata baccata** (Roxb.) Esser[2]
31. Leaves peltate or not - if peltate then with stellate hairs and/or peltate hairs and/or glandular scales present (check various parts). Leaves below without such glandular areas
    32. Stellate hairs and/or peltate hairs and/or glandular scales present (check various parts! esp. lower surface of leaves and buds; use high magnification). Leaves peltate or not
        33. Glandular scales or peltate hairs present; stellate hairs present or not
            34. Rheophytic shrub (along/in rivers). Leaves narrowly elliptic (willow-like). Filaments branched **Homonoia riparia** Lour.
            34. No rheophyte, shrub to trees. Leaves not willow-like. Filaments not united and branching
                35. Inflorescences opposite leaves. Petals with apical gland(s). Stamens with an apical gland **Pantadenia adenanthera** Gagnep.
                35. Inflorescences terminal or in axils of (former) leaves. Petals absent or present, but then without apical gland(s). Stamens without apical gland
                    36. Plants with peltate hairs, either on lower side of leaves or on petioles and flowers. Petals present at least in staminate flowers. Leaves often with 2 raised glands (next to non-raised marginal glands) along basal part of margin **Croton** L.
                    36. Plants, esp. leaves below with few to many glandular scales. Petals absent. Leaves without raised glands along basal part of margin
                        37. Staminate flowers in catkins. Calyx papery, cupular, 5-teethed. Stamens 5, on sepals. Ovary 2-locular. Fruit capsule of 2 flat, somewhat roundish wings **Hymenocardia punctata** Wall. ex Lindl.
                        37. Staminate flowers in racemes, spikes or panicles. Sepals free, thicker, 3 or 4 lobes. Stamens 1–250, on receptacle. Ovary 2- or 3–(5-) locular. Fruit a non flattened capsule, often armed
                            38. Stem hollow or not. Leaves usually peltate; stipules usually very large and conspicuous. Stellate hairs absent. Stamens 1–20; anthers 4-celled. Inflorescences axillary **Macaranga** Thou.
                            38. Stem not hollow. Leaves usually not peltate; stipules small, inconspicuous. Stellate hairs usually present. Stamens 16–250; anthers 2-celled. Inflorescences terminal **Mallotus** Lour.
        33. Glandular scales and peltate hairs absent, only stellate hairs present
            39. Margin of leaves dentate or serrate (N.B. the teeth may be minute and just the nerve protruding)
                40. Leaves broadly-ovate, as broad as long, coarsely toothed, with a group of glands at leaf insertion. Stamens more than 200 with purple gland on back of stamen connective. Pistillate flowers with a round disc. Fruits not armed **Melanolepis multiglandulosa** (Reinw. ex Blume) Rchb.f. & Zoll.
                40. Leaves ovate to elliptic or broadly-ovate; when broadly ovate then not coarsely toothed though often lobed; no or 2 glands at leaf insertion. Stamens 16–250, without a gland. Pistillate flowers without a disc. Fruits armed or not
                    41. Leaves white hairy below, ovate-elliptic to elliptic (much longer than broad)
                        42. Most leaves less than 15 cm long, coarsely toothed, not to subpeltate. Staminate flowers contracted into heads. Pistillate flowers separate, solitary, with 5–7 sepals. Fruits less than 1.5 cm in diameter **Cladogynos orientalis** Zipp. ex Span.
                        42. Most leaves more than 17 cm long, often hardly toothed, subpeltate to peltate. Inflorescences bisexual spikes. Pistillate flowers with 5 sepals. Fruits more than 2 cm in diam **Sumbaviopsis albicans** (Blume) J.J.Sm.
                    41. Leaves green (brown when dry) OR white hairy below (and then broadly ovate: about as broad as long)

---

[2] *Balakata* is a newly described genus, containing *B. baccata* formerly known as *Sapium baccatum*.

43. Red exudate present. Leaves basally with two raised glands on upper surface. Inflorescence thyrsoid **Fahrenheitia pendula** (Hassk.) Airy Shaw[3]
43. Red exudate absent. Leaves basally with or without two raised glands on upper surface. Inflorescences racemes or spikes
    44. Leaves basally often with two raised glands on upper surface, without domatia or basal (black) glandular areas. Petals present. Inflorescences bisexual, pistillate flowers towards base. Fruits not armed **Croton** L.
    44. Leaves basally without raised glands, though often with two (black) glandular areas, domatia often present. Petals absent. Inflorescences unisexual. Fruits usually armed **Mallotus** Lour.
39. Margin of leaves entire, though often wavy or irregular
    45. Leaves white below, (ovate-)elliptic, more than 20 cm long **Sumbaviopsis albicans** (Blume) J.J.Sm.
    45. Leaves white or not below; when white then (broadly) ovate and far less than 20 cm long
        46. Woody herb or small shrub. Leaves 3-lobed, lobes rounded; base truncate. Stigma red, fruits reddish purple **Chrozophora rottleri** (Geisel.) A.Juss. ex Spreng.
        46. Small shrubs to trees. Leaves not lobed or if lobed, lobes pointed; base cordate to acute
            47. Dwarf shrub (to treelet) with usually thickened root. Mature leaves broadly cordate, without raised glands near the petiole. Petals present. Sepals and fruits floccose. Inflorescence a raceme **Thyrsanthera suborbicularis** Pierre ex Gagnep.
            47. Shrubs to trees, roots not conspicuously thickened. Mature leaves cordate (then often with glands near the petiole) to obovate. Petals absent or present. Sepals and fruits at most evenly pilose. Inflorescences racemes, cymes, thyrses or panicles
                48. Leaves ovate, peltate or not. Inflorescences diffuse cymes or pyramidal thyrses.
                    49. Cultivated tree. Leaves not peltate, base on upper surface with two raised glands. Inflorescences bisexual. Staminate flowers with petals. Fruit a large (more than 1 cm) bilocular woody drupe **Aleurites moluccana** (L.) Willd.
                    49. Wild trees. Leaves peltate or not, base on lower surface often with two raised glands. Inflorescences unisexual. Staminate flowers without petals. Fruit a small (less than 1 cm) indehiscent or partly dehiscent thin fleshy capsule **Endospermum** Benth.
                48. Leaves elliptic to obovate, at most subpeltate. Inflorescences racemes, panicles or globose heads
                    50. Petals absent. Inflorescences unisexual, pistillate ones often cauliflorous. Stamens 4–10. Ovary with 2 ovules per locule. Fruit fleshy berry, not armed **Baccaurea** Lour.
                    50. Petals absent or present. Inflorescences unisexual or bisexual, usually terminal or axillary. Stamens 4 or 5 or numerous. Ovary with 1 ovule per locule. Fruits dry capsules, armed or not
                        51. Leaves glabrous. Inflorescences bisexual. Staminate flowers in small clusters. Filaments united into a tube, fleshy; anthers 4 or 5, pendulous. Anthers diverging from tip of filament **Koilodepas longifolium** Hook.f.
                        51. Leaves with (a few) hairs or glabrous. Inflorescences unisexual or bisexual. Staminate flowers not clustered in a head. Filaments numerous, free, not thickened; anthers erect
                            52. Inflorescences bisexual. Petals present. Leaves without domatia, nor with basal (black) glandular areas, but often with two raised glands along the margin. Fruits not armed **Croton** L.
                            52. Inflorescences unisexual. Petals absent. Leaves often with domatia and/or basal (black) glandular areas, without raised glands. Fruits usually armed **Mallotus** Lour.

---

[3] According to Balakrishnan & Chakrabarty (Kew Bull. 48: 719. 1993) the name *Fahrenheitia* is invalid and should be *Paracroton* with the combination *Paracroton pendulus* (Hassk.) Miq.

32. Stellate hairs, peltate hairs, and glandular scales absent. Leaves not peltate
  53. Inflorescences opposite leaves. Leaves glandular dotted (punctate)
    Suregada multiflora (Juss.) Baill.
  53. Inflorescences not opposite leaves, but terminal, axillary or cauli/ramiflorous. Leaves not punctate, without
    54. Petiole with 2 raised glands subapically or apically at leaf insertion or leaves below or above with (1) 2 (more) subbasal submarginal glandular areas (black when dry) or leaves with two subbasal glands at margin. Check several leaves!
      55. Leaves entire or wavy
        56. Leaves with two subbasal marginal glands; margin very shallowly crenate with small glands in the undulations. Mangrove/littoral **Excoecaria agallocha** L.
        56. Leaves with glands at apical part of petiole or with subbasal submarginal glandular areas. Margin entire or wavy with small glands. Other habitats
          57. Leaves cordate or broadly ovate to deltoid (about as long as broad)
            58. Leaves broadly ovate to deltoid, glands at top of petiole hardly raised or confluent into one gland. Inflorescences unbranched racemes. Bracts to staminate flowers with 2 large glands. Petals absent **Homalanthus populneus** (Geisel.) Pax[4]
            58. Leaves cordate to broadly ovoid, glands at top of petiole distinctly raised. Inflorescences (branching) panicles. Bracts to staminate flowers without glands. Petals more than 1 cm long **Vernicia** Lour.
          57. Leaves ovate-elliptic to obovate (longer than broad)
            59. Leaves long obovate, glabrous; glands at apex of petiole very conspicuous. Inflorescences cymes **Elateriospermum tapos** Blume
            59. Leaves ovate-elliptic to obovate, glabrous to densely pilose; glands at apex of petiole often inconspicuous or glands subapical on petiole or absent. Inflorescences spikes/racemes or flowers seemingly in axillary clusters
              60. Glands at apex of petiole. Basal nerves free of margin. Inflorescences usually very contracted spikes, but also racemes or flowers seemingly in axillary clusters **Aporosa** Blume
              60. Glands absent or subapically or apically on petiole, in latter case basal part of lowest nerves part of margin. Flowers in racemes
                61. Glands absent. Basal nerves free of margin. Leaves with black subbasal submarginal glandular areas on lower surface. Seeds dropping after dehiscence leaving bare column **Balakata baccatum** (Roxb.) Esser
                61. Glands subapically or apically on petiole. Basal part of lowest nerves part of margin. Seeds persistent on column after dehiscence
                  Triadica cochinchinensis Lour.
      55. Leaves serrate (to crenate), sometimes minutely so (nerves ending outside margin)
        62. Staminate flowers in dense spikes, each flower with a thick staminal column with 2 or 3 horizontal rows of anthers. Pistillate flowers single, calyx tightly enveloping flower when young, stigma saucer-shaped, margin with dentate. Fruits 8–9 cm in diam. Introduced, cultivated as ornamental. Leaves emarginate at base, nerves many, under right angles with midrib **Hura crepitans** L.
        62. Staminate flowers in dense spikes (then very small) or not. Stamens free. Pistillate flowers single or in an inflorescence, calyx free from pistil, stigmas linear. Fruits much smaller
          63. Petals present. Fruit with fleshy exocarp and mesocarp and woody endocarp. Bracts without basal glands **Ostodes** Blume
          63. Petals absent. Fruit woody or fleshy; when fleshy bracts with 2 basal glands

---

[4] The original spelling *Omalanthus* should be preferred over *Homalanthus*, which is in agreement with the revision of H.-J. Esser for Flora Malesiana, but most people are more familiar with *Homalanthus* and, therefore, the latter is retained here.

64. Deciduous tree. Branchlets thick, soft, spongy, shrivelled when dry. Glands in inflorescences very large. Fruits dehiscing irregularly
Falconeria insignis Royle
64. Evergreen trees. Branchlets slender, with normal wood, not shrivelling when dry. Glands on bracts absent or small. Fruits dehiscing regularly
65. Bracts with glands. Sepals or calyx lobes 3. Leaves with 2 marginal glands next to petiole (not on top) **Shirakiopsis indica** (Willd.) Esser
65. Bracts without glands. Sepals or calyx lobes 3–6. Leaves with 2 (confluent) glands on top of petiole
66. Leaves with round domatia with hair tufts underneath. Staminate inflorescences racemes; staminate flowers with 30 to many stamens, without disc glands. Pistillate flowers single per axil, long pedicel (up to 9 cm)
Cleidion spiciflorum (Burm.f.) Merr.
66. Leaves without domatia. Staminate inflorescences racemes or cymes; staminate flowers with less than 25 stamens or when more than 30 then glands and scales among filaments. Pistillate flowers always several per inflorescences, shortly pedicelled or sessile
67. Inflorescences usually strongly contracted spikes or racemes or flowers seemingly in axil. Stamens 2 or 3 per flower. Disc absent. Pistil 2- or 3-locular, with 2 ovules in each. Fruits not lobed, dehiscing irregularly or in 2 or 3 valves **Aporosa** Blume
67. Inflorescences lax cymes or long spikes with bundled (staminate) flowers. Stamens 10–200 per flower. Disc or disc glands present. Pistil 3- locular, with 1 ovule in each. Fruits lobed, dehiscing regularly into 6 or 3-bivalved parts
68. Inflorescences lax cymes. Stamens 18–21, without mixing glands and scales (but with disc glands!). Stigmas widening into wing, channelled. Fruit 3-lobed. Seeds carunculate only **Baliospermum** Blume
68. Inflorescences spikes with either single pistillate flowers or bundles of staminate flowers. Stamens 12–200 with glands and scales between the filaments. Stigmas short, divided into segments but not winged or channelled. Fruit 2- (or 3-)lobed. Seeds with fleshy sarcotesta
Claoxylon Juss.

54. Petiole without raised glands. Leaves without subbasal submarginal glandular areas at lower surface
69. Woody herb or small shrub. Leaves narrowly elliptic, margin with setae. Fruits with rows of short spines **Microstachys chamaelea** (L.) Juss.
69. Herbs to trees. Leaves all kinds of shapes, margin without setae or minute ones. Fruits smooth or armed (often with branching spines) but not distinctly in rows
70. Leaves entire or somewhat wavy
71. Inflorescences absent, flowers or fruits single or grouped (fascicled) in axils
72. Leaves spirally on terminal twigs, more or less grouped together. Petals present. Pistillate flowers on a long (more than 3 cm) pedicel; calyx often enlarged, persistent (reflexed) till after dehiscence **Actephila** Blume
72. Leaves in 2 rows (sometimes seemingly compound) on twigs (on stem alternate to spiral possible!)- or spirally, but then pistillate flowers on short (less than 1 cm) pedicels or sessile and without petals. Petals present or not. Calyx enlarged or not, persistent or not
73. Flowers present
74. Petals present
75. Petals shorter than calyx
76. Disc divided into lobes. Stamens free **Leptopus** Decne
76. Disc cupular or annular. Stamens basally united on gynandrophore
77. Ovary 2-locular. Leaves with a very dense distinct venation. (Fruit drupe) **Bridelia** Willd.

77. Ovary 3-locular. Leaves with a lax to dense often indistinct venation. (Fruit capsule) **Cleistanthus** Hook.f.

75. Petals (as long as or) longer than calyx

78. Leaves less than 3 cm long. Disc present. Stamens 5. (Fruit capsule) **Chorisandrachne diplosperma** Airy Shaw

78. Leaves when mature more than 8 cm long. Disc absent. Stamens 5 or 10. (Fruit drupe) **Microdesmis caseariifolia** Planch.

74. Petals absent (or a single one)

79. Stamens (partly) united into a column. Monoecious or dioecious (*Chaetocarpus*), latter with bristle-like hairs on ovary

80. Stamens 8. Ovary with bristle-like hairs **Chaetocarpus castanocarpus** (Roxb.) Thw.

80. Stamens 3–6. Ovary glabrous or with soft short hairs

81. Stamens only basally, partly united, erect. Sepals free. Disc present **Phyllanthus** L.

81. Stamens completely united (anthers in whorl around androphore) or anthers hanging horizontally underneath lobes of androphore. Sepals free or basally connate. Disc absent

82. Stamens 3–6, completely united with anthers in a whorl around androphore, on top of anthers a teeth-like appendix. Stigmas usually united into a cone. Sepals usually free **Glochidion** J.R. & G.Forst.

82. Stamens 3, completely united with anthers in a whorl around androphore, but then no tooth-like appendix, or anthers hanging horizontally underneath lobes of androphore, tooth-like appendages absent. Stigmas free. Sepals usually basally united (*Sauropus* (*Synostemon*) *bacciformis* is an exception)

83. Leaves usually drying blackish. Calyx of staminate flowers urcinate; stamens along vertical androphore **Breynia** J.R. & G.Forst.

83. Leaves drying greenish. Calyx of staminate flowers flattened and discoid; androphore apically split, spreading and stamens hanging underneath **Sauropus** Blume

79. Stamens completely free. Monoecious or dioecious; latter without bristle-like hairs on ovary

84. Disc absent. Sepals usually 4. Stamens 2 or 3. Ovary 2- or 3-locular; styles and stigmas free, latter usually forked **Aporosa** Blume

84. Disc or disc glands present

85. Disc in staminate flowers broad, lobed or folded. Stigmas in pistillate flowers broad, flat, fan- to almost kidney-shaped **Drypetes** Vahl

85. Disc not broad, usually separate glands in staminate flowers. Stigmas slender, not broadened

86. Sepals 5. Staminate flowers: stamens 5; pistillode 3-lobed **Flueggea** Willd.

86. Sepals 4 or 6. Staminate flowers: stamens 3–6; pistillode absent

87. Sepals 4. Stamens 4 **Margaritaria indica** (Dalz.) Airy Shaw

87. Sepals 6. Stamens 3–6. Stipules may give thorny impression **Phyllanthus** L.

73. Fruits present

88. Fruit indehiscent capsule, berry or drupe

89. Fruit a capsule. Seeds angled, trigonous, with a juicy sarcotesta **Flueggea** Willd.

89. Fruits a berry or a drupe. Seeds or stones ovoid to globose, without an arilloid
    90. Leaves symmetric, both sides more or less equal, longer than 2 cm. Leaves with many nerves and pronounced scalariform venation **Bridelia** Willd.
    90. Leaves asymmetric, one side broader; if seemingly symmetric than leaves shorter than 2 cm
        91. Stone in drupe single, sculptured (1 ovule per locule). Sepals 5 **Microdesmis casearifolia** Planch.
        91. Stones in drupe 1–3, smooth (2 ovules per locule). Sepals 4–6
            92. Stigmas broad, flat, fan- to kidney-shaped. Sepals 4–6 **Drypetes** Vahl
            92. Stigmas slender. Sepals 6. Stipules may give thorny impression **Phyllanthus** L.
88. Fruit dehiscing capsule
    93. Fruit with echinate hairs **Chaetocarpus castanocarpus** (Roxb.) Thw.
    93. Fruits pilose with soft hairs or glabrous
        94. Seeds with metallic blue arilloid **Margaritaria indica** (Dalz.) Airy Shaw
        94. Seeds without arilloid or with a differently coloured one
            95. Seeds angled, trigonous, with a sarcotesta **Flueggea** Willd.
            95. Seeds plano-convex (flattened) or ovoid to globose to trigonous, without arilloid
                96. Seeds plano-convex, flattened, cohering in pairs long after being shed **Chorisandrachne diplosperma** Airy Shaw
                96. Seeds ovoid to ellipsoid to trigonous, separate after shedding
                    97. Calyx 3–6-partite. Leaves often yellowish green when dry, variously glandularly dotted. Fruits dehiscing irregularly or into 2 or 3 entire valves; apex sometimes beaked into style **Aporosa** Blume
                    97. Sepals or calyx 5- or 6-partite. Leaves greenish or blackish when dry, not glandularly dotted. Fruits dehiscing regularly into 3 bivalved parts; apex never beaked
                        98. Sepals 5. Seeds smooth **Cleistanthus** Hook.f.
                        98. Sepals 5 or 6; when 5: seeds rugulose-tubercled
                            99. Seeds rugulose-tubercled **Leptopus** Decne
                            99. Seeds smooth
                                100. Fruits often lobed around seeds, more or less round in transverse section, usually apically and basally flattened; stigmas usually united in a cone (if separate then 2 sepals) **Glochidion** J.R. & G.Forst.
                                100. Fruits not lobed (then ± globose) or lobed (then lobes ± globose), not flattened; stigmas separate, spreading or erect
                                    101. Leaves usually drying blackish. Stigmas erect to recurved, but well separate, seldom basally joined and spreading like *Phyllanthus* and *Sauropus*. Calyx present **Breynia** J.R. & G.Forst.
                                    101. Leaves drying brownish or greenish. Stigmas usually sessile and split to the base, horizontal and spreading (like 3 half-moons). Sepals separate or calyx present
                                        102. Fruits small to large, often lobed, well dehiscent, apically convex. Sepals separate **Phyllanthus** L.

102. Fruits small, globose, tardily dehiscent, apically flat or depressed. Calyx present except for *S. bacciformis* (sepals free)
Sauropus Blume

71. Inflorescences spikes, thyrsoid or cymose
103. Flowers present
104. Petals present, in staminate and pistillate flowers or only in staminate flowers, the latter monoecious
105. Stamens 3–5, all united into a column **Trigonostemon** Blume
105. Stamens 10–30, all free or only inner whorl on a column or joined with pistillode
106. Stamens 15–30, all free. Sepals with long glandular hairs on margin. Leaves usually panduriform (obovate with widened base)
Strophioblachia fimbricalyx Boerl.
106. Stamens 10–20, all free or inner whorl united on column or with pistillode. Sepals without glandular hairs on margin
107. Inflorescences terminal, umbellate. Petals 4 or 5 in staminate flowers, absent in pistillate flowers **Blachia** Baill.
107. Inflorescences terminal or axillary (sometimes panicle-like) racemes or spikes. Petals 5 in staminate and pistillate flowers
108. Inflorescences panicle-like racemes. Stamens 10–20, inner whorl connate at base. Pistillode absent
Dimorphocalyx Thw.
108. Inflorescences long (thyrsoid) racemes or spikes. Stamens 10, sometimes inner joined with pistillode
109. Inflorescences very long, up to more than 30 cm, usually pendulous, terminal. Petals with hairs along margin, esp. apically. Stamens free; anthers parallel to each other and touching. Leaves elliptic **Galearia fulva** (Tul.) Miq.
109. Inflorescences usually shorter than 20 cm, patent, axillary. Petals glabrous along margin. Stamens free or central whorl united with pistillode; anthers separate from each other, at basal edges of trapezium-shaped connective. Leaves (elliptic to) obovate. Leaves relatively long, gradually decurrent into petiole. One species with conspicuous bracts
Agrostistachys Dalz.
104. Plants monoecious or dioecious. Petals absent
110. Plants monoecious. Stamens 3, united into a short column. Disc absent
Sauropus Blume
110. Plants monoecious (*Phyllanthus*) or dioecious. Stamens 2 to numerous, free or basally connate, but then either 6 or more stamens present or disc absent
111. Stamens 3–5, sometimes on sepals; latter united into calyx. Staminate flowers with very distinct (joined) disc glands. Ovary 1-locular (though with 3 forked stigmas). Staminate inflorescences spikes or sometimes panicles connective very broad, separating anthers, dark, anthers on top of it, bent **Antidesma** L.
111. Stamens 2 to numerous, ometimes on sepals (then sepals free, inflorescences thread-like panicles; other staminate flowers with 5 or less stamens without or with an inconspicuous disc). Ovaries (incompletely) 2- or more locular
112. Disc absent. Staminate flowers: stamens 6–12, connate at base. Pistillate flowers: ovaries incompletely 2-locular; staminodes present **Daphniphyllum** Blume

112. Disc present or absent. Staminate flowers: stamens 2-numerous, only when numerous basally joined into 6 groups. Pistillate flowers: 0varies completely 2- or more locular; staminodes absent
    113. Staminate flowers: sepals 5; disc glands 5; stamens 5 on sepals; pistillode lobed. Pistillate flowers: ring-like disc. Inflorescences thread-like panicles
        Richeriella cf. **gracilis** (Merr.) Pax & K.Hoffm.
    113. Staminate flowers: sepals 2–6; disc seldom present; stamens 2 to numerous, not on sepals; pistillode absent or present, not lobed. Pistillate flowers: disc absent or present but then inflorescences racemes
        114. Leaves distichous, somewhat like compound leave. Staminate flowers: stamens 3–6, free to variously connate; disc (glands) present; pistillode absent. Pistillate flowers: disc present
            Phyllanthus L.
        114. Leaves alternate (or distichous). Staminate flowers: stamens 2 to numerous, free; disc (indistinct or) absent; pistillode absent or present. Pistillate flowers: disc absent
            115. Staminate flowers contracted into dense spikes; stamens 2 (3). Pistillate flowers axillary, 2- (or 3-)locular, 2 ovules per locule, sepals somewhat persistent, ovary hairy or glabrous. Leaves often yellowish green when dry, usually variously glandular-dotted **Aporosa** Blume
            115. Staminate flowers in lax racemes and spikes; stamens 4 to numerous. Pistillate flowers 2–5-locular, when 2-locular either often cauliflorous and sepals dropping soon (2 ovules per locule) or ovary with 1 ovule per locule
                116. Stmens 4–10. Pistillate flowers often cauliflorous, also axillary, calyx 4–6-lobed, soon caducous; pistil 2–5-locular, 2 ovules perlocule. Petioles of leaves relatively long, usually kneed at base and apex
                    Baccaurea Lour.
                116. Stamens 16-numerous. Pistillate flowers axillary (or terminal); calyx 3–6-lobed, not soon caducous; pistil (2- or) 3(–5)-locular, 1 ovule per locule
                    117. Stamens numerous, with numerous fleshy glands, anthers deeply divided at base, spreading. Pistillate flowers with 6 thick sepals **Ptychopyxis** Miq.
                    117. Stamens 15-numerous, without glands, anthers not divided at base. Pistillate flowers with a 3–5-lobed thin calyx
                        118. Inflorescences long, up to 25 or more cm, slender. Leaves: petiole kneed at base and apex; blade glabrous, without domatia, tertiary veins scalariform. Stamens basally joined into 6 bundles
                            Spathiostemon moniliformis Airy Shaw
                        118. Inflorescences usually shorter than 15 cm, thick to slender. Leaves: petiole usually not kneed; blade glabrous to variously hairy, domatia absent or present, tertiary veins scalariform or not. Stamens free, 15 to numerous
                            119. Every flower or group of flowers with a bract only; latter without conspicuously ciliate margin, outside usually completely pilose
                                Mallotus Lour.

119. Every flower with a bract and bracteoles; latter each with a ciliate margin, further glabrous
Sampantaea amentiflora (Airy Shaw) Airy Shaw

103. Fruits present
120. Fruits drupes or when capsular with relatively thick fleshy mesophyll
121. Inflorescences densely studded with stalked, large glands
Ptychopyxis Miq.

121. Inflorescences without stalked glands
122. Fruits drupes, 1 locular, 1 (rarely 2)-seeded
123. Leaves distichous, stipulate (may be caducous) **Antidesma** L.
123. Leaves alternate or crowded, without stipules
Daphniphyllum Blume

122. Fruits fleshy capsules or drupes, 2–5-locular, 1–5-seeded
124. Leaves distichous. Drupe small, up to 5 mm in diam
Phyllanthus L.

124. Leaves alternate. Drupe or capsule larger than 5 mm in diam.
125. Fruits fleshy capsules, longer or as high as broad. Seeds with a juicy sarcotesta. Inflorescences axillary, infructescences often cauli/ramiflorous, usually less than 20 cm long
Baccaurea Lour.

125. Fruits drupes, broader than high. Seeds without arilloid. Inflorescences mainly terminal, very long, usually exceeding 20 cm. Stone sculptured **Galearia fulva** (Tul.) Miq.

120. Fruits capsular, wall woody to leathery fleshy, sometimes dehiscing very tardily
126. Fruits ovoid to (sub)globose
127. Stigmas persistent, 3, flat against fruit, joined, apex lobed, lobes strongly recoiled. Fruit opening very late, wall leathery. Leaves in 2 rows
Sauropus Blume

127. Stigmas persistent or not, not flat against fruit. Fruit opening early or late, wall leathery to woody. Leaves in 2 rows or alternate
128. Fruits opening regularly or irregularly, 2- or 3-locular. Leaves alternate to distichous, often variously glandular pitted on lamina and along edge, often yellowish when dry **Aporosa** Blume

128. Fruits opening regularly, 3-locular. Leaves alternate, without glands, brownish or greenish when dry **Blachia** Baill.

126. Fruits 3-lobed
129. Leaves usually panduriform (obovate with broadened base). Pistillate sepal margin usually fringed with long glandular fimbriae in 1 (or 2) rows, when (partly) absent margin densely pilose or subglabrous
Strophioblachia fimbricalyx Boerl.

129. Leaves ovate to obovate, not panduriform. Pistillate sepal margin without long glandular fimbriae
130. Fruits with spines (muricate) **Mallotus** Lour.

130. Fruits smooth, without spines
131. Leaves elliptic to short obovate, with domatia
Sampantaea amentiflora (Airy Shaw) Airy Shaw

131. Leaves elliptic to usually long obovate, without domatia
132. Sepals enlarged, enclosing fruit. Leaves elliptic
Dimorphocalyx luzoniensis Merr.

132. Sepals not enlarged or sometimes enlarged, not enclosing fruit; when enlarged leaves usually obovate

133. Inflorescences branched. Locules with 2 ovules each. Styles appressed to fruit
Richeriella cf. **gracilis** (Merr.) Pax & K.Hoffm.

133. Inflorescences not branched (or branched). Locules with 1 ovule each. Styles erect

134. Leaves elliptic, margin basally with 3 black dot-like glands on each side of the midrib; petiole basally and apically pulvinate. Seeds without arilloid
Spathiostemon moniliformis Airy Shaw

134. Leaves elliptic to usually obovate, margin without glands; petiole not pulvinate. Seeds with or without arilloid

135. Plants glabrous. Axillary buds superposed. Inflorescences unbranched. Seeds with orange caruncle
Agrostistachys Dalz.

135. Plants glabrous or hairy. Axillary buds next to each other or in a group, not vertically superposed. Inflorescences branched or not. Seeds ecarunculate
Trigonostemon Blume

70. Leaves serrate or crenate (Careful, only nerve ends may be protruding in shallow crenations)

136. Nerves palmate, 5 protruding from base **Jatropha curcas** L.

136. Nerves pinnate, though at base sometimes 3 nerves

137. Hemicryptophytic shrub of 10–15 cm. Monoecious, with pistillate flower basally and staminate ones upwards. Latter with petals. Ovary and fruit apically abruptly truncate, fruit apically with a protruding horizontal flange. Northeastern
Croton colobocarpus Airy Shaw

137. Shrub to tree, larger, no hemicryptophyte. Mono- or dioecious. Petals absent or not. Ovary and fruit apically not truncate, grading into style/stigmas. Fruit without a flange

138. Deciduous tree. Branchlets thick, soft, spongy, shrivelled when dry. Glands in inflorescences very large. Fruits dehiscing irregularly
Falconeria insignis Royle

138. Plants not deciduous. Branchlets not soft and spongy, not shrivelled when dry. Glands in inflorescence absent or on bracts. Fruits indehiscent to dehiscing regularly or irregularly

139. Stamens with umbrella-like connective, anthers 4-celled. Pistillate flowers with large 6–8-lobed disc. Fruit a big woody capsule with 3 keeled angles uniting into style **Botryophora geniculata** (Miq.) Beumée ex Airy Shaw

139. Stamens with normal connective, anthers 2-celled. Pistillate flowers without a disc, or with a minute one, or with separate glands. Fruits small or large, woody or not, without keels

140. Leaves with domatia (pockets: small triangular roof between midrib and nerves)

141. Every flower or group of flowers with a bract only; latter without conspicuously ciliate margin, outside usually completely pilose. Fruits not emarginate, lobes as high as centre, pilose (not velvety) to spiny. Leaves basally often triplinerved, base cordate to attenuate
Mallotus Lour.

141. Every flower with a bract and bracteoles; latter each with a ciliate margin, further glabrous. Fruits emarginate, lobes higher than centre, velvety pilose. Leaves basally not triplinerved, base attenuate, margin slightly teethed
Sampantaea amentiflora (Airy Shaw) Airy Shaw

140. Leaves without pocket domatia, though bundles of hairs (*Alchornea*) may be present

142. Plant dioecious. Staminate flowers very small, contracted into very dense catkins; stamens 2 or 3. Pistillate flowers and fruits in axillary bundles, on less than 1 cm long pedicels. Fruits not lobed, leathery, opening regularly or irregularly. Leaves hirsute

Aporosa Blume

142. Plants dioecious or monoecious. Staminate flowers at most contracted along lax racemes or spikes; stamens 3 to numerous. Pistillate flowers in inflorescences or in the axils but then plant monoecious (*Acalypha*) or leaves glabrous. Fruits lobed or not, woody, leathery, or fleshy capsules, or drupes

143. Stamens 35–80, often in distinct vertical ranks on raised receptacle; anthers 4 cells, each pair above each other together forming square, connective with appendix. Pistillate flowers 2-locular, single in axil on more than 5 cm long pedicel. Fruits glabrous, 2-lobed, with up to more than 1 cm long style

Cleidion spiciflorum (Burm.f.) Merr.

143. Stamens 3 to numerous, receptacle not raised; anthers 2-celled. Pistillate flowers 2–5-locular, in inflorescences, or in axil but then flowers subsessile. Fruits pilose or glabrous, when glabrous usually 3-locular. Styles remnants far less than 1 cm

144. Flowers in axillary clusters. Stigmas broad, flat, fan- to kidney-shaped. Fruits sessile, in axils of leaves, drupes. Seeds naked

Drypetes Vahl

144. Flowers in axillary spikes or panicles. Fruits fleshy, leathery, or woody capsules. Seeds naked or with a (partial) arilloid

145. Stamens 8; anther cells long, erect or spreading, twisted. Pistillate flowers and fruits hidden by large crenate bracts

Acalypha L.

145. Stamens 3 to numerous; anther cells normal, erect, not twisted. Pistillate flowers and fruits not hidden by bracts

146. Leaves often with 2 stipels at apex of petiole. Stamens 8, basally united. Pistillate flowers and fruits in usually terminal inflorescences. Pistillate flowers without disc; those without stipels obovate and with 2 large glands on the bracts; those with stipels ovate

Alchornea Swartz

146. Leaves without stipels. Stamens 3-numerous, not united or when partly united 10–20. Pistillate flowers and fruits in axillary (and terminal) inflorescences; disc present or not; bracts with or without glands; leaves ovate to obovate

147. Flowers present

148. Petals present, at least in staminate flowers

149. Stamens 10; nthers separate from each other, at base of trapezium-shaped connective. Disc prominent, annular, lobed. Inflorescences racemes **Agrostistachys** Dalz.

149. Stamens 10–20 (then disc divided in separate glands) or stamens 3–5 (then disc annular or separate glands); anthers normal, parallel and touching. Inflorescences racemes or panicles

150. Stamens 10–20, only inner united in column **Dimorphocalyx** Thw.

150. Stamens 3–5, joined in column
Trigonostemon Blume

148. Petals absent
151. Stamens 3. Monoecious with pistillate flowers at base of further staminate raceme
Excoecaria cochinchinensis Lour.
151. Stamens 4 to numerous. Monoecious and pistillate flowers at various places or dioecious
152. Stamens 4–8. Pistil 2–5-locular, with (1 or) 2 ovules each. Pistillate flowers often in cauliflorous or ramiflorous inflorescences. Leaves on long petioles, apically kneed **Baccaurea** Lour.
152. Stamens 10 to numerous. Pistil (2)3(–5-)locular, with 1 ovule each. Pistillate flowers only axillary
153. Flowers in branched racemes or cymous panicles. Plants monoecious
154. Flowers in cymous panicles. Stamens 10–20. Stigmas widening into channelled wings
Baliospermum Blume
154. Flowers in branched racemes. Stamens numerous (>20). Stigmas slender, forked **Chondrostylis kunstleri** (King ex Hook.f.) Airy Shaw
153. Flowers in unbranched racemes or spikes. Plants dioecious
155. Leaves usually shorter, ovate to elliptic to somewhat obovate
Claoxylon A.Juss.
155. Leaves large, up to 56 cm, strongly obovate **Wetria insignis** (Steud.) Airy Shaw

147. Fruits present
156. Seeds with a caruncle or with a fleshy sarcotesta
157. Seeds with a caruncle. Leaves usually irregularly lobed. Stigmas widened into wings, channelled **Baliospermum** Blume
157. Seeds with a complete sarcotesta or a caruncle. Leaf margins regular. Stigmas slender, not widened into channelled wings
158. Fruits not lobed, with a fleshy mesocarp, higher than broad or as broad as high, often indehiscent **Baccaurea** Lour.
158. Fruits lobed, without fleshy mesocarp, broader than high, (late) dehiscent
159. Inflorescences branching racemes
Chondrostylis kunstleri (King ex Hook.f.) Airy Shaw
159. Inflorescences unbranched racemes or spikes
160. Axillary buds superposed. Disc prominent, annular. Sepals 5. Fruit 3-locular **Agrostistachys** Dalz.

160. Axillary buds in groups, not in vertical rows. Disc indistinct, separate glands. Sepals 2–4. Fruit 2- or 3-locular **Claoxylon** A.Juss.

156. Seeds naked

161. Caruncle remaining attached to fruit column. Bracts with two basal glands **Excoecaria cochinchinensis** Lour.

161. Caruncle absent. Bracts without glands

162. Leaves very large, up to 56 cm or more, obovate, with 19 or more pairs of nerves. Disc absent. Fruits along long spikes. Sepals not larger in fruit **Wetria insignis** (Steud.) Airy Shaw

162. Leaves much smaller to large too, then also obovate, but with less than 20 pairs of nerves. Disc present. Fruits along short to long spikes, racemes or in cymes. Sepals often somewhat enlarged in fruit

163. Sepals either strongly enlarged in fruit, or somewhat, but then fruit tuberculate **Dimorphocalyx** Thw.

163. Sepals at most somewhat enlarged in fruit. Fruits smooth **Trigonostemon** Blume

ACKNOWLEDGEMENTS

First of all I like to thank the financial support of the Biodiversity Research and Training Programme, a joint Programme supported by The Thai Research Fund and the National Center for Genetic Engineering and Biotechnology; without their aid the Flora of Thailand Euphorbiaceae project as a whole would not exist.

The help of Stefan Dressler (*Bridelia*, *Cleistanthus*), Hans-Joachim Esser (tribe Hippomaneae), Raoul Haegens (*Baccaurea*), and Anne Schot *(Aporosa*) in checking several genera is highly appreciated.

This key was constructed during a sabbatical leave, which was granted by the University of Leiden. The following organisations are kindly thanked for their financial support: the Netherlands Foundation for the Advancement of Tropical Research (WOTRO, travel grant no. WR 84-402), the Society for the Advancement of Research in the Tropics (Treub Foundation), and the University of Leiden.

The neighbours in Bangkok and my brother in law are thanked for providing early morning transport to the BKF herbarium and my wife for picking me up in the afternoon.

LITERATURE

Airy Shaw, H.K. 1972. The Euphorbiaceae of Siam. Kew Bull. 26: 191–363.

Backer, C.A. & Bakhuizen van den Brink *f.*, R.C. 1963. Flora of Java 1: 441–505. N.V. P. Noordhoff, Groningen.

Whitmore, T.C. 1973. Euphorbiaceae. In: T.C. Whitmore (Ed.), Tree Flora of Malaya 2: 34–136. Longman, London.