The contribution of Johann Friedrich Klotzsch to the taxonomy of Croton (Euphorbiaceae) and associated genera

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Source: Willdenowia, 41(1) : 15-33

Published By: Botanic Garden and Botanical Museum Berlin (BGBM)

URL: https://doi.org/10.3372/wi.41.41102

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Abstract

Ee B. W. van: The contribution of Johann Friedrich Klotzsch to the taxonomy of *Croton (Euphorbiaceae)* and associated genera. – Willdenowia 41: 15–33. – Online ISSN 1868-6397; © 2011 BGBM Berlin-Dahlem.
doi:10.3372/wi.41.41102 (available via http://dx.doi.org/)

The contribution of J. F. Klotzsch to *Croton* taxonomy is summarised through a review of the original literature, an examination of specimens and taxonomic decisions. The currently accepted names are given for Klotzsch's taxa associated with *Croton*. The new combinations *Astraea comosa* and *A. jatropha* are made. Lectotypes are designated for *C. comosus, C. comosus* var. *major, C. comosus* var. *minor, C. compressus, C. essequiboensis, C. hircinus, C. jatropha, C. leucadenius, C. lobatus, C. multispicatus, C. muricatus, C. sphaerogynus, C. tricolor* and *Lasiogyne brasiliensis*. Neotypes are designated for *Argyrodendron bicolor* and *Cleodora sellowiana*. Epitypes are designated for *Croton hircinus* and *C. multispicatus*.

Additional key words: *Astraea,* botanical nomenclature, synonyms, typification

Introduction

Johann Friedrich Klotzsch (1805–60), a German botanist and mycologist based at Berlin (Stafleu & Cowan 1979), described, or was attributed as describing, over 3000 species and 220 genera of plants (IPNI 2010). Taxa belonging to *Euphorbiaceae,* including approximately 60 genera, account for more than a quarter of Klotzsch's productivity (IPNI 2010). The purpose of this work is to critically examine Klotzsch's genera, infrageneric taxa and species that are associated with *Croton* L. *(Euphorbiaceae).* Of these genera, *Astraea* Klotzsch is currently accepted as a genus, while the rest are considered synonyms of *Croton* (Webster 1993; Govaerts & al. 2000; Radcliffe-Smith 2001; Berry & al. 2005). Many of Klotzsch's names serve as basionyms of sections of *Croton*. Therefore, their status is relevant to ongoing work on the taxonomy of *Croton,* in which the rank of section plays an important role in classifying the estimated 800–1200 accepted species into more manageable units.

Webster (1993), Berry & al. (2005, 2007), Ee & al. (2009) and others used the name '*Croton* sect. *Geiseleria* (Klotzsch) Baill.', but upon closer evaluation Ee & Berry (2010a) identified the correct name for this taxon as *Croton* sect. *Geiseleria* (A. Gray) Baill. This revealed the need for a similar critical examination of taxa described by, or attributed to, Klotzsch.

Material and methods

This work is based upon a review of the original literature and nomenclatural types. I relied on type specimens received on loan, first at WIS and subsequently at MICH, and the numerous types and type fragments assembled at A and GH by L. Croizat. I also relied heavily on the specimen photographs available from JSTOR Plant Science (2010+), those available online directly from the sites of the herbaria (abbrevations after Thiers 2008+) B, C, F, K, M, MICH, MO, NY, PH and US, as well as a collection of photos from G, G-BOIS, G-DC, LE, P, P-Bonpl., P-LA and P-MICH generously made available by P. E. Berry (MICH).

Previous lectotypifications are identified and additional lectotypes, neotypes and epitypes are designated in some cases. Virtually all of Klotzsch's species names

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lack a holotype, and lectotypes are designated in some of the cases in which it is desirable to do so in order to ensure nomenclatural stability through the continuation of the current usage of the names. The currently accepted names for many of Klotzsch's species were published by J. Müller Argoviensis or by H. E. Baillon and many of these likewise require lectotypification. Holotypes are assumed only when a single gathering in a particular herbarium was cited in the protologue and it appears that there is only a single specimen of that gathering in that herbarium, or a single gathering, but no herbarium, was cited in the protologue and it appears that only a single specimen exists in the institution where the author was based (ICBN Art. 9.1, Rec. 9A.4; Art. 37, Note 1, McNeill & al. 2006).

A large number of Klotzsch's taxa lack a description or diagnosis, and as such are nomina nuda (ICBN Art. 32.1–2, McNeill & al. 2006). However, annotated specimens exist for nearly all of these, and as such they can be linked to accepted species names. In cases in which subsequent authors made new combinations or replacement names for these names without any validating description or diagnosis, e.g. Baillon (1864: 340, 341, 347, 351), these subsequent names are also nomina nuda. Despite these names being nomenclaturally nonexistent, nearly all of them have been included in indices such as Govaerts & al. (2000), IPNI (2010), Tropicos (2010) and Kew's World Checklist (2010). These invalid names are accounted for by including them in square brackets in the synonymy of the accepted names to which they can be linked.

Taxonomic treatment

Taxa are arranged alphabetically by accepted family, genus, section, subsection and species names. Accepted names are in boldface. Klotzsch's taxa and their currently accepted names are summarised in Table 1. A discussion is provided for taxa and specimens for which it is warranted.

Combretaceae R. Br.

Combretum Loefl., Iter Hispan.: 308. 1758.

Combretum imberbe Wawra in Sitzungsber. Kaiserl. Akad. Wiss. Wien, Math.-Naturwiss. Cl. 38: 556. 1860.

= *Argyrodendron petersii* Klotzsch in Peters, Naturw. Reise Mossambique: 101. 1861 ≡ *Combretum petersii* (Klotzsch) Engl., Pflanzenw. Ost-Afrikas C: 290. 1895 ≡ *Combretum imberbe* var. *petersii* (Klotzsch) Engler & Diels in Engler, Monogr. Afrik. Pflanzen.-Fam. 3: 14. 1899. – Holotype: Mozambique, Sambesi-Gebiet, Sena, 1846, *W. C. H. Peters 248* (B, destroyed).

Of the two species of *Argyrodendron* Klotzsch described by Klotzsch (1861: 101–102), *A. petersii* Klotzsch has been treated as a synonym of *Combretum imberbe* Wawra (Engler & Diels 1899: 14; Wickens 1973: 19; Exell 1978: 110; Govaerts & al. 2000), while *A. bicolor* Klotzsch has been treated as a synonym of *Croton menyharthii* Pax (Prain 1920: 415; Radcliffe-Smith 1987: 142, 1996: 278; Govaerts & al. 2000). Engler & Diels (1899) provided additional information about the type of *A. petersii* beyond what is found in Klotzsch (1861), but that specimen, *Peters 248* (B), appears to have been destroyed. Two sheets of *Barbosa & al. 2667* (WAG 0000460 & WAG 0000461) are annotated by C. Jongkind as the neotype of *A. petersii,* although that neotypification has yet to be published (Jongkind pers. comm.).

Euphorbiaceae Juss.

Acalypha L., Sp. Pl.: 1003. 1753. – Lectotype (designated by Britton, Fl. Bermuda: 208. 1918): *Acalypha virginica* L.

= *Geiseleria* Klotzsch in London J. Bot. 2: 47. 1843, non Klotzsch (1841). – Type: *Geiseleria chamaedrifolia* (Lam.) Klotzsch (≡ *Acalypha chamaedrifolia* (Lam.) Müll. Arg. ≡ *Croton chamaedrifolius* Lam.).

See Ee & Berry (2010a) for an explanation of the taxonomy of Klotzsch's two *Geiseleria* genera.

Acalypha chamaedrifolia (Lam.) Müll. Arg. in Candolle, Prodr. 15(2): 879. 1866 ≡ *Croton chamaedrifolius* Lam., Encycl. 2: 214. 1786 ≡ *Cupamenis chamaedrifolius* (Lam.) Raf., Sylva Tellur.: 67. 1838 ≡ *Geiseleria chamaedrifolia* (Lam.) Klotzsch in London J. Bot. 2: 47. 1843 ≡ *Ricinocarpus chamaedrifolius* (Lam.) Kuntze, Revis. Gen. Pl. 2: 617. 1891. – Lectotype (designated by Ee & Berry in Harvard Pap. Bot. 15: 80. 2010): H. Sloane, Voy. Jamaica 1: t. 82, fig. 3 "Urtica minor iners spicata, folio subrotundo serrato, fructu tricocco", 1707; epitype (designated by Ee & Berry in Harvard Pap. Bot. 15: 80. 2010): Jamaica, *H. Sloane 634*, herb. Sloanei 634, vol. 2: 77, left-hand specimen (BM 000588910).

Astraea Klotzsch in Arch. Naturgesch. 7(1): 194. 1841 ≡ *Croton* sect. *Astraea* (Klotzsch) Baill., Étude Euphorb.: 363. 1858 ≡ *Croton* subg. *Astraea* (Klotzsch) Pax in Engler & Prantl, Nat. Pflanzenfam. 3(5): 40. 1890. – Lectotype (designated by Klotzsch in Seemann, Bot. Voy. Herald 3: 103. 1853): *Astraea lobata* (L.) Klotzsch (≡ *Croton lobatus* L.).

= *Schradera* Willd. in Gött. J. Naturwiss. 1: 2. 1798, non Vahl (1796, *Rubiaceae*, nom. cons.), nec *Schraderia* Heister ex Medik. (1791, *Lamiaceae,* nom. rej.). – Lectotype (designated by Pfeiffer in Nomencl. Bot. 2(2): 1090. 1874): *Schradera scandens* Willd. (= *Astraea lobata* (L.) Klotzsch).

In the description of *Astraea,* named after the daughter of the Greek deities Zeus and Themis, Klotzsch (1841: 194) enumerated eight species and only listed one basionym, *Croton lobatus* L., for *A. lobata* (L.) Klotzsch. The epithets of three of the other species, *A. divaricata* Klotzsch,

A. tomentosa Klotzsch and *A. prunifolia* Klotzsch, had previously been used in *Croton*. This has led some workers to interpret some of these *Astraea* names as new combinations based on species of *Croton* and the remaining *Astraea* names as nomina nuda because no description or diagnosis was given for any of them. *C. divaricatus* Sw. was described from the West Indies with a pair of glands at the base of the leaves (Swartz 1788: 100) and was subsequently transferred as a variety of *C. glandulosus* L. by Müller (1866: 684). *C. prunifolius* Vahl was also described from the West Indies as a perennial shrub with axillary inflorescences and lepidote scales (Geiseler 1807: 47). Klotzsch (1841) made no reference to these and there are numerous morphological and geographical differences between them and *Astraea,* which does not have glands at the base of the leaves and only simple or stellate trichomes. Therefore, as in Baillon (1864) and Müller (1866), these should not be interpreted as basionyms of the *Astraea* species. Both prior uses of *C. tomentosus* (Shecut 1806: 471; Link 1822: 406) are illegitimate and *A. tomentosa* has not been interpreted as a combination of either of them. Given the lack of descriptions or diagnoses, or reference to any previously published species, all of Klotzsch's (1841) *Astraea* species names, except for *A. lobata,* were not validly published by him (ICBN Art. 32.1, McNeill & al. 2006).

In the original description of *Astraea* (Klotzsch 1841) no species was indicated as the type, although *A. lobata* was the only valid species included and could therefore be interpreted as the obligate type. Klotzsch (1853: 103) stated "When I first established *Astraea* upon *Croton lobatus,* Linn., in the year 1841, I was only acquainted with eight species belonging to this genus; since that time they have increased to not less than twenty-two. Specimens of all of them are preserved in the Royal Herbarium at Berlin." This can be interpreted as a lectotypification of *Astraea* with *Croton lobatus*. It also provides evidence that at one time there was material at B for all of Klotzsch's (1841) intended species of *Astraea*.

Astraea comosa (Müll. Arg.) B. W. van Ee, **comb. nov.** ≡ *Croton comosus* Müll. Arg. in Candolle, Prodr. 15(2): 667. 1866 ≡ *Croton comosus* var. *major* Müll. Arg. in Candolle, Prodr. 15(2): 667. 1866. – Lectotype (designated here): Brazil, Minas Gerais, Serra da Caraça, 12.1841, *P. Claussen 1576* (G; isolectotypes: BR (2), G-DC, P 00634928, 00634929).

= *Croton comosus* var. *minor* Müll. Arg. in Candolle, Prodr. 15(2): 667. 1866. – Lectotype (designated here): Brazil, *J. B. E. Pohl 3911* (G; isolectotype: W).

[– *Astraea tomentosa* Klotzsch in Arch. Naturgesch. 7(1): 194. 1841, nom. nud.]

[– *Croton digitifolius* Baill. in Adansonia 4: 340. 1864, nom. nud.]

Astraea jatropha (Müll. Arg.) B. W. van Ee, **comb. nov.** ≡ *Croton jatropha* Müll. Arg. in Candolle, Prodr. 15(2): 667. 1866. – Lectotype (designated here): Brazil, Minas Gerais, Estrella, 1844, *H. A. Weddell 778* (G-DC; isolectotypes: P 00634933, 00634934, 00634932).

[– *Astraea jatropha* Klotzsch in Arch. Naturgesch. 7(1): 194. 1841, nom. nud.]

Astraea klotzschii Didr. in Vidensk. Meddel. Naturhist. Foren. Kjøbenhavn 1857: 137. 1857 [– *Croton klotzschii* (Didr.) Müll. Arg. f. *genuinus* Müll. Arg. in Linnaea 34: 136. 1865, nom. inval. – *Astraea diversifolia* Klotzsch in Arch. Naturgesch. 7(1): 194. 1841, nom. nud.]. – Type: Brazil, *K. E. v. Mercklin s.n.* (C?, LE?, MW? [not located]).

= *Croton klotzschii* (Didr.) Müll. Arg. f. *divaricatus* Müll. Arg. in Linnaea 34: 136. 1865, nom. illeg., non *C. klotzschii* Baill. in Adansonia 4: 346. 1864 [– *Astraea divaricata* Klotzsch in Arch. Naturgesch. 7(1): 194. 1841, nom. nud. – *Croton astraeatus* Baill. in Adansonia 4: 341. 1864, nom. nud.]. – Holotype: Brazil, *F. Sellow s.n.* (B, destroyed; isotypes: BR 00000875992(4), G (2), K 000186084, LE, P 00634925).

= *Croton klotzschii* (Didr.) Müll. Arg. f. *prunifolius* Müll. Arg. in Linnaea 34: 136. 1865, nom. illeg., non *C. klotzschii* Baill. in Adansonia 4: 346. 1864 [– *Astraea prunifolia* Klotzsch in Arch. Naturgesch. 7(1): 194. 1841, nom. nud.]. – Syntypes: Brazil, *F. Sellow s.n.* (G-BOIS; isosyntype: W); Brazil, *L. Riedel s.n.* (K 000252626).

= *Croton klotzschii* (Didr.) Müll. Arg. var. *latifolius* Müll. Arg. in Linnaea 34: 136. 1865, non *Croton klotzschii* Baill. var. *latifolius* Baill. in Adansonia 4: 346. 1864. – Syntypes: Brazil, Bahia, *C. F. P. Martius s.n.* (isosyntypes: L 0234698, M 0086086, 0086087, 0089105); Brazil, Bahia, *J. S. Blanchet 3216A* [= *3621*?] (G (2), G-BOIS, G-DC; isosyntypes: A 0257948, MA 249988, W).

= *Astraea glandulifera* Klotzsch ex Wawra, Bot. Ergebn.: 31. 1866. – Syntypes: Brazil, Pernambuco, 1838, *G. Gardner 1137* (G; isosyntype: K 000186082); Brazil, Bahia, *J. S. Blanchet 3216* [= *3621*?] (G (2), G-BOIS; isosyntypes: A 00257948, MA 249988, W).

Astraea lobata (L.) Klotzsch in Arch. Naturgesch. 7(1): 194. 1841 ≡ *Croton lobatus* L., Sp. Pl. 2: 1005. 1753. – Lectotype (designated here): Herb. Clifford: 445, *Croton* 4 (BM 000647404).

= *Schradera scandens* Willd. in Gött. J. Naturwiss. 1: 1. 1797.

= *Astraea seemannii* Klotzsch in Seemann, Bot. Voy. Herald 3: 103. 1853 ≡ *Croton lobatus* var. *seemannii* (Klotzsch) Müll. Arg. in Candolle, Prodr. 15(2): 669. 1866. – Type: "Near Panama" [not located].

= *Croton lobatus* var. *manihot* Müll. Arg. in Candolle, Prodr. 15(2): 668. 1866 [– *Astraea manihot* Klotzsch in Arch. Naturgesch. 7(1): 194. 1841, nom. nud. – *Croton manihot* Baill. in Adansonia 4: 341. 1864,

Table 1. Names of *Croton* and associated genera published by Klotzsch in alphabetical order and the currently accepted names of the corresponding taxa; accepted names are in boldface; numbers in parantheses refer to the running number of the *Croton* species in the present paper.

Klotzsch's names	Currently accepted names
Argyrodendron Klotzsch	***Croton*** sect. ***Croton***
Argyrodendron bicolor Klotzsch	***Croton menyharthii*** Pax (19)
Argyrodendron petersii Klotzsch	***Combretum imberbe*** Wawra
[*Asterocroton* Klotzsch, nom. nud.]	***Croton*** sect. ***Barhamia*** (Klotzsch) Baill.
[*Asterocroton guianensis* Klotzsch, nom. nud.]	***Croton guianensis*** Aubl. (3)
Astraea Klotzsch	***Astraea*** Klotzsch
[*Astraea divaricata* Klotzsch, nom. nud.]	***Astraea klotzschii*** Didr.
[*Astraea diversifolia* Klotzsch, nom. nud.]	***Astraea klotzschii*** Didr.
Astraea glandulifera Klotzsch ex Wawra	***Astraea klotzschii*** Didr.
[*Astraea jatropha* Klotzsch, nom. nud.]	***Astraea jatropha*** (Müll. Arg.) B. W. van Ee
Astraea lobata (L.) Klotzsch	***Astraea lobata*** (L.) Klotzsch
[*Astraea manihot* Klotzsch, nom. nud.]	***Astraea lobata*** (L.) Klotzsch
[*Astraea palmata* Klotzsch, nom. nud.]	***Astraea lobata*** (L.) Klotzsch
[*Astraea prunifolia* Klotzsch, nom. nud.]	***Astraea klotzschii*** Didr.
Astraea seemannii Klotzsch	***Astraea lobata*** (L.) Klotzsch
[*Astraea tomentosa* Klotzsch, nom. nud.]	***Astraea comosa*** (Müll. Arg.) B. W. van Ee
Barhamia Klotzsch	***Croton*** sect. ***Barhamia*** (Klotzsch) Baill.
Barhamia essequiboensis (Klotzsch) Klotzsch	***Croton essequiboensis*** Klotzsch (2)
Barhamia hispida (Kunth) Klotzsch	***Croton hircinus*** Vent. (4)
[*Barhamia macrostachya* Klotzsch, nom. nud.]	***Croton essequiboensis*** Klotzsch (2)
Barhamia multispicata (Vell.) Klotzsch	***Croton urticifolius*** Lam. (6)
Barhamia ovalifolia (Vahl) Klotzsch	***Croton ovalifolius*** Vahl (5)
Barhamia panamensis Klotzsch	***Croton hircinus*** Vent. (4)
Barhamia urticifolia (Lam.) Klotzsch	***Croton urticifolius*** Lam. (6)
Brachystachys hirta (L'Hér.) Klotzsch	***Croton hirtus*** L'Hér. (29)
Brachystachys Klotzsch	***Croton*** sect. ***Geiseleria*** (A.Gray) Baill.
Cleodora Klotzsch	***Croton*** sect. ***Cleodora*** (Klotzsch) Baill.
Cleodora sellowiana Klotzsch	***Croton sphaerogynus*** Baill. (15)
[*Codonocalyx divaricatus* Klotzsch ex Baill., nom. nud.]	***Croton nitrariifolius*** Baill. (11)
[*Croton angularis* Klotzsch pro syn., nom. inval.]	***Croton salutaris*** Casar. (14)
Croton brasiliensis Mart. ex Klotzsch	***Croton compressus*** Lam. (37)
Croton cuneatus Klotzsch	***Croton cuneatus*** Klotzsch (22)
Croton essequiboensis Klotzsch	***Croton essequiboensis*** Klotzsch (2)
[*Croton lanatus* Klotzsch ex Baill., nom. nud.]	***Croton malacotrichus*** Müll. Arg. (8)
[*Croton longifolius* Klotzsch ex Baill., nom. nud.]	***Croton montevidensis*** Spreng. (10)
Croton nervosus Klotzsch, nom. illeg.	***Croton argyrophyllus*** Kunth (36)
Croton palanostigma Klotzsch	***Croton palanostigma*** Klotzsch (39)
[*Croton polymorphus* Klotzsch ex Baill., nom. nud.]	***Croton nitrariifolius*** Baill. (11)
Croton tricolor Klotzsch ex Baill.	***Croton tricolor*** Klotzsch ex Baill. (38)
[*Croton* sect. *Codonocalyx* Klotzsch ex Baill., nom. nud.]	***Croton*** subsect. ***Medea*** (Klotzsch) Pax
[*Crotonanthus* Klotzsch ex Schltdl., nom. nud.]	***Croton*** sect. ***Adenophyllum*** Griseb.
[*Crotonanthus padifolius* Klotzsch ex Schltdl., nom. nud.]	***Croton conduplicatus*** Kunth (1)
Cyclostigma Klotzsch, nom. illeg.	***Croton*** sect. ***Cyclostigma*** Griseb.
Cyclostigma denticulatum Klotzsch	***Croton draco*** Schltdl. & Cham. (23)
Cyclostigma draco (Schltdl. & Cham.) Klotzsch	***Croton draco*** Schltdl. & Cham. (23)
Cyclostigma panamense Klotzsch	***Croton draco*** Schltdl. & Cham. (23)
Engelmannia Klotzsch, nom. illeg.	***Croton*** sect. ***Heptallon*** (Raf.) Müll. Arg.
Engelmannia nuttalliana Klotzsch, nom. illeg.	***Croton monanthogynus*** Michx. (34)
Eutropia Klotzsch	***Croton*** sect. ***Eutropia*** (Klotzsch) Baill.
Eutropia brasiliensis (Spreng.) Klotzsch	***Croton polyandrus*** Spreng. (26)
[*Eutropia obovata* Klotzsch, nom. nud.]	***Croton polyandrus*** Spreng. (26)
Geiseleria Klotzsch (1841), nom. illeg.	***Croton*** sect. ***Geiseleria*** (A. Gray) Baill.
Geiseleria Klotzsch (1843), nom. illeg.	***Acalypha*** L.
Geiseleria chamaedryfolia (Lam.) Klotzsch	***Acalypha chamaedryfolia*** (Lam.) Müll. Arg.
Geiseleria glandulosa (L.) Klotzsch	***Croton glandulosus*** L. (28)
[*Hendecandra divaricata* Klotzsch, nom. nud.]	***Croton nitrariifolius*** Baill. (11)
[*Hendecandra glabrescens* Klotzsch, nom. nud.]	***Croton nitrariifolius*** Baill. (11)
[*Hendecandra longifolia* Klotzsch, nom. nud.]	***Croton montevidensis*** Spreng. (10)

Hendecandra maritima (Walter) Klotzsch	***Croton punctatus*** Jacq. (24)
Hendecandra montevidensis (Spreng.) Klotzsch	***Croton montevidensis*** Spreng. (10)
Hendecandra texensis Klotzsch	***Croton texensis*** (Klotzsch) Müll. Arg. (25)
[*Hendecandra velleriflora* Klotzsch, nom. nud.]	***Croton nitrariifolius*** Baill. (11)
Lasiogyne Klotzsch	***Croton*** sect. ***Lasiogyne*** (Klotzsch) Baill.
Lasiogyne brasiliensis Klotzsch	***Croton compressus*** Lam. (37)
Lasiogyne pottsii Klotzsch	***Croton pottsii*** (Klotzsch) Müll. Arg. (35)
[*Leucadenia* Klotzsch, nom. inval.]	***Croton*** subsect. ***Medea*** (Klotzsch) Pax
[*Leucadenia pilosa* Klotzsch, nom. inval.]	***Croton fuscus*** (Didr.) Müll. Arg. (7)
[*Macrocroton* Klotzsch, nom. nud.]	***Croton*** sect. ***Cuneati*** (G. L. Webster) Riina & P. E. Berry
[*Macrocroton cuneatus* (Klotzsch) Klotzsch, nom. nud.]	***Croton cuneatus*** Klotzsch (22)
[*Macrocroton surinamensis* Klotzsch, nom. nud.]	***Croton cuneatus*** Klotzsch (22)
Medea Klotzsch	***Croton*** subsect. ***Medea*** (Klotzsch) Pax
Medea hirta Klotzsch	***Croton timandroides*** (Didr.) Müll. Arg. (13)
Ocalia Klotzsch	***Croton*** sect. ***Geiseleria*** (A. Gray) Baill.
[*Ocalia angustifolia* Klotzsch, nom. nud.]	***Croton antisyphiliticus*** Mart. (27)
[*Ocalia betulina* Klotzsch, nom. nud.]	***Croton repens*** Schltdl. (31)
[*Ocalia cordiifolia* Klotzsch, nom. nud.]	***Croton antisyphiliticus*** Mart. (27)
[*Ocalia echiifolia* Klotzsch, nom. nud.]	***Croton antisyphiliticus*** Mart. (27)
[*Ocalia grandifolia* Klotzsch, nom. nud.]	***Croton antisyphiliticus*** Mart. (27)
[*Ocalia sellowiana* Klotzsch, nom. nud.]	***Croton antisyphiliticus*** Mart. (27)
Pilinophytum Klotzsch	***Croton*** sect. ***Heptallon*** (Raf.) Müll. Arg.
Pilinophytum capitatum (Michx.) Klotzsch	***Croton capitatus*** Michx. (33)
Podostachys Klotzsch	***Croton*** sect. ***Geiseleria*** (A. Gray) Baill.
Podostachys hirta (L'Hér.) Klotzsch	***Croton hirtus*** L'Hér. (29)
[*Podostachys incana* Klotzsch, nom. nud.]	***Croton lundianus*** (Didr.) Müll. Arg. (30)
[*Podostachys sellowiana* Klotzsch, nom. nud.]	***Croton lundianus*** (Didr.) Müll. Arg. (30)
[*Podostachys serrata* Klotzsch, nom. nud.]	***Croton trinitatis*** Millsp. (32)
Tiglium Klotzsch	***Croton*** sect. ***Croton***
Tiglium cumingii Klotzsch	***Croton leiophyllus*** Müll. Arg. (17)
Tiglium lanceolatum Klotzsch	***Croton verreauxii*** var. ***angustifolius*** Müll. Arg. (21)
Tiglium officinale Klotzsch	***Croton tiglium*** L. (20)
Tiglium pubescens Klotzsch	***Croton luzoniensis*** Müll. Arg. (18)
Tiglium subincanum Klotzsch	***Croton consanguineus*** Müll. Arg. (16)
Timandra Klotzsch	***Croton*** subsect. ***Medea*** (Klotzsch) Pax
[*Timandra dichotoma* Klotzsch, nom. nud.]	***Croton serratus*** Müll. Arg. (12)
[*Timandra erythroxyloides* Klotzsch, nom. nud.]	***Croton microphyllinus*** Radcl.-Sm. & Govaerts (9)
[*Timandra serrata* Klotzsch, nom. nud.]	***Croton serratus*** Müll. Arg. (12)

nom. nud.]. – Syntypes: Brazil, *F. Sellow s.n.* (isosyntype: P 00634915); Brazil, *J. F. Widgren* [*364*] *s.n.* (isosyntype: BR); Brazil, Rio de Janeiro, *C. F. P. Martius s.n.*, (G-DC; isosyntypes: M 0089080, 0089081, 0089082); Brazil, *C. Gaudichaud 1129* (G-DC); Brazil, *J. B. A. Guillemin 167* (G-DC).

= *Croton lobatus* var. *palmatus* Müll. Arg. in Candolle, Prodr. 15(2): 668. 1866 [– *Astraea palmata* Klotzsch in Arch. Naturgesch. 7(1): 194. 1841, nom. nud.]. – Holotype: Brazil, *F. Sellow s.n.* (B, destroyed; isotype: LE).

Smith & al. (1988: 68) indicated a "Hort. cliff. 445" specimen from Veracruz, Mexico as the type of *Croton lobatus,* but stated that the specimen did not exist, which makes it difficult for this to be considered an effective lectotypification. For the species for which Smith & al. (1988) called one of the syntype specimens the type, and sometimes indicated a herbarium, their designation can be considered an effective lectotypification, as by Caruzo & Cordeiro (2007), although some of these require a second step (ICBN Art. 9.15, McNeill & al. 2006). Webster (2001a: 375) indicated a *Houston s.n.* specimen in the Clifford herbarium as the type of *C. lobatus* and also attributed it as being from Veracruz, Mexico. However, as Jarvis (2007) pointed out this lacked the phrase "designated here" and can therefore not be considered an effective lectotypification (ICBN Art. 7.11, McNeill & al. 2006). That is remedied here by designating the sheet in the Clifford herbarium the lectotype.

Linnaeus (1753: 1005) indicated the distribution of *Croton lobatus* as "in Vera Cruce" and along with "Hort. cliff. 445" also made reference to Martyn (1728: t. 46), which makes the latter a part of the original material. Martyn (1728: p. 46) indicated the distribution of his taxon "Ricinoides herbaceum, foliis trifidis vel quinquefidis, & serratis" (= *Astraea lobata*) by stating "Circa Veram Crucem frequens est, teste Houstono, qui semina ejus anno 1730 in Europam misit [frequent near Veracruz, according to Houston, who sent seeds of it to Europe in 1730]." There is no indication that the lectotype sheet is definitely a plant grown from seed sent by B. R. Houston, or a specimen collected by him, or that it is from Veracruz, Mexico, and Linnaeus (1753) may have been referring to Martyn (1728) rather than to the provenance of the specimen in the Clifford herbarium.

Fig. 1. Illustration of *Croton hircinus* in Ventenat (1803: t. 50), the designated lectotype of *C. hircinus*. – Reproduced with permission from the Library of the Gray Herbarium, Harvard University, Cambridge, Massachusetts, U.S.A.

I have not been able to locate any apparent original material of *Astraea seemannii*. Klotzsch (1853: 103) indicated that it was from "near Panama." Müller (1866: 669) transferred it as a variety of *Croton lobatus* and listed specimens from Nicaragua and Veracruz, Mexico, which is the type locality of *C. lobatus*. The only species of *Astraea* recognised as occurring outside of South America is *A. lobata;* it therefore seems certain that *A. seemannii* is a synonym of it. Webster & Burch (1967: 263), Burger & Huft (1995: 93) and Webster (2001b: 870), among others, have also treated *A. seemannii* as a synonym of *A. lobata*.

Croton L., Sp. Pl.: 1004. 1753.
Lectotype (designated by Britton in Fl. Bermuda: 207. 1918): *Croton tiglium* L.

See Ee & Berry (2010a) for an overview of the lectotypification of *Croton*.

Croton sect. ***Adenophyllum*** Griseb., Fl. Brit. W. I.: 40. 1859. – Type: *Croton adenophyllus* Bertero ex Spreng.
[– *Crotonanthus* Klotzsch ex Schltdl. in Linnaea 26: 634. 1855, nom. nud.]

1. *Croton conduplicatus* Kunth in Humboldt & al., Nov. Gen. Sp. 2: 80. 1817. – Holotype: Venezuela, crescit locis planis arenosis prope Nova Barcelona, 1800, *A. J. A. Bonpland & F. W. H. von Humboldt 1212* (P-Bonpl.; isotypes: B, destroyed, F [photo], P 00129798).
[– *Crotonanthus padifolius* Klotzsch ex Schltdl. in Linnaea 26: 634. 1855, nom. nud.].

In the entry for *'Crotonanthus padifolius'* (Schlechtendal 1855: 634), the only description given other than the locality information was "Frutex 5–6". This is not sufficient to distinguish the taxon from others included in the same work, such as the identically-described *Croton fragilis* Kunth ("Frutex 5–6") on the preceding page, and therefore *'Crotonanthus padifolius'* should be considered a nomen nudum (ICBN Art. 32.1–2, McNeill & al. 2006). I have been unable to locate any of the material cited for *Crotonanthus padifolius* (Schlechtendal 1855), so I follow Müller (1866: 635) who included it in synonymy under *Croton rhamnifolius* Willd. (= *C. conduplicatus* Kunth).

Croton sect. ***Barhamia*** (Klotzsch) Baill., Étude Euphorb.: 367. 1858 ≡ *Barhamia* Klotzsch in Seemann, Bot. Voy. Herald 3: 104. 1853. – Lectotype (designated by Wheeler in Taxon 24: 534. 1975): *Barhamia panamensis* Klotzsch (= *Croton hircinus* Vent.).
[– *Asterocroton* Klotzsch in Schomburgk, Reis. Br.-Guiana 3: 1186. 1849, nom. nud.]

2. *Croton essequiboensis* Klotzsch in London J. Bot. 2: 49. 1843 ≡ *Barhamia essequiboensis* (Klotzsch) Klotzsch in Seemann, Bot. Voy. Herald 3: 104. 1853 ≡ *Croton populifolius* var. *essequiboensis* (Klotzsch) Müll. Arg. in Candolle, Prodr. 15(2): 654. 1866. – Lectotype (designated here): Guyana, on the Essequibo [river], 1836, *M. R. Schomburgk 33* (G; isolectotypes: G-BOIS, G-DC, K 000254436, 000254437, L 0145332, P 00587445, U 0006797, W 163348 upper right, W).
[– *Barhamia macrostachya* Klotzsch in Seemann, Bot. Voy. Herald 3: 104. 1853, nom. nud.].

In the protologue of *Croton essequiboensis* (Klotzsch 1843a: 4950) the specimen *Schomburgk 33* is cited. The sheet of this at W [163348] is a mixed collection, with the specimen on the upper right corresponding to *Croton* (sect. *Barhamia*) *essequiboensis* and the specimen on the left corresponding to *Croton* (sect. *Lasiogyne*) *argyrophyllus* Kunth. In contrast, the *Schomburgk 33* specimen at BR [855291], which is labelled as *C. essequiboensis,* consists of a single plant referable to *C. argyrophyllus*. Given the mixture of two different species among the material of *Schomburgk 33,* the isotype of it at G is selected as lectotype.

For *'Barhamia macrostachya'* Klotzsch (1853: 104) cited the specimen *Schomburgk 382,* of which exists an apparent duplicate at K numbered "316/382a". It is clear that Klotzsch intended a new name rather than a combination of the African *C. macrostachyus* Hochst. ex Delile. I therefore interpret *B. macrostachya* as a nomen nudum, given the lack of any description or diagnosis.

3. *Croton guianensis* Aubl., Hist. Pl. Guiane 2: 882. 1775. – Original material: *J. B. C. F. Aublet,* Hist. Pl. Guiane 4: t. 339 *"Croton Guyannense"*. 1775; French Guyana, [without collector], ex herb. Aublet (W 119206); French Guyana, herb. Adanson no. 19004 (P).
[– *Asterocroton guianensis* Klotzsch in Schomburgk, Reis. Br.-Guiana 3: 1186. 1849, nom. nud.].

Croton guianensis Aubl. is placed here in *Croton* sect. *Barhamia* even though the glands at the base of the leaves are unusual for the section. These are clearly visible in t. 339 cited in the protologue and in the specimen from Adanson's herbarium.

4. *Croton hircinus* Vent., Jard. Malmaison: 50. 1803. – Lectotype (designated here): *E. P. Ventenat,* Jard. Malmaison, t. 50 *"Croton Hircinum"*. 1803; epitype (designated here): *Adanson 19005* (P; isoepitype: P) – Fig. 1.
= *Barhamia panamensis* Klotzsch in Seemann, Bot. Voy. Herald 3: 104. 1853. – Type: Panama, near Natá, *B. C. Seemann s.n.* [not located].
= *Croton hispidus* Kunth in Humboldt & al., Nov. Gen. Sp. 2: 72. 1817 ≡ *Barhamia hispida* (Kunth) Klotzsch in Seemann, Bot. Voy. Herald 3: 104. 1853. – Holotype: Venezuela, Caracas, 1800, *A. J. A. Bonpland & F. W. H. von Humboldt 655* (P-Bonpl.; isotype: B-W 17884010).

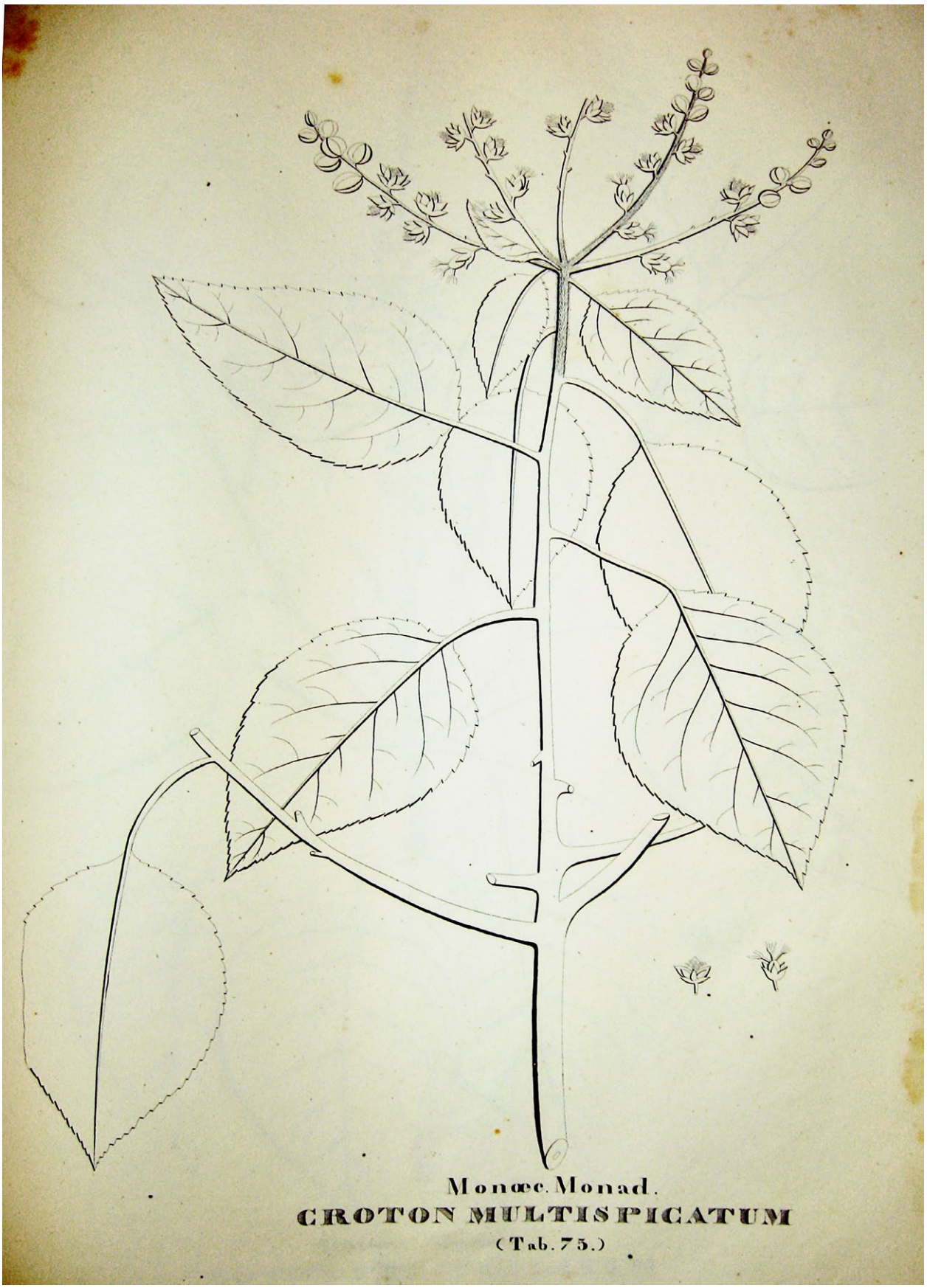

Fig. 2. Illustration of *Croton multispicatus* (= *C. urticifolius*) in Vellozo (1831: t. 75), the designated lectotype of *C. multispicatus*. – Reproduced with permission from the Library of the Gray Herbarium, Harvard University, Cambridge, Massachusetts, U.S.A.

= *Croton populifolius* Lam., Encycl. 2(1): 205. 1786, non Mill. (1768). – Lectotype (designated by Ee & Berry in Syst. Bot. 34: 138. 2009): St Domingue (P-LA 00382037).
= *Croton margaritensis* J. R. Johnst. in Proc. Amer. Acad. Arts 40: 689. 1905. – Holotype: Venezuela, Island of Margarita, San Juan Mt, 28.8.1903, *J. R. Johnston 50* (GH 47194; isotype: US 109612).
= *Croton odoratus* Ridl. in J. Linn. Soc., Bot. 27: 58. 1890. – Original material: Brazil, Pernambuco, Fernando de Noronha, hills above S Antonio Bay, 16.8.1887, *H. N. Ridley, Lea, Ramage "108"* (GH 47367); Brazil, Pernambuco, Fernando de Noronha, Taeyle Bay, 1887, *H. N. Ridley, Lea, Ramage "108"* (K 000254448).

Webster & Burch (1988: 1123) indicated the type of *Croton hircinus* Vent. as "cultivated specimen, *Ventenat* (presumably at G, not seen)," and this was repeated by Ee & Berry (2009: 138). This specimen has not been located, although there are early collections of *C. hircinus* at G and P. Therefore, t. 50 *"Croton Hircinum"*, of Ventenat (1803, see Fig. 1) is designated as the lectotype of *C. hircinus*, and specimen no. 19005 with the handwritten label from Adanson's herbarium (P) as an epitype.

5. *Croton ovalifolius* Vahl in West, Bidr. Beskr. Ste Croix: 307. 1793 ≡ *Barhamia ovalifolia* (Vahl) Klotzsch in Seemann, Bot. Voy. Herald 3: 104. 1853. – Type: Herb. Vahlii, "*Astrea (Brachÿbotrÿa) ovalifolia* F. Didr." (isotype: C); U.S. Virgin Islands, St. Croix, Hb. Vahlii, "*Astrea (Brachÿbotrÿa) ovalifolia* F. Didr." *H. West s.n.* (isotype: C).

Although Klotzsch (1853: 104) attributed *Barhamia ovalifolia* (Vahl) Klotzsch as a new combination of *Croton ovalifolium* sensu Walpers (as 'Wlprs.'), there is no taxon by that name published by Walpers. *B. ovalifolia* is either a nomen nudum, which otherwise refers to the same species as *C. ovalifolium* Vahl, or it is a new combination of Vahl's name (West 1793: 307). I interpret it as a new combination, with Vahl as the parenthetical author.

6. *Croton urticifolius* Lam., Encycl. 2: 213. 1786 ≡ *Barhamia urticifolia* (Lam.) Klotzsch in Seemann, Bot. Voy. Herald 3: 104. 1853. – Holotype: Brazil, *P. Commerson s.n.* (P-LA 00222698; isotypes: A 00277234, P-JU 00222697).
= *Croton multispicatus* Vell., Fl. Flumin. 10: t. 75. 1831 ≡ *Barhamia multispicata* (Vell.) Klotzsch in Seemann, Bot. Voy. Herald 3: 104. 1853. – Lectotype (designated here): *J. M. de Conceição Vellozo*, Fl. Flumin. 10: t. 75 "Monæe. Monad. Croton Multispicatum," 1831; epitype (designated here): Brazil, 1838, *C. F. P. Martius 162* (K 000254357; isoepitypes: G-BOIS, G-DC, GH 47357) – Fig. 2.
= *Ocalia lantanifolia* Didr. in Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1857: 139. 1857. – Type: Brazil, *N. T. Lund s.n.* (C? [not located]).

Croton (sect. ***Barhamia***) subsect. ***Medea*** (Klotzsch) Pax in Engler & Prantl, Nat. Pflanzenfam. 3(5): 39. 1890 ≡ *Medea* Klotzsch in Arch. Naturgesch. 7(1): 198. 1841 ≡ *Croton* sect. *Medea* (Klotzsch) Baill., Étude Euphorb.: 368. 1858 ≡ *Croton* ser. *Medea* (Klotzsch) Müll. Arg. in Martius, Fl. Bras. 11(2): 144. 1873. – Type: *Medea hirta* Klotzsch (= *C. timandroides* (Didr.) Müll. Arg.).
= *Timandra* Klotzsch in Arch. Naturgesch. 7(1): 197. 1841. – Lectotype (designated by Wheeler in Taxon 24: 538. 1975): *Croton serratus* Müll. Arg.
= *Croton* sect. *Codonocalyx* Klotzsch ex Baill., Étude Euphorb.: 369. 1858. – Lectotype (designated by Webster in Taxon 42: 820. 1993): *Croton montevidensis* Spreng.
[– *Leucadenia* Klotzsch in Adansonia 4: 338. 1864, pro syn., nom. inval.]

Although occasionally treated as if it was published as a genus (Brummitt 1992: 107; Govaerts & al. 2000: 422), *Croton* sect. *Codonocalyx* Klotzsch ex Baill. was actually described as a section (Baillon 1858: 369). Klotzsch (1841a: 193) listed six species in *Hendecandra* Eschsch. One of these, *H. montevidensis* (Spreng.) Klotzsch, was a new combination for *Croton montevidensis* Spreng., the rest are nomina nuda. Baillon (1858: 370) listed five of these six epithets under *Croton* sect. *Codonocalyx,* plus "*C. lanatus* Kl.", attributing all of them to Klotzsch, but he did not use the epithet *'glabrescens'*, which had been used by Klotzsch (1841a: 193). Baillon's (1858) names in *Croton* sect. *Codonocalyx* are also nomina nuda. My interpretation is that these nomina nuda in *Croton* sect. *Codonocalyx* (Baillon 1858) were intended for the same taxa listed in *Hendecandra* by Klotzsch (1841a) and can be accounted for within *Croton* sect. *Barhamia*. Later in the same year, Klotzsch (1841b: 252) published the combination *H. maritima* (Walter) Klotzsch based on *C. maritimus* Walter (= *C. punctatus* Jacq.) and described *H. texensis* Klotzsch (= *C. texensis* (Klotzsch) Müll. Arg.). Both of these taxa are members of *Croton* sect. *Drepadenium* (Raf.) Müll. Arg. It appears that Klotzsch's concept of *Hendecandra* changed from Klotzsch (1841a) to Klotzsch (1841b).

7. *Croton fuscus* (Didr.) Müll. Arg. in Linnaea 34: 131. 1865 ≡ *Myriogomphos fuscus* Didr. in Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1857: 143. 1857 ≡ *Oxydectes fusca* (Didr.) Kuntze, Revis. Gen. Pl. 2: 611. 1891. – Type: Brazil, São Paulo, 6.1834. *N. T. Lund s.n.* (C? [not found], G-DC).
= *Croton leucadenius* Baill. in Adansonia 4: 338. 1864 ≡ *Croton fuscus* var. *leucadenius* (Baill.) Müll. Arg. in Candolle, Prodr. 15(2): 648. 1866. – Lectotype (collection at P designated by Caruzo & Cordeiro in

Hoehnea 34: 579. 2007, specimen designated here): Brazil, São Paulo, *A. F. C. P. Saint-Hilaire cat. C2, n. 1467* (P 00623508; isolectotypes: A, P [P00623509]).

[– *Leucadenia pilosa* Klotzsch in Adansonia 4: 338. 1864, pro syn., nom. inval.]

Some indices, such as Radcliffe-Smith (2001: 322) and IPNI (2010), have included '*Leucadenia* Klotzsch ex Baill.' and '*Leucadenia pilosa* Klotzsch ex Baill.' as if they were validly published names. However, Baillon (1864: 338) did not accept these taxa and merely listed "*Leucadenia pilosa* Kl., mss." as a synonym in his description of *Croton leucadenius* Baill. Therefore, these taxa are not validly published (ICBN Art. 34.1, McNeill & al. 2006).

8. *Croton malacotrichus* Müll. Arg. in Linnaea 34: 101. 1865 ≡ *Croton lanuginosus* Baill. in Adansonia 4: 355. 1864, non K. Schum. ex Schweinf. (1862). – Holotype: Brazil, *F. Sellow 2310* (B 100086866, F [photo]; isotypes: A 00047332, 00047333, P 00634788).

[– *Croton* (sect. *Codonocalyx*) *lanatus* Klotzsch ex Baill., Étude Euphorb.: 370. 1858, nom. nud.]

9. *Croton microphyllinus* Radcl.-Sm. & Govaerts in Kew Bull. 52: 188. 1997 ≡ *Croton erythroxyloides* Müll. Arg. in Linnaea 34: 111. 1865, non Baill. (1864). – Holotype: Brazil, *F. Sellow 302* (B 10 0127731, F [photo]).

[– *Timandra erythroxyloides* Klotzsch in Arch. Naturgesch. 7(1): 198. 1841, nom. nud.]

10. *Croton montevidensis* Spreng., Syst. Veg. 3: 873. 1826 ≡ *Oxydectes montevidensis* (Spreng.) Kuntze, Revis. Gen. Pl. 2: 612. 1891 ≡ *Hendecandra montevidensis* (Spreng.) Klotzsch in Arch. Naturgesch. 7(1): 193. 1841. – Type: Brazil, *F. Sellow s.n.* (isotypes: BR 0000008552716, F 0056166F, K 000186151, 000186152, 000186153, 000186156, L 0234914, P 00634510, 00634511).

= *Croton penaeaceus* Baill. in Adansonia 4: 352. 1864. – Syntypes: Uruguay, 1816–21, *A. F. C. P. Saint-Hilaire cat. C2, n. 2134* (P 00634508, 00634509; isosyntype: A 00257975); Uruguay, *F. Sellow s.n.* (P [not located]; isosyntypes: A 00257975, G-DC); Brazil, Rio Grande do Sul, *C. Gaudichaud 1660–1661* (P? [not located]).

[– *Hendecandra longifolia* Klotzsch in Arch. Naturgesch. 7(1): 193. 1841, nom. nud.]

[– *Croton longifolius* Klotzsch ex Baill., Étude Euphorb.: 370. 1858, nom. nud.]

11. *Croton nitrariifolius* Baill. in Adansonia 4: 351. 1864 [– *Hendecandra divaricata* Klotzsch in Arch. Naturgesch. 7(1): 193. 1841, nom. nud. – *Codonocalyx divaricatus* Klotzsch ex Baill., Étude Euphorb.: 370. 1858, nom. nud.]. – Syntypes: Brazil, *Sellow* [*1659*] *s.n.* (P 00634546; isosyntypes: A 00047458 [lower plant], G-DC, K 000186149, 000254379, L 0234934, LE); Brazil, Rio Grande do Sul, *C. Gaudichaud 1659* (P [not located]); Uruguay. *A. F. C. P. Saint-Hilaire cat. C2, n. 2101* (P 00634540, 00634541, 00634542; isosyntype: A 00257966).

= *Croton codonocalyx* Baill. in Adansonia 4: 353. 1864 [– *Croton* (sect. *Codonocalyx*) *polymorphus* Klotzsch ex Baill., Étude Euphorb.: 370. 1858, nom. nud.]. – Syntypes: Brazil, *Sellow s.n.* (P 00634544, 00634545; isosyntypes: GH 00257965, K 000254376); Brazil, Rio Grande do Sul, *C. Gaudichaud 1657* (P 00634547).

= *Croton velleriflorus* Baill. in Adansonia 4: 353. 1864 ≡ *Croton polymorphus* Müll. Arg. var. *velleriflorus* (Baill.) Müll. Arg. in Linnaea 34: 100. 1865 ≡ *Croton nitrariifolius* var. *velleriflorus* (Baill.) Müll. Arg. in Candolle, Prodr. 15(2): 563. 1866 [– *Hendecandra velleriflora* Klotzsch in Arch. Naturgesch. 7(1): 193. 1841, nom. nud. – *Croton* (sect. *Codonocalyx*) *velleriflorus* Klotzsch ex Baill., Étude Euphorb.: 370. 1858, nom. nud.]. – Syntypes: Brazil, *F. Sellow s.n.* (P 00634543; isosyntypes: A 00047458 [upper plant], K 000254375, 000254377); Uruguay, *A. F. C. P. Saint-Hilaire cat. C2, n. 2675* (P? [not located]).

= *Croton polymorphus* Müll. Arg. var. *glabrescens* Müll. Arg. in Linnaea 34: 101. 1865 [– *Hendecandra glabrescens* Klotzsch in Arch. Naturgesch. 7(1): 193. 1841, nom. nud.]. – Type: Brazil, *F. Sellow s.n.* (isotypes: G-DC, K 000254378, 000186150, LE).

12. *Croton serratus* Müll. Arg. in Candolle, Prodr. 15(2): 647. 1866 [– *Croton serratus* var. *genuinus* Müll. Arg. in Candolle, Prodr. 15(2): 647. 1866, nom. inval.] ≡ *Oxydectes serrata* (Müll. Arg.) Kuntze, Revis. Gen. Pl. 2: 613. 1891 [– *Timandra serrata* Klotzsch in Arch. Naturgesch. 7(1): 198. 1841, nom. nud. – *Croton timandra* Baill. in Adansonia 4: 351, 1864, nom. nud.]. – Syntypes: Brazil, *F. Sellow s.n.* (G-BOIS, G-DC; isoyntypes: BR 876102, K 000186124, 000186123, P 00634719, 00634720).

= *Croton serratoideus* Radcl.-Sm. & Govaerts in Kew Bull. 52: 188. 1997 ≡ *Croton serratus* var. *dichotomus* Müll. Arg. in Candolle, Prodr. 15(2): 647. 1866 ≡ *Croton dichotomus* (Müll. Arg.) Müll. Arg. in Martius, Fl. Bras. 11(2): 187. 1873, non Willd. (1805) [– *Timandra dichotoma* Klotzsch in Arch. Naturgesch. 7(1): 198. 1841, nom. nud. – *Croton brachiatus* Mart. ex Baill., Étude Euphorb.: 368. 1858, nom. nud.]. – Syntypes: Brazil, *F. Sellow s.n.* (K 000186126); Brazil, *C. F. P. Martius 959* (F [photo], G-DC; isosyntypes: K 000186125, LE, MICH 1104792, P 00634721); Brazil, *H. A. Weddell s.n.* (G-DC); Brazil, Minas Gerais, in monte Itabira do Campo, *G. Casaretto 2589* (G-BOIS, G-DC).

13. *Croton timandroides* (Didr.) Müll. Arg. in Linnaea 34: 132. 1865 ≡ *Medea timandroides* Didr. in Kjoeb. Vidensk. Meddel. 1857: 141. 1857. – Type: Serra da Pie-

dade, 11.1834, *N. T. Lund* [*1716*] *s.n.* (isotypes: C [herb. Eug. Warming], C 21537, G-DC).

= *Medea hirta* Klotzsch in Arch. Naturgesch. 7(1): 198. 1841. – Syntypes: Brazil, *C. F. P. Martius 958* (original material: G-DC, K 000186128, P 00634789); Brazil, *F. Sellow s.n.* (original material: K 000186127).

= *Croton abnormis* Mart. ex Baill. in Adansonia 4: 354. 1864. – Syntypes: Brazil, *C. F. P. Martius 958* (P 00634789; isosyntypes: G-DC, K 000186128); Brazil, Minas Gerais. *A. F. C. P. Saint-Hilaire* [*cat. B2, n. 2240*] *s.n.* (isosyntypes: A 00257868, 00257869, 00257870, 00257871); Brazil, *F. Sellow s.n.* (P [not located]; isosyntype: B, destroyed); Brazil, Minas Gerais, Ouro-Preto, 1844, *H. A. Weddell s.n.* (P? [not located]); Brazil, [collector unknown] (original material: G-BOIS).

Croton sect. ***Cleodora*** (Klotzsch) Baill., Étude Euphorb.: 369. 1858 ≡ *Cleodora* Klotzsch in Arch. Naturgesch. 7(1): 196. 1841. – Type: *Cleodora sellowiana* Klotzsch (≡ *Croton pachycalyx* Müll. Arg. = *Croton sphaerogynus* Baill.).

14. *Croton salutaris* Casar., Nov. Stirp. Bras.: 89. 1845. – Holotype: Brazil, Rio de Janeiro, Serra dos Orgaos, *G. Casaretto 856* (TO?, not seen; isotype: G-DC).

= *Croton urceolatus* Desv. ex Baill. in Adansonia 4: 299. 1864 [– *Croton angularis* Klotzsch in Adansonia 4: 299. 1864, pro syn., nom. inval.] – Syntypes: Brazil, Minas Gerais, bords du Persicaba à Itaja, *A. F. C. P. Saint-Hilaire cat. B*[1]*, n. 601* ([not located]); Brazil, Minas Gerais, bords du Persicaba à Itaja, *A. F. C. P. Saint-Hilaire cat. B1, n. 691* ([not located]); Brazil. *F. Sellow s.n.* (B, destroyed?; isosyntypes: BR 876789, G-BOIS, GH 00277233, P 00634684, 00634685).

15. *Croton sphaerogynus* Baill. in Adansonia 4: 326. 1864. – Lectotype (collection at P designated by Caruzo & Cordeiro in Hoehnea 34: 583. 2007, specimen designated here): Brazil, Rio de Janeiro, 1831, *C. Gaudichaud 1139* (P 00634641; isolectotypes: B, destroyed, F [photo], F 0056197F, G-DC, P 00634642, 00634643, 00634639, 00634644, 00634645).

= *Croton pachycalyx* Müll. Arg. in Linnaea 34: 109. 1865 ≡ *Cleodora sellowiana* Klotzsch in Arch. Naturgesch. 7(1): 196. 1841. – Neotype (designated here): Brazil, Rio de Janeiro, 1831, *C. Gaudichaud 1139* (P 00634641).

In the description of *Cleodora* (Klotzsch 1841: 198) only *Cleodora sellowiana* Klotzsch was described, making it the obligate type of the genus, and no specimens were cited. Müller (1865: 109) published the replacement name *Croton pachycalyx* Müll. Arg. for *Cleodora sellowiana* and cited specimens by Gaudichaud (no. *1139*), Riedel, Luschnath and Widgren (no. *487*). Müller (1866: 591) later listed *Cleodora sellowiana* and *Croton pachycalyx* as synonyms of *C. sphaerogynus* Baill., for which *Gaudichaud 1139* was cited along with *Claussen 79* and *2004* (Baillon 1864: 326). Webster (1993: 800) indicated that he was still a little uncertain as to the application of *Cleodora sellowiana* given that he had seen no type material, but that he nevertheless followed Müller (1866). One of the several specimens of *Gaudichaud 1139* at P (00634642) has the annotation "*Timandra* Klotzsch." This annotation is not in Klotzsch's hand, and this collection matches the description of *Cleodora* rather than that of *Timandra* (Klotzsch 1841: 196–197). There is a photograph of *Gaudichaud 1139* from B in the MacBride pre-World War II type photograph collection at F (http://emuweb.fieldmuseum.org/botany/search_berlin.php). This specimen was presumably there during the time of Klotzsch, but was not annotated by him. Given that *Cleodora sellowiana* is the type of *Croton* sect. *Cleodora,* to stabilise its current application as a synonym of *Croton sphaerogynus*, I designate one of the *Gaudichaud 1139* sheets as a neotype for it. Caruzo & Cordeiro (2007: 583) designated *Gaudichaud 1139* from P as lectotype of *C. sphaerogynus,* but because there are at least six duplicates of this collection at P, I further narrow this down to a single sheet (ICBN Art. 9.15, McNeill & al. 2006).

Croton sect. ***Croton*** ≡ *Tiglium* Klotzsch in Nov. Actorum Acad. Caes. Leop.-Carol. Nat. Cur. 19(Suppl. 1): 418. 1843 ≡ *Croton* sect. *Tiglium* (Klotzsch) Baill., Étude Euphorb.: 361. 1858 [– *Croton* sect. *Eucroton* Baill., Étude Euphorb.: 354. 1858, nom. inval.]. – Type: *C. tiglium* L.

= *Croton* ser. *Argyrocroton* Müll. Arg. in Martius, Fl. Bras. 11(2): 133. 1873 ≡ *Croton* subsect. *Argyrocroton* (Müll. Arg.) Pax in Engler & Prantl, Nat. Pflanzenfam. 3(5): 39. 1890 ≡ *Croton* sect. *Argyrocroton* (Müll. Arg.) G. L. Webster in Taxon 42: 814. 1993 ≡ *Argyrodendron* Klotzsch in Peters, Naturw. Reise Mossambique: 100. 1861, non F. Muell. (1858, *Malvaceae*). – Lectotype (designated by Webster in Taxon 42: 814. 1993): *Argyrodendron bicolor* Klotzsch.

Linnaeus (1753: 1004) did not specify a type for *Croton*, and the genus was not lectotypified with *C. tiglium* L. until Britton (1918: 207). This choice rendered *Tiglium* Klotzsch synonymous with *Croton*. Ee & Berry (2010a) explained in more detail that the earlier lectotypification of Small (1913) can be superseded and that the one by Webster (1993: 800) is superfluous.

Klotzsch (1843c: 3) described four new *Tiglium* species from the Philippines based on specimens collected by Cuming. Müller (1865) later described these as species or varieties of *Croton* and cited all of the same Cuming specimens plus a few more, but did not make reference to Klotzsch (1843c). Two of Klotzsch's (1843c) *Tiglium* names, *T. lanceolatum* Klotzsch and *T. pubescens* Klotzsch, were blocked from being transferred to *Croton* by earlier uses of those epithets, and Müller

(1865) effectively blocked the other two, *T. cumingii* Klotzsch and *T. subincanum* Klotzsch, by using those epithets in the descriptions of unrelated species of *Croton* (Müller 1865: 101, 139).

16. *Croton consanguineus* Müll. Arg. in Linnaea 34: 117. 1865 ≡ *Tiglium subincanum* Klotzsch in Hayne, Getreue Darstell. Gew. 14: t. 3. 1843 [non *Croton subincanum* Müll. Arg. (1865)]. – Type: Philippines, Luzon, 1840 or 1841, *H. Cuming 1871* (isotypes: A 00102044, A 00135580, BM 000951457, G-BOIS, G-DC, GOET 003343).

17. *Croton leiophyllus* Müll. Arg. in Linnaea 34: 103. 1865 ≡ *Tiglium cumingii* Klotzsch in Hayne, Getreue Darstell. Gew. 14: t. 3. 1843 [non *Croton cumingii* Müll. Arg. (1865)]. – Syntypes: Philippines, *H. Cuming 998* (G-DC; isosyntypes: A 00047531, BM 000951458, GOET 003351, 003352); Philippines, *H. Cuming 1075* (G-BOIS, G-DC; isosyntypes: A 00047532, GOET 003349, 003350).

18. *Croton luzoniensis* Müll. Arg. in Linnaea 34: 118. 1865 ≡ *Tiglium pubescens* Klotzsch in Hayne, Getreue Darstell. Gew. 14: t. 3. 1843 [non *Croton pubescens* Geiseler (1807)]. – Type: Philippines, Luzon, Manilla, 1841, *H. Cuming 1136* (isotypes: A 00047535, 00106973, BM 000951459, G-BOIS, G-DC (2), GOET 003355).

19. *Croton menyharthii* Pax in Bull. Herb. Boissier 6: 733. 1898. – Syntypes: Mozambique, Maringa (Marenga), *L. Menyhárth 796* (Z 000015987); Mozambique, Maringa (Marenga), *L. Menyhárth 797* (Z [not seen]).

= *Argyrodendron bicolor* Klotzsch in Peters, Naturw. Reise Mossambique: 102. 1861. – Holotype: Mozambique, near Tette, 1842–48, *W. C. H. Peters s.n.* (B, destroyed). – Neotype (designated here): Mozambique, near Tette, lower Zambesi, 4.–5.1860, *J. Kirk 60* (K 000347465).

Argyrodendron bicolor is here neotypified with *J. Kirk 60* (K), on which there is the note "= *Argyrodendron bicolor,* Kl. (compared with type from Berlin! J. H. 1.6.11) *Croton menyharti,* Pax."

Argyrodendron Klotzsch is a later homonym of *Argyrodendron* F. Muell. (*Malvaceae,* Mueller 1858: 2), but it should not be interpreted as being linked to *Leucadendron* sect. *Argyrodendron* Endl. (*Proteaceae,* Endlicher 1847: 74) such as by Farr & al. (1979: 128).

20. *Croton tiglium* L., Sp. Pl.: 1004. 1753 ≡ *Kurkas tiglium* (L.) Raf., Sylva Tellur.: 62. 1838 ≡ *Tiglium officinale* Klotzsch in Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 19 (Suppl. 1): 418. 1843 ≡ *Oxydectes tiglium* (L.) Kuntze, Revis. Gen. Pl. 2: 614. 1891 ≡ *Croton officinalis* (Klotzsch) Alston in Trimen, Handb. Fl. Ceylon 4 (Suppl.): 264. 1931, nom. superfl. – Lectotype (collection in BM designated by Philcox in Dassanayake, Rev. Handbook Fl. Ceylon 11: 94. 1997, specimen designated by Chakrabarty & Balakrishnan in Bull. Bot. Surv. India 34: 72. 1997): Herb. Hermann 2: 6, no. 343, left-hand specimen (BM 000621512).

21. *Croton verreauxii* Baill. (1858) var. ***angustifolius*** Müll. Arg. in Linnaea 34: 117. 1865 ≡ *Tiglium lanceolatum* Klotzsch in Hayne, Getreue Darstell. Gew. 14: t. 3. 1843 [non *Croton lanceolatus* Cav. (1800)] ≡ *Croton angustifolius* (Müll. Arg.) Airy Shaw in Kew Bull. 38: 68. 1983, non Hamilton (1825). – Syntypes: Philippines, *H. Cuming 736* (isosyntype: BM 000951466); Philippines, *H. Cuming 1421* (G-DC; isosyntypes: BM 000951465, GOET 003337); Philippines, 1859, *A. Llanos s.n.* (G-DC).

Croton sect. ***Cuneati*** (G. L. Webster) Riina & P. E. Berry in Taxon 59: 1153. 2010 ≡ *Croton* subsect. *Cuneati* G. L. Webster in Taxon 42: 804. 1993. – Type: *C. cuneatus* Klotzsch

[– *Macrocroton* Klotzsch in Schomburgk, Reis. Br.-Guiana 3: 1186, 1849, nom. nud.]

22. *Croton cuneatus* Klotzsch in London J. Bot. 2: 49. 1843. – Lectotype (designated by Riina & al. in Taxon 59: 1154. 2010): British Guiana, 1839, *M. R. Schomburgk s.n.* (K 000186073; isolectotypes: B, destroyed, F [photo], 0BN005079).

[– *Macrocroton cuneatus* (Klotzsch) Klotzsch in Schomburgk, Reis. Br.-Guiana 3: 1186. 1849, nom. nud.]

[– *Macrocroton surinamensis* Klotzsch in Schomburgk, Reis. Br.-Guiana 3: 1186, 1849, nom. nud.]

Croton sect. ***Cyclostigma*** Griseb., Fl. Brit. W. I.: 42. 1859 ≡ *Croton* subsect. *Cyclostigma* (Griseb.) Müll. Arg. in Linnaea 34: 81. 1865 ≡ *Croton* ser. *Cyclostigma* (Griseb.) Müll. Arg. in Martius, Fl. Bras. 11(2): 91. 1873. – Type: *Croton gossypiifolius* Vahl

= *Cyclostigma* Klotzsch in Seemann, Bot. Voy. Herald 3: 104. 1853, non Hochst. ex Endl. (1842, *Apocynaceae*). – Lectotype (designated by Wheeler in Taxon 24: 535. 1975): *Cyclostigma panamense* Klotzsch (≡ *Croton panamensis* (Klotzsch) Müll. Arg. = *C. draco* Schltdl. & Cham.).

Cyclostigma Klotzsch (Klotzsch 1853: 104) is illegitimate as a younger homotype of *Cyclostgima* Hochst. ex Endl. (in Endlicher 1842: 56, *Apocynaceae*). In the description of *Croton* sect. *Cyclostigma* Griseb. (Grisebach 1859: 42) only *C. gossypiifolius* Vahl. was listed, and no reference to Klotzsch, nor any of the species he included in *Cyclostigma,* was made. Wheeler (1975: 535) lectotypified *Cyclostigma* Klotzsch with *C. panamense* Klotzsch. Webster (1993: 801) considered *Cyclostigma* Klotzsch and *Croton* sect. *Cyclostigma* Griseb. as homotypic synonyms, and interpreted Wheeler's (1975) lectotypification as applying to both, but did not adopt

it. I interpret these as heterotypic synonyms, with *Cyclostigma* Klotzsch having been effectively lectotypified by Wheeler (1975), and with *Croton gossypiifolius* Vahl. as the obligate type of *C.* sect. *Cyclostigma* Griseb.

23. *Croton draco* Schltdl. & Cham. in Linnaea 6: 360. 1831 ≡ *Cyclostigma draco* (Schltdl. & Cham.) Klotzsch in Seemann, Bot. Voy. Herald 3: 105. 1853. – Type: Mexico, Veracruz, Papantla, 2.1829, *F. Deppe & C. J. W. Schiede 1127* (isotypes: B, destroyed, F [photo], HAL 098599, 0107588).

= *Cyclostigma denticulatum* Klotzsch in Seemann, Bot. Voy. Herald 3: 105. 1853. – Type: Panama, 1.1848, *B. C. Seemann 1234* (original material: BM 000617185, K 574023).

= *Cyclostigma panamense* Klotzsch in Seemann, Bot. Voy. Herald 3: 105. 1853 ≡ *Croton panamensis* (Klotzsch) Müll. Arg. in Candolle, Prodr. 15(2): 546. 1866 ≡ *Oxydectes panamensis* (Klotzsch) Kuntze, Revis. Gen. Pl. 2: 612. 1891 ≡ *Croton draco* subsp. *panamensis* (Klotzsch) G. L. Webster in Ann. Missouri Bot. Gard. 75: 1120. 1988. – Original material: Panama, Boquete, Veraguas, *B. C. Seemann 1656* (K 574022); Panama, Boquete, Veraguas, 2.1848, *B. C. Seemann 1650* (BM 000617186, K 574021).

Croton sect. ***Drepadenium*** (Raf.) Müll. Arg. in Linnaea 34: 79. 1865 ≡ *Drepadenium* Raf., Neogenyton: 2. 1825 ≡ *Croton* subg. *Drepadenium* (Raf.) Pax in Engler & Prantl, Nat. Pflanzenfam. 3(5): 40. 1890. – Type: *C. maritimus* Walter (≡ *Drepadenium maritimum* (Walter) Raf. = *C. punctatus* Jacq.).

24. *Croton punctatus* Jacq., Collectanea 1: 166. 1787. – Holotype: [without locality] (W).

= *Croton maritimus* Walter, Fl. Carol.: 239. 1788 ≡ *Hendecandra maritima* (Walter) Klotzsch in Arch. Naturgesch. 7: 252. 1841. – Type: U.S.A. (original material: B-W 17842, G-DC (2), PH 8525).

= *Croton disjunctiflorus* Michx., Fl. Bor.-Amer. 2: 215. 1803. – Type: U.S.A., Maritimis Carolinae, *A. Michaux s.n.* (isotypes: P 00634605, 00634606).

25. *Croton texensis* (Klotzsch) Müll. Arg. in Candolle, Prodr. 15(2): 692. 1866 ≡ *Hendecandra texensis* Klotzsch in Arch. Naturgesch. 7(1): 252. 1841. – Type: U.S.A., Texas [no original material located].

= *Croton muricatus* Nutt. in Trans. Amer. Philos. Soc., ser. 2, 5: 173. 1835, non Vahl (1807). – Lectotype (designated here): U.S.A., Arkansas, on sand beaches of Great Salt river, *T. Nuttal s.n.* (PH 01025966; isolectotype: G-DC).

= *Croton virens* Müll. Arg. in Linnaea 34: 142. 1865. – Type: U.S.A., New Mexico, 1851–52, *C. Wright 1799* (isotypes: A 00047076, F 0056014F, G-DC, GH 00112848, 00112849).

Croton sect. ***Eutropia*** (Klotzsch) Baill., Étude Euphorb.: 357. 1858 ≡ *Eutropia* Klotzsch in Arch. Naturgesch. 7(1): 196. 1841 ≡ *Croton* subsect. *Eutropia* (Klotzsch) Müll. Arg. in Linnaea 34: 101. 1865 ≡ *Croton* ser. *Eutropia* (Klotzsch) Müll. Arg. in Martius, Fl. Bras. 11(2): 87. 1873. – Type: *Eutropia brasiliensis* (Spreng.) Klotzsch, nom. illeg. et superfl. (≡ *C. polyandrus* Spreng.).

26. *Croton polyandrus* Spreng., Neue Entd. 2: 120. 1821 ≡ *Rottlera brasiliensis* Spreng., Syst. Veg. 3: 877. 1826 ≡ *Eutropia brasiliensis* (Spreng.) Klotzsch in Arch. Naturgesch. 7(1): 196. 1841 ≡ *Croton brasiliensis* (Spreng.) Müll. Arg. in Linnaea 34: 104. 1865, non Mart. ex Klotzsch (1843) ≡ *Oxydectes polyandra* (Spreng.) Kuntze, Revis. Gen. Pl. 2: 609. 1891. – Type: Brazil, *Otto s.n.* ([not located]).

[– *Eutropia obovata* Klotzsch in Arch. Naturgesch. 7(1): 196. 1841, nom. nud.]

Croton sect. ***Geiseleria*** (A. Gray) Baill., Étude Euphorb.: 359. 1858 ≡ *Geiseleria* Klotzsch in Arch. Naturgesch. 7(1): 254. 1841, nom. illeg. – Type: *Geiseleria glandulosa* (L.) Klotzsch (≡ *C. glandulosus* L.).

= *Decarinium* Raf., Neogenyton: 1. 1825 ≡ *Croton* sect. *Decarinium* (Raf.) Müll. Arg. in Linnaea 34: 78. 1865 ≡ *Croton* subg. *Decarinium* (Raf.) Pax in Engler & Prantl, Nat. Pflanzenfam. 3(5): 40: 1890. – Type: *Decarinium glandulosum* (L.) Raf. (≡ *C. glandulosus* L.).

= *Aldinia* Raf., Autik. Bot.: 50. 1840. – Type: *A. glechomoides* Raf. (= *C. betulinus* Vahl).

= *Ocalia* Klotzsch in Arch. Naturgesch. 7(1): 195. 1841 ≡ *Croton* sect. *Ocalia* (Klotzsch) Baill., Étude Euphorb.: 366. 1858. – Lectotype (designated by Baillon, Étude Euphorb.: 366. 1858, confirmed by Wheeler in Taxon 24: 537. 1975): *C. perdicipes* A. St.-Hil.

= *Podostachys* Klotzsch in Arch. Naturgesch. 7(1): 193. 1841 ≡ *Croton* sect. *Podostachys* (Klotzsch) Baill., Étude Euphorb.: 365. 1858 ≡ *Croton* subsect. *Podostachys* (Klotzsch) Müll. Arg. in Linnaea 34: 134. 1865. – Lectotype (designated by Wheeler in Taxon 24: 537. 1975): *Podostachys subfloccosa* Didr. (= *C. lundianus* (Didr.) Müll. Arg.).

= *Brachystachys* Klotzsch in London J. Bot. 2: 47. 1843. – Type: *Brachystachys hirta* (L'Hér.) Klotzsch (≡ *C. hirtus* L'Hér.).

= *Heterocroton* S. Moore in Trans. Linn. Soc. London, Bot., ser. 2, 4: 461. 1895 ≡ *Croton* subg. *Heterocroton* (S. Moore) Pax in Engler & Prantl, Nat. Pflanzenfam. Nachtr. 1: 211. 1897. – Type: *Heterocroton mentiens* S. Moore (≡ *C. mentiens* (S. Moore) Pax).

= *Croton* sect. *Octolobium* Chodat & Hassl. in Bull. Herb. Boissier, ser. 2, 5: 496. 1905. – Type: *C. guaraniticus* Chodat & Hassl. (= *C. aberrans* Müll. Arg.).

Klotzsch (1841a: 195) listed six binomials, five for species from Brazil and one from Mexico, under *Ocalia,* which are, given the lack of descriptions or diagnoses,

all nomina nuda. Müller (1866: 594) listed *O. betulina* Klotzsch as a synonym of the Mexican species *Croton repens* Schltdl. and accommodated the remaining five names within the varieties of the South American *C. antisyphiliticus* Mart. (Müller 1865: 110, 1866: 593). Earlier, Baillon (1864: 337) recognised four varieties of *C. perdicipes* A. St.-Hil., a species that Müller (1865, 1873) treated as a synonym of *C. antisyphiliticus*. Baillon's (1864) varietal names have priority over Müller's (1865) (ICBN Art. 11.4, McNeill & al. 2006), but they must be transferred to *C. antisyphiliticus* as done by Müller (1866). The taxonomy of the ten varieties of *C. antisyphiliticus* recognised by Müller (1873) requires further evaluation.

27. *Croton antisyphiliticus* Mart. in Martius & Spix, Reise Bras. 1: 282. 1823 [– *Croton antisyphiliticus* var. *genuinus* Müll. Arg. in Candolle, Prodr. 15(2): 593. 1866, nom. inval.]. – Holotype: Brazil, Sao Paulo, in campis editis, e.g. ad Ypanema, ubi Erva Mular, 1.1818, *C. F. P. Martius s.n.* (M 0086128).

= *Croton perdicipes* A. St.-Hil., Pl. Usuel. Bras.: t. 59. 1827 ≡ *Croton antisyphiliticus* var. *perdicipes* (A. St.-Hil.) Müll. Arg. in Linnaea 34: 110. 1865 [– *Croton perdicipes* var. *genuinus* Baill. in Adansonia 4: 337. 1864, nom. inval.]. – Syntypes: Brazil, Minas Gerais, campos auprès de Tanque, bomarca de Rio das mortes, 1816–21, *A. F. C. P. Saint-Hilaire cat. C1, n. 227* (P 00623643, 00623644).

= *Croton antisyphiliticus* var. *mollis* Müll. Arg. in Candolle, Prodr. 15(2): 593. 1866. – Holotype: Brazil, Minas Gerais, *C. F. P. Martius s.n.* (B, destroyed; isotypes: M 0086129, 0086130).

= *Croton gracilescens* Müll. Arg. in Linnaea 34: 110. 1865. – Holotype: Brazil, ad Tavalcante, *J. B. E. Pohl 297* (B 100242753; isotype: A 00257930).

= *Croton antisyphiliticus* var. *angustifolius* Müll. Arg. in Linnaea 34: 110. 1865 [– *Ocalia angustifolia* Klotzsch in Arch. Naturgesch. 7(1): 195. 1841, nom. nud.]. – Type: Brazil, *F. Sellow s.n.* [not located].

= *Croton antisyphiliticus* var. *weddellianus* (Baill.) Müll. Arg. in Candolle, Prodr. 15(2): 593. 1866 ≡ *Croton perdicipes* var. *weddellianus* Baill. in Adansonia 4: 337. 1864. – Type: Brazil, Sertao d'Amaroleité, 9.1844, *H. A. Weddell 2753* (isotypes: P (2)).

= *Croton antisyphiliticus* var. *cordiifolius* Müll. Arg. in Linnaea 34: 110. 1865 [– *Ocalia cordiifolia* Klotzsch in Arch. Naturgesch. 7(1): 195. 1841, nom. nud. – *Ocalia grandifolia* Klotzsch in Arch. Naturgesch. 7(1): 195. 1841, nom. nud.]. – Syntypes: Brazil, *F. Sellow s.n.* (isosyntypes: BR 876389, K 000254362, P, W); Brazil, Megaponte, *J. B. E. Pohl s.n.* ([not located]).

= *Croton antisyphiliticus* var. *latifolius* (Baill.) Müll. Arg. in Candolle, Prodr. 15(2): 593, 1866 ≡ *Croton perdicipes* var. *latifolius* Baill. in Adansonia 4: 337, 1864. – Syntypes: Brazil, Minas Gerais, *A. F. C. P. Saint-Hilaire cat. C2, n. 611*[8] (P? [not located]); Brazil, *A. F. C. P. Saint-Hilaire cat. C2, n. 1393* (P? [not located]); Brazil, Sao Paulo, *A. F. C. P. Saint-Hilaire cat. C1, n. 1058* (P? [not located]).

= *Croton antisyphiliticus* var. *echiifolius* Müll. Arg. in Linnaea 34: 110. 1865 [– *Ocalia echiifolia* Klotzsch in Arch. Naturgesch. 7(1): 195. 1841, nom. nud.]. – Syntypes: Brazil, *F. Sellow s.n.* ([not located]); Brazil, *N. T. Lund s.n.* (C? [not located]); Brazil, *H. A. Weddell 1086* (G-DC); Brazil, 1840, *P. Claussen 446* (G-BOIS); Brazil, Minas Gerais, *A. F. Regnell s.n.* (isosyntypes: P (2)).

= *Croton antisyphiliticus* var. *minor* (Baill.) Müll. Arg. in Candolle, Prodr. 15(2): 593, 1866 ≡ *Croton perdicipes* var. *minor* Baill. in Adansonia 4: 337. 1864 [– *Ocalia sellowiana* Klotzsch in Arch. Naturgesch. 7(1): 195. 1841, nom. nud.]. – Syntypes: Brazil, *C. Gaudichaud 953* (P); Brazil, *F. Sellow s.n.* ([not located]); Brazil, Minas Gerais, 1838, *P. Claussen* [*769*] (P); Brazil, *H. A. Weddell 1086* (G-DC); Brazil, *A. F. C. P. Saint-Hilaire s.n.* (P? [not located]).

28. *Croton glandulosus* L., Syst. Nat. ed. 10, 2: 1275. 1759 ≡ *Decarinium glandulosum* (L.) Raf., Neogenyton: 1. 1825 ≡ *Geiseleria glandulosa* (L.) Klotzsch in Arch. Naturgesch. 7(1): 254. 1841 ≡ *Oxydectes glandulosa* (L.) Kuntze, Revis. Gen. Pl. 2: 614. 1891. – Lectotype (designated by Fawcett & Rendle, Fl. Jamaica 4: 285. 1920): Jamaica, *P. Browne,* herb. Linnaeus no. 1140.7 (LINN).).

29. *Croton hirtus* L'Hér., Stirp. Nov.: 17. 1785 ≡ *Podostachys hirta* (L'Hér.) Klotzsch in Arch. Naturgesch. 7(1): 194. 1841 ≡ *Brachystachys hirta* (L'Hér.) Klotzsch in London J. Bot. 2: 47. 1843 ≡ *Croton klotzschii* Baill. in Adansonia 4: 346. 1864, nom. superfl. – Type: French Guiana, *L. C. Richard s.n.* (isotypes: G-DC, P 00623550, 00623551, P [Herb. Drake (2)], P-JU [obscured-6358], P-LA 00382067).

= *Croton glandulosus* var. *martii* Müll. Arg. in Martius, Fl. Bras. 11(2): 268. 1873. – Type: Brazil, Maranhâo, in campis et pascuis ad flumen Itapicurú prope Caxias, *C. F. P. Martius 2557a* (isotypes: K 000254389, L 0234460, M 0089077, 0089078, 0089079).

30. *Croton lundianus* (Didr.) Müll. Arg. in Candolle, Prodr. 15(2): 662. 1866 ≡ *Podostachys lundianus* Didr. in Vidensk. Meddel. Naturhist. Foren. Kjøbenhavn 1857: 137. 1857 [– *Croton lundianus* var. *genuinus* Müll. Arg. in Candolle, Prodr. 15(2): 663 1866, nom. inval.]. – Holotype: Brazil, São Paulo, "Croton. Herbaceum. Taubaté Pr. St. Paulo Novb 33." *N. T. Lund s.n.* (C; isotypes: G-DC 3).

= *Croton similis* Müll. Arg. in Linnaea 34: 134. 1865 ≡ *Croton lundianus* var. *similis* (Müll. Arg.) Müll. Arg. in Candolle, Prodr. 15(2): 663. 1866 [– *Podostachys incana* Klotzsch in Arch. Naturgesch. 7(1): 194. 1841, nom. nud. – *Podostachys sellowiana* Klotzsch in Arch. Naturgesch. 7(1): 194. 1841, nom.

nud. – *Croton klotzschii* var. *incanus* Baill. in Adansonia 4: 347. 1864, nom. nud.]. – Holotype: Brazil, *F. Sellow s.n.* (B, destroyed; isotypes: K 000254394, 000254395, P 00633410).

= *Podostachys subfloccosa* Didr. in Vidensk. Meddel. Naturhist. Foren. Kjøbenhavn 1857: 135. 1857. – Type: Brazil, São Paulo. *N. T. Lund 1702* (isotypes: C (2)).

= *Croton klotzschii* var. *hilarii* Baill. in Adansonia 4: 347. 1864 ≡ *Croton lundianus* var. *hilarii* (Baill.) Müll. Arg. in Candolle, Prodr. 15(2): 663. 1866. – Syntypes: Brazil, São Paulo, *A. F. C. P. Saint-Hilaire cat. C1, n. 1116* (isosyntype: A 257947); Brazil. São Paulo, *F. Sellow s.n.* ([not located]).

31. *Croton repens* Schltdl. in Linnaea 19: 237. 1846. – Lectotype (designated by Webster in Contr. Univ. Michigan Herb. 23: 362. 2001): Mexico, Veracruz, Hacienda de la Laguna, 7.1829, *C. J. W. Schiede s.n.* (HAL 98379).

[– *Ocalia betulina* Klotzsch in Arch. Naturgesch. 7(1): 195. 1841, nom. nud.]

32. *Croton trinitatis* Millsp. in Publ. Field Columb. Mus., Bot. Ser. 2: 57. 1900. – Lectotype (designated by Ee & Berry in Harvard Pap. Bot. 15: 82. 2010): Guyana, 1837, *R. Schomburgk 241* (BM; isolectotype: G-DC).

= *Croton klotzschii* var. *bahiensis* Baill. in Adansonia 4: 347. 1864 ≡ *Croton lundianus* var. *bahiensis* (Baill.) Müll. Arg. in Candolle, Prodr. 15(2): 663. 1866. – Type: Brazil, Bahia, *J. S. Blanchet 1665* (isotypes: A 257944, 257945, 257946, G-DC, P 00633411, 00633412).

= *Croton klotzschii* var. *latifolius* Baill. in Adansonia 4: 346. 1864 ≡ *Croton lundianus* var. *latifolius* (Baill.) Müll. Arg. in Candolle, Prodr. 15(2): 663. 1866. – Synypes: Brazil, Rio de Janeiro, 1831–33, *C. Gaudichaud 1137* (P 00633407); Brazil, Rio de Janeiro, Serra d'Estrella, 1844, *H. A. Weddell 821* (P 00633408; isosyntype: G-DC).

= *Croton lundianus* var. *leptophyllus* Müll. Arg. in Candolle, Prodr. 15(2): 664. 1866. – Holotype: Brazil, Pernambuco, 1838, *G. Gardner 1129* (B, destroyed; isotypes: K 000254404, 000254405).

= *Croton lundianus* var. *serratus* Müll. Arg. in Candolle, Prodr. 15(2): 664. 1866 [– *Podostachys serrata* Klotzsch in Arch. Naturgesch. 7(1): 194. 1841, nom. nud. – *Croton dentifolius* Baill. in Adansonia 4: 347. 1864, nom. nud.]. – Syntypes: Brazil, *F. Sellow s.n.* (isosyntypes: K 000254396, 000254397, P 00633409); Brazil, *J. S. Blanchet 1824 pro parte* (G-BOIS, G-DC; isosyntype: A 00257943).

= *Croton miquelensis* A. M. Ferguson in Rep. (Annual) Missouri Bot. Gard. 12: 49. 1901. – Lectotype (designated by Ee & Berry in Harvard Pap. Bot. 15: 82. 2010): U.S.A., Florida, Escambia Co., ballast earth, wharf at Pensacola, 20.9.1886, *A. H. Curtiss 15* (GH 277262).

= *Croton tragioides* S. F. Blake in Contr. U.S. Natl. Herb. 24: 11. 1922. – Holotype: Guatemala, Izabal, shores of Lake Izabal, 2.6.1919, *S. F. Blake 7854* (US 989621/00028448).

= *Croton buchtienii* Rusby in Mem. New York Bot. Gard. 7: 284. 1927. – Lectotype (designated by Ee & Berry in Harvard Pap. Bot. 15: 82. 2010): Bolivia, Reyes, 1000 ft, 26.10.1921, *H. H. Rusby 1332* (NY 246520; isolectotypes: GH 47237, MICH 1104791, NY 579361, US 01232343/00109512).

Croton sect. ***Heptallon*** (Raf.) Müll. Arg. in Linnaea 34: 78. 1865 ≡ *Heptallon* Raf., Neogenyton: 1. 1825. – Type: *Heptallon graveolens* Raf. (= *Croton capitatus* Michx.).

= *Pilinophytum* Klotzsch in Arch. Naturgesch. 7(1): 255. 1841 ≡ *Croton* subg. *Pilinophytum* (Klotzsch) A. Gray, Manual, ed. 2: 391. 1856. – Type: *Pilinophytum capitatum* (Michx.) Klotzsch (≡ *Croton capitatus* Michx.).

= *Gynamblosis* Torr., Rep. Marcy Exped.: 295. 1853 ≡ *Croton* subg. *Gynamblosis* (Torr.) A. Gray, Manual, ed. 2: 392. 1856 ≡ *Croton* subg. *Angelandra* (Müll. Arg.) Pax in Engler & Prantl, Nat. Pflanzenfam. 3(5): 40. 1890 ≡ *Croton* sect. *Angelandra* Müll. Arg. in Linnaea 34: 79. 1865 ≡ *Engelmannia* Klotzsch in Arch. Naturgesch. 7(1): 253. 1841, non A. Gray ex Nutt. (1840, *Asteraceae*) ≡ *Angelandra* Endl., Gen. Pl. Suppl. 5: 91. 1850, non Endl. (1843, *Asteraceae*). – Type: *Engelmannia nuttalliana* Klotzsch, nom. illeg. (≡ *Croton ellipticus* Nutt., nom. illeg. = *Gynamblosis monanthogyna* (Michx.) Torr. ≡ *Croton monanthogynus* Michx.).

Engelmannia (Klotzsch 1841b: 253) is illegitimate as a younger homonym of *Engelmannia* A. Gray ex Nutt. (Nuttall 1840: 343–344, *Asteraceae*). The replacement name *Angelandra* Endl. is also illegitimate given his earlier use of that generic name in *Asteraceae* (Endlicher 1843: 69). Torrey (1853: 295) published *Gynamblosis* Torr. as a substitute name for *Engelmannia* Klotzsch. Müller (1865: 79) included *Engelmannia* Klotzsch and *Gynamblosis* Torr. as synonyms under *Croton* sect. *Angelandra* Müll. Arg., which was followed by Pax (1890: 40) and Pax & Hoffmann (1931: 87), the latter authors listing *C. ellipticus* Nutt. and *C. monanthogynus* Michx., apparently as distinct species, for the section. Although Torrey (1853: 295) only made the combination *Gynamblosis monanthogyna* (Michx.) Torr. in *Gynamblosis,* the type of *Gynamblosis* is that of the older name that it replaced, which is *Engelmannia nuttalliana* Klotzsch (ICBN Art. 7.3, McNeill & al. 2006).

Webster (1993: 813) accepted both '*Croton* sect. *Gynamblosis* (Torr.) A. Gray' and '*Croton* sect. *Pilinophytum* (Klozsch) A.Gray,' and considered *C. lindheimerianus* Scheele to be the accepted name for *C. ellipticus* (as *E. nuttalliana*). However, Ee & Berry (2010b)

synonymised *Engelmannia* Klotzsch, *Gynamblosis* Torr. and *Pilinophytum* Klotzsch under *Croton* sect. *Heptallon* (Raf.) Müll. Arg. and indicated that Gray (1856: 391–392) had combined these as subgenera, not as sections. Both Webster (1993: 813) and Ee & Berry (2010b: 157) erroneously treated *Engelmannia* Klotzsch, nom. illeg. and *Gynamblosis* Torr. as heterotypic synonyms, while they are actually homotypic.

33. *Croton capitatus* Michx., Fl. Bor.-Amer. 2: 214. 1803 ≡ *Pilinophytum capitatum* (Michx.) Klotzsch in Arch. Naturgesch. 7(1): 255. 1841 ≡ *Oxydectes capitata* (Michx.) Kuntze, Revis. Gen. Pl. 2: 611. 1891. – Holotype: U.S.A., Illinois. *A. Michaux s.n.* (P-MICH; isotype: P).

= *Heptallon graveolens* Raf., Neogenyton: 1. 1825. – Lectotype (designated by Ee & Berry in Syst. Bot. 35: 158. 2010): U.S.A., Kentucky. *C. S. Rafinesque 118* (G).

34. *Croton monanthogynus* Michx., Fl. Bor.-Amer. 2: 215. 1803 ≡ *Gynamblosis monanthogyna* (Michx.) Torr., Rep. Marcy Exped.: 295. 1853. – Holotype: U.S.A., Tennessee, near Nashville, *A. Michaux s.n.* (P-MICH; isotype: P).

= *Heptallon ellipticum* Raf., Sylva Tellur.: 65. 1838 ≡ *Croton ellipticus* Nutt., Gen. N. Amer. Pl. 2: 225. 1818, non Geiseler (1807) ≡ *Leptemon ellipticum* (Raf.) Raf., Autik. Bot.: 47. 1840 ≡ *Engelmannia nuttalliana* Klotzsch in Arch. Naturgesch. 7(1): 253. 1841, nom. illeg. [– *Angelandra elliptica* (Raf.) Endl. in Baill., Étude Euphorb.: 379. 1858, pro syn., nom. inval. – *Engelmannia elliptica* (Raf.) Baill., Étude Euphorb.: 379. 1858, pro syn., nom. inval.]. – Lectotype (designated by Ee & Berry in Syst. Bot. 35: 163. 2010): U.S.A., Missouri, around St. Louis, *T. Nuttall s. n.* (PH 1025961).

In contrast to Webster (1993: 813), who considered *Croton ellipticus* (as *Engelmannia nuttalliana* Klotzsch) a synonym of *C. lindheimerianus* Scheele, Torrey (1853: 295) and Ee & Berry (2010b: 163) considered it a synonym of *C. monanthogynus* and the lectotype designated by Ee & Berry (2010b: 163) supports this.

35. *Croton pottsii* (Klotzsch) Müll. Arg. in Candolle, Prodr. 15(2): 561. 1866 ≡ *Lasiogyne pottsii* Klotzsch in Seemann, Bot. Voy. Herald 7–8: 278. 1856 ≡ *Oxydectes pottsii* (Klotzsch) Kuntze, Revis. Gen. Pl. 2: 612. 1891. – Holotype: Mexico. Chihuahua, *W. J. Potts s.n.* (BM 000080187).

Croton sect. ***Lasiogyne*** (Klotzsch) Baill., Étude Euphorb.: 370. 1858 ≡ *Lasiogyne* Klotzsch in Nov. Actorum Acad. Caes. Leop.-Carol. Nat. Cur. 19 (Suppl. 1): 418. 1843 ≡ *Croton* subsect. *Lasiogyne* (Klotzsch) Müll. Arg. in Linnaea 34: 81 (95). 1865. – Type: *Lasiogyne brasiliensis* Klotzsch (= *C. compressus* Lam.).

= *Croton* sect. *Gonocladium* Baill. in Adansonia 4: 299. 1864 ≡ *Croton* ser. *Gonocladium* (Baill.) Müll. Arg. in Martius, Fl. Bras. 11(2): 126. 1873 ≡ *Croton* subsect. *Gonocladium* (Baill.) Pax in Engler & Prantl, Nat. Pflanzenfam. 3(5): 39. 1890. – Type: *C. compressus* Lam.

= *Croton* sect. *Argyroglossum* Baill. in Adansonia 4: 289. 1864 ≡ *Croton* ser. *Argyroglossum* (Baill.) Müll. Arg. in Martius, Fl. Bras. 11(2): 118. 1873 ≡ *Croton* subsect. *Argyroglossum* (Baill.) Pax in Engler & Prantl, Nat. Pflanzenfam. 3(5): 39. 1890. – Type: *C. argyroglossum* Baill.

= *Croton* sect. *Decalobium* Müll. Arg. in Linnaea 34: 78. 1865 ≡ *Croton* subg. *Decalobium* (Müll. Arg.) Pax in Engler & Prantl, Nat. Pflanzenfam. 3(5): 40. 1890. – Type: *C. decalobus* Müll. Arg.

= *Croton* sect. *Anadenocroton* G. L. Webster in Taxon 42: 806. 1993. – Type: *C. axillaris* Müll. Arg.

36. *Croton argyrophyllus* Kunth in Humboldt & al., Nov. Gen. Sp. 2: 68. 1817 [– *Croton argyrophyllus* var. *genuinus* Müll. Arg. in Linnaea 34: 96. 1865, nom. inval.] ≡ *Croton micans* var. *argyrophyllus* (Kunth) Müll. Arg. in Candolle, Prodr. 15(2): 555. 1866. – Holotype: Venezuela, Cumana, Maniguares, 10 or 11.1800, *A. J. A. Bonpland & F. W. H. von Humboldt 1217* (P-Bonpl.; isotype: B-W 17899010).

= *Croton nervosus* Klotzsch in London J. Bot. 2: 50. 1843, non Rottler (1803) ≡ *Croton nervosus* var. *pubescens* Klotzsch in London J. Bot. 2: 50. 1843 ≡ *Croton argyrophyllus* var. *pubescens* (Klotzsch) Müll. Arg. in Linnaea 34: 96. 1865 ≡ *Croton micans* var. *pubescens* (Klotzsch) Müll. Arg. in Candolle, Prodr. 15(2): 554. 1866 ≡ *Croton schomburgkianus* Gomes & al. in Acta Bot. Brasil. 24: 907. 2010. – Lectotype (designated by Gomes & al. in Acta Bot. Brasil. 24: 907. 2010): Guyana, Rio Takutu, 1839 or 1840, *R. H. Schomburgk 802* (K 000185985; isolectotypes: F 0056106F, 0056169F, G, G-DC, K 000185986, L 0234893, P 00634523, TCD 0007645, US 00109626).

= *Croton nervosus* var. *villosus* Klotzsch in London J. Bot. 2: 50. 1843 ≡ *Croton argyrophyllus* var. *villosus* (Klotzsch) Müll. Arg. in Linnaea 34: 96. 1865. – Lectotype (designated here): Guyana, Warapoota Falls on the Essequibo [river], 1836, *R. H. Schomburgk 44* (G [Herb. Delessert]; isolectotypes: G, G-DC, K 000253587, K 000253589).

Gomes & al. (2010) created the new name *C. schomburgkianus* for *C. nervosus* and accepted it as a distinct species. Much work remains to be done to clarify the species boundaries within *C.* sect. *Lasiogyne* and I tentatively consider *C. schomburgkianus* a synonym of *C. argyrophyllus.*

37. *Croton compressus* Lam., Encycl. 2: 208. 1786. – Lectotype (designated here): Brazil, Rio de Janeiro, *P.*

Commerson s.n. (P-LA 00382064 [upper plant]; isolectotypes: P 00493370, 00493371, P-JU 16345).

= *Croton gonocladus* Mart. in Flora 20(2) Beibl.: 119. 1837. – Type: Brazil, Rio de Janeiro, *C. F. P. Martius 163* (isotypes: BR 8553041, G-BOIS, G-DC, L 0234169, 0234170, 0234171, LE, M 0089100, P 00623111, 00623112, 00623113).

= *Lasiogyne brasiliensis* Klotzsch in Nova Acta Acad. Caes. Leop.-Carol. Nat. Cur. 19(Suppl. 1): 419. 1843 ≡ *Croton brasiliensis* Mart. ex Klotzsch in Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 19(Suppl. 1): 419. 1843. – Lectotype (designated here): Brazil, Rio de Janeiro, in montium apricis prope Sebastianopolim, Nov., *C. F. P. Martius s.n.* (M 0086105; isolectotype: M 0089101).

38. *Croton tricolor* Klotzsch ex Baill. in Adansonia 4: 291. 1864. – Lectotype (collection at P designated by Gomes & al. in Acta Bot. Brasil. 24: 907. 2010, specimen designated here): Brazil, Minas Gerais, 1816, *A. F. C. P. Saint-Hilaire cat. C1, n. 92* (P 00634797; isolectotype: 00634795).

= *Croton argyrophylloides* Müll. Arg. in Linnaea 34: 96. 1865. – Type: Brazil, Bahia, Sio S. Francisco, 1838, *J. S. Blanchet 2835* (isotypes: F 520872, LE, P 00634797, 00634798).

= *Croton tricolor* Müll. Arg. in Linnaea 34: 96. 1865, non Klotzsch ex Baill. (1864). – Holotype: Brazil, Facienda do Funil, 1836, *F. Sellow 1262* [= *2077/2114*?] (B 100086878; isotypes(?): P 00634796; K 000186160).

Some indices have listed *Croton tricolor* Müll. Arg. as a later homonym of *Croton tricolor* Klotzsch ex Baill.; in contrast, Caruzo & Cordeiro (2007: 583) considered that Müller (1865: 96) was merely repeading Baillon's (1864) name and credited him with lectotypifying it because he cited a single specimen in a single herbarium. Every taxon entry in Müller (1865) includes the description of a new taxon, whether it be a new species or infrageneric taxa for previously described species. In the latter case, e.g. *C. scaber* Willd. (Müller 1865: 99), the original author is always cited. Given this context, I treat *C. tricolor* Müll. Arg. as a later homonym of *C. tricolor* Klotzsch ex Baill. It is unclear if the numbers *2077, 2114,* and *1262* annotated on the F. Sellow specimen from Facienda do Funil, Brazil at B are all in reference to that specimen, or if they are an indication that the specimen is the same as some other specimen, or specimens, linked to those numbers. The F. Sellow specimen at P (00634796) only has the numbers *2077* and *2114* on it, while that at K (000186160) does not have any numbers. Whether part of the same gathering, or not, they are all the same species.

Croton sect. ***Luntia*** (Neck. ex Raf.) G. L. Webster in Taxon 42: 804. 1993 ≡ *Luntia* Neck. ex Raf., Sylva Tellur.: 62. 1838. – Type: *Luntia sericea* Raf., nom. illeg. (≡ *C. sericeus* Lam., nom. illeg. ≡ *C. matourensis* Aubl.).

= *Croton* subsect. *Palanostigma* Mart. ex Baill., Étude Euphorb.: 358. 1858 – Type: *C. palanostigma* Klotzsch.

39. *Croton palanostigma* Klotzsch in London J. Bot. 2: 48. 1843 [– *Palanostigma crotonoides* Mart. in London J. Bot. 2: 49. 1843, pro syn., nom. inval.]. – Syntypes: Guyana, on the River Padawire, *M. R. Schomburgk 1008* (isosyntypes: F 0056173F, G (3), GH 00105461, P 00634619, 00634620, US 00109636); Brazil, *C. F. P. Martius s.n.* (isosyntypes: M 0086063, 0086064, 0086065, 0089111, 0089112, 0089113).

= *Croton benthamianus* Müll. Arg. in Martius, Fl. Bras. 11(2): 105. 1873. – Syntypes: Brazil, habitat in provincia do Alto Amazonas, in silvis Japurensibus, *C. F. P. Martius s.n.* (isosyntype: M 0086123); Brazil, Manaos, *R. Spruce 1112* (isosyntype: M 0086125); Brazil, Manaos, *R. Spruce 1114* (isosyntype: M 0086124); Guyana. *M. R. Schomburgk 1008* (G (3); isosyntypes: F 0056173F, GH 00105461, P 00634619, 00634620, US 00109636).

Acknowledgements

I am grateful to H. J. Esser (M), I. Cordeiro (SP) and an anonymous reviewer for comments that improved the manuscript. L. DeCesare of the Harvard University Herbaria libraries kindly assisted me with locating bibliographic material and the reproduction of the figures. And I am especially grateful to N. Kilian (B) for his extensive editorial assistance.

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