SYNOPSIS OF SUBGENUS PHYLLANTHUS

Subgenus **PHYLLANTHUS.**

Monoecious or dioecious herbs or shrubs with phyllanthoid branching; inflorescences axillary on deciduous brnachlets, glomerular, unisexual or bisexual. Staminate sepals (4) 5 or 6; disk dissected; stamens 2 or 3 (4), free or united; anthers dehiscing vertically to horizontally; pollen grains prolate, 3- or 4-colporate, exine reticulate or tectate-punctate. Pistillate sepals 5 or 6; disk cupular, annular, or dissected; ovary 3-locular; styles mostly free, bifid. Fruit capsular, seeds trigonous, mostly ribbed or verruculose.

This large subgenus includes mostly of the weedy annual species of *Phyllanthus*, but also a great variety of perennial herbs and small shrubs.

KEY TO THE SECTIONS OF SUBGENUS PHYLLANTHUS

1. Stamens 5, free; pollen grains 4-colporate; monoecious herbs or shrubs; seeds verruculose.

Sect. 1. **Pentandra**

1. Stamens mostly 2 or 3 (rarely 4), filaments free or connate; pollen grains 3- or 4-colporate; monoecious or dioecious; seeds striate, ribbed, or verruculose.

2. Ovary smooth (or if roughened, then seeds not transversely ribbed).

3. Leaves on lateral axes not reduced to scales,.

4. Anthers distinctly emarginate, the thecae discrete; pollen grains spheroidal, coarsely reticulate; shrubs or undershrubs……Sect. 2. **Lysiandra**

5. Leaves subtending branchlets mostly not reduced to scales; branchlet axes scarcely (if at all) zigzag. Subsect. 2.1 ***Subcrenulati***

5. Leaves subtending branchlets mostly reduced to scales (except in *P. subemarginatus*); branchlet axes ± zigzag. Subsect. 2.2. ***Subemarginati***

4. Leaves subtending deciduous branchlets reduced to cataphylls; seeds various; anthers usually not emarginate.

6. Pistillate flowers mostly several per axil; shrubs, branchlets wing-angled; cataphyllary stipules indurate, auriculate. Sect. 3. **Mascarenanthus**

6. Pistillate flowers solitary (rarely 2) per axil; undershrubs or herbs, branchlets usually not wing-angled; cataphyllary stipules scarious to indurate. Sect. 4. **Phyllanthus**

7. Seeds verruculose; leaves mostly inaequilateral at base; stipules subulate; cymules unisexual; pollen grains 4-colporate; style-branches capitate. Subsect. 4.1. ***Niruri***

7. Seeds striate or ribbed, not verruculose; leaves not or scarcely inaequilateral at base; cymules unisexual or bisexual; pollen grains 3- or 4-colporate; style branches usually not capitate.

8. Stamens 3, free; shrubs or subshrubs. Subsect. 4.2. ***Bathiani***

8. Stamens with filaments connate; habit various.

9. Cataphyllary stipules darkened and indurate, auriculate; pollen grains 3-colporate; anthers dehiscing horizontally or obliquely; sepals 5 or 6.

Subsect. 4.3. ***Pentaphylli***

9. Cataphyllary stipules not darkened and indurate; pollen grains 3- or 4- colporate.

10. Shrubs, branchlets often fascicled; sepals 6; stamens 3, free or connate, anthers dehiscing vertically; pollen 4-colporate; dioecious..

Subsect. 4.4 ***Virgulati***

10. Herbs or subshrubs, branchlets usually not fascicled; stamens 2 or 3, filaments mostly connate; anthers mostly dehiscing horizontally or obliquely; pollen 3-colporate. Subsect. 4.5. ***Swartziani***

13. Branchlet axes terete. Series 4.5a. ***Amari***

13. Branchlet axes wing-angled. Series 4.5b. ***Odontadenii***

3. Leaves on lateral axes reduced to scales; stems cylindrical or modified into phylloclades; anthers

Sect. 5. **Choretropsis**

12. Branches and branchlets terete. Subsect. 5.1. ***Choretroides***

12. Branchlets modified into phylloclades. Subsect. 5.2 ***Applanatae***

2. Pistillate flowers at proximal axils of branchlet, staminate distal; seeds transversely ribbed; pollen grains 4-colporate; ovary often bullose. Sect. 6. **Urinaria**

Sect. 1. **Pentandra** G. L. Webster, J. Arnold Arb. 48: 333.1967. TYPE: *Phyllanthus pentandrus*

Schum. & Thonn.

An African group of still uncertain disposition. Because of the androecium of 5 stamens, it has usually been referred to subg. *Kirganelia*. However, the pollen grains are much more similar to those in subg. *Phyllanthus*; it may be regarded as a possible link between the two subgenera. One species, *Phyllanthus tenellus*, is now widely spread as a ruderal in both tropical and warm temperate areas.

REPRESENTATIVE SPECIES: AFRICA. *Phyllanthus angolensis* Müll. Arg., *P.. graminicola* Hutch. ex S. Moore, *P. loandensis* Welw. ex Müll. Arg., P. *mendesii* J. F. Brunel ex Radcl.-Sm., *P. nummulariifolius* Poir., *P. parvulus* Sond., *P. pentandrus* Schum. & Thonn. MADAGASCAR: *P. comorensis* Leandri, *P. goudotianus* Müll. Arg., *P. geayi* Leandri, *P. humbertianus* Leandri, *P. multiflorus* Poir. Additional Madagascar species may prove to belong to this section.

Sect. 2. **Lysiandra** (F. Muell.) G. L. Webster, Rhodora 80: 573. 1978. *Phyllanthus* subg. *Lysiandra* F. Muell., Fragm. Phyt. Austral. 1: 108. 1859. TYPE: *Phyllanthus subcrenulatus* F. Mueller

Monoecious or dioecious, glabrous shrubs; branching phyllanthoid but leaves on penultimate axes mostly not reduced to scales; flowers in axillary glomerules; sepals 5 or 6; staminate disk dissected; stamens 3, usually free or nearly so; anthers dehiscing longitudinally to horizontally; pollen grains subglobose, 3-colporate, coarsely reticulate; pistillate disk annular; ovary glabrous; styles bifid (rarely entire); seeds smooth.

This section, as defined by Webster (1978), was especially characterized by the "subphyllanthoid" branching, with typical deciduous floriferous branchlets, but subtended by leaves rather than cataphylls. At that time, the possible resemblance of South American species such as *Phyllanthus claussenii* was noted. Further study indicates that the resemblance is close enough so that the plants from the two continents can be associated in a single section, but it remains uncertain if they are true sister groups.

Subsect. 2.1. ***Subcrenulati*** G. L. Webster, subsect. nov.; foliis subter ramulis non reductis; axes ramulorum teretes; connectivo antherae non dilatata. TYPE: *Phyllanthus subcrenulatus* F. Muell.

Monoecious or dioecious shrubs; branchlet axes not zigzag; sepals 6; anthers dehiscing longitudinally, connective not enlarged, thecae not separated..

This section, limited to Australia, is vegetatively diverse, and it may be questioned whether it is a natural group. In species that branch near the base, such as *P. flagellaris*, it can be difficult to determine whether or not phyllanthoid branchingis present.

Series 2.1a. ***Subcrenulati*** G. L. Webster, series nov., foliis glabris, semina hilo parva.

REPRESENTATIVE SPECIES: AUSTRALIA.NORTHERN TERRITORY: *Phyllanthus flagellaris* Benth. SOUTH AUSTRALIA: *Phyllanthus saxosus* F. Muell. EASTERN AUSTRALIA (Queensland to New South Wales, Victoria, Tasmania): *P. dallachyanus* Benth., *P.gasstroemii* Müll. Arg., *P. gunnii* Hook. f., *P. similis* Müll. Arg., *P. subcrenulatus* F. Muell.

Series 2.1b. ***Fuernrohriani*** G. L. Webster, series nov.: foliis pubescentibus, semina hilo grandi.

TYPE: *Phyllanthus fuernrohrii* F. Muell.

Apparently a montypic Australian group.

Subsect. 2.2. ***Harrimaniani*** G. L. Webster, subsect. nov.: foliis glabris, subter ramulis non reductis, axes ramulorum teretes; sepalis 5; connectivo antherae nonilhil incrassato; disco flore pistillato segmentis 5. TYPE: *Phyllanthus harrimanii* G. L. Webster

A monotypic section, known only from type species in northern Mexico. It is somewhat more similar in habit to the Australian *Phyllanthus subcrenulatus* than it is to the South American species of subsect. *Clausseniani*, but its relationships remain quite uncertain.

Subsect. 2.2. ***Clausseniani*** G. L. Webster, subsect. nov.: follis subter ramulis reductis; axes ramulorum fractiflexis; filamentis liberis, connectivo antherae dilatata. TYPE: *Phyllanthus claussenii* Müll. Arg.

This South American group of c. 15 species appears to be entirely confined to Brazil. The group is well characterized by the deeply emarginate anthers with the two thecae often appearing stipitate.

REPRESENTATIVE SPECIES: *Phyllanthus acutifolius* Poir. ex Spreng., *P. arenicola* Casar.,

P. atalaianus G. L. Webster, *P. blanchetianus* Müll. Arg., *P. bradeanus* G. L. Webster, *P. caravalhoi* G. L.Webster, *P. claussenii* Müll. Arg., *P. glaziovii* Müll. Arg., *P. hypoleucus* Müll. Arg., *P. heteradenius* Müll. Arg.,*itatiaiensis* Brade, *P. lagoensis* Müll. Arg., *P. subemarginatus* Müll. Arg.

Sect. 3. **Mascarenanthus** G. L. Webster, subsect. nov. TYPE: *Phyllanthus phillyreifolius* Poir.

Monoecious or dioecious shrubs; leaf blades equilateral at base; sepals 5 or sometimes 6; stamens 3, filaments connate; anthers dehiscing horizontally, sometimes completely confluent; pistillate flowers mostly 2 or more (-15) per axil, less commonly solitary; disk annular or with narrow creases; styles free or connate, bifid or dilated; seeds reticulate-striate.

This section of five species has been thoroughly revised by Coode (1982) as the "Groupe du *Phyllanthus phillyreifolius*, but it is so distinctive that it appears appropriate to recognize it as a section endemic to the Mascarene. It is possible that some species in Madagascar may prove to belong here.

SPECIES INCLUDED: *Phyllanthus consanguineus* Müll. Arg., *P. lanceolatus* Poir., *P. oppositifolius* Baillon ex Müll. Arg., *P.phillyreifolius* Poir., *P. pileostigma* Coode

Sect. 4. **Almadanthus** G. L. Webster, sect. nov. Herbae glabrae monoicae; ramuli 2-phylli; inflorescentiae racemiformae, cymulis proximalis ♂, distalis ♂ + ♀; sepalis 5; filamentis liberis; antheris malliformis; grana pollinis prolatis, 3-colporatis, tectato-prerforatis; stylis bifidis. TYPE: *Phyllanthus almadensis* Müll. Arg.

Monoecious glabrous herb with single main stem; leaves subopposte; flowers on axillary leafless axes; proximal cymules staminate, distal bisexual; sepals 5; disk segments 5, stamens 3, filaments free; anthers with enlarged flattened connective, dehisincing laterally; pollen grains prolate, 3-colporate, exine tectate-perforate; pistillate sepals 5; disk cupular, entire; ovary 3-locular, smooth; styles free, bifid. '

This monotypic section, containing only *Phyllanthus almadensis* from Bahia, Brazil, is immediately distinguished by its unique habit of bifoliate branchlets with with racemiform inflorescences. The enlarged connective recalls the Brazilian subsect. *Clausseniani* (sect. *Lysiandra*), but in

most other respects it shows little resemblance. The tectate-perforate pollen grains somewhat resemble those of sect. *Phyllanthus*.

Sect. 5. **Phyllanthus.**

Monoecious or dioecious shrubs or herbs; leaves on penultimate axes reduced to scales; flowers in axillary glomerules, the staminate at proximal axils and the pistillate distal; sepals (4) 5 or 6; staminate disk dissected; stamens 2 or 3 (4), filaments mostly partly to completely connate; anthers dehiscing vertically to horizontally, thecae usually not distinctly separated; pollen grains mostly subprolate to prolate, finely reticulate or tectate-punctate (rarely coarsely reticulate); pistillate flowers solitary; pistillate disk annular or lobed; ovary glabrous or pubescent; styles bifid (sometimes only emarginate), ümostly free or basally connate; seeds striate, finely ribbed, or (in subsect. *Niruri*) verruculose.

Key to the Subsections

1. Seeds verruculose; leaves ± inequilateral at base; pollen grains 4-colporate. subsect. 5.1. ***Niruri***

1. Seeds longitudinally finely ribbed or striate; leaves not inequilateral at base; pollen grains mostly 3-colporate.

2. Filaments free; sepals 6; subshrubs with pubescent foliage and flowers. subsect. 5.2. ***Bathiani***

2. Filaments connate (rarely free); sepals 5 or 6; plants mostly glabrous.

3. Anthers dehiscing vertically; pollen 4-colporate; dioecious shrubs; sepals 6. subsect. 5.3. ***Virgulati***

3. Anthers dehiscing horizontally to obliquely; monoecious or dioecious; sepals 4—6.

4. Cataphyllary stipules darkened and indurate; pollen grains 3-colporate; monoecious subshrubs or perennial herbs. subsect. 5.4 ***Pentaphylli***

4. Cataphyllary stipules not darkened and indurate; pollen grains 3- or 4-colporate; subshrubs, perennial herbs, or annual herbs. subsect. 5.5. ***Swartziani***

5. Branches and branchlets ± terete series 5.5a. ***Amari***

5. Branchles and branchlets carinate. series 5.5b. ***Odontadenii***

Subsect. 5.1 ***Niruri*** G. L. Webster, Contr. Gray Herb. 176: 52. 1955; J. Arnold Arb. 38: 399. 1957.

Niruri Adanson, Fam. Pl. 2: 356. 1763. TYPE: *Phyllanthus niruri* L.

Monoecious herbs or shrubs; cataphyllary stipules linear-lanceolate; leaf blades obliquely inaequilateral at base; sepals 5; stamens 3, filaments free or connate; anthers dehiscing obliquely or horizontally; pollen grains prolate, 4-colporate; pistillate disk patelliform; styles free, bifid, branch tips subcapitate; seeds verruculose.

About 5 neotropical species. Subsect. *Niruri* could perhaps be treated as a separate section, since it is distinctive in leaf and pollen morphology. One west African (Angola) species, *Phyllanthus benguelensis* Müll. Arg., may belong here.

SPECIES INCLUDED: NORTH AND SOUTH AMERICA: *Phyllanthus niruri* L. SOUTH AMERICA: *P. augustinii* Baillon, *P. mimicus* G. L. Webster, *P. perpusillus* Baillon, *P. wurdackii* G. L. Webster.

Subsect. 5.2 ***Bathiani*** G. L. Webster, subsect. nov. TYPE: *Phyllanthus bathianus* Leandri

Monoecious or dioecious subshrubs; leaf blades equilateral at base; sepals 6 (rarely 5); stamens 3 (rarely 4), filaments free; anthers dehiscing longitudinally; pistillate disk annular or lobed; styles free, bifid; seeds striate.

As here defined, this is a small subsection endemic to Madagascar, although it is possible that some African species might be included.

SPECIES INCLUDED: MADAGASCAR: *Phyllanthus bathianus* Leandri, *P. betsileanus* Leandri, *P.isalensis* (Leandri) Leandri, *P. phillippioides* Leandri.

Subsect. 5.3 ***Virgulati*** G. L. Webster, subsect. nov. TYPE: *Phyllanthus virgulatus* Müll. Arg.

Dioecious (rarely monoecious) subshrubs or rhizomatous herbs; branchlets often fasciculate; cymules unisexual; sepals mostly 6; stamens 3, filaments connate, anthers dehiscing longitudinally (vertically); ovary smooth; stigmas capitate; seeds with lines of dots.

A primarily African group, but some species from Madagascar appear to belong here.

REPRESENTATIVE SPECIES: AFRICA: *Phyllanthusfischeri* Pax, *P. fluminis-athi* Radcl.-Sm., *P. kaessneri* Hutch., *P. sepialis* Müll. Arg., *P.virgulatus* Pax, *P. volkensii* Pax. MADAGASCAR: *P. bernieranus* Baillon

Susbsect. 5.4 **Pentaphylli** G. L. Webster, Contr. Gray Herb. 176: 54. 1955; J. Arnold Arb. 38: 325. 1957.

TYPE: *Phyllanthus penatphyllus* C. Wright ex Griseb.

Monoecious or dioecious annual or perennial herbs or subshrubs; cataphyllary stipules blackened and indurate, usually conspicuously auriculate; cymules unisexual; sepals 5 or 6; staminate disk dissected;stamens 2 or 3, filaments connate; pollen grains 3-colporate, finely or coarsely reticulate; pistillate disk patelliform, sometimes lobed or divided; styles free, bifid to bipartite, tips not capitate; seeds longitudinally striate or banded.

This neotropical section of 14 species appears to be endemic to the West Indies (extending to southern Florida). It is closely related to some Caribbean species of subsect. *Swartziani*. Because of the considerable number of African species of sect. *Phyllanthus*, some of which have indurate cataphylls, it is not clear whether subsect. *Pentaphylli* is indeed confined to the Americas. The inclusion of the Brazilian species, *Phyllanthus fastigiatus*, is tentative.

REPRESENTATIVE SPECIES: WEST INDIES (widespread): *Phyllanthus pentaphyllus* C. Wright ex Griseb. CUBA: *P. dimorphus* Britton & Wilson, *P. echinospermus* C. Wright, *P. imbricatus* G. L. Webster, *P. junceus* Müll. Arg., *P. maestrensis* Urb., *P. micranthus* Rich., *P. pulverulentus* Urb., *P.*

selbyi Britton & P. Wilson. HISPANIOLA: *P. amnicola* G. L. Webster, *P. brachyphyllus* Urb., *P. buchii* Urb., *P. leptoneurus* Urb.

SOUTH AMERICA. BRAZIL: *P. fastigiatus* Mart. ex Müll. Arg.

Subsect. 5.5 ***Swartziani*** G. L. Webster, Contr. Gray Herb. 176: 53. 1955. TYPE: *Phyllanthus swartzii* Kostel., [= *P. amarus* Schumach. & Thonn.]

Perennial or annual, glabrous herbs, usually monoecious; cataphyllary stipules neither indurate not auriculate; stamens 2 or 3, filaments connate (rarely free); anthers dehiscing obliquely to horizontally; pollen grains 3-colporate, finely reticulate; pistillate disk patelliform or lobed (rarely dissected); styles bifid, tips not capitate; seeds longitudinally ribbed or striate.

This subsection includes most of the widespread annual weedy species of *Phyllanthus*. *Phyllanthus amarus*, the commonest, is of American orgin, but *P. debilis* and *P. fraternus* have also become nearly cosmopolitan. The number of species in the subsection is still uncertain, but it would appear that the majority are African. Only a limited number of species are cited here, since it has not been possible to examine critically all of the Old World species.

Series 5.5a. ***Amari*** G. L. Webster, series nov.: ramulis ± teretibus; sepalis 5, cymulis bisexualibus. TYPE: *Phyllanthus amarus* Schumach. & Thonn.

Annual herbs; branchlet axes terete; cymules of 1 staminate and 1 pistille flower; sepals 5; seeds longitudinally ribbed.

Two American species, one of which (*Phyllanthus amarus*) has become a cosmopolitan weed.

REPRESENTATIVE SPECIES: AMERICA: *Phyllanthus amarus* Schumach. & Thonn. NORTH AMERICA (Mexico to Florida): *P. abnormis* Baillon.

Series 5.5b. ***Stipulati*** G. L. Webster, series nov.: ramulis teretibus, cymulis unisexualibus. TYPE: *Phyllanthus stipulatus* (Raf.) G. L. Webster

Annual or perennial herbs; branchlet axes terete; cymules unisexual, staminate flowers proximal on branchlet; sepals 5 or 6; seeds longitudinally ribbed or striate.

At least 30 species, mainly of America and Africa; however, the two commonest introduced species in America are Asiatic: *Phyllanthus debilis* and *P. fraternus*.

REPRESENTATIVE SPECIES: ASIA: *Phyllanthus airy-shawii* Brunel & Roux, *P. debilis* Klein ex Willd., *P. fraternus* G. L. Webster, *P. rheedii* Wight. TROPICAL AFRICA: *P. arvensis* Müll. Arg., *P. fischeri* Pax, *P. hutchinsonianus* S. Moore, *P. leucocalyx* Hutch., *P. rotundifolius* Klein ex Willd., *P. volkensii* Engl. SOUTH AFRICA: *P. asperulatus* Hutch., *P. delagoensis* Hutch., *P. meyerianus* Müll. Arg. AMERICA (widespread): *P. caribaeus* Urb., *P. stipulatus* (Raf.) G. L. Webster. NORTH AMERICA: MEXICO: *P. hexadactylus* McVaugh, *P. standleyi* McVaugh.CUBA: *P. procerus* C. Wright. SOUTH AMERICA: *P leptophyllus* Müll. Arg., *P. lindbergii* Müll. Arg., *P. microphyllus* Kunth, *P. minutulus* Müll. Arg.,

Series 5.5c. ***Odontadenii*** (Brunel & Roux) G. L. Webster, stat. nov.:*Phyllanthus* subsect. *Odontadenii* Brunel & Roux, Willdenowia 11: 70. 1981. TYPE: *Phyllanthus odontadenius* Müll. Arg.

Monoecious perennial or annual herbs; branchlets carinate; sepals 6; stamens 3, anthers dehiscing horizontally or vertically; ovary sometimes stipitate.

This group of 12 species appears to be entirely African; further study is needed to determine which species should be included.

REPARESENTATIVE SPECIES: AFRICA: *Phyllanthus aspersus* Brunel & Roux, *P. bancilhonae* Brunel & Roux, *P. braunii* Pax, *P. caligatus* Brunel & Roux, *P. chevalieri* Beille, *P. dusenii* Hutch., *P. gagnioevae* Brunel & Roux, *P. jaegeri* Brunel & Roux, *P. magnificens* Brunel & Roux, *P. mannianus* Müll. Arg., *P.mieschii* Brunel & Roux, *P. nozeranianus* Brunel & Roux, *P. raynalii* Brunel & Roux.

Subsect. 5.6. ***Leucocalyci*** G. L. Webster, subsect. nov. TYPE: *Phyllanthus leucocalyx* Hutch.,

Monoecious annual herbs; branchlets terete; cymules unisexual; sepals 5; stamens 3, filaments connate; anthers muticous, dehiscing horizontally; ovary papillate to tuberculate; seeds longitudinally striate.

REPRESENTATIVE SPECIES:AFRICA: *Phyllanthus leucocalyx* Hutch., *P. micromeris* Radcl.-Sm., *P.niruroids* Müll. Arg. MADAGASCAR:

Sect. 6. **Choretropsis** Müll. Arg., Linnaea 32: 4. 1863. TYPE: *Phyllanthus choretroides* Müll. Arg.

Glabrous subshrubs, dioecious or subdioecious; leaves on branchlets normally reduced to scales or absent; branchlet axes terete to flattened into phylloclades; cymules unisexual; flowers subsessile (pedicels mostly < 1 mm long); sepals 5 or 6; stamens 3, filaments connate; ovary smooth; styles free, bifid; branches sometimes capitate or dilated; seeds puncticulate.

This group of Brazilian species is easy to distinguish from other taxa of subg. *Phyllanthus* by virtue of the reduction of the leaves and, in subsect. *Applanata*, expansion of the axes into phylloclades. In one species. *Phyllanthus flagelliformis*, normal leaves are developed that resemble those of species related to *P. claussenii*; however, sect. *Choretropsis* is distinguished by the dioecious inflorescences, subsessile flowers, and puncticulate seeds.

Subsect. 6.1. ***Choretroides*** G. L. Webster, subsect. nov., a subsectionis *Applanata* differt ramulis teretis.

TYPE: *Phyllanthus choretroides* Müll. Arg.

Branchlets terete, 0.5—1.(1.5) mm broad; leaves linear, < 1 mm broad; stamens (2) 3, filaments connate; styles spreading.

Four species of eastern Brazil.

SPECIES INCLUDED: BRAZIL (Minas Gerais, Goiás, Bahia): *P. choretroides* Müll. Arg., *P. goianensis* Santiago, *P. sarothamnoides* Govaerts & Radcl.-Sm., *P. spartioides* Pax & K. Hoffmann.

Subsect. 6.2 ***Applanata*** L. J. M. Santiago, Bradea 5(2): 45. 1988. TYPE: *Phyllanthus klotzschianus* Müll. Arg.

Shrubs or subshrubs; branchlet axes dilated into phylloclades; leaf blades reduced (except in

Phyllanthus flagelliformis); stamens 3 (4), free or connate; styles ± erect.

This group of phylloclade-bearing Brazilian species was referred to sect. *Xylophylla* by Müller (1873), but it was pointed out by Webster (1956) that the 3-colporate pollen of the Brazilian plants is very different from the clypeate pollen of subg. *Xylophylla*.

SPECIES INCLUDED: *Phyllanthus angustissimus* Müll. Arg., *P. coradinii* G. L. Webster, *P. edmundoi* L. J. M. Santiago, *P. flagelliformis* Müll. Arg., *P. gladiatus* Müll. Arg., *P. klotzschianus* Müll. Arg., *P. sarothamnoides* Govaerts & Radcl.-Sm.

Sect. 6. **Urinaria** G. L. Webster, Contr. Gray Herb. 176: 51. 1955. TYPE: *Phyllanthus urinaria* L.

Monoecious subshrubs or herbs; leaves on penultimate branches reduced to scales; flowers in axillary glomerules, the staminate at distal axils, the pistillate proximal; sepals 6; stamens 3, filaments free or connate; anthers dehiscing vertically; pollen grains 4-colporate, finely reticulate; pistillate disk cupular; ovary bullate; styles bifid; fruits capsular, tuberculate; seeds transversely ribbed.

This section appears to be entirely Asiatic in origin, although *Phyllanthus urinaria* is widely distributed as a weed. The section appears rather isolated within subgenus *Phyllanthus*, particularly in inflorescence and seed structure.

Haicour (1984) and Rossignol et al. (1987) have investigated in detail taxa of sect. *Urinaria* and have shown that the Linnaean *Phyllanthus urinaria* is a polyploid complex. They have proposed several segregate species based on seed morphology and ploidy level. All of these taxa appear very similar, and they could be interpreted as subspecies, although Rossignol et al. believe they are reproductively isolated.

Haicour and Rossignol (in Rossignol et al., 1987) proposed three subsections of sect. *Urinaria*, only one of which has a Latin description. Here two sections are recognized, with their subsect. *Arenaria* validated by a Latin description.

Subsect. 6.1. ***Urinaria*** Haicour & Rossignol, Amer. J. Bot. 74: 1987. TYPE: *Phyllanthus urinaria* L.

Annual herbs; leaves with marginal hispid trichomes; pistillate disk crenulate; ovary rugulose or bullate; seeds transversely ribbed..

REPRESENTATIVE SPECIES: ASIA (widespread): *Phyllanthus urinaria* L. SOUTHEAST ASIA (Thailand to Vietnam): *P. embergeri* Haicour & Rossignol, *P. nozeranii*.Haicour & Rossignol.

Subsect. 6.2. ***Arenarii*** Haicour & Rossignol, subsect. nov.: suffrutices foliis non hispidulis; disci feminei 6—lobato, ovario laeve. TYPE: *Phyllanthus arenarius* Beille.

Subshrubs; leaves not marginally hispid; pistillate disk patelliform, 6-lobed; ovary smooth; seeds transversely ribbed.

This subsection of Asiatic and Pacific Island species was described by Haicour & Rossignol (1987), but without Latin description. It differs from subsect. *Urinaria* vegetatively and in the smooth ovary. *Phyllanthus quangtriensis* Beille, from Vietnam, differs in its smooth seeds; although synonymized with *P. urinaria* by Govaerts et al., it appears to be a distinct species, and may have to be assigned to a different subsection.

REPRESENTATIVE SPECIES: VIETNAM: *Phyllanthus arenarius* Beille. MALAYA: *P. chamaepeuce* Ridl. MICRONESIA: *P. marianus* Müll. Arg. POLYNESIA: *P. societatis* Müll. Arg..