

A KEY TO COMMICARPUS

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ABSTRACT. A synopsis is given of the essentially African genus *Commicarpus* (Nyctaginaceae); Twenty-three species are recognised and keyed out; the inflorescences and fruits of all are illustrated. Three new species are described (*C. decipiens*, *C. greenwayi* and *C. australis*); *C. pilosus* is a new specific combination.

The genus *Commicarpus* was first recognised and described by Standley in 1909 (Contrib. U.S. Nat. Herb. 12:373). Heimerl had previously (Nat. Pflanzenfam. III, 1b: 26, 1889) regarded it as a section (sect. *Adenophorae*) of *Boerhavia* L. (1753), with which genus it has obvious and close affinities. It is, however, readily recognisable, and uniformly distinguished from *Boerhavia* by its funnel-shaped (infundibuliform) perianth, long-exserted stamens and styles, and obscurely 10-sulcate, fusiform or clavate anthocarps (or fruits) studded over, to a greater or lesser degree, with large, viscid, sessile or stipitate glands, here termed, because of their appearance, "gland-warts". From these striking glands is derived the name of the genus (*Comm*i—gum, *carpus*—fruit). In addition to these technical distinctions *Commicarpus* tends to be more suffruticose in habit than *Boerhavia*, and is often partly woody, at least towards the base, with the stems scrambling or climbing, sometimes to a height of 2.5 m or more. The type of the genus is the American *Commicarpus scandens* (L.) Standl. (*Boerhavia scandens* L.).

Commicarpus is very largely an African genus, occurring almost throughout that continent except in the extreme north and south, and in the wet, rain-forest areas of the west. Its preference for arid habitats is reflected in local concentrations of species in Somalia, Ethiopia and adjacent regions of tropical Arabia, and in South-West Africa (Namibia). Outside Africa, the number of species diminishes rapidly, one (*C. plumbagineus*) extending to southern Spain, one (*C. chinensis*) to Burma, Malaysia and southern China, two to Australia (*C. australis*, *C. sp. A*) and three (or possibly four) to the southernmost states of the U.S.A., to Mexico, the West Indies, and western tropical South America.

Though most authors (but not all) are nowadays prepared to allow *Commicarpus* generic status, there is still a measure of disagreement as to the number of species properly to be included in the genus. The *Flora of Tropical Africa* (1909) recognised five, but as recently as 1964 (*Fl. Malesiana* ser. 1, 6:453) J. F. Stemmerik writes, "In addition to the Malesian sheets, I have examined a very large material, under many names, from Africa and America, and I have come to the conclusion that there are only three variable species in all". This is an extreme view, and not one which could be sustained even if one were to unite under a single name all the species which look superficially alike.

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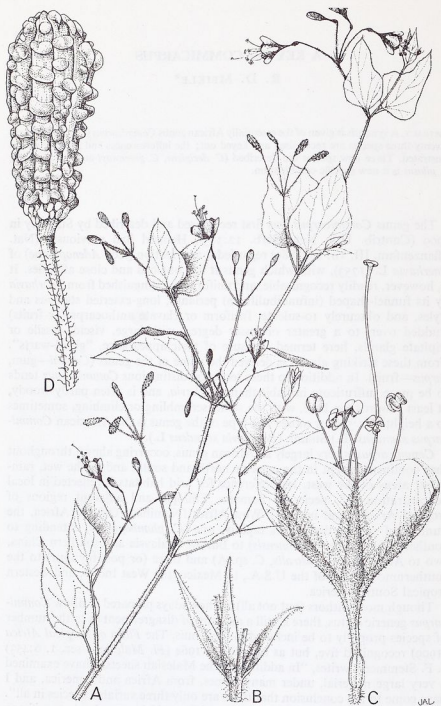


FIG. 1. *Commicarpus greenwayi* Meikle. A, habit $\times \frac{3}{8}$; B, bracts $\times 9$; C, fl. $\times 3\frac{1}{2}$; D, fr. $\times 8$ (Tanzania, Greenway & Kanuri 14131).

It may be argued that the number of species recognised here goes to the other extreme, a view with which I am naturally bound to disagree. Speaking from an acquaintanceship with the genus spanning more than twenty years, I am convinced that anyone who is prepared to look at *Commicarpus* carefully, critically and without prejudice, will, in the end, accept as many species as are enumerated here, and probably more, since I have almost certainly overlooked some, either unrepresented, or too imperfectly represented for recognition, in the collections available. I do not think that the number of such additions is likely to be very great.

Why then the conflict of views as to the size of the genus? The answer, I think, lies largely in the character of the plants themselves. All *Commicarpus* species are superficially similar in habit and foliage; all have a lank, straggling mode of growth, unremarkable and rather variable leaves, relatively small, fugacious flowers with delicate perianths which are quickly reduced to an amorphous pulp in the plant-press, and which cannot readily be resuscitated later. The distinctive, viscid fruits are all too often left behind when the drying papers are changed. The result is that the herbarium botanist surveys fragments of plants which are devoid of mature fruits, and which bear, at best, only a few squashed and irreclaimable flowers. If, in the past, collectors had been prepared to make spirit collections, or to press at least some of the flowers separately and with special care; if they had been prepared to note the colour of the perianth (in my opinion of considerable importance), the number of stamens and the colour of the filaments and anthers, and if they had been careful to preserve some mature fruits, then I think the genus *Commicarpus* would have been found considerably less intractable to taxonomy than has been supposed. As it is, certain important morphological features, such as the colouring and lobing of the perianth, have had to be very largely ignored in drawing up the present key.

At one time I thought stamen-number might furnish some valuable discriminatory characters, but it is less useful than I had hoped. In most species the range of variation allows for the addition or subtraction of a stamen, and it is possible that examination of a larger number of flowers would show an even wider range of variation. On the basis of present evidence, the numbers are as follows:

Stamens 5-6: *C. pedunculatus*; *C. pentandrus*; *C. greenwayi*.

„ 4-5: *C. simonyi*.

„ 3-4: *C. boissieri*; *C. heimerlii*; *C. chinensis* ssp. *chinensis*; *C. australis*; *C. sinuatus*.

„ 3: *C. reniformis*; *C. fruticosus*; *C. grandiflorus*; *C. stenocarpus*; *C. plumbagineus*; *C. arabicus*.

„ 2-3: *C. pilosus*; *C. chinensis* ssp. *natalensis*; *C. tuberosus*; *C. squarrosus*; *C. decipiens*.

„ 2: (rarely 3): *C. brandegei*; *C. scandens*; *C. helenae*; *C. fallacissimus*.

A final note: in the key the word "fruit" has been preferred to "anthocarp", though the latter term is sometimes used (for want of a better) to describe the green ovary-like structure at the base of the coloured, funnel-shaped, portion of the perianth. New taxa are described at the end of this paper. All cited specimens have been seen and are in the herbarium of the Royal Botanic Gardens, Kew (K), unless otherwise indicated.

KEY TO SPECIES

1. Inflorescence a short-stalked axillary umbel; peduncle usually less than 1 cm long 14. *C. reniformis*
- + Inflorescence a long-stalked capitulum, umbel or verticel: peduncle more than 1 cm long 2
2. Flowers numerous, sessile or almost so, crowded into a dense head at the apex of a long, stout peduncle 1. *C. pedunculatus*
- + Flowers and inflorescences not as above 3
3. Perianth widely infundibuliform, with a very short, inconspicuous basal tube; flower (including anthocarp) usually less than 7 mm long 4
- + Perianth narrowly infundibuliform with a well-developed basal tube; flowers (including anthocarp) usually more than 7 mm long 11
4. Inflorescence umbellate 5
- + Inflorescence verticillate 7
5. Pedicels and flower-buds densely glandular-pubescent; perianth 1 cm or more diam., white, with radiating pink or purple stripes 17. *C. brandegei*
- + Pedicels and flower-buds glabrous or nearly glabrous; perianths less than 7 mm diam. 6
6. Perianth greenish-white; fruits narrowly fusiform, often slightly curved, gland-warts almost confined to apex of fruit 18. *C. scandens*
- + Perianth pink or mauve; fruits clavate, studded all over with conspicuous gland-warts 15. *C. fruticosus*
7. Inflorescences much-branched, forming a nebulous mass; pedicels very long, slender and hair-like 15. *C. fruticosus*
- + Inflorescences not as above 8
8. Mature fruits turbinate, tapering markedly from apex to base; gland-warts prominent only at apex of fruit, forming a sort of crown; stems glabrous or sparsely scabridulous 9
- + Mature fruits clavate, tapering at both ends; gland-warts prominent all over the fruit; stems often minutely but distinctly glandular or hairy 10
9. Flowers sessile or very shortly pedicellate, in narrow, elongate verticels; stamens usually 2 23. *C. helenae*
- + Flowers distinctly pedicellate, pedicels often more than 1 cm long; verticels short, seldom with more than 2 whorls of flowers; stamens usually 3 22. *C. boissieri*
10. Stems minutely glandular; perianth less than 4 mm diam. 21. *C. fallacissimus*
- + Stems distinctly glandular-hairy; perianths often 5 mm diam. 20. *C. pilosus*
11. Stems and leaves conspicuously pilose 12
- + Stems and leaves glabrous or scabridulous, or clothed with a short indumentum of crisped hairs, not pilose 15
12. Buds densely covered with stalked glands; inflorescences usually umbellate; fruits studded all over with prominent gland-warts 13
- + Buds glabrous or thinly pilose; gland-warts sessile and inconspicuous or prominent only at apex of fruit 14

13. Perianth pink, mauve or purple 3. *C. grandiflorus*
 + Perianth white 4. *C. decipiens*
14. Inflorescences verticillate; perianth purple, generally not more than 5 mm diam., stems and leaves viscid-pilose 5. *C. stenocarpus*
 + Inflorescences umbellate; perianth purple, to 1.5 cm diam., stems and leaves pilose, but not viscid 8. *C. greenwayi*
15. Stems, at least in the lower part, closely crisped-pubescent or scabridulous 16
 + Stems glabrous, or at most very sparsely scabridulous or puberulous 21
16. Leaves sinuate or lobed; flowers sessile or very shortly pedicellate; stems pubescent throughout; perianth pink 11. *C. sinuatus*
 + Leaves entire; flowers distinctly pedicellate 17
17. Perianth white; inflorescences often irregular, or consisting of mixed umbels and verticels 10A. *C. plumbagineus* var. *trichocarpus*
 + Perianth pink or purple; inflorescences umbellate, very seldom verticillate or irregular 18
18. Leaves not fleshy; stems scabridulous, not viscid towards apex; inflorescence region usually leafy 20
 + Leaves fleshy; stems crisped-pubescent towards base, often viscid and glabrous towards apex, inflorescence-region usually leafless or with very reduced leaves 19
19. Perianth about 1 cm diam. 13. *C. heimerlii*
 + Perianth seldom exceeding 5 mm diam. 19. *C. squarrosus*
20. Flowers (including anthocarp) about 8–9 mm long; fruits clavate, tapering from a broad apex 6. *C. arabicus*
 + Flowers (including anthocarp) 10 mm or more long; fruits fusiform with a narrow apex 7A. *C. chinensis* ssp. *natalensis*
21. Perianth white; buds often densely crisped-pubescent; inflorescences irregular, or of mixed umbels and verticels 10. *C. plumbagineus*
 + Perianth mauve, pink or purple 22
22. Inflorescences umbellate, rarely (and abnormally) verticillate or irregular 23
 + Inflorescences verticillate or irregularly branched, not regularly umbellate 27
23. Leaves repand-sinuate; upper parts of stems and inflorescence-region generally leafy; peduncles and pedicels slender; fruits fusiform or narrowly clavate 7. *C. chinensis* ssp. *chinensis*
 + Leaves entire 24
24. Inflorescence-region a nebulous, leafless mass of slender, intricately branched peduncles and pedicels; stamens 4–5 12. *C. simonyi*
 + Inflorescence-region not as above; stamens 2–3 25
25. Perianth with a short basal tube, about 2 mm long; fruit prominently gland-warted at apex, generally smooth or inconspicuously warted towards base 26
 + Perianth with a tube 3–5 mm long; fruit often prominently gland-warted all over 7A. *C. chinensis* ssp. *natalensis*

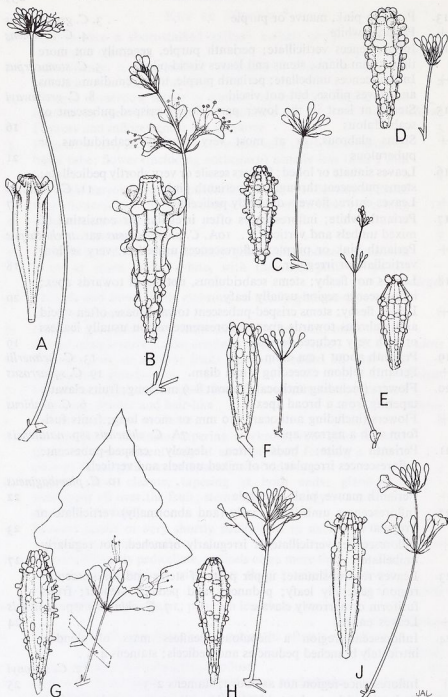


FIG. 2. *Commicarpus* species: inflorescences $\times \frac{2}{3}$; fruits $\times 4$. A, *C. pedunculatus* (A. Rich.) Cufod. (infl. Tanzania, Richards 19186; fr. Kenya, Tweedie 3301); B, *C. pentandrus* (Burchell) Heimerl (infl. S Africa, Hardy & Bayliss 1242; fr. SW Africa (Namibia) Seydel 1761); C, *C. grandiflorus* (A. Rich.) Standl. (infl. Eritrea, Colville 93; fr. Somalia, Wood 5/73/132); D, *C. decipiens* Meikle (infl. SW Africa (Namibia) de Winter 2742; fr. SW Africa

26. Stems glabrous, smooth (rarely a little puberulous); pedicels slender, almost filiform, often more than 1 cm long . 16. *C. tuberosus*
 + Stems sparsely scabridulous; pedicels less than 1 cm long, often very short . 6. *C. arabicus*
27. Fruits clavate, 2–3 mm wide at apex, tapering to base . 28
 + Fruits fusiform or narrowly clavate, tapering to apex and base; inflorescence sometimes verticillate, but more often umbellate . 7A. *C. chinensis* ssp. *natalensis*
28. Perianth 1–1.5 cm diam.; flowers in remote whorls at the apex of a long unbranched axillary peduncle . 2. *C. pentandrus*
 + Perianth 1 cm diam. or less; inflorescences very irregular; peduncles often branched . 9. *C. australis*

1. *C. pedunculatus* (A. Rich.) Cufod. in Bull. Jard. Bot. Brux. 23, Suppl.: 79 (1953). Fig. 2A.

Syn.: *Boerhavia pedunculosa* A. Rich., Tent. Fl. Abyss. 2:210 (1850).

Type. Ethiopia: Choho (*Quartin Dillon*), Tchélikite (*Ant. Petit*) (P—n.v.). S Arabia, Ruanda, Somalia, Sudan, Ethiopia, Uganda, Kenya, Tanzania.

2. *C. pentandrus* (Burchell) Heimerl in Engl. & Prantl, Nat. Pflanzenfam., ed. 2, 16C:117 (1934). Fig. 2B.

Syn.: *Boerhavia pentandra* Burchell, Travels 1:432 (1822).

B. burchellii Choisy in DC., Prodr. 13, 2:455 (1849).

Type. S Africa: "Along the Vaal River, Griqualand West, Nov. 1811," Burchell 1765 (K).

Mozambique, Zambia, Rhodesia, Botswana, SW Africa (Namibia), S Africa.

3. *C. grandiflorus* (A. Rich.) Standl. in Contrib. U.S. Nat. Herb. 18:101 (1916). Fig. 2C.

Syn.: *Boerhavia grandiflora* A. Rich., Tent. Fl. Abyss. 2:209 (1850).

B. fruticosa Dalzell in Dalzell & Gibson, The Bombay Flora 213 (1861).

Type. Ethiopia: Chiré (*Quartin Dillon*), near Tchélatchékanné (*Schimper*) (P—n.v., K).

S Arabia, W India, S Sahara (Tibesti), Somalia, Eritrea, Sudan, Ethiopia, Uganda, Kenya, Tanzania.

4. *C. decipiens* Meikle (see p. 246). Fig. 2D.

Syn.: *Boerhavia grandiflora* (non A. Rich.) Heimerl in Bull. Herb. Boiss. 5, App. 3:67 (1897).

Type. SW Africa (Namibia): Okahandja, ann. 1907, Dinter 167 (K). SW Africa (Namibia).

(Namibia) Dinter 167; E. *C. stenocarpus* (Chiov.) Cufod. (infl. & fr. Iran, *Grey-Wilson & Hewer* 280); F. *C. arabicus* Meikle (infl. & fr. Yemen Arab Rep., *Hepper* 5659); G. *C. chinensis* (L.) Heimerl (infl. and lf. India. *herb. Madras* s. n.; fr. India. *Gamble* 18675); H. *C. australis* Meikle (infl. W Australia, *Pavry* 15; fr. W Australia, *Morrison* 15257); J. *C. plumbagineus* (Cav.) Standl. (infl. Tanzania, *Richards* 24957; fr. Kenya, *Verdcourt* 405).

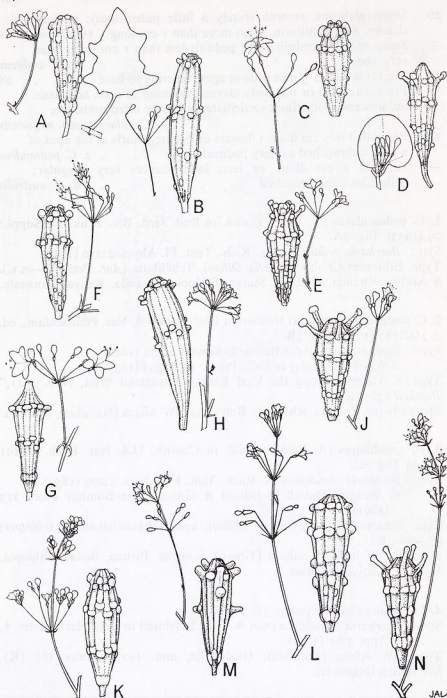


FIG. 3. *Commicarpus* species: inflorescences $\times \frac{2}{3}$; fruits $\times 4$. A, *C. sinuatus* Meikle (infl. Somalia, Burne 57; lf. Ethiopia, Thulin 1300; fr. Somalia, Bally 9638); B, *C. simonyi* (Heimerl & Vierh.) Meikle (infl. & fr. Socotra, Smith & Lavranos 223); C, *C. heimerlii* (Vierh.) Meikle (infl. Socotra, Smith & Lavranos 75; fr. Semha, Simony s.n.); D, *C. reniformis* (Chiov.) Cufod. (infl. & lf. Somalia, Hemming 1694; fr. Somalia, Hemming 2020);

5. *C. stenocarpus* (Chiov.) Cufod. in Bull. Jard. Bot. Brux. 23, Suppl.: 81 (1953). Fig. 2E.

Syn.: *Boerhavia stenocarpa* Chiov., Fl. Somalia 283 (1929).

Type. Somalia: Costa du Migiurtini, penisola di Hafun, *Chiovenda* 606 (FI). S Arabia (Oman), Iran, Pakistan, Somalia.

6. *C. arabicus* Meikle in Kew Bull. 32:482 (1978). Fig. 2F.

Type. Yemen Arab Republic: 10 km SW of Yerim, *F. N. Hepper* 5659 (K). S Arabia.

7. *C. chinensis* (L.) Heimerl in Engl. & Prantl, Nat. Pflanzenfam., ed. 2, 16c:117 (1934). Fig. 2G.

Syn.: *Valeriana chinensis* L., Sp. Pl., ed. 1, 33 (1753); Burm. f., Fl. Ind. 15, t. 6, fig. 3 (1768).

Boerhavia repanda Willd., Sp. Pl. 1:22 (1797).

B. chinensis (L.) Aschers. & Schweinf., Beitr. Fl. Aethiop. 1:167 (1867); Druce in Rep. B.E.C. Br. Is. 3:415 (1914).

Commicarpus repandus (Willd.) Standl. in Contrib. U.S. Nat. Herb. 18:101 (1916).

ssp. *chinensis*

Type. "in China. Osbeck" (LINN!). Collected by Osbeck near Canton. S China, Pakistan, India, Burma, Malay Peninsula, Thailand, Vietnam, Java, Lesser Sunda Islands, Moluccas.

7A. *C. chinensis* (L.) Heimerl ssp. *natalensis* Meikle (see p. 247).

[*C. pentandrus* (non (Burchell) Heimerl) J. M. Gibson, Wild Flowers of Natal, pl. 32, fig. 6 (1975)].

Type. S Africa: Natal, beach near Clairmont, *W. Haygarth ex herb. J. M. Wood* 4495 (K).

S Africa (coast of Natal).

8. *C. greenwayi* Meikle (see p. 247). Fig. 1.

Type. Tanzania: Iringa Distr., Msembe, upper air-strip, 2800 ft, 1970, *P. J. Greenway & Kanuri* 14131 (K).

Tanzania.

9. *C. australis* Meikle (see p. 248). Fig. 2H.

[*Boerhavia repanda* (non Willd.) Benth., Fl. Austral. 5:278 (1870)].

Type. Australia: Monte Bello Islands, Trimonille, 1952, *F. H. Pavry* 15 (K). W and S Australia.

E. C. fruticosus Pohn. [infl. SW Africa (Namibia), *Seydel* 451; fr. SW Africa (Namibia) *Jensen* 32]; *F. C. tuberosus* (Lam.) Standl. [infl. Peru, *Cruickshanks* s.n.; fr. Peru, *Hutchison* 1408]; *G. C. brandegei* Standl. [infl. Mexico, *Carter* 2572; fr. Mexico, *Constance* 3176]; *H. C. scandens* (L.) Standl. [infl. (? cult.) herb. *Hook.*; fr. Bahamas, *Curtiss* 16]; *J. C. squarrosus* (Heimerl) Standl. [infl. Somalia, *Glover & Gilliland* 107; fr. Somalia *Hemming* 2273]; *K. C. pilosus* (Heimerl) Meikle [infl. Transvaal, *Werdermann & Oberdieck* 1786; fr. Transvaal, *Strey* 3489]; *L. C. fallacissimus* (Heimerl) Heimerl [infl. SW Africa (Namibia) *Seydel* 1350; fr. SW Africa (Namibia) *Tolken & Hardy* 664]; *M. C. boissieri* (Heimerl) Cufod. [infl. Abd al Kuri, *Smith & Lavranos* 663; fr. India, *Drummond* 15218]; *N. C. helenae* (J. A. Schultes) Meikle [infl. Kenya, *Greenway & Kanuri* 12880; fr. Kenya, *Post* 39].

10. *C. plumbagineus* (Cav.) Standl. in Contrib. U.S. Nat. Herb. 18:101 (1916). Fig. 2J.

Syn.: *Boerhavia plumbaginea* Cav., Icones 2:7, t. 112 (1793).

B. dichotoma Vahl, Enum. Pl. 1:290 (1804).

B. verticillata Poir. in Lam., Encycl. Méth. 5:56 (1804).

B. commersonii Baill. in Bull. Soc. Linn. Paris 1:484 (1885).

Commicarpus verticillatus (Poir.) Standl. in Contrib. U.S. Nat. Herb. 18:101 (1916).

C. commersonii (Baill.) Cavaco in Bull. Soc. Bot. Fr. 100:297 (1953).

Type. Spain: "ad radices Orcellitani montis [Orihuela]", *Cavanilles* (MA—n.v.).

S Spain, Palestine, S Arabia, Senegal, N Nigeria, Chad, Ruanda, Burundi, Zaire, E Cameroun, Sudan, Eritrea, Ethiopia, Somalia, Uganda, Kenya, Tanzania, Mozambique, Malawi, Zambia, Rhodesia, Botswana, Angola, Madagascar, SW Africa (Namibia), S Africa (Transvaal, Natal).

10A. *C. plumbagineus* (Cav.) Standl. var. *trichocarpus* (Heimerl) Meikle, comb. nov.

Syn.: *Boerhavia plumbaginea* Cav. var. *trichocarpa* Heimerl in Bull. Herb. Boiss. 5, App. 3:68 (1897).

Type. SW Africa (Namibia): Ombalambuenge, *Rautanen* 155; between Ondonga and Uukuambi, 1894, *Rautanen* 80 (lectotypus, K).

Botswana, SW Africa (Namibia).

11. *C. sinuatus* Meikle in Kew Bull. 29:83 (1974). Fig. 3A.

Type. Somalia: Erigavo, *Bally* 11199 (K).

Sinai, S Arabia, Somalia, Ethiopia.

12. *C. simonyi* (Heimerl & Vierh.) Meikle in Hooker's Icones 37:t. 3694, p. 2 (1971). Fig. 3B.

Syn.: *Boerhavia simonyi* Heimerl & Vierh. in Oest. Bot. Zeitschr. 53:435 (1903).

Type: Socotra, 1899, *Simony* (WU).

Socotra.

13. *C. heimerlii* (Vierh.) Meikle in Hooker's Icones 37:t. 3694, p. 2 (1971). Fig. 3C.

Syn.: *Boerhavia heimerlii* Vierh. in Oest. Bot. Zeitschr. 53:435 (1903).

Type. Socotra: Semha, 1899 *Simony* (WU).

Socotra: Semha.

14. *C. reniformis* (Chiov.) Cufod. in Bull. Jard. Bot. Brux. 23, Suppl.: 80 (1953). Fig. 3D.

Syn.: *Boerhavia reniformis* Chiov., Fl. Somalia 283, t. 33, fig. 2 (1929).

Type. Somalia: "Bacino del Darror, Halil Damölle, *Chioventa* 1002 (FI). Somalia, Ethiopia.

15. *C. fruticosus* Pohn. in Mitt. Bot. Staatssamml. München 1:337 (1953). Fig. 3E.

Type. SW Africa (Namibia): Tsarisberge, *E. Walter* 2095 (M—n.v.).

SW Africa (Namibia).

16. *C. tuberosus* (Lam.) Standl. in Contrib. U.S. Nat. Herb. 18:101 (1916). Fig. 3F.

Syn.: *Boerhavia tuberosa* Lam., Tabl. Encycl. Méth. 1:10 (1791).

Herba purgationis Feuillée, Journ. des. Obs. t. 18 (1714).

Type. "E Peru" (P).

Ecuador, Peru, Galapagos.

17. *C. brandegei* Standl. in Contrib. U.S. Nat. Herb. 12:374 (1909). Fig. 3G.

Syn.: *C. brandegei* Standl. ssp. *glabrior* Standl. in Contrib. U.S. Nat. Herb. 12:374 (1909).

Type. Mexico: Baja California, San Pablo, 1889, *Brandegee* (US—n.v.).

Mexico (Baja California).

18. *C. scandens* (L.) Standl. in Contrib. U.S. Nat. Herb. 12:373 (1909). Fig. 3H.

Syn.: *Boerhavia scandens* L., Sp. Pl., ed. 1, 3 (1753).

Type. "in Jamaica ad urbem jago de la vega" (LINN).

Arizona, Texas, Mexico, Guatemala, West Indies (Bahamas, Cuba, Jamaica, Puerto Rico, St Thomas, Tortola, St Martin, St Bartholomew, Bonaire, Curaçao, Aruba), Colombia, Venezuela, Ecuador, Peru, Bolivia.

19. *C. squarrosus* (Heimerl) Standl. in Contrib. U.S. Nat. Herb. 18:101 (1916). Fig. 3J.

Syn.: *Boerhavia squarrosa* Heimerl in Bull. Herb. Boiss. 5:813 (1896).

Commicarpus verticillatus (Poir.) Standl. var. *puberulus* Hutch. &

E. A. Bruce in Kew Bull., 1941:96 (1941).

Type. Somalia: without locality, *Prof. Dr C. Keller* (? BR, P, Z—omn. n.v.). S Arabia (Oman), Somalia, Kenya.

20. *C. pilosus* (Heimerl) Meikle (see p. 249). Fig. 3K.

Syn.: *C. fallacissimus* (Heimerl) Heimerl f. *pilosus* Heimerl in Bothalia 3:233 (1937).

Type. S Africa: Transvaal, near Vivo, *Schweickerdt & Verdoorn* 653 (PRE—n.v., K).

Rhodesia, S Africa (Transvaal).

21. *C. fallacissimus* (Heimerl) Heimerl in Bothalia 3:233 (1937). Fig. 3L.

Syn.: *Boerhavia fallacissima* Heimerl ap. Schinz in Verh. Bot. Ver. Brandenb. 31:223 (1890).

Type. SW Africa: Hereroland, 1885, *Lüderitz* 171 (? B—n.v., K).

22. *C. boissieri* (Heimerl) Cufod. in Bull. Jard. Bot. Brux. 23, Suppl.: 79 (1953). Fig. 3M.

Syn.: *Boerhavia boissieri* Heimerl in Denkschr. Akad. Wiss. Wien Math.-Nat. Kl. 71:346 (1907).

Type. Pakistan: Baluchistan and Sind, *Stocks* (G—n.v., K).

S Arabia (Oman), Socotra (Abd al Kuri), Pakistan, NW India.

23. *C. helenae* (J. A. Schultes) Meikle in Hooker's *Icones* 37:t. 3694, p. 1 (1971). Fig. 3N.

Syn.: *Boerhavia helenae* J. A. Schultes in Roemer & Schultes, *Syst. Veg.* 1, Mantissa 1:73 (1822).

B. stellata Wight, *Icones Pl. Ind. Orient.* 3(2):6, t. 875 (1843) non *B. stellata* Bojer (1842) *nom. illeg.*

Commicarpus stellatus Berhaut in Bull. Soc. Bot. Fr. 100:51 (1953). [*C. verticillatus* auct. non *C. verticillatus* (Poir.) Standl. (= *C. plumbagineus* (Cav.) Standl.)].

Type. "In ins. *St Helenae*", Burchell (K).

Iran, S Arabia, S Palestine, Egypt, Tibesti, Canaries (Fuerteventura), India, Cape Verde Islands, St Helena, Senegal, Mali, Central African Empire, Zaire, Sudan, Eritrea, Ethiopia, Somalia, Uganda, Kenya, Tanzania, Botswana, Angola.

DOUBTFUL OR EXCLUDED SPECIES

C. crassifolius Heimerl in Notizbl. Bot. Gart. Berlin 11:461 (1932).

(Type. Bolivia; "Unteres Aracatal, 1400 m, 1926, *C. Troll* 2325"). From the description this seems very close to *C. tuberosus* (Lam.) Standl. differing chiefly in its thicker leaves and 4 stamens. No authentic material has been seen.

C. africanus (Lour.) Dandy in Andrews, Fl. Plants Anglo-Egypt. Sudan 1:152 (1950), based on *Boerhavia africana* Lour., Fl. Cochinchin. 1:16 (1790) from Mozambique. This is certainly not a *Commicarpus*, but may well be a *Boerhavia*. No specimen has been seen.

C. montanus de Miré, Gillet & Quezel in Journ. Agric. Trop. et Bot. Applic. 4:154 (1957) and *C. montanus* var. *obovatus* Quezel, Miss. Bot. Tibesti 130 (1958), both from the Tibesti area, S Sahara, seem, from description, to come very close to *C. grandiflorus* (A. Rich.) Standl.

C. sp. Hinton 15911 from Mexico; Michoacán, Tizupan (Sept. 4, 1941) has been labelled *Commicarpus* n. sp. by C. V. Morton. It much resembles *C. tuberosus* (Lam.) Standl., but has larger flowers (like those of *C. brandegei* Standl.), and, in the Kew specimen, some of the stems are distinctly hairy, with short crisped hairs. It may be distinct, but available material is too scanty for adequate comparison.

NEW TAXA

Commicarpus decipiens Meikle, sp. nov. *C. grandifloro* (A. Rich.) Standl. affinis, sed floribus albis, foliis et caulibus brevius hirsutis differt, a *C. plumbagineo* (Cav.) Standl. indumento viscosissimo, alabastris dense glandulosis manifeste discrepat.

Herba perennis usque 2 m alta sed plerumque humilior, caules erecti, decumbentes vel subscandentes, basin versus lignosi, supra herbacei, multiramosi, pilis brevibus et glandulis stipitatis viscosissimis haud dense vestiti.

Folia opposita, ovata, acuta vel obtusa, 1.5–6(–10) × 1.5–4.5(–6) cm, margine integra, utrinque, praecipue ad nervos, pilis brevibus et glandulis viscosis oblecta; petiolus 0.5–2 cm longus, dense viscoso-glandulosus. *Inflorescentiae* axillares et terminales, umbellatae vel rarius verticillatae; pedunculi 1–3 cm longi, dense glandulosi; flores in quaque umbella 4–10; pedicelli glandulosi 5–12 mm longi; bractae involucrales lanceolatae, viscosae, circiter 4 × 1.5 mm, mox deciduae. *Perianthium* infundibuliforme, 12–15 mm longum, ad apicem 7–10 mm latum, album, extus (praecipue ante anthesin) glandulis stipitatis viscosis dense vestitum. *Stamina* 2–3; filamenta usque 2 cm longa, glabra, e perianthio longe exserta; antherae magnae, reniformes, flavae, 0.8 mm longae, 1 mm latae. *Stylus* quam stamina paullo longior, stigmate rotundato-pulviniformi instructus. *Anthocarpium* late clavatum, 8 mm longum, ad apicem 3–3.5 mm latum, glanduloso-viscosum, tuberculis glandulosis prominentibus ubique instructum.

SOUTH WEST AFRICA (NAMIBIA): Okahandja, 1300 m, 8 v 1907, *Dinter* 167 (holo. K); Waterberg, 1928, *R. D. Bradfield* 528; 9.6 miles S of Otjiwarongo on road to Waterberg, 1955, *de Winter* 2742; slopes of flat-topped mountain about 3 m NNE of Ohopoho, 1957, *de Winter & Leistner* 5280; 17 m from Okahandja to Kalkfeld, 1965, *Tölken & Hardy* 728; Omaruru to Etja Mountains, 1965, *Tölken & Hardy* 737.

***Commicarpus chinensis* (L.) Heimerl ssp. natalensis Meikle, ssp. nov.** A subspecie typica foliis integris (nec repandis), staminibus 2–3 (nec 3–4), habitu plerumque repente differt.

S AFRICA. Natal: between Umcomaas River and Umlazi River, 1840, *Drège*; the Bluffs near Durban, 1848, *Gueinzus*; *ibid.*, 1852, *Sanderson* 75; beach near Clairmont, c. 1891, *W. Haygarth ex herb. J. M. Wood* 4495 (holo. K); near Durban, 1893, *Schlechter* 2863; Santa Lucia Bay, 1948, *Rodin* 4734; Mapelana, 1964, *R. G. Strey* 5404; Ubombo, Lake Silayi, 1965, *Vahrmeijer & Tölken* 873; Lower Tugela, Zinkuazi, 1966, *E. J. Moll* 2913; Bella Vista, dunes N of Kosi mouth, 1972, *Stephen & Van Graan* 1291.

***Commicarpus greenwayi* Meikle, sp. nov.** affinitate obscura, forsan ad *C. chinensem* (L.) Heimerl spectans, sed caulibus hirsutis, floribus magnis, anthocarpiis late clavatis longe discrepat. Fig. 1.

Herba perennis, scandens vel reptans, siccitate nigrescens; caules ad 2 m vel ultra longi, herbacei, ramosi, dense et conspicue hirsuti, haud viscosi. *Folia* opposita, ovata, plerumque acuta, usque 7 × 6 cm, utrinque, praecipue ad nervos, conspicue hirsuta vel strigosa, basi rotundata vel leviter cordata, margine integra vel leviter repanda; petioli usque 1.8 cm longi, supra canaliculati, dense hirsuti. *Inflorescentiae* axillares, umbellatae, 3–5(–6)-florae; pedunculus gracilis, 2–3 cm longus, hirsutus; pedicelli usque 1.5 cm longi; bractae involucrales anguste lanceolatae, attenuatae, usque 5 mm longae, vix 6 mm latae, mox deciduae. *Perianthium* magnum, infundibuliforme, usque 15 mm longum et ad apicem 10–12 mm latum, saturate magenteum, extus pilis perpaucis ornatum. *Stamina* plerumque 5, filamenta usque 2 cm longa, glabra, e perianthio longe exserta; antherae magnae, reniformes, flavae, 0.8–1 mm longae, 1–1.2 mm latae. *Stylus* stamina distincte superans;

stigma rotundato-pulviniforme. *Anthocarpium* late clavatum circiter 8 mm longum, apicem versus 3 mm latum, glabrum (rhapidibus exclusis), tuberculis glandulosis sessilibus seriatim et regulariter ubique instructum.

TANZANIA: Iringa Distr., between Kisinge and Nyangolo, 1280 m, 1962, Polhill & Paulo 2033; Ruaha National Park, between Mbagi and Msembe, 840 m, 1966, Mrs H. M. Richards 21004; Kimiramotonge Hill, 840 m, 1966, Mrs H. M. Richards 21050; Msembe, 850 m, 1970, P. J. Greenway & Kanuri 14131 (holo. K); road to Trekimboga, 1970, Thulin & Mhoro 606.

Commicarpus australis Meikle, sp. nov. *C. chinensi* (L.) Heimerl [*C. repando* (Willd.) Standl.] forsan affinis, inflorescentiis irregulariter verticillatis, fructibus valde clavatis, foliis carnosulis inter alia discrepat.

Herba perennis suffruticosa; caules diffusi, multiramosi, interdum scandentes, usque 2.5 m longi, tegetes intricatas saepe formantes, basi sublignosi, supra herbacei, glabri, haud raro flexuosi, nodis leviter tumidis instructi. *Folia* opposita, deltoideo-ovata, usque 4.5 × 3.5 cm, glabra, carnosula, apice acuta, basi late cuneata, margine integra vel irregulariter sinuata; petiolus brevis, vix 1 cm excedens, glaber vel crispato-pubescent, supra valde canaliculatus. *Inflorescentiae* axillares et terminales, irregulariter ramosae, cymas, umbellas, verticillosque intermixtos efformantes; pedunculi plerumque crassi, usque 8 cm longi; pedicelli breves, vix 7 mm excedentes, glabri vel glandulis stipitatis viscosis interdum vestiti; bractae involucrales anguste ovatae, herbaceae, glabrae vel sparse pubescentes, usque 2.5 mm longae et 1.5 mm latae, mox deciduae. *Perianthum* infundibuliforme, c. 10 mm longum, ad apicem usque 10 mm latum, roseum vel malvinum, extus (rhapidibus exclusis) glabrum. *Stamina* 3-4, filamenta e perianthio breviter exserta, glabra; antherae pro ratione parvae, vix 0.5 mm longae et 1 mm latae. *Stylus* usque 1.5 cm longus, breviter exsertus, stigmate rotundato-pulviniforme instructus. *Anthocarpium* late clavatum, circiter 8 mm longum, apicem versus 3-3.5 mm latum, glabrum, tuberculis glandulosis sessilibus irregulariter ornatum.

W AUSTRALIA: Shark Bay, Milne; between Moore and Murchison Rivers, 1853, Drummond 217; Carnarvon, mouth of Gascoyne R., 1905, Morrison 15257; between Globe Hill and Minderoo, Ashburton R., 1905, Morrison; Monte Bello Islands, Pt Hermite, 1952, F. L. Hill 545; Monte Bello Islands, Trimonille, 1952, F. L. Hill 584; Trimonille, 1952, F. H. Pavry 15 (holo. K).

S AUSTRALIA: northern Flinders Range, entrance to Brachina Gorge, 1960, T. R. N. Lothian 965; Everard Range, Everard Park Station, between Betty and Ronalds Well, 1965, Symon 3344.

The identity of the plant recorded by Bentham (Fl. Austral. 5:278) from "Queensland. Lady Elliott's Island. Capt. Robertson" under the name *Boerhavia repanda* Willd. cannot be ascertained in the absence of the relevant specimen.

Since going to press, the specimen has been traced to the National Herbarium, Melbourne (MEL) and the authorities there have kindly supplied a photograph. The specimen was collected by Capt. G. Robinson (not Robertson) and represents a distinct new species, shortly to be described, and for the present labelled *Commicarpus* sp. A.

***Commicarpus pilosus* (Heimerl) Meikle, stat. nov.**

Syn.: *C. fallacissimus* (Heimerl) Heimerl f. *pilosus* Heimerl in *Bothalia* 3:233 (1937).

A *C. fallacissimo* (Heimerl) Heimerl caulibus dense et conspicue glanduloso-pilosis, floribus majoribus, perianthio usque 7 mm diam., magenteo, fructibus auguste clavatis, usque 8 mm longis, 2-2.5 mm latis, tuberculis glandulosis apice distincte coronatis inter alia differt.

RHODESIA: Gwanda, near junction of Umzingwane and Limpopo Rivers, 1956, *I. M. Rattray* 1726; same area, 1956, *R. M. Davies* 2363; Beitbridge, 1961, *L. C. Leach* 10664; same locality, 1967, *P. Symes* 67/M/1.

S AFRICA. Transvaal: Messina, 1925, *I.B.P.E.* 1911; and, 1926, *I.B.P.E.* 1955; Zoutpansberg, Vivo, 1934, *Schweickerdt & Verdoorn* 653 (holo. PRE—n.v.; iso. K); Messina, on summit of Mapuwgubwe, 1938, *Smuts & Gillett* 4058; Wyllies Poort, 1948, *Rodin* 4234; Olifantsriver, 1954, *Van den Schyff* 3298; Wyllies Poort, 1954, *Meeuse* 9204; about 42 m W of Louis Trichardt, 1955, *Schlieben* 7548; Beauty Berg, 1959, *Werdermann & Oberdieck* 1786; Liliput, 1960, *R. G. Strey* 3489; Zoutpansberg, 1962, *Schlieben* 9233.