

SYNOPSIS OF EMBLICA

Subgenus **EMBLICA** (Gaertn.) Kurz, J. As. Soc. Bengal 42(2): 238. 1874. *Emblica* Gaertn., Fruct.

2: 122. 1790. TYPE: *Emblica officinalis* Gaertn. (nom. illeg.) [= *Phyllanthus emblica* L.]

Monoecious trees; branchlets pinnatifid; flowers in axillary cymes; sepals mostly 6, staminate disk of 6 segments, sometimes confluent or absent; stamens mostly 2—7, filaments connate; anthers dehiscing vertically, sometimes apiculate; pollen grains prolate spheroidal, mostly 4- or 5-colporate, exine reticulate; pistillate disk annual or cupular; ovary 3-locular; styles free or connate, bifid or quadrifid; fruits capsular, exocarp dry or fleshy; seeds with smooth dry testa, hilum not invaginated.

As interpreted here, subgenus *Emblica* includes 3 sections, sect. *Emblica* from Asiatic, and sects. *Microglochidion* and *Pityrocladus* in South America. The pollen grains are fundamentally divergent from those of subgenus *Kirganelia* in their increased number of colpi and germ pores and the lack of vermiculate exine ornamentation. Subgenus *Dendrophyllanthus* is very close to subgenus *Emblica*, and it is possible that the two subgenera should be combined.

KEY TO THE SECTIONS OF EMBLICA

1. Pollen grains 4- or 5-colporate, colpi monorate; leaves without subapical laminar glands.
2. Sepals 6; disk-segments 6; stamens 3, filaments connate, anthers apiculate; pistillate disk patelliform; styles mostly connate into a column, tips bifid and often dilated or lacerate.

Sect. **Emblica**

3. Fruits with fleshy exocarp; staminate disk reduced; stipules scarious, lacerate.

Subsect. *Emblicae*

3. Fruits with dry exocarp; staminate disk segments 6; stipules rigid, subentire.

Subsect. *Polyphylli*

2. Sepals mostly 5; disk-segments 5; stamens 2—5 (7), anthers muticous; pistillate disk patelliform or dissected; styles free, bifid or unlobed. Sect. **Pityrocladus**

1. Pollen grains 5—8-colporate, colpi often often diorate; leaves often with subapical laminar glands; anthers often apiculate; styles free or connate, tips bifid to unlobed.

Sect. **Microglochidion**

Sect. 1. **Emblica** (Gaertn.) Baillon, *Étude Gen. Euphorb.* 626. 1858. *Emblica* Gaertn., *Fruct.* 2: 122.

1790. TYPE: *Phyllanthus emblica* L

Dichelactina Hance in Walp. *Ann. Bot. Syst.* 3: 375. 1853 TYPE: *Dichelactina nodicaulis* Hance ex Walp. [= *Phyllanthus emblica* L.?]

Monoecious trees or shrubs; branchlets pinnatifid, often fascicled; flowers in axillary cymes; sepals 6; staminate disk of 6 segments or absent; stamens 3, filaments connate; anthers apiculate, dehiscing longitudinally; pollen grains subprolate, 4- or 5-colpate; pistillate disk annular to urceolate; ovary 3-locular, styles connate into a column, tips bifid; fruits capsular (sometimes fleshy and tardily dehiscent; seeds with dry testa, not invaginated at the hilum.

About 10 Asiatic species. It appears that Müller (1866) was correct in interpreting the sectional boundaries broadly, to include species that lack the fleshy pseudodrupe of *Phyllanthus emblica*.

Subsect. 1.1. **Emblicae** G. L. Webster, subsect. nov., ab aliis speciebus sectionis differt fructibus drupaceis.

TYPE: *Phyllanthus emblica* L.

Monoecious trees; branchlets with 30-100 linear-oblong imbricate leaves; staminate disk rudimentary or absent; pistillate disk urceolate, covering the ovary; styles twice bifid, branches ± dilated; fruit drupaceous with bony endocarp that separates into pyrenes.

The representation of this subsection is somewhat unclear, since most of the species proposed are very similar to *Phyllanthus emblica*

REPRESENTATIVE SPECIES: ASIA: *Phyllanthus emblica* L., *P. pectinatus* Hook. f., *P. pomiferus* Hook. f.

Subsect. 1.2. ***Polyphylli*** G. L. Webster, subsect. nov., ab subsectionis *Emblicae* differt disci ♂ evoluti, fructibus capsularibus. TYPE: *Phyllanthus polyphyllus* Willd.

Monoecious trees or shrubs; staminate disk annular or dissected; fruits capsular.

A small section of 6 or 7 Asiatic species. There is a resemblance, especially in the androecium, to species of subg. *Phyllanthodendron*.

REPRESENTATIVE SPECIES: INDIA: *Phyllanthus lawii* J. Graham. BURMA TO MALAYSIA: *P. albizzioides* (Kurz) Hook. f., *P. baeobotryoides* Wall. ex Müll. Arg., *P. columnaris* Müll. Arg., *P. oxyphyllus* Miq., *P. pachyphyllus* Müll. Arg., *P. polyphyllus* Willd. INDO-CHINA: *P. angkorensis* Beille, *P. geoffrayi* Beille, *P. harmandii* Beille, *P. phuquocensis* Beille.

Sect. 2. ***Pityrocladus*** G. L. Webster, sect. nov.

TYPE: *Phyllanthus ruscifolius* Kunth

Monoecious (rarely dioecious) shrubs, often scandent; leaf blades chartaceous, lacking subapical laminar glands; stipules persistent; inflorescences axillary, glomerular; staminate sepals 5 or 6; disk segments 5; stamens 2—5 (-7), filaments connate; anthers muticous, dehiscent obliquely to horizontally; pollen grains subprolate, 4- or 5-colporate, colpi monorate and unbordered, exine reticulate; pistillate sepals 5, persistent in fruit; disk crateriform or dissected; ovary 3-locular; styles free, bifid to unlobed; fruits dehiscent or indehiscent; seeds smooth.

This neotropical section of 6 described species is mostly South American, with a single species in Costa Rica. It does not appear closely related to either sect. *Emblica* or sect. *Microglochidion*, despite the overall resemblance in some pollen characters.

SPECIES INCLUDED: COSTA RICA: *Phyllanthus valerii* Standl. SOUTH AMERICA:
Phyllanthus cuatrecasanus G. L. Webster, *P. popayanensis* Pax, *P. ruscifolius* Müll. Arg., *P. sponiifolius*
Müll. Arg., *P. symphoricarpoids* Kunth

This neotropical section includes 7 Andean species, mostly South America but with one species reaching Central America.

REPRESENTATIVE SPECIES: COSTA RICA: *Phyllanthus valerii* Standl. SOUTH AMERICA:
BRAZIL: *P. bahiensis* Müll. Arg. ANDES (Colombia to Peru): *P. cuatrecasanus* G. L. Webster, *P.*
popayensis Pax, *P. ruscifolius* Kunth, *P. sponiifolius* Müll. Arg., *P. symphoricarpoides* Kunth

Sect. 3. **Microglochidion** (Müll. Arg.) Müll. Arg., Flora 1865: 370. 1865; DC. Prodr. 15(2): 322.
1866; Jablonski, Mem. N. Y. Bot. Gard. 17: 89. 1967. *Glochidion* sect. *Microglochidion*
Müll. Arg., Linnaea 32: 58. 1863. LECTOTYPE: *Glochidion vacciniifolium* Müll. Arg. [= *Phyllanthus vacciniifolius* (Müll. Arg.) Müll. Arg.]

This neotropical section of c. 25 species is confined to South America, and is developed mainly on the Guyana Highlands of Venezuela and Brazil (Webster, 1999). Additional species remain to be described. Despite the vegetative and floral diversity, it does not appear practicable to subdivide the section into subsections. The common occurrence of diorate colpi suggests a possible link with subgenus *Conami*, but that group appears closer to subgenus *Gomphidium*. Sclerophyll species of the Guayana Highlands suggest New Caledonian species of subgenus *Gomphidium*, but that appears to be due to convergence, as the pollen grains are very different. A more suggestive affinity would be with sect. *Pseudomenarda* in subgenus *Kirganelia*, where diorate colpi also occur.

Subsect. 3.1. **Vacciniifolii** G. L. Webster, subsect. nov.: stylis connatis, integris; antheris apiculatis; disco ♂ 3-lobato. TYPE: *Phyllanthus vacciniifolius* (Müll. Arg.) Müll. Arg.

Leaves mostly with subapical embedded laminar glands; stamens free or connate, anthers mostly apiculate, dehiscing vertically; pollen grains with diorate colpi; fruiting pedicels short; styles connate, entire or emarginate.

Approximately 15 species of the Guayana Highlands; one species of the Brazilian plateau, *Phyllanthus websterianus* Steyerl., agrees with subsect. *Vacciniifolii* in most characters but has aberrant pollen.

REPRESENTATIVE SPECIES: SOUTH AMERICA: *Phyllanthus chimantae* Jabl., *duidae* Gleason, *P. lediformis* Jabl., *P. longistylus* Jabl., *P. obfalcatus* Lasser & Maguire, *P. paraqueensis* Jabl., *P. pycnophyllus* Müll. Arg., *P. vacciniifolius* (Müll. Arg.) Müll. Arg., *P. ventuarii* Jabl.

Subsect. 3.2 ***Myrsinites*** G. L. Webster, subsect. nov.: stylis liberis, bifidis; antheris muticis; disco ♂ dissecto. TYPE: *Phyllanthus myrsinites* Kunth.

Leaves with subapical embedded laminar glands; stamens free; anthers muticous, dehiscing vertically to horizontally; pollen grains with monorate colpi; fruiting pedicels elongated; styles free or nearly so, bifid.

Seven species of the Guayana Highlands, but also reaching the Amazon basin.

REPRESENTATIVE SPECIES: *Phyllanthus gallinetae* Jabl., *P. maguirei* Jabl., *P. minutifolius* Jabl., *P. myrsinites* Kunth, *P. neblinae* Jabl., *P. pimichinianus* Jabl., *P. tepuicola* Steyerl.

Subgenus **Phyllanthodendron** (Hemsl.) G. L. Webster, stat. nov. *Phyllanthodendron* Hemsl., Hook.

Ic. Pl. 26: t. 2563-2564. 1898. TYPE: *Phyllanthodendron mirabile* (Müll. Arg.) Hemsl.

[= *Phyllanthus mirabilis* Müll. Arg.]

Monoecious or dioecious trees or shrubs with phyllanthoid branching; branchlets pinnatifid; sepals 5 or 6; usually strongly carinate and/or appendaged; staminate disk of petaloid elongated segments; stamens 3, filaments completely connate into a column; anthers erect, dehiscing vertically, connective usually apiculate; pollen grains subprolate, 4-colporate, colpi narrow and monorate, exine finely to coarsely reticulate; pistillate disk as in staminate; ovary 3-locular; styles free, spreading, subentire; fruit capsular; seeds striate, excavated ventrally.

This very distinctive group of Asiatic species appears close to subg. *Emblica* in many respects, especially the androecium and pollen. There are in fact some Indo-Chinese species that are somewhat intermediate between the two subgenera.

KEY TO THE SECTIONS OF PHYLLANTHODENDRON

1. Sepals 6, at least the inner not caudate.

2. Sepals not caudate; styles completely united into a truncate column; dioecious.

sect. 1. **Pseudoglochidion**

2. Inner sepals distinctly caudate; styles bifid; monoecious. sect. 2. **Arachnodes**

1. Sepals 5, all long-caudate.

3. Styles distinctly bifid; flowers in terminal paniculate inflorescences; pollen grains

coarsely reticulate.

sect. 3. **Phyllanthodendron**

3. Styles short, entire or scarcely bifid; flowers in axillary glomerules; pollen grains finely reticulate.

sect. 4. **Pseudactephila**

Sect. 1. **Pseudoglochidion** (Gamble) G. L. Webster, stat. nov. *Pseudoglochidion* Gamble, Kew Bull.

1925: 329. 1925. TYPE: *Pseudoglochidion anamalayanum* Gamble [= *Phyllanthus anamalayanus* (Gamble) G. L. Webster

Dioecious glabrous shrubs or trees; flowers in axillary glomerules; sepals 6, lanceolate, neither carinate nor appendaged; staminate disk segments massive, fimbriate; stamens 3, filaments connate below in a column shorter than the anthers, anthers apiculate, erect, dehiscing longitudinally; pollen grains coarsely reticulate; pistillate disk urceolate, margin crenulate; ovary smooth; styles connate into a thick column, style-branches reduced to apical crenulations; seeds trigonous, smooth with scattered shallow pits.

The single species of this section is confined to the Anamalai Hills, considerably disjunct from the other species of subg. *Phyllanthodendron*.

Sect. 2. **Arachnodes** (Gagnep.) G. L. Webster, stat. nov. *Arachnodes* Gagnep., Not. Syst. (Paris) 14: 32.

1950. *Phyllanthodendron* sect. *Arachnodes* (Gagnep.) Airy Shaw, Kew Bull. 14: 470. 1960.

TYPE: *Arachnodes chevalieri* Gagnep. [= *Phyllanthus arachnodes* Govaerts & Radcl.-Sm.]

The only species of this section, *Phyllanthus arachnodes*, was described from Cambodia and still requires further study.

Sect. 3. **Phyllanthodendron** (Hemsl.) Beille, Bull. Soc. Bot. France 72: 160. 1925. *Phyllanthodendron*

Hemsl., Hook. Ic. Pl. 26: t. 2563-64. 1898. TYPE: *Phyllanthodendron mirabile* (Müll. Arg.)

Hemsl.