

SYNOPSIS OF GOMPHIDIUM

1. Pollen grains not syncolpate, colpi without distinct borders; exine reticulate; stamens 3'
staminate disk of 3 duplex segments.

2. Pollen grains \pm oblate; exine evenly reticulate; sepals 6, biseriate; styles free, unlobed.

Sect. 1. **Ardisianthus**

2. Pollen grains subglobose, sepals mostly 5; styles free or connate.

3. Pollen exine reticulate; staminate disk segments 5; stamens 5 (6), filaments free or
connate, anthers apiculate; styles free, unlobed, often reduced and stigmatiform.

Sect. 2. **Leandrianthus**

3. Pollen exine coarsely reticulate; staminate disk segments 3; stamens 3, filaments free;
anthers mucous; styles connate into a prominent column, tips bifid.

Sect. 3. **Calodictyon**

1. Pollen grains with marginate colpi, often meeting at poles; exine \pm vermiculate (except in
sect. *Puntianthus*); disk present or absent; stamens 3—15.

3. Ovary 3- (4-) locular; stamens free; pistillate disk present or absent.

4. Pollen exine reticulate, brochi somewhat irregular, with granules in lumina; sepals 5, stamens
free, 5-7.

Sect. 4. **Puntianthus**

4. Pollen exine vermiculate, brochi very irregular, without granules in lumina; sepals 5 or 6;
stamens free or connate, 3--10.

5. Sepals mainly 6, biseriata; anthers dehiscing vertically; staminate disk usually of 3 segments; inflorescences often unisexual. Sect.5. **Gomphidium**

6. Branchlets pinnatifid; leaves obtuse to acuminate.

7. Pistillate sepals not accrescent in fruit.....Subsect. 5.1. **Chamaecerasi**

7. Pistillate sepals foliose, biseriata, distinctly accrescent in fruit.

Subsect. 5.2 **Phyllocalyx**

6. Branchlets bipinnatifid; leaves distinctly acuminate. Subsect. 5.3. **Caudati**

5. Sepals mainly 5, not clearly biseriata; anthers dehiscing vertically to horizontally; disk entire or segmented, sometimes absent; inflorescences often bisexual.

8. Filaments free; inflorescences glomerular;

Sect. 6. **Adenoglochidion**

9. Staminate disk prominent, fleshy; stamens mostly 5—15; anthers longer than filaments, dehiscence longitudinal. Subsect. 6.1. **Aenei**

9. Staminate disk reduced or absent; stamens 3—5, anthers shorter than filaments, dehiscing longitudinally to horizontally. Subsect. 6.2. **Eleutherogynium**

8. Filaments mostly connate; inflorescences glomerular or paniculate.

Sect. 7. **Nymania**

10. Inflorescences glomerular. Subsect. 7.1. **Cuscutiflori**

10. Inflorescence paniculate or racemiform.

Subsect. 7.2. *Clamboides*

3. Ovary 4-5-locular; stamens connate; pistillate disk absent.

Sect. 8. **Heteroglochidion**

SYNOPSIS OF THE TAXA OF GOMPHIDIUM

Subgenus **GOMPHIDIUM** (Baillon) G. L. Webster, J. Arnold Arb. 48: 338. 1967; Kew Bull. 26: 92.

1971. *Phyllanthus* sect. *Gomphidium* Baillon, Adansonia 2: 234. 1862. TYPE:

Phyllanthus chamaecerasus Baillon

Sect. 1. **Ardisianthus** G. L. Webster, sect. nov. Ramulis simplicis; sepalis 6 biseriatis; stamina 3, filamentis connatis; disci glanduli 3; grana pollinis oblati 3-colporati, colpi angusti; stylis integris. TYPE: *Phyllanthus ardisianthus* Airy Shaw & G. L. Webster.

Monoecious, glabrous shrubs, sometimes arborescent; branchlets pinnatifid or bipinnatifid; inflorescences glomerular, flowers pedicellate; staminate sepals 6, usually biseriata; disk segments 3; stamens 3, filaments free (except in *P. acinacifolius*), anthers apiculate, pollen grains oblate, 3-colporate, colpi narrow and without distinct margins, exine reticulate; pistillate sepals 6, biseriata; disk annular; ovary 3-locular; styles unlobed, free or connate, minute to 1.5 mm long; seeds 2—4 mm long, testa smooth.

A Melanesian section of 8 or 9 species. The section is distinguished from other taxa of subgenus *Gomphidium* by the distinctive “Acinacifolius” pollen type described by Punt (1980).

Representative species: NEW GUINEA: *Phyllanthus acinacifolius* Airy Shaw & G. L. Webster, *P. ardisianthus* Airy Shaw & G. L. Webster, *P. bourgeoisii* Baillon, *P. flaviflorus* (Lauterb. & K. Schum.) Airy Shaw, *P. kostermansii* Airy Shaw, *P. stultitiae* Airy Shaw NEW CALEDONIA: *Phyllanthus bourgeoisii* Baillon, *P. koumacensis* Guillaumin, *P. virgultiramus* Däniker. *Phyllanthus tabularis* Airy Shaw, from New Guinea, may also belong here.

Sect. 2. **Leandrianthus** G. L. Webster, sect. nov., differt sectionibus affinis sepalis 5, disco ♂ segmentis 5, anthers apiculatis, stylis liberis integris. TYPE: *Glochidion ankaratrae* Leandri [= *Phyllanthus ankaratrae* (Leandri) G. L. Webster]

Monoecious glabrous shrubs, branchlets unramified; cymules unisexual; sepals 5; staminate disk of 5 segments; stamens 5 (6), filaments free or connate; anthers mucicous or apiculate, dehiscing longitudinally; pollen grains spheroidal, 3-colporate, colpi unbordered and not meeting at poles, exine reticulate; pistillate sepals 5 or 6, disk annular, dissected, or obsolete; seeds smooth.

The 7 Madagascar species of this new section were all referred to *Glochidion* by Leandri, apparently because of the reduced unlobed styles. Except for the pollen exine sculpturing, sect. *Leandrianthus* has much in common with the neotropical section *Calodictyon*, but it does also differ in its much smaller leaves and smaller discrete, unlobed, styles.

Sect. 3. **Calodictyon** G. L. Webster, Ann. Missouri Bot. Gard. 54: 194. 1967. TYPE: *Phyllanthus tuerckheimii* G. L. Webster

Monoecious glabrous shrubs; branchlets unramified; cymules bisexual; sepals 5; staminate disk of 3 duplex segments; stamens 3, free, mucicous, dehiscing longitudinally; pollen grains 3-colporate, colpi not distinctly bordered and not meeting at poles; exine coarsely reticulate; pistillate disk crateriform; ovary 3-locular; styles united into a column, tips bifid; fruits capsular; seeds smooth.

A monotypic section known only from Guatemala and Honduras; the sole neotropical section of the subgenus.

Sect. 4. **Puntianthus** G. L. Webster, sect. nov. Ramulis simplicis; glomerulis staminalis multifloris; sepalis 5; staminibus 5—7; filamentis liberis connatisve; grana pollinis TYPE: *Phyllanthus caesius* Airy Shaw & G. L. Webster.

Two species from New Guinea, the type and *Phyllanthus maritimus* J. J. Sm. The section is appropriately named in honor of the distinguished palynologist Wim Punt, who suggested that pollen evidence indicates that these two species could belong to a separate section.

REPRESENTATIVE SPECIES: NEW GUINEA: *Phyllanthus caesius* Airy Shaw & G. L. Webster, *P. frodinii* Airy Shaw, *P. maritimus* J. J. Sm., *P. verrucicaulis* Airy Shaw.

Sect. 5. **Gomphidium** Baillon, Adansonia 2: 234. 1862. LECTOTYPE (selected by Webster, 1967):

Phyllanthus chamaecerasus Baillon.

This section, as defined here, includes about 50 species, mostly endemic to New Caledonia. It corresponds to “Groupe 5” of Schmid (1984). The palynological studies of the New Guinea species by Punt (1980) indicate that all of the species have a characteristic pollen type: oblate grains with marginate colpi meeting at the poles, and \pm vermiculate exine ornamentation. The section is quite variable morphologically, and is not clearly demarcated from sect. *Adenoglochidion*. For convenience, it is here divided into 3 subsections.

Subsect. 5.1. **Chamaecerasi**, subsect. nov.: ramulis deciduis simplicis; foliis plerumque obtusis; sepalis fructiferis non accrescentibus. TYPE: *Phyllanthus chamaecerasus* Baillon

Dendrophyllanthus S. Moore, J. Linn. Soc. Bot. 45: 395. 1921. TYPE: *Dendrophyllanthus comptonii* S.

Moore [= *Phyllanthus moorei* M. Schmid]

About 35 species confined to New Caledonia, except for two species from New Guinea that are of doubtful placement..

REPRESENTATIVE SPECIES: NEW GUINEA: *Phyllanthus kostermansii* Airy Shaw, *P. stultitiae* Airy Shaw. NEW CALEDONIA: *Phyllanthus balanseanus* Guillaumin, *P. buxoides* Guillaumin, *Phyllanthus castus* S. Moore, *P. cornutus* Baillon, *P. jaffrei* M. Schmid, *P. mangelotii* M. Schmid, *P. mcphersonii* M. Schmid, *P. poumensis* Guillaumin, *P. quintuplinervis* M. Schmid, *P. veillonii* M. Schmid

Subsect. 5.2 **Phyllocalyx** (Baillon) G. L. Webster, stat. nov. *Phyllanthus* sect. *Phyllocalyx* Baillon,

Adansonia I. 2: 236. 1862. TYPE: *Phyllanthus faguettii* Baillon

In the treatment of Schmid (1991), the subsection contains 9 New Caledonian species.

REPRESENTATIVE SPECIES: *P. avanguiensis* M. Schmid, *P. jaubertii* Vieill. ex Guillaumin, *P. natoensis* M. Schmid, *P. nothisii* M. Schmid, *P. platycalyx* Müll. Arg., *P. pilifer* M. Schmid, *P. pindaiensis* M. Schmid, *P. stipitatus* M. Schmid.

Subsect. 5.3. **Caudati** G. L. Webster, subsect. nov.: ramulis deciduis bipinnatiformibus; foliis caudato-acuminatis; sepalis fructiferis non accrescentibus. TYPE: *Phyllanthus caudatus* Müll. Arg.

This distinctive group of Melanesian species has deciduous branchlets with lateral axes that resemble the branching pattern of species in subg. *Conami*. Four Fijian species may tentatively be referred here, although they differ from New Caledonian plants in some characters (e.g., stamens with filaments connate).

REPRESENTATIVE SPECIES: NEW CALEDONIA: *Phyllanthus helenae* M. Schmid, *P. koghiensis* Guillaumin, *P. montis-fontium* M. Schmid.

Sect. 6. **Adenoglochidion** (Müll. Arg.) Müll. Arg., DC. Prodr. 15(2): 319. 1866. *Glochidion* sect.

Adenoglochidion Müll. Arg., Linnaea 32: 58. 1863. TYPE: *Phyllanthus aeneus* Baillon

Monoecious shrubs; branchlets pinnatifid; glomerules axillary; stamens mainly 5, not clearly biseriate; anthers dehiscing vertically to horizontally; disk entire or segmented, sometimes absent; inflorescences often bisexual.

As circumscribed here, sect. *Adenoglochidion* roughly corresponds to “Groupe 7” of Schmid (1991) for the New Caledonian species, but also a large number of New Guinea species listed by Webster and Airy Shaw (1971). The pollen type is the same as sect. *Gomphidium*, and the boundaries between the two sections remain ill-defined and subject to further delineations.

Subdivision of this complex group of over 50 species remains problematic. It seems expedient to recognize two subsections.

Subsect. 6.1 **Aenei** G. L. Webster, subsect. nov.: discus staminalis carnosus; stamina 5—15; antheris quam filamentis longior. TYPE: *Phyllanthus aeneus* Baillon

As tentatively delineated here, subsect. *Aenei* includes approximately 35 New Caledonian species.

REPRESENTATIVE SPECIES: *P. artensis* M. Schmid, *P. bupleuroides* Baillon, *P. comptonii* S. Moore, *P. deciduiramus* Däniker, *P. francii* Guillaumin, *P. guillauminii* Däniker, *P. gneissicus* S. Moore, *P. ligustrifolius* S. Moore, *P. serpentinus* S. Moore, *P. tireliae* M. Schmid. AUSTRALIA (Queensland): *Phyllanthus brassii* C. T. White, *P. hypospodius* F. Muell., *P. sauropodoides* Airy Shaw,.

Subsect. 6.2. **Eleutherogynium** (Müll. Arg.) G. L. Webster, stat. nov. *Phyllanthus* sect. *Eleutherogynium* Müll. Arg., *Linnaea* 32: 4. 1863. TYPE: *Phyllanthus loranthoides* Baillon
Glochidion sect. *Chorizogynium* Müll. Arg., op. cit. 58. LECTOTYPE: *Phyllanthus macrochorion* Baillon
Phyllanthus sect. *Heteroglochidion* Müll. Arg., DC. Prodr. 15(2): 319. 1866. TYPE: *Phyllanthus baladensis* Baillon
Phyllanthus sect. *Scleroglochidion* Müll. Arg., DC. Prodr. 15(2): 317. 1866. TYPE: *Phyllanthus myrianthus* Müll. Arg.

This subsection, treated as a section in Webster (1988), is almost entirely New Caledonian, but with one species (*Phyllanthus myrianthus*) in the New Hebrides (Vanuatu).

REPRESENTATIVE SPECIES. NEW CALEDONIA: *Phyllanthus baladensis* Baillon, *P. casearioides* S. Moore, *P. conjugatus* M. Schmid, *P. dracunculoides* Baillon, *P. macrochorion* Baillon, *P. margaretae* M. Schmid, *P. moratii* M. Schmid, *P. ouveanus* Däniker, *P. salicifolius* Baillon, *P. vespertilio* Baillon, *P. yaouhensis* Schltr.

Sect. 7. **Nymania** (K. Schum.) J. J. Sm., *Nova Guinea* 8: 781.1912. *Nymania* K. Schum., Nachtr. Fl. Deutsch. Schutzgeb. 291. 1905. TYPE: *Nymania insignis* K. Schum. [= *Phyllanthus schumannianus* L. S. Sm., a probable synonym of *P. clamboides* (F. Muell.) Diels]
Leichhardtia F. Muell., *Fragm. Phytogr. Austral.* 10: 68. 1878 (nom. illeg., non *Leichhardtia* R. Br., 1849). *Phyllanthus* sect. *Leichhardtia* (F. Muell.) Diels, *Notizbl. Bot. Gart. Berlin* 11: 308. 1931. TYPE: *Leichhardtia clamboides* F. Muell. [= *Phyllanthus clamboides* (F. Muell.) Diels]
Hexaspermum Domin, *Bibl. Bot.* 22: 869. 1927. TYPE: *Hexaspermum paniculatum* Domin [= *Phyllanthus clamboides* (F. Muell.) Diels]

This Melanesian is primarily in New Guinea but also occurs in Queensland and the Solomon Islands. The pollen is very similar to that of sections *Gomphidium* and *Adenoglochidion*, and the connate stamens is the main distinguishing character. For convenience, the species are assigned to two subsections on the basis of inflorescence type, although this admittedly may prove to be an artificial division.

Subsect. 7.1. **Clamboides** G. L. Webster, subsect. nov.; differt aliis subsectionibus floribus paniculatis, stylis integris, disco plerumque crasso. TYPE: *Phyllanthoides clamboides* (F. Muell.) Diels

Ten species, mostly of New Guinea.

REPRESENTATIVE SPECIES: NEW GUINEA: *Phyllanthus actephilifolius* J. J. Sm., Webster, *P. choristylus* Diels, *P. effusus* S. Moore, *P. flaviflorus* (Lauterb. & K. Schum.) Airy Shaw, *P. gjellerupii* J. J. Sm., *P. merinthopodus* Diels, *P. rubriflorus* J. J. Sm..

Subsect. 7.2 **Rheophili** G. L. Webster, subsect. nov., differt aliis subsectionibus ramulis compositis, antheris muticis. TYPE: *Phyllanthus rheophilus* Airy Shaw

This small group of species has a distinctive habit with bipinnatifid branchlets, but may prove not to be monophyletic.

REPRESENTATIVE SPECIES: NEW GUINEA: *Phyllanthus papuanus* Gage, *P. rheophilus* Airy Shaw. MOLUCCAS and CELEBES: *P. tenuirachis* J. J. Sm. FIJI: *P. heterodoxus* Müll. Arg., *P. wilkesianus* Müll. Arg. *Phyllanthus pergracilis* Gillespie (Fiji) and *P. amicum* G. L. Webster are aberrant in having discrete filaments.

Subsect. 7.3. **Cuscutiflori** G. L. Webster, subsect. nov., differt aliis subsectionibus glomerulis axillaribus,

REPRESENTATIVE SPECIES: NEW GUINEA: *Phyllanthus aphanostylis* Airy Shaw & G. L. Webster, *P. finschii* K. Schum., *P. hylo-dendron* (K. Schum.) Airy Shaw & Webster, *P. praelongipes* Airy Shaw & G. L. Webster, *P. poli-borealis* Airy Shaw, *P. pullenii* Airy Shaw & G. L. Webster, *P. tagulae* Airy Shaw & G. L. Webster, *P. utricularis* Airy Shaw & G. L. Webster, *P. warburgii* K. Schum. LOUISIADE

ARCHIPELAGO: *P. rosselensis* Airy Shaw & G. L. Webster, *P. tagulae* Airy Shaw & G. L. Webster.

SOLOMON I.: *P. salomonis* Airy Shaw

Sect. 8. **Leptonema** Baillon, Adansonia I. 2: 234. 1862. *Glochidion* sect. *Pentaglochidion* Müll. Arg.,
Linnaea 32: 58. 1863. *Phyllanthus* sect. *Pentaglochidion* (Müll. Arg.) Müll. Arg., DC. Prodr.
15(2): 315. 1866. TYPE: *Phyllanthus kanalensis* Baillon

A monotypic section of New Caledonia. The palynological studies of Lobreau-Callen et al. (1988)
have shown that the pollen of *Phyllanthus kanalensis* is very similar to that of species of sect.
Adenoglochidion; possibly it should be treated as a subsection of that section.