

**THECACORIS, INCLUDING CYATHOGYNE  
(PHYLLANTHACEAE), IN WEST AFRICA:  
GENERIC DELIMITATION, DESCRIPTION OF  
A NEW SPECIES, AND A SYNOPSIS OF ALL  
WEST AFRICAN SPECIES**

F. J. BRETELER

The separation of *Thecacoris* and *Cyathogyne* (Phyllanthaceae, formerly Euphorbiaceae) is discussed and it is concluded that they should remain united. A separation of the continental forest species (except *Thecacoris viridis* (Müll.Arg.) Leandri ex G.L.Webster) awaits molecular investigation. *Thecacoris micrantha* sp. nov. is described and illustrated. *Thecacoris grandifolia* (Pax & K.Hoffm.) Govaerts from Cameroon is neotypified. *Thecacoris membranacea* Pax and *T. annobonae* Pax & K.Hoffm. are lectotypified and placed in synonymy under *T. stenopetala* (Müll.Arg.) Müll.Arg. and *T. trichogyne* Müll.Arg., respectively. *Thecacoris manniana* (Müll.Arg.) Müll.Arg. is united with *T. stenopetala* under the latter name. A key to and a synopsis of the West African species is provided.

*Keywords.* Côte d'Ivoire, *Cyathogyne*, Ghana, new species, Phyllanthaceae (formerly Euphorbiaceae), *Thecacoris*, West Africa.

INTRODUCTION

The genus *Thecacoris* (Phyllanthaceae, formerly Euphorbiaceae) was described from Madagascar by A. de Jussieu in 1824 based on *T. madagascariensis* A.Juss. Leandri added *Thecacoris perrieri* Leandri from Madagascar in 1937, and in 1957 another new species, *T. humbertii* Leandri. He also transferred two species to *Thecacoris*: *T. cometia* (Baill.) Leandri based on *Cometia lucida* Baill. (non *T. lucida* (Pax) Hutch.) and *T. spathulifolia* (Pax) Leandri based on *Cyathogyne spathulifolia* Pax. Leandri's paper (1957) gave ample evidence in favour of uniting *Cyathogyne* Müll.Arg. (Müller Argoviensis, 1864) with *Thecacoris*, but he transferred only *C. spathulifolia* to *Thecacoris*, not *C. bussei* Pax nor the type species *C. viridis* Müll.Arg. Transfer of the latter was effected by Webster in 1994 although he referred it to Leandri. Radcliffe-Smith (1987) treated *Cyathogyne* as a distinct genus and united the two East African species *C. bussei* and *C. spathulifolia*, simultaneously published by Pax (1903), under the former name. Govaerts *et al.* (2000) erroneously united them under the latter name. In 1996 Radcliffe-Smith followed the generic

concept of Leandri (1957) and Webster (1994) and transferred *Cyathogyne bussei* to *Thecacoris*.

Léonard (1995) recognised the genera as distinct, based on a number of small characters of the habit, the leaves, the inflorescence, the presence of petals, the shape of the pistillode, the angle between the pedicel and the columella, the fruit-wall, as well as some seed characteristics. These characters unite the continental African forest species of *Thecacoris* and separate this group from *Cyathogyne viridis*. His comparison of this group of continental forest species with *Thecacoris madagascariensis*, the type species of the genus, raised doubts as to whether they are congeneric, especially when the seeds are compared. Léonard (1995) compared the continental forest species with *Thecacoris madagascariensis* on the one hand and with *Cyathogyne viridis* on the other hand and concluded that both genera should remain separate. His incomplete knowledge of *Thecacoris madagascariensis* may have caused him to misinterpret the evidence; it may have been more logical to conclude that *Cyathogyne viridis* shows the same characters as the type species of *Thecacoris* and that therefore these two genera should be united. P. Hoffmann (pers. comm., 2006) stated that after a detailed examination of material of *Thecacoris madagascariensis* her conclusion is that this species and *Cyathogyne viridis* belong to the same genus. She advocates an eventual separation of the continental forest species at a subgeneric level. Such a separation at subgeneric or even generic level (for which the name *Baccaureopsis* Pax (1909) is available) should, in my opinion, be strongly supported by molecular evidence.

*Key to the species of Thecacoris in West Africa*

- 1a. Herb or shrublet (0.2–)0.3–0.6(–1) m tall; stem often partly procumbent, rhizome-like and rooting; inflorescence usually branched (From South Nigeria to Central Africa) \_\_\_\_\_ **5. T. viridis**
- 1b. Shrub to small tree (0.6–)2–10 m tall and up to 10 cm dbh; inflorescence unbranched (West and Central Africa) \_\_\_\_\_ 2
- 2a. Inflorescences pendulous, > 15 cm long; ovary pubescent; fruits appressed-pubescent, sometimes almost glabrous at maturity; leaves (10–)17–34 × (4–)6–15 cm (SW Cameroon, N Gabon) \_\_\_\_\_ **1. T. grandifolia**
- 2b. Inflorescences ± erect, ≤ 12 cm long; ovary glabrous, or nearly so; fruit glabrous; leaves (1.5–)3–20(–31) × (1–)3–10(–13) cm (West and Central Africa) \_\_\_\_\_ 3
- 3a. Leaves (1.5–)3–12(–14) cm long with (4–)5–9 pairs of main lateral nerves; midrib puberulous above (SE Côte d'Ivoire, SW Ghana) \_\_\_\_\_ **3. T. micrantha**
- 3b. Leaves (4–)12–20(–31) cm long with (6–)7–12(–15) pairs of main lateral nerves; midrib glabrous above (West and Central Africa) \_\_\_\_\_ 4
- 4a. Stipules 2–6(–7) mm long; petioles (1–)2–5(–11) mm long; petals absent (South Nigeria, western Central Africa) \_\_\_\_\_ **2. T. leptobotrya**

- 4b. Stipules (3–)5–7(–12) mm long; petioles (4–)5–12(–16) mm long; petals present (West Africa, western Central Africa) \_\_\_\_\_ **4. *T. stenopetala***

SYNOPSIS OF THE WEST AFRICAN SPECIES OF *THECACORIS*

- 1. *Thecacoris grandifolia*** (Pax & K.Hoffm.) Govaerts in Govaerts et al., World Checklist and Bibliogr. Euphorbiaceae 1517 (2000). – *Cyathogyne grandifolia* Pax & K.Hoffm. in Engler, Pflanzenr. IV, 147, XV: 41 (1922). – Type: Cameroon, Ndonge, *Ledermann* 6199 and 6311 (syn B†); neotype, designated here, forest near Mekom Bakossi, 8 km E of Kumba–Mamfe Rd, near Konye, 16 iv 1986, *Nemba & Thomas* 14 (neo MO; isoneo WAG).

*Note.* The following collections, hitherto mainly identified as *Thecacoris* cf. *annobonae* Pax & K.Hoffm. (Keay, 1958), belong to *T. grandifolia*: CAMEROON. Kumba Distr., 22 iii 1956, *Binuyo & Daramola* FHI 35639 (K); 21 iii 1948, *Brenan et al.* 9329 (K); 25 iv 1959, *Daramola* FHI 29832 (K); 26 iv 1959, *Daramola* FHI 29847 (K); SW Province, 26 iv 1986, *Etuge & Thomas* 48 (MO, WAG); Kumba Distr., 19 i 1951, *Keay & Russell* FHI 28679; 40 km NNE of Douala, 30 iv 1976, *Letouzey* 14774 (HBG, K, WAG); near Konye, 28 v 1986, *Nemba & Thomas* 99 (K, MO, WAG); Kumba Distr., 9 iv 1951, *Olorunfemi* FHI 30507 (K); 19 iv 1951, *Olorunfemi* FHI 30531 (K); 15 vi 1951, *Olorunfemi* 30619 (K); 5 km S of Kumba, 25–31 v 1983, *Thomas* 2143 (MO, WAG); near Kumba, 14 iv 1984, *Thomas* 3447 (K, MO), 3448 (K, MO), 3449 (K); Korup Nat. Park, 3 iv 1988, *Thomas et al.* 7635 (K, MO, WAG), 7636 (K, MO, WAG); Banya, 15 km W of Manyemon, 29–30 vi 1988, *Thomas* 8141 (K, MO, WAG); 25 iv 1988, *Thomas & Mambo* 8235 (K, WAG). GABON. Cristal Mts, E of Nkan, 13 ii 1968, *Hallé & Villiers* 5232 (P).

*Thecacoris annobonae* Pax & K.Hoffm., published by Pax & Hoffmann in 1922, was based on *Mildbraed* 6499, 6554 and 6557. This material was lost in the Berlin Herbarium fire of 1943. *Mildbraed* 6557 (HBG), here designated as the lectotype, is the only duplicate of these three syntypes that has been traced. This duplicate undoubtedly belongs to *Thecacoris trichogyne* Müll.Arg. *Thecacoris annobonae* is thus placed in synonymy under *T. trichogyne*, a species from Central Africa.

- 2. *Thecacoris leptobotrya*** (Müll.Arg.) Brenan, Kew Bull. 1952: 446 (1953); Keay in Fl. West. Trop. Afr., ed. 2, 1: 372 (1958). – *Antidesma leptobotryum* Müll.Arg., Flora 47: 529 (1864). – Type: Gabon, Sierra del Crystal, 1862, *Mann* 1714 (holo K; iso P).

- 3. *Thecacoris micrantha*** Breteler, *sp. nov.* Figs 1, 2.

Praesentia petalorum *Thecacoridi stenopetalae* (Müll.Arg.) Müll.Arg. maxime similis, sed differt stipulis minoribus, foliis parvis costa supra pilosa, floribus minoribus disco glabro et fructibus minoribus. – Type: Côte d'Ivoire, between Aboisso and Bonoua, 4 ix 1969, *Thijssen* 294 (holo WAG; iso BR, E, K, MO, P).

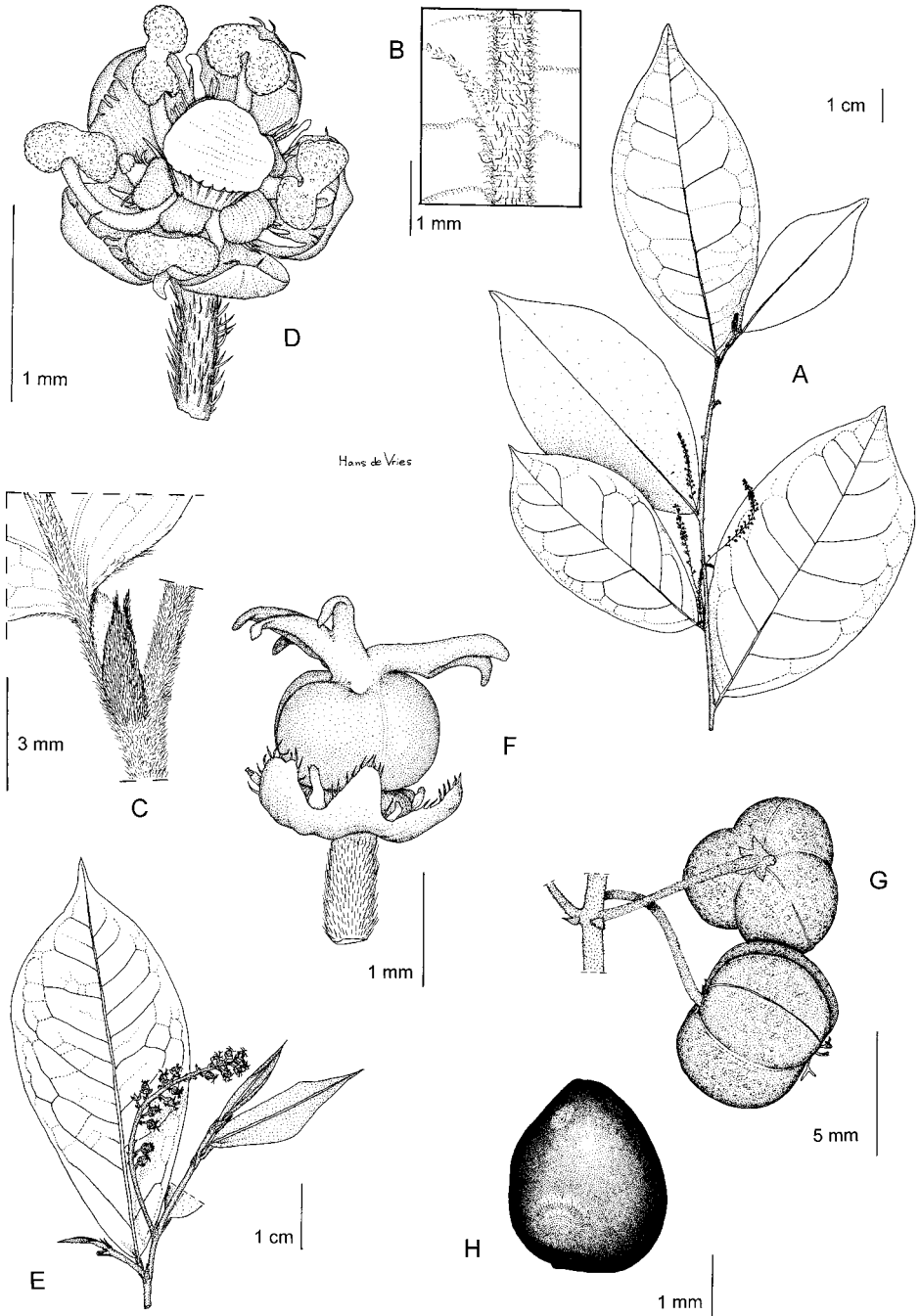


FIG. 1. *Thecacoris micrantha* Bretelet. A, flowering male branch; B, detail of indumentum on midrib above; C, stipule; D, male flower; E, branchlet with female inflorescence; F, female flower; G, part of an infructescence with two fruits; H, seed (A–D, *Beentje* 404-a; E, F, *Jongkind & Abbw* 2169; G, H, *Thijssen* 294). Drawn by H. de Vries.

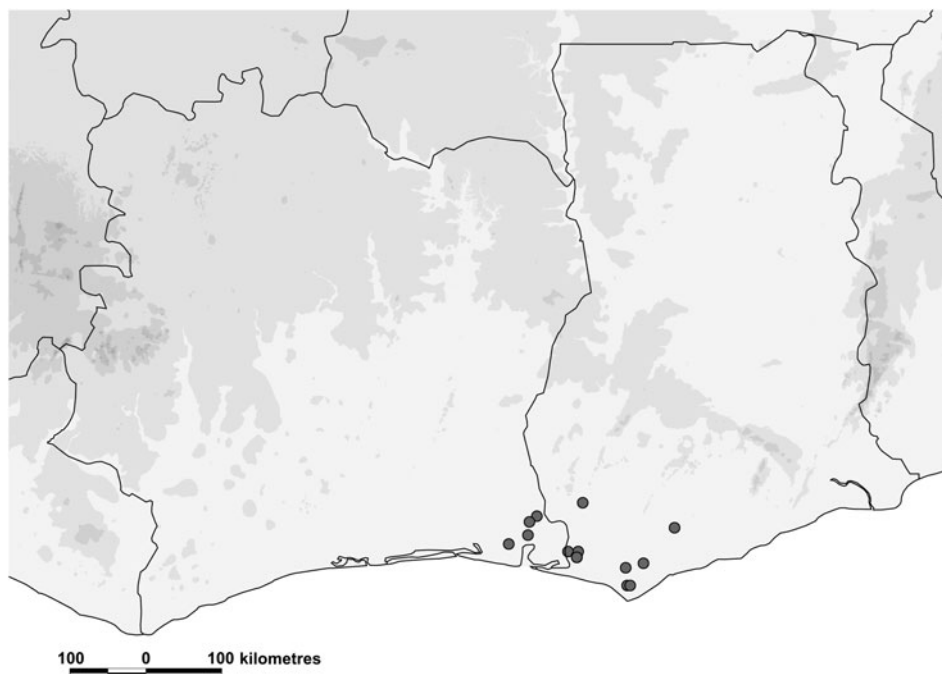


FIG. 2. Distribution of *Thecacoris micrantha* Breteler in Côte d'Ivoire and Ghana.

Shrub 1.5–3 m tall. *Branchlets* puberulous-tomentellous. *Stipules* early caducous or not, triangular, 1–3 mm long,  $\leq 1$  mm wide, appressed-pubescent outside, glabrous inside. *Leaves*: petiole grooved above, 1–3(–6) mm long, puberulous-tomentellous; lamina elliptic, sometimes obovate, often very unequal in size, (1.5–)2–3(–4) times as long as wide, (1.5–)3–12(–14)  $\times$  1–5(–6.5) cm, rounded to cuneate at base, 0.5–1(–2) cm acuminate at apex; lateral nerves (4–)5–9 pairs, thin, flush to slightly prominent above,  $\pm$  distinctly prominent beneath; puberulous-tomentellous on the flush or impressed midrib above (sometimes also on the main laterals),  $\pm$  appressed-pubescent on the prominent midrib beneath and more sparsely so on the main laterals, the remaining surface and the revolute margin glabrescent. *Inflorescence* racemose, puberulous-tomentellous, the male 1.5–2 cm long, the female 2–7 cm long, 3–10 cm long in fruit; bracts broadly ovate-triangular,  $\leq 1$  mm long, appressed-pubescent, ciliate. *Male flowers* c.1.5 mm in diameter; pedicel  $\leq 1$  mm long, puberulous; sepals 5, united at base, thin, almost hyaline,  $\pm$  elliptic in outline, c.0.6 mm long, with a few  $\pm$  appressed hairs, ciliate; petals 5, filiform,  $\leq 0.5$  mm long, glabrous; stamens 5, 1 mm long, glabrous; disk glands 5, glabrous; pistillode obconical, c.0.5 mm long, glabrous. *Female flowers* c.2 mm in diameter; pedicel 0.5–2 mm long, puberulous, accrescent in fruit; sepals  $\pm$  triangular, c.1 mm long, hairy as in the male flowers; petals as in the male flowers; small staminodes

sometimes present; disk annular, entire to slightly lobulate, glabrous; pistil 2 mm long, glabrous; ovary globose, c.1 mm in diameter, slightly 3-lobed; styles 3, bifurcate. *Capsule* 3-lobed, glabrous, 5–6 mm long, 6–7 mm in diameter; pedicel in fruit 7–12 mm long,  $\pm$  straight or slightly curved towards the fruit; columella 3–4 mm long. *Seed* brown, smooth, shiny,  $3 \times 2$  mm.

*Distribution.* SE Côte d'Ivoire, SW Ghana.

*Habitat and ecology.* In undergrowth of primary evergreen rain forest; altitude 0–100 m.

*Additional specimens examined.* CÔTE D'IVOIRE. Near Ayamé, 15 vii 1965, *Aké Assi* 8139 (G); 18 km NE of Ayamé, 17 vi 1975, *Beentje* 404-a (WAG), 404-b (WAG); Ayamé, 12 v 1965, *Miège* s.n. (G); Soumié, 27 iv 1931, *Service Forestier Côte d'Ivoire* 456 (P). GHANA. Tano Anwia F.R., 31 xii 1954, *Adams* 2263 (K); Benso, viii 1952, *Andoh* 3744 (BM); Subiri F.R., ix 1951, *Andoh* 5572 (K, P); Benso, viii 1953, *Andoh* 5744 (P); Nkwanta, 11 ix 1912, *Chipp* 366 (K); Abra W.R., 26 ii 1965, *Hall* 2888 (P); 2 km N of Twife Mapong, 3 xi 1973, *Hall & Abbiv* GC 44588 (MO, P, WAG); 22 km ESE of Takoradi, 14 vii 1995, *Harder et al.* 3423 (MO, WAG); Ankassa Game Res., 19–20 iii 1995, *Jongkind & Abbiv* 2144 (MO, WAG), 2169 (MO, WAG); Ankassa F.R., 12 iii 1996, *Merello et al.* 1398 (K, MO), 1414 (MO); 8 miles from Princess Town, 28 iii 1954, *Morton* A 342 (K); Ankassa F.R., 12 iii 1996, *Schmidt et al.* 3442 (MO); Simpa W.P., v 1930, *Vigne* 1954 (K).

*Note.* Specimens of *Thecacoris micrantha* were previously (Keay, 1958; Aké Assi, 2001) assigned to *T. stenopetala*, then the only known species in that area. *Thecacoris micrantha* is a narrow endemic of the relatively wet region situated on both sides of the southern border between Côte d'Ivoire and Ghana. Some other species with a similar distribution, such as *Cola umbratilis* Brenan & Keay (Sterculiaceae), *Combretum tarquense* J.J.Clark (Combretaceae), *Hymenostegia gracilipes* Hutch. & Dalz. (Leguminosae – Caesalpinioideae) and *Tapura ivorensis* Breteler (Dichapetales), are illustrated in Poorter *et al.* (2004).

4. *Thecacoris stenopetala* (Müll.Arg.) Müll.Arg. in DC., Prodr. 15(2): 246 (1866); Keay in Fl. West Trop. Afr., ed. 2, 1: 372 (1958). – *Antidesma stenopetalum* Müll.Arg., Flora 47: 520 (1864). – Type: Sao Tomé & Príncipe, Príncipe Island, *Mann* s.n. (holo K).

*Thecacoris manniana* (Müll.Arg.) Müll.Arg. in DC., Prodr. 15(2): 246 (1866); Exell, Cat. Vasc. Pl. S. Tomé 287 (1944). – *Antidesma mannianum* Müll.Arg., Flora 47: 519 (1864), **syn. nov.** – Type: Sao Tomé & Príncipe, Sao Tomé Island, sine loc., *Mann* 1073 (holo K) (see note).

*Thecacoris membranacea* Pax, Bol. Soc. Brot. 10: 158 (1892), **syn. nov.** – Type: Sao Tomé & Príncipe, Sao Tomé Island, *Quintas* s.n. (holo B†). Lectotype, designated here: *Quintas in Moller* 993 (COI) (see note).

*Notes.* The basionyms of *Thecacoris manniana* and *T. stenopetala* were simultaneously published and later simultaneously transferred to *Thecacoris*. According to the author of both species *Antidesma mannianum* from Sao Tomé differs from

*A. stenopetalum* from Principe in being more slender and having flowers that are half as large. This difference in flower size reflects flower development. The flowers of the type of *Antidesma mannianum* are, although already open at the top, not fully expanded, which accounts for their smaller size. A thorough investigation of material of both species did not reveal any character by which they might be separated.

The holotype of *Thecacoris membranacea*, an unnumbered *Quintas* collection in the protologue (Pax, 1892) and lost in Berlin, was later (Pax, 1894) cited as *Quintas* 121. According to Exell (1944) the COI-duplicate of the Berlin specimen is numbered *Quintas* 993 (in the *Moller* collection).

Of the specimens cited by Exell (1944) under *Thecacoris stenopetala* the following collections from COI belong to the genus *Maesobotrya* Benth., probably an undescribed species: *Campos* 75, *Exell* 291, 301, 355, 356 and *Quintas* 315 (see Exell, 1959: 466). The collection *Campos* 76, also cited by Exell under this species, is identified as *Antidesma vogelianum* Müll.Arg.

**5. *Thecacoris viridis* (Müll.Arg.) Leandri ex G.L.Webster, Ann. Missouri Bot. Gard. 81: 52 (1994).** – *Cyathogyne viridis* Müll.Arg., *Flora* 47: 536 (1864); Keay in *Fl. W. Trop. Afr.*, ed. 2, 1: 375 (1958). – Type: Equatorial Guinea/Gabon, Corisco Bay, 1862, *Mann* 1868 (holo K; iso P).

#### ACKNOWLEDGEMENTS

I am grateful to my wife B. J. M. Breteler-Klein Breteler for preparing the electronic version of the manuscript and to Mr H. de Vries for the excellent illustration. Dr R. H. M. J. Lemmens is kindly acknowledged for the translation of the species diagnosis into Latin and Dr J. J. Wieringa for preparing the distribution map.

#### REFERENCES

- AKÉ ASSI, L. (2001). Flore de la Côte d'Ivoire: catalogue systématique, biogéographie et écologie I: 245. *Boissiera* 57: 1–396.
- EXELL, A. W. (1944). *Catalogue of the Vascular Plants of S. Tomé (with Principe and Annobon)*. London: Trustees of the British Museum.
- EXELL, A. W. (1959). Additions to the flora of S. Tomé and Principe. *Bull. Inst. Franç. Afrique Noire* 21: 439–476.
- GOVAERTS, R., FRODIN, D. G. & RADCLIFFE-SMITH, A. (2000). *World Checklist and Bibliography of Euphorbiaceae (and Pandaceae)*. Kew: Royal Botanic Gardens.
- JUSSIEU, A. H. L. DE (1824). *De Euphorbiacearum generibus medicisque earundem viribus tentamen, tabulis aeneis 18 illustratum*. Paris: Didot jr.
- KEAY, R. W. J. (1958). Euphorbiaceae. In: HUTCHINSON, J. & DALZIEL, J. M. (eds) *Flora of West Tropical Africa*, ed. 2, 1: 364–423. London: Crown Agents for Oversea Governments and Administrations.
- LEANDRI, J. (1937). Contributions à l'étude des Euphorbiacées de Madagascar. *Notul. Syst.* 6: 11–35.

- 
- LEANDRI, J. (1957). Notes systématiques sur les Euphorbiacées–Phyllantées de Madagascar. *Mém. Inst. Sci. Madagascar*, sér. B, 8: 205–213.
- LÉONARD, J. (1995). Révision des espèces zaïroises des genres *Thecacoris* A.Juss. et *Cyathogyne* Müll.Arg. (Euphorbiaceae). *Bull. Jard. Bot. Nat. Belg.* 64: 13–52.
- MÜLLER ARGOWIENSIS, J. (1864). Neue Euphorbiaceen des Herbarium Hooker in Kew (Schluss). *Flora* 47(34): 529–540.
- PAX, F. (1892). Euphorbiaceae. In: HENRIQUES, J. A., *Catalogo da Flora da Ilha de S. Thomé*. *Bol. Soc. Brot.* X: 156–161.
- PAX, F. (1894). Beiträge zur Flora von Afrika VIII. Euphorbiaceae africanae II. *Bot. Jahrb. Syst.* 19: 76–127.
- PAX, F. (1903). Euphorbiaceae Africanae VI. *Bot. Jahrb. Syst.* 33: 276–291.
- PAX, F. (1909). Beiträge zur Flora von Afrika XXXV, Euphorbiaceae. *Bot. Jahrb. Syst.* 43: 317–325.
- PAX, F. & HOFFMANN, K. (1922). Euphorbiaceae–Phyllanthoideae–Phyllantheae. In: ENGLER, A., *Das Pflanzenreich* IV, 147, XV: 1–349. Leipzig: Wilhelm Engelmann.
- POORTER, L., BONGERS, F., KUAMÉ, F. N. & HAWTHORNE, W. D. (2004). *Biodiversity of West African Forests: An Ecological Atlas of Woody Plant Species*. Wallingford: CABI Publishing.
- RADCLIFFE-SMITH, A. (1987). Euphorbiaceae (part 1). In: POLHILL, R. M., *Flora of Tropical East Africa*: 1–407. Rotterdam/Boston: A. A. Balkema.
- RADCLIFFE-SMITH, A. (1996). Notes on African Euphorbiaceae XXX: *Phyllanthus* (V) & C. *Kew Bull.* 51: 301–331.
- WEBSTER, G. L. (1994). Systematics of the Euphorbiaceae. *Ann. Missouri Bot. Gard.* 81(1): 1–144.

*Received 18 December 2010; accepted for publication 31 May 2011*