

Nomenclature and typification of southern African species of *Euphorbia*

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ABSTRACT

Types have been located for most of the 185 species of *Euphorbia* L. that are known to occur naturally in southern Africa and also for most of their synonyms. Lectotypes or neotypes are selected where possible for those names for which a holotype cannot be found. The synonymy largely follows previous accounts and reasons are given where new synonymy is proposed. *Euphorbia huttonae* N.E.Br. is reinstated at the level of species and *E. franksiae* var. *zuluensis* A.C.White *et al.* is raised to the level of species as *E. gerstneriana* Bruyns, nom. nov. A new name, *E. radyeri* Bruyns, is provided for the rhizomatous plants previously referred to as *E. caerulescens* Haw., which is synonymous with *E. ledienii* A.Berger.

INTRODUCTION

The large, cosmopolitan genus *Euphorbia* L. is represented in southern Africa (taken here to include the countries Botswana, Lesotho, Namibia, South Africa, and Swaziland) by 185 species. For these there are 368 validly described names at the level of species. In this listing only naturally occurring species are included. These are distributed among the four subgenera established by Bruyns *et al.* (2006) and based on molecular and morphological data as shown in Table 1, where additional information on growth habit is also supplied. Many of the succulent species such as *E. globosa* Sims, *E. meloformis* Aiton and *E. obesa* Hook.f. are popular subjects in specialist collections around the world, but the other species have little economical use, though their medicinal use is probably underestimated. The last revisions of the genus for this region were those of N.E. Brown (1911–1912, 1915), with the succulent species receiving further attention by White *et al.* (1941). The taxonomy of *Euphorbia* in southern Africa remains disorganised, with many names applied in different herbaria in South Africa to quite different species. In an attempt to bring order to the situation, types have been located and, where these are missing, lectotypes or neotypes are selected as applicable.

MATERIALS AND METHODS

For each validly published name for a southern African species of *Euphorbia*, the protologue was consulted in the relevant literature. Type specimens have been searched for among material in the herbaria B, BM, BOL, G, GRA, K, KMG, M, NBG, NH, NU, NY, OXF, P, PRE, S, SAM, SBT, W, WIND, WRSL, WU, Z (herbarium acronyms according to Holmgren *et al.* (1990)). A specimen is taken as the holotype if it was indicated as such by the author, or if it is clear from where it is located relative to where the author worked that it must be the holotype. In many cases it has proved to be impossible to be sure which specimen is the holo-

type. In such instances, a lectotype is generally selected from among the duplicates of the ‘type number’ or from among the ‘syntypes’ mentioned by the author in the protologue. A particular specimen is chosen over others according to its quality or, in the case of syntypes, according also to how widely duplicates (if any) are represented. In cases where no appropriate material for use as a lectotype was located, a neotype was selected. All material cited has been seen unless it is expressly stated otherwise. The JSTOR Plant Science website (<http://plants.jstor.org/>) has been consulted in all applicable cases and the Kew Herbarium Catalogue (<http://apps.kew.org/herbcat>) was consulted for many species and names as well. Data on localities is given as on the specimens, with the present-day country where the specimen was collected added.

RESULTS

The species are arranged alphabetically within the four subgenera of *Euphorbia* that were established in Bruyns *et al.* (2006). The synonymy is as in Bruyns *et al.* (2006), except where otherwise mentioned and discussed.

NOMENCLATRURAL ACCOUNT

1. *Euphorbia* subg. *Chamaesyce* Raf.

1a. Sect. *Anisophyllum* Roeper

E. austro-occidentalis Thell., Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich 61: 431 (1916). Type: Namibia, Okahandja, sandy bushveld, cultivated land, 1 300 m, Oct., *Dinter 105* (Z, lecto., designated here; BOL, GRA, SAM-3 sheets, isolecto.). [Thellung cited also *Dinter 222* (Z), *222a* (Z) and *822* (Z). A lectotype is selected.]

E. chamaesycoides B.Nord., Dinteria 11: 20 (1974). *Chamaesyce chamaesycoides* (B.Nord.) Koutnik: 263 (1984). Type: Namibia, Brandberg, Upper Tsisab Valley, ± 1 600 m, 6 May 1963, *Nordenstam 2567* (S, holo.; M, iso.).

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Table 1.—Numbers of species, available (i.e. validly published) names and showing the numbers of species exhibiting different growth forms (annuals, herbs, succulents, and geophytes) in the subgenera of *Euphorbia*.

Subgenus	Species	Available names	Annuals	Perennial, non-succulent herbs	Succulents	Geophytes
<i>Chamaesyce</i>	37	84	15	0	21	1
<i>Esula</i>	15	33	0	12	3	0
<i>Euphorbia</i>	50	66	0	0	50	0
<i>Rhizanthium</i>	83	183	0	5	73	5

E. eylesii Rendle, *Journal of Botany* 43: 52 (1905). *Chamaesyce eylesii* (Rendle) Koutnik: 263 (1984). Type: Zimbabwe, Deka siding along Bulawayo-Victoria Falls railway line, May 1904, *Eyles 130* (BM, holo.; SRGH, iso.).

E. leshumensis N.E.Br., *Flora of Tropical Africa* 6(1): 513 (1911). Type: Botswana, Leshumo Forest, received May 1883, *Holub* (K, lecto., designated here). [Brown (1911) also cited *Macaulay 423* (K), from Zambia.]

E. glanduligera Pax, *Botanische Jahrbücher für Systematik* 19: 142 (1894). *Chamaesyce glanduligera* (Pax) Koutnik: 263 (1984). Type: Namibia, bei Nawas am Swakop, bei Salem, 12 Dec. 1888, *Gürich 3* (missing; sketch of type at K). Neotype (designated here): Namibia, Naukluft Mtns, between Ababes and Homnus, *Pearson 9106* (BOL).

E. pfeilii Pax.: 534 (1897). Type: Namibia, Stolzenfels, Rietfontein, 1890/1891, *Pfeil 91* (missing).

E. glaucella Pax.: 737 (1898). Type: Namibia, Okahandja, Mar. 1883, *Köpfner 68* (Z, lecto., designated here). [Pax (1898) also cited *Fleck 454a* (Z), so a lectotype is selected.]

E. anomala Pax: 636 (1908), *nom. illegit.*, non Boissier (1862).

E. kwebensis N.E.Br.: 137 (1909). Type: Botswana, Kwebe Hills, 3300', 7 Jan. 1897, *Lugard 143* (K, lecto., designated here). [Brown (1909) also cited *Lugard 81* (K), from the same locality and marked both specimens as 'Type'.]

E. gueinzii Boiss. in A.P. de Candolle, *Prodromus* 15(2): 71 (1862). Type: South Africa, at Natal Bay, *Gueinzii* (G, lecto., designated here; W, isolecto.). [Boissier (1862) also cited an unnumbered collection of *Sander-son* (in 'h. Kew', missing).]

E. gueinzii var. *albovillosa* (Pax) N.E.Br.: 252 (1915). *E. albovillosa* Pax: 373 (1904). Type: South Africa, Natal, Inchanga, 1 180 m, 16 Sept. 1893, *Schlechter 3245* (BOL, lecto., designated here; GRA, K, PRE, isolecto.). [A lectotype is designated as no specimens seen by Pax have been located.]

E. inaequilatera Sond., *Linnaea* 23: 105 (1850). *Anisophyllum inaequilaterum* (Sond.) Klotzsch & Garcke: 22 (1860). *Chamaesyce inaequilatera* (Sond.) Soják: 169 (1972). Type: South Africa, Port Natal, *Gueinzii 167* (MEL [501275], holo.; F, MEL, iso.).

Anisophyllum mundii Klotzsch & Garcke: 25 (1860). Type: South Africa, Cape, Gamka R., Prince Albert div.,

Jan. 1820, *Mund & Maire 15* (K 000253186, lecto., designated here). [There are two specimens under this number at K and it is not certain that either was seen by Klotzsch & Garcke. This is the larger specimen, the other is a 'branch from the type', according to N.E. Brown.]

A. setigerum E.Mey. ex Klotzsch & Garcke: 29 (1860). Type: South Africa, Cape, *Drège* (missing).

E. parvifolia E.Mey. ex Boiss.: 34 (1862). Type: South Africa, Cape, Jan. 1820, *Mund & Maire 15* (K 000253186, lecto., designated here). [Boissier cited: near Gariiep, *Drège*; Beaufort distr., *Lund*; '*Anis. Mundtii* Kl. et Gke l.c. p. 25'. From the latter, a lectotype is selected.]

E. parvifolia var. *laxa* Boiss.: 34 (1862). Type: none located. [Boissier cited: *Drège 8191*; *8198* and '*Sieb. Cap. n. 154*, which have not been located.]

E. sanguinea var. *setigera* E.Mey. ex Boiss.: 35 (1862). Type: South Africa, near Kei and Bashee Rivers, *Drège* (missing).

E. sanguinea var. *natalensis* Boiss.: 35 (1862). Type: South Africa, Port Natal, *Gueinzii 167* (F, lecto., designated here; MEL-2 sheets, isolecto.). [Boissier (1862) did not say in which herbarium he had seen this specimen so a lectotype is selected.]

E. nelsii Pax: 737 (1898). Type: Namibia, Hereroland, 1886, *L. Nels 91* (Z, holo.; K, iso.). [N.E. Brown annotated the piece of *Nels 91* at K as 'fragment from type' and mentioned also that the type was at Z.]

E. inaequilatera var. *perennis* N.E.Br.: 246 (1915). Type: South Africa, Natal, near Tugela, 4 Jan. 1886, *Wood 3552* (K, lecto., designated here). [Brown also cited many other syntypes for this variety.]

E. livida E.Mey. ex Boiss., in A.P. de Candolle, *Prodromus* 15(2): 14 (1862). *Chamaesyce livida* (E.Mey. ex Boiss.) Koutnik: 263 (1984). Neotype (designated here): South Africa, Natal, without precise locality, *Gerrard 1171* (K). [Boissier (1862) cited 'ad Natal Bay, *Drège*' and *Gueinzii 177*, which are both missing. The *Drège* specimens found do not have this locality on them so a neotype is selected.]

E. mossambicensis (Klotzsch & Garcke) Boiss. in A.P. de Candolle, *Prodromus* 15(2): 36 (1862). *Anisophyllum mossambicense* Klotzsch & Garcke: 30 (1860). *Chamaesyce mossambicensis* (Klotzsch & Garcke) Koutnik: 263 (1984). Type: Moçambique, Rios de Sena, *Peters 33* (K, lecto., designated here). [No type has been

found at B. This is a fragment of the type so is designated as lectotype.]

E. neopolycnemoides Pax & K.Hoffm., *Botanische Jahrbücher für Systematik* 45: 240 (1910). *Chamaesyce neopolycnemoides* (Pax & K.Hoffm.) Koutnik: 263 (1984). Type: South Africa, Transvaal, between Nylstroom and Naboomspruit, sandy places along Machalaquana R., 24 Jan. 1894, *Schlechter 4278* (missing). Neotype (designated here): South Africa, Waterberg, Boschpoort near Warmbaths, 3650', Jan 1906, *Bolus 12280* (K; duplicate at BOL). [The type is missing and the specimen at K of *Bolus 12280* was matched by N.E. Brown against *Schlechter 4278* so it is selected as neotype.]

E. arabica var. *latiappendiculata* Pax: 85 (1909). Type: South Africa, Waterberg, Boschpoort near Warmbaths, Jan 1906, *Bolus 12280* (K, lecto., designated here; BOL, isolecto.). [The specimen at K is 'part of the type' and the other was not seen by Pax so a lectotype is selected.]

E. pergracilis P.G.Mey., *Mitteilungen aus der Botanischen Staatssammlung München* 6: 247 (1966). *Chamaesyce pergracilis* (P.G. Mey.) Koutnik: 263 (1984). Type: Namibia, 7 miles east of Purros towards Sesfontein, 23 June 1963, *Giess 3211* (M, holo.; MO, PRE, WAG, iso.).

E. phylloclada Boiss. in A.P. de Candolle, *Prodromus* 15(2): 66 (1862). Type: South Africa, between Verleptpram and mouth of Gariep, Sept., *Drège 238* (S, lecto., designated here). [Boissier (1862) cited *Drège* 'in h. Bunge' (missing), from the same locality.]

E. hereroensis Pax: 35 (1889). Type: Namibia, Hereroland, Hykamkab, 300 m, May 1886, *Marloth 1190* (missing).

E. rubriflora N.E.Br., *Flora of Tropical Africa* 6(1): 509 (1911). Type: Zimbabwe, Victoria Falls, Jan. 1906, *Allen 264* (K, lecto., designated here; SRGH, isolecto.). [Brown (1911) also cited: Zambia, Livingstone, *Rogers 7132* (K, BOL).]

E. schlechteri Pax, *Botanische Jahrbücher für Systematik* 28: 26 (1900). *Chamaesyce schlechteri* (Pax) Koutnik: 263 (1984). Type: Moçambique, Ressano Garcia, 1 000', 24 Dec. 1897, *Schlechter 11915* (PRE, lecto., designated here; BOL, BR, COI, G, GRA, HBG, K, WAG, isolecto.). [No material definitely seen by Pax in known and so a lectotype is selected.]

E. spissiflora S.Carter, *Kew Bulletin*. 45: 331 (1990). Type: Zimbabwe, Nhungo, 8 km north of Gokwe, 6 Mar. 1964, *Bingham 1158* (K, holo.; SRGH, iso.).

E. tettensis Klotzsch in W.C.H. Peters, *Naturwissenschaftliche Reise nach Mossambique* 1: 94 (1861). *Chamaesyce tettensis* (Klotzsch) Koutnik: 263 (1984). Type: Moçambique, Tete, *Peters* (missing). [The name *Anisophyllum tettense* Klotzsch & Garcke: 34 (1860) was not validly published since it only cited the above, which had not yet appeared.]

E. zambesiana Benth., *Hooker's Icones Plantarum* 14: t. 1305 (1880). *Chamaesyce zambesiaca* (Benth.)

Koutnik: 263 (1984). Type: Malawi, Zomba Mtn, 1861, *Meller, Livingstone's Expedition* (K, lecto., designated here). [Bentham (1880) also cited: Malawi, Shire Highlands, Blantyre, *Buchanan 10* (K). A lectotype is selected.]

1b. Sect. *Articulofruticosae* Bruyns

E. angrae N.E.Br., *Flora capensis* 5(2): 279 (1915). Type: Namibia, Lüderitz (Angra Pequeña), 18 Jan. 1907, *Galpin & Pearson 7549* (K, lecto., designated here; drawing; PRE, SAM, isolecto.). [Both the specimen at SAM and that at K were annotated as 'Type' by N.E. Brown, so a lectotype is selected.]

E. einensis G.Will.: 57 (2004). Type: Namibia, southern Schakalberg, 70 km NE of Oranjemund, *Williamson 5143* (BOL-2 sheets, holo.).

E. einensis var. *anemoarenicola* G.Will.: 62 (2004). Type: South Africa, Kortdoorn, *Williamson 5985* (BOL-2 sheets, holo.).

E. burmannii E.Mey. ex Boiss. in A.P. de Candolle, *Prodromus* 15(2): 75 (1862). Type: South Africa, Cape, towards Blauwberg, *Drège 2920* (P, lecto., designated here). [Boissier (1862) cited *Drège 2920* (P); Tygerberg, *Bergius*; *Krauss*. Neither of the latter two specimens has been located.]

E. biglandulosa Willd.: 27 (1814), *nom. illegit. non* Desf. (1808). [Willdenow (1814) gave a description but cited no specimens.]

Arthrothamnus burmannii E.Mey. ex Klotzsch & Garcke: 62 (1860). Type: South Africa, Cape, *Drège* (missing). Neotype (designated here): South Africa, Cape, *Drège 2920* (P). [No specimen as cited by Klotzsch & Garcke (1860) has been found, so a neotype is selected.]

Arthrothamnus bergii Klotzsch & Garcke: 63 (1860). Type: South Africa, Cape, *Bergius* (missing).

E. phymatoclada Boiss.: 24 (1860). Type: South Africa, rocky hills at Ebenezer, *Drège 2943* (GRA, lecto., designated here). [Boissier (1860) cited a specimen 'in h. Bunge', which has not been located so a lectotype with the same number is selected. This is from a plant of *E. burmannii*, although this name is usually placed as a synonym of *E. mauritanica* (e.g. White *et al.* 1941).]

E. hydnorae E.Mey. ex Boiss.: 95 (1862). Type: South Africa, between Kaus and Doornpoort, *Drège 2943* (GRA, lecto., designated here). [Apart from *Drège 2943*, Boissier (1862) also cited 'in montibus Niueweweld alt. 3 000–4 000 ped.', apparently another collection of *Drège* and both were 'in h. Bunge'. The lectotype selected here is a specimen of *E. burmannii*, although this name is also usually placed as a synonym of *E. mauritanica* (e.g. White *et al.* 1941).]

E. corymbosa N.E.Br.: 279 (1915). Type: South Africa, Cape, near Albertinia, 16 Nov. 1910, *Muir* (K, holo.).

E. karroensis (Boiss.) N.E.Br.: 290 (1915). *E. burmannii* var. *karroensis* Boiss. in DC.: 75 (1862). Type: South Africa, Cape, Karoo between Hol River and Mierenkasteel, 500–1 000', 5 Aug. 1830, *Drège 2947* (P, lecto., designated here; K, isolecto.). [Boissier (1862) did not say in which herbarium the specimen was located so a lectotype is selected.]

E. macella N.E.Br.: 288 (1915). Type: South Africa, Cape, near Little Brak River, 10 Oct. 1814, *Burchell 6197/2* (K, holo.).

E. ephedroides *E.Mey. ex Boiss.* in A.P. de Candolle, Prodr. 15(2): 75 (1862). Type: South Africa, Cape, Karoo at Goedemanskraal, 2 500', 8 Sept. 1830, *Drège 2949* (P, lecto., designated here; K, MO, S, isolecto.). [Boissier (1862) cited also *Burchell 1424* ('in h. DC.'), which has not been located.]

E. ephedroides var. *imminuta* L.C.Leach & G.Will.: 72 (1990). Type: South Africa, Cape, Alexander Bay, *Williamson 3652* (NBG, holo.; K, PRE, iso.).

E. ephedroides var. *debilis* L.C.Leach: 73 (1990). Type: Namibia, north of Rosh Pinah, *Leach & Brunton 15893* (NBG, holo.; K, MO, PRE, iso.).

E. exilis *L.C.Leach*, South African Journal of Botany 56: 76 (1990). Type: South Africa, Cape, Aties, May 1984, *Leach & Bayer 17129* (NBG-2 sheets, holo.; K, iso.).

E. glandularis L.C.Leach & G.Will.: 75 (1990). Type: South Africa, Cape, near Steinkopf, *Leach & Hilton-Taylor 17019* (NBG, holo.; K, PRE, iso.).

E. gentilis *N.E.Br.*, Flora capensis 5(2): 289 (1915). Type: South Africa, Cape, Vanrhynsdorp Div., hills near Zout River, 500', 14 Jul. 1896, *Schlechter 8136* (BOL, lecto., designated here; GRA, HBG, K, PRE, S, isolecto.). [Brown (1915) also cited Graafwater (Grauwater), 15 Dec. 1908, *Pearson 3271* (BOL, K, SAM); near Bitterfontein, *Zeyher 1531* (G, K, S, W).]

E. vaalputsiana L.C.Leach: 534 (1988a). Type: South Africa, Cape, Vaalputs, near Gamoep, *Leach & Perry 17232* (NBG, holo.; K, MO, PRE, iso.).

E. gentilis subsp. *tanquana* L.C.Leach: 538 (1988a). Type: South Africa, Cape, near turnoff to Skitterykloof, *Leach & Perry 17247a* (NBG, holo.; K, M, MO, PRE, iso.).

E. giessii *L.C.Leach*, Dinteria 16: 27 (1982). Type: Namibia, 18 km east of Henties Bay, Dec. 1976, *Giess 14809* (sub *Leach 15940*) (PRE, holo.; M, WIND, iso.).

E. herrei *A.C.White et al.*, The Succulent Euphorbiae 2: 962 (1941). Type: South Africa, Cape, near Swartwater, 1930, *Herre sub PRE 46025* (PRE, holo.). [Although White *et al.* (1941) did not mention the number PRE 46025, it is assumed that this is the same specimen as the one they cited.]

E. juttiae *Dinter*, Neue und wenig bekannte Pflanzen Deutsch-SWA's: 30 (1914). Type: Namibia, Garub, 900 m, 9 Jan. 1910, *J.Dinter 1047* (SAM, lecto., designated by Leach (1988a); NY, isolecto.).

E. siliciicola *Dinter*: 31 (1914). Type: Namibia, Büllsport, 5 Apr. 1911, *Dinter 2132* (SAM, lecto., designated by Leach (1988a)).

E. aequoris N.E.Br.: 279 (1915). Type: South Africa, Cape, Middelburg div., Schoombie, Feb. 1897, *Trolip* (sub *SAM 20091*) (SAM, lecto., designated here; K, isolecto.). [Brown (1915) cited also: Rosmead Junction, 4 000', 22 Mar. 1900, *Sim sub Galpin 5626* (PRE); between Colesburg & Hanover, 1871, *Bolus 2201* (K).]

Leach (1988a) discussed *E. juttiae* in detail but considered that *E. aequoris*, although closely related, was 'sufficiently distinct in vegetative characters and habit alone for it to be disregarded' in those discussions. He did not say in what way it was so distinct. It appears that this distinctiveness lay in the much more robust plants formed by *E. aequoris*, with longer and more slender stems and branches, with more widely spaced and less prominent tubercles and a longer rootstock, as well as the lack of the peculiar habit that the branches have in *E. juttiae* of bending over to the north or west. Nevertheless, among the material that he cited under *E. juttiae* were two specimens from near Olifantshoek and near Kenhardt respectively that are rather more typical of *E. aequoris* than of *E. juttiae*. While many specimens of *E. aequoris* are unmistakable (especially those from the Great Karoo and drier parts of the Eastern Cape), those from the Northern Cape and calcareous pans on the southern edge of the Kalahari are not clearly referable to either species. Some of these (especially plants from exposed spots) may even exhibit a similar, almost prostrate habit to *E. juttiae*, and have shorter stems and branches with more prominent tubercles while more protected plants are erect, slender, and more typical of *E. aequoris*. I have found no clear distinctions between the two species and have placed *E. aequoris* in synonymy.

E. lavrani *L.C.Leach*, The Journal of South African Botany 49: 807 (1983). Type: Namibia, Namuskluft, 1 200 m, *Lavranos & Newton 16872* (PRE holo.; NBG, SRGH, iso.).

E. muricata *Thunb.*, Prodr. 2: 86 (1800). Type: South Africa, Cape, *Thunberg* (UPS-THUNB 11499, holo.; drawing and fragment at K, iso.).

E. spicata *E.Mey. ex Boiss.*: 97 (1862). Type: South Africa, 31 Aug. 1830, *Drège 2946* (K, lecto., designated here; S, isolecto.). [Boissier (1862) cited also Cape, near Bitterfontein, *Zeyher 1531* (G, K, S, W), which is *E. gentilis*.]

E. aspericaulis *Pax*: 26 (1899). Type: South Africa, Cape, Hantam Mtns, *ex Dr Meyer* (holo. missing; drawing and fragment at K, iso.). [According to Carter (2002) this specimen is at B, but it cannot be located.]

E. rhombifolia *Boiss.*, Centuria Euphorbiarum: 19 (1860). Type: South Africa, Cape, arid places on southern Karoo, *Drège 8217* (G, lecto., designated here; K, S, W, isolecto.). [Boissier (1860) cited also *Ecklon & Zeyher, Euphorb. 23, 83* (G, W).]

Arthrothamnus densiflorus *Klotzsch & Garcke*: 62 (1860). Type: South Africa, Cape, Karoo near Olifants

River, Oudtshoorn distr., Jan. 1820, *Mund & Maire* (K, lecto., designated here). [Since there is no evidence that Klotzsch & Garcke saw this specimen it is designated as lectotype.]

E. brachiata (E.Mey. ex Klotzsch & Garcke) Boiss.: 74 (1862). *Arthrothamnus brachiatus* E.Mey. ex Klotzsch & Garcke: 62 (1860). Type: South Africa, Cape, near Ebenezer, *Drège 2948* (K, lecto., designated here; S, isolecto.). [Although Boissier (1862) included *E. muricata* Thunb. in the synonymy of *E. brachiata*, this is considered here as a separate species. Since it is unlikely that Klotzsch & Garcke saw any of the sheets listed, a lectotype is selected. The specimen at K of *Drège 2948* was taken from 'the type' in 'Drège's herbarium' by N.E. Brown.]

E. decussata E.Mey. ex Boiss.: 74 (1862), *nom illegit.*, non Salisb. (1796). [Boissier (1862) cited *Drège 3926* (missing), *Drège 8218* (K, MO, S, W) and 'Olivants River, *Mund & Maire*' (K). However, since it is an illegitimate name, a lectotype is not selected here.]

E. amarifontana N.E.Br.: 275 (1915). Type: South Africa, Cape, near Springbokkuil River, Bitterfontein, *Zeyher 1534* (K, lecto., designated here; BOL, SAM '1534b'-2 sheets, isolecto.). [Brown (1915) cited also *Pearson 5532* (BOL).]

E. chersina N.E.Br.: 274 (1915). Type: Namibia, Lüderitz (Angra Pequena), 18 Jan. 1907, *Galpin & Pearson 7584* (K, lecto., designated here; PRE, isolecto.). [Brown (1915) also cited *Marloth 4638* (K) and marked both specimens as 'Type', so a lectotype is selected.]

E. caterviflora N.E.Br.: 286 (1915). Type: South Africa, Cape, Nieuveveld, Beaufort West, *Drège 8218* (K, lecto., designated here; G, MO, W, isolecto.). [Brown (1915) also cited and wrote 'Type' on *Tyson 167* (K, SAM), so a lectotype is selected.]

E. hastisquama N.E.Br.: 288 (1915). Type: South Africa, Cape, fields by the Swartkops River, *Zeyher 1099* (BOL, lecto., designated here; K, isolecto.). [Brown (1915) cited also *Zeyher 3854* (SAM) and *Ecklon & Zeyher, Euphorb. 25* (K, SAM).]

E. mundii N.E.Br.: 287 (1915). Type: South Africa, Cape, Montagu, 1 Jan. 1903, *Marloth 2805* (K, lecto., designated here; PRE, isolecto.). [Brown (1915) also cited *Marloth 3904* (PRE) and *Marloth 4878* (K) and several others as syntypes. Brown gave this as a new name for *Arthrothamnus densiflorus* Klotzsch & Garcke, which could not be transferred to *Euphorbia*. He regarded these syntypes as identical to the *Mund & Maire* specimen that typified *A. densiflorus* and therefore named this plant after *Mund*.]

E. perpera N.E.Br.: 277 (1915). Type: South Africa, Cape, along Orange River, between Verleptpram and its mouth, *Drège* (K, holo.).

E. rudolfii N.E.Br.: 276 (1915). Type: South Africa, Cape, Vanrhynsdorp div., Bitterfontein, Sept. 1897, *Schlechter 11047* (K 000252612, lecto., designated here; BR, GRA, K. L-2 sheets, PRE, S, isolecto.). [Brown

cited also: between Bitterfontein and Stinkfontein, 5 Dec. 1910, *Pearson 5533* (BOL, K). He only wrote 'Type' on the specimens at K of *Pearson 5533* and on one of the specimens at K of *Schlechter 11047* (K 000252612). Therefore a lectotype is selected here.]

E. bayeri L.C.Leach: 539 (1988b). Type: South Africa, Cape, 2 km west of Mossel Bay, 11 Sept. 1985, *Bayer 4875* (NBG, holo.; K, MO, PRE, iso.).

E. spartaria N.E.Br. *Flora of Tropical Africa* 6(1): 558 (1911). Type: Namibia, Hoffnung, Feb. 1907, *Galpin & Pearson 7560* (K, holo.; PRE, SAM, iso.). [Brown annotated the sheet of *Galpin & Pearson 7560* (K) as 'Type' and that at SAM as 'Part of the type'. He did not do this for any of the specimens of *Dinter 983* (K, SAM-2 sheets) designated by Leach & Williamson (1990) as lectotype and also not on *Dinter 255* (K). Consequently their lectotype is set aside here in favour of Brown's preferred 'type'.]

E. racemosa E.Mey. ex Boiss.: 75 (1862), *nom. illegit.*, non Tausch ex Rchb. (1832). [Boissier (1862) cited: South Africa, Cape, near Hamerkuil, *Drège* (MO, S '8204'); distr. Beaufort, *Ecklon* in h. Petrop (missing). As this is an illegitimate name a lectotype is not selected.]

E. indecora N.E.Br.: 274 (1915). Type: South Africa, Cape, between Dabenoris and Houms Drift, 11 Jan. 1909, *Pearson 3387* (K 000252597, lecto., designated here; K, isolecto.). [There are two specimens of this collection at K, both annotated by N.E. Brown as 'Type', so a lectotype is selected. The size of these plants (2–3' tall, according to the specimens) suggests that they are *E. spartaria* rather than *E. rhombifolia*.]

E. rhombifolia var. *laxa* N.E.Br.: 285 (1915). Type: South Africa, Cape, among rocks along Chichaba River between Komgha and Kei Mouth, Aug. 1891, 1 000', *Flanagan 838* (GRA, lecto., designated here; PRE, SAM, isolecto.). [In this case (unlike for *E. spartaria*) Brown annotated the sheets of the different collections *MacOwan 1612* (GRA) and *Flanagan 838* (GRA, PRE, SAM) as 'type' so a lectotype is designated. Another syntype is *Sutherland* (K).]

E. rhombifolia var. *triceps* N.E.Br.: 285 (1915). Type: South Africa, Cape, Queenstown distr., mountains near Imbasa River, 1860, *Cooper 318* (K, lecto., designated here; BOL, W, isolecto.). [Brown (1915) cited several specimens as representing var. *triceps*, so a lectotype is selected.]

E. cibdela N.E.Br.: 275 (1915). Type: Namibia, on hills at Schakalskuppe, 4 900–5 600', 18 Jan. 1909, *Pearson 4428* (K, holo.; BOL, LD, SAM, iso.).

E. rectirama N.E.Br.: 283 (1915). Type: South Africa, Cape, Klipfontein, Griqualand West, 29 Dec. 1812, *Burchell 2633* (K, lecto., designated here). [Brown (1915) cited several specimens, of which the above is selected as lectotype.]

E. spinea N.E.Br., *Flora capensis* 5(2): 272 (1915). Type: Namibia, among rocks near Dabegabis, *Pearson 4380* (K, lecto., designated here; BOL, isolecto.).

[Brown (1915) also cited *Pearson 3296* (BOL, K, SAM), which is *E. rhombifolia* and *Pearson 4585* (K) and wrote 'Type' on all three specimens, so a lectotype is designated.]

E. stapelioides Boiss., *Centuria Euphorbiarum*: 26 (1860). Type: South Africa, Cape, at the mouth of the Gariap (Orange), 4 Oct. 1830, *Drège 8199* (P, holo.; S, W, iso.).

E. lumbricalis L.C.Leach: 369 (1986b). Type: South Africa, Cape, north of Koekenaap, 10 May 1984, *Leach & Bayer 17123* (NBG, holo.; K, MO, PRE-2 sheets, iso.).

E. suffulta Bruyns, *South African Journal of Botany* 56: 129 (1990). Type: South Africa, Cape, Tierberg, Prince Albert distr., 6 Dec. 1987, *Bruyns 2902* (BOL, holo.; K, PRE, iso.).

E. tenax Burch. *Travels in the Interior of southern Africa*, 1: 219 (1822). Type: South Africa, Cape, Hangklip, near Ongeluku River, Ceres div., 17 July 1811, *Burchell 1219* (K, holo.).

E. arceuthobioides Boiss.: 20 (1860). Type: South Africa, Cape, 70.10, *Ecklon & Zeyher, Euphorb. 76*, (*Ecklon 1312*) (G, holo.; W, iso.).

Arthrothamnus ecklonii Klotzsch & Garcke: 63 (1860). Type: South Africa, Cape, *Ecklon & Zeyher, Euphorb. 24*, (*Ecklon 1871*) (W, lecto., designated here). [Klotzsch & Garcke (1860) cited 'Ecklon n. 23. 25 & 24 ex parte'. The only specimens from the Ecklon and Zeyher collections with similar numbering are those labelled 'Euphorb. 23', 'Euphorb. 24' and 'Euphorb. 25' and so it must be to these that Klotzsch & Garcke referred.]

Arthrothamnus scopiformis Klotzsch & Garcke: 63 (1860). Type: South Africa, Cape, *Bergius* (missing).

E. rhombifolia var. *cymosa* (Klotzsch & Garcke) N.E.Br.: 285 (1915). *Arthrothamnus cymosus* Klotzsch & Garcke: 63 (1860). Type: South Africa, Cape, *Ecklon & Zeyher, Euphorb. 24* (W, lecto., designated here). [Klotzsch & Garcke (1860) cited 'Ecklon n. 24 ex parte'. This is assumed to be the same as '*Ecklon & Zeyher, Euphorb. 24*', of which there is a piece in W. This piece belongs to *E. tenax*. However, there is no evidence that they saw this specimen and so it is selected as a lectotype.]

E. serpiformis Boiss.: 75 (1862). Type: South Africa, Cape, Berg River Valley, *Zeyher 1535* (BOL, lecto., designated here; K, S, SAM, W, WU, Z, isolecto.). [Boissier (1862) cited also 'Eckl. & Zeyh. 24' (i.e. *Ecklon & Zeyher, Euphorb. 24* (W)) and 'Riesvallei (*Bergius h. Berol.*)' (missing).]

E. mixta N.E.Br.: 585 (1925). *E. arrecta* N.E.Br.: 283 (1915), *nom. illegit., non* N.E.Br. (1914). Type: South Africa, Cape, Berg River Valley, *Zeyher 1535* (K, holo.; BOL, S, SAM, W, WU, Z, iso.).

In Bruyns *et al.* (2006), *E. tenax* was treated as a synonym of *E. arceuthobioides*. The respective types make it clear that they are the same species. However, *E. tenax* was published first and so this treatment was wrong.

E. verruculosa N.E.Br., *Flora capensis* 5(2): 585 (1925). Type: Namibia, Lüderitz (Angra Pequena), 10 miles from coast, Nov. 1908, *Marloth 4639* (PRE, holo.; K, iso.). [Brown annotated the specimen at PRE as 'Type' and that at K as 'half of the Type sheet, presented to Kew by Dr Marloth'. So the sheet at PRE is taken as the holotype.]

1c. Sect. **Espinosa** Pax & K.Hoffm.

E. guerichiana Pax, *Botanische Jahrbücher für Systematik* 19: 143 (1894). Type: Namibia, rocks south of Khorixas, 14 Nov. 1888, *Gürich 73* (missing). Neotype (designated here): Namibia, Ababes, banks of Tsondap River, 30 Dec. 1915, *Pearson 9119* (BOL).

E. commiphoroides Dinter: 90 (1909). Neotype (designated here): Namibia, Tsumeb distr., Auros, 10 Feb. 1925, *Dinter 5596* (BOL; duplicate at SAM). [Dinter (1909) cited no specimens and only mentioned 'Häufig in Hererolande: Salem, Modderfontein, Omburo, Tsao-bis, Omatako'. No specimens from any of these localities have been found. A neotype is therefore selected.]

E. frutescens N.E.Br.: 270 (1915). Type: Namibia, lower mountain slopes of Aus, 3 000', Jan. 1909, *Pearson 4714* (K, holo.; BOL, SAM, iso.). [Although several of these sheets are labelled 'Type', only that at K was annotated by N.E. Brown himself and so this specimen is taken as the holotype.]

E. espinosa Pax, *Botanische Jahrbücher für Systematik* 19: 120 (1894). Type: Tanzania, without precise locality, *Fischer 285* (K, lecto., designated here). [No material definitely seen by Pax in known and so a lectotype is selected.]

E. gynophora Pax: 374 (1904). Type: Tanzania, Pare Mountains, between Kisuani and Madji-ya-juu, 700 m, 13 Oct. 1902, *Engler 1579* (K, drawing, lecto., designated here). [Pax (1904b) cited *Engler 1579* and *Engler 1586*. No material definitely seen by Pax is known, but drawings of both these specimens are at K. One of these is selected as lectotype.]

1d. Sect. **Frondosae** Bruyns

E. leistneri R.Archer, *South African Journal of Botany* 64: 258 (1998). Type: Namibia, east of Epupa Falls, Jul. 1976, *Leistner et al. 264* (PRE, holo.; B, K, WIND, iso.).

E. transvaalensis Schltr., *Journal of Botany* 34: 394 (1896). Type: South Africa, Transvaal, near Edwin Bray Battery, shady kloofs in Kap River Valley, Barberton, 2 000', fl. Nov. 1890, *Galpin 1198* (GRA, lecto., designated here; K, NH, SAM, Z, isolecto.). [Since there is no sign that Schlechter saw any of the sheets listed, a lectotype is selected. Brown compared the specimen at K with the type, but did not state where the latter was.]

E. galpinii Pax: 742 (1898). Type: South Africa, Transvaal, near Edwin Bray Battery, Barberton, 2 000', fl. Nov. 1890, *Galpin 1198* (SAM, lecto., designated here; GRA, K, NH, Z, isolecto.). [No material definitely seen by Pax in known and so a lectotype is selected.]

E. ciliolata Pax: 743 (1898). Type: Angola, Sierra Chella and Gambos, 900–1 100 m, *Antunes & Dekindt 781* (BR, lecto., designated here; LISC, Z, isolecto.). [No material definitely seen by Pax in known and so a lectotype is selected. Specimens labelled ‘*Dekindt 781*’ are at Z and BR while at LISC there is a specimen labelled ‘*Antunes 781*’. These are all assumed to be the same collection, namely *Antunes & Dekindt 781*.]

2. *Euphorbia* subg. *Esula* Pers.

E. albanica *N.E.Br.*, *Flora capensis* 5(2): 258 (1915). Type: South Africa, Albany div., Brookhuisens Poort, near Grahamstown, *MacOwan 657* (GRA, holo.; K, iso.).

E. berotica *N.E.Br.*, *Flora of Tropical Africa* 6(1): 600 (1912). Type: Angola, Moçamedes distr., foot of Sierra Negros, behind the mouth of the Bero River, July 1859, *Welwitsch 633* (BM, holo.; LISU, iso.).

E. epicyparissias *E.Mey. ex Boiss.* in *A.P. de Candolle*, *Prodromus* 15(2): 168 (1862). Type: South Africa, Transvaal, near Vaal River, *Burke* (K, lecto., designated here). [Boissier (1862) cited: Cape, near Zwangerberg, *Drège*; *Mund & Maire* in h. Berol; near Vaal R, in h. Kew, *Burke* (K). The lattermost is selected as lectotype.]

Tithymalus epicyparissias *E.Mey. ex Klotzsch & Garcke*: 88 (1860). Type: South Africa, Cape, *Drège* (HBG, holo.; MO, W-3 sheets, iso.).

Tithymalus involucratus *E.Mey. ex Klotzsch & Garcke*: 91 (1860). Type: South Africa, *Drège* (HBG, lecto., designated here; MO, isolecto.). [Klotzsch & Garcke (1860) cited: *Drège* (MO, HBG), *Ecklon & Zeyher n. 6*; *Ecklon & Zeyher n. 8* (HBG, S, SAM); *Krebs* (K).]

E. involucrata *E.Mey. ex Boiss.*: 168 (1862). Type: South Africa, near Phillipstown, *Ecklon & Zeyher n. 8* (HBG, lecto., designated here; S, SAM, isolecto.). [Boissier (1862) cited: near George, *Drège* (BM, MO); between Langekloof and ‘Zoëga’ R., *Krauss*; near Phillipstown, *Ecklon & Zeyher n. 6*; *Ecklon & Zeyher n. 8* (HBG, S, SAM).]

E. bachmannii: Pax: 535 (1897). Type: South Africa, Pondoland, end Oct. 1888, *Bachmann 755* (missing).

E. involucrata var. *megastegia* *Boiss.*: 168 (1862). Type: South Africa, Cape, near Katberg, *Drège*; *Krebs*.

E. epicyparissias var. *puberula* *N.E.Br.*: 267 (1915). Type: South Africa, Kentani, 1 200’, 8 Oct. 1910, *Pegler 460* (K, holo.; SAM, iso.).

E. epicyparissias var. *wahlbergii* (*Boiss.*) *N.E.Br.*: 267 (1915). *E. wahlbergii* *Boiss.*: 169 (1862). Type: South Africa, 1842, *Wahlberg* (S, lecto., designated here). [Boissier (1862) cited: ‘South Africa, between Umtata and Omgaziana, *Drège*; *Wahlberg*, h. Bunge & Holm’. The latter is in S.]

E. ericoides *Lam.*, *Encyclopédie méthodique* 2(2): 430 (1788). Type: South Africa, Cape of Good Hope, *Sonnerat* (P-LAM P00381881, holo.).

E. erythrina *Link*, *Enumeratio plantarum horti regii berolinensis altera* 2: 12 (1822). *Tithymalus erythri-*

nus (*Link*) *Klotzsch & Garcke*: 91 (1860). Type: South Africa, Cape of Good Hope, *Bergius* (missing). Neotype (designated here): South Africa. Cape, Paarl Mountain, *Drège 2197* (K 000253220; duplicate at K).

E. erythrina var. *meyeri* *N.E.Br.*: 262 (1915). *E. meyeri* *Boiss.*: 35 (1860), *nom. illegit., non* *Steud.* (1840). Type: South Africa. Cape, Paarl Mountain, *Drège 2197* (K 000253220, lecto., designated here; K, isolecto.). [Since *E. meyeri* *Boiss.* was illegitimate, I treat var. *meyeri* as described by Brown. Brown (1915) cited several specimens: without locality, *Mund & Maire*; Malmesbury, *Schlechter 5348*; Paarl Mountain, *Drège 2197* (K); mountains near Cape Town, *Ecklon & Zeyher Euphorb. 14* (LE).]

Tithymalus apiculatus *Klotzsch & Garcke*: 94 (1860). Type: South Africa. Cape, *Mund & Maire* (K, lecto., designated here). [Cited were: South Africa. Cape, *Ecklon & Zeyher 14* (LE); *Mund & Maire* (K) so a lectotype is selected. The latter is annotated by N.E. Brown as ‘from the type’ from the Berlin Herbarium.]

Tithymalus confertus *Klotzsch & Garcke*: 94 (1860). Type: South Africa. Cape, *Mund & Maire* (K, lecto., designated here). [Cited were: South Africa. Cape, *Ecklon & Zeyher 5* (SAM); *Mund & Maire* (K) so a lectotype is selected. The specimen *Ecklon & Zeyher 5* (SAM) is of *E. ericoides* rather than *E. erythrina* (though the label on it gives ‘*Euphorbia striata* Thunb.’).]

E. erythrina var. *burchellii* *Boiss.*: 169 (1862). Type: South Africa, *Burchell 458* (missing). [This specimen was said to be ‘in herb. DC.’]

E. foliosa (*Klotzsch & Garcke*) *N.E.Br.* *Flora capensis* 5(2): 262 (1915). *Tithymalus foliosus* *Klotzsch & Garcke*: 67 (1860). Type: South Africa, Cape Flats, near Cape Town, *Ecklon & Zeyher 12* (K 000253222, lecto., designated here; K, SAM, isolecto.). [The type of *Klotzsch & Garcke* has not been located but Brown kept part of it at K (comment on 000253222).]

E. dumosa *E.Mey. ex Boiss.*: 168 (1862), *nom. illegit., non* *A.Rich.* (1850). Types: South Africa, Pondoland, near the Umsikaba River, *Drège 4619* (K, 2 sheets, MO); ‘*Eckl. & Zeyh 86*’ (missing). [Since this is an illegitimate name, a lectotype is not selected here.]

E. artifolia *N.E.Br.*: 263 (1915). Type: South Africa, Milkwoodfontein, Riversdale div., ± 600’, 7 Oct. 1897, *Galpin 4562* (K, holo.; PRE, iso.). [The specimen at K was annotated as ‘Type Specimen’ by N.E. Brown while that at PRE was not annotated by him. Consequently the one at K is the holotype.]

E. genistoides *P.J.Bergius*, *Descriptiones Plantarum ex Capite Bonae Spei*: 146 (1767). *Tithymalus genistoides* (*P.J.Bergius*) *Klotzsch & Garcke*: 97 (1860). *Galarhoeus genistoides* (*P.J.Bergius*) *Haw.*: 144 (1812). Type: South Africa, Cape of Good Hope, *Auge* (*Grubb*) (SBT 3.1.6.13, holo.).

Bergius only cited ‘Herm. Afr. 23’, which refers to page 23 in J. Burman’s *Catalogi duo plantarum africanorum* of 1736 that was in turn part of his *Thesaurus*

zeylanicus. No illustration or specimen is listed, only a phrase which corresponds to the same phrase on page 23 in Burman's *Catalogi*. However, there is a specimen at SBT annotated by Bergius as 'Euphorbia mihi genistoides' and 'e. Cap. b. sp. Grubb'. It is known that a consignment of specimens collected at the Cape by J.A. Auge was bought from Auge by Michael Grubb during a brief visit to the Cape in 1764 and presented to Bergius, and that these formed the basis of Bergius' '*Descriptiones*' (Gunn & Codd 1981). Consequently, this specimen is taken as the type. Haworth (1812) did not refer to Bergius' publication directly, but to 'Willd., Sp. Pl. 2: 908' where references 'Mant. 564' and 'Berg. cap. 146' were given, the latter clearly the same as above.

Tithymalus revolutus Klotzsch & Garcke: 99 (1860). Type: South Africa. Cape of Good Hope, *Ecklon & Zeyher 2* (missing).

E. genistoides var. *puberula* N.E.Br.: 264 (1915). Type: South Africa, Cape, Lion Mountain, *Wolley-Dod 3104* (K, lecto., designated here; BOL, isolecto.). [Brown (1915) cited: without locality, *Thunberg*; *Mund*; *Harvey 444* (K); near Hopefield, *Bachmann 85*; New Kloof, *Drège*; Lion Mountain, *Drège 8192* (HBG); *Schlechter 1381*; *Wolley-Dod 3104* (BOL, K); near Cape Town, *Prior* (K); Simon's Bay, *Wright 447*.]

E. genistoides var. *corifolia* (Lam.) N.E.Br.: 264 (1915). *E. corifolia* Lam.: 431 (1788). Type: South Africa, Cape of Good Hope, *Sonnerat* (P-LAM P00381882, holo.; K, iso.).

E. kraussiana Bernh. ex C.Krauss, *Flora* 28: 87 (1845). Type: South Africa, Natal, forest margins near Pietermaritzburg, Sept. 1839, 2 000–2 500', *Krauss 256* (MO, holo.; BM, K-2 sheets, iso.). [Bernhardi's herbarium was bought by MO (Gunn & Codd 1981) and, since Bernhardi drew up the description and Krauss published it, the holotype is taken as the specimen at MO.]

Tithymalus truncatus Klotzsch & Garcke: 75 (1860). Type: South Africa, Cape, *Krebs* (missing).

Tithymalus meyeri Klotzsch & Garcke: 75 (1860). Type: South Africa, Cape, *Ecklon & Zeyher Euphorb. 13* (Z, lecto., designated here; SAM, isolecto.). [Klotzsch & Garcke (1860) also cited '*Drège*' and '*Krebs*', which have not been located.]

E. kraussiana var. *erubescens* (E.Mey. ex Boiss.) N.E.Br.: 268 (1915). *E. erubescens* E.Mey. ex Boiss.: 116 (1862). Type: South Africa, Natal, between Umzimkulu & Umkomaas, Apr., *Drège* (S, lecto., designated here; BM, isolecto.). [Boissier (1862) cited 'Zuurbergen ('2347' K); near Grahamstown, *Drège* (K); near Vanstadensriver, *Krauss*; between Umzimkulu & Umkomaas, *Drège* (BM, S); 'Winterberg, *Ecklon & Zeyher*'. Only that at S is annotated by Boissier.]

E. mauritanica L., *Species Plantarum* 1: 452 (1753). *Tithymalus mauritanicus* (L.) Haw.: 139 (1812). Type: Illustration in Dillen., *Hort. Eltham*. 2: 384, t. 289, f. 373 (1732) (lecto., designated by Croizat 1945).

Tithymalus zeyheri Klotzsch & Garcke: 71 (1860). Type: South Africa, Cape, *Ecklon & Zeyher, Euphorb. 26* (missing).

T. brachypus Klotzsch & Garcke: 74 (1860). Type: South Africa, Cape, *Bergius* (missing).

E. melanosticta E.Mey. ex Boiss.: 95 (1862). Type: South Africa, Kaus Mountain, towards Goedemanskraal, 2 500', *Drège 2945* (K, lecto., designated here; MO, isolecto.). [Boissier (1862) cited a specimen at 'h. Bunge' that has not been located, so a lectotype is selected.]

E. mauritanica var. *namaquensis* N.E.Br.: 292 (1915). Type: South Africa, Pofadder distr., Groot Rosynbos, 9 Jan. 1909, *Pearson 3845* (K, lecto., designated here; BOL, NBG, Z, isolecto.). [Brown (1915) cited (among others): Namibia, koppie about 20 km south of Warmbad, 27 Jan. 1909, *Pearson 4432* (BOL, K); South Africa, between Groot Rosynbos and Wortel, 10 Jan. 1909, *Pearson 3628* (BOL, K).]

E. sarcostemmatoides Dinter: 304 (1921b). Type: Namibia, (Tsamkubis ?) Klein Aub, 7 Apr. 1911, *Dinter 2149* (SAM, lecto., designated here). [Dinter (1921b) cited 2 collections: *Dinter 2149* (SAM) and 2532a (missing).]

E. paxiana Dinter: 265 (1921a). Type: Namibia, Klein Aub, am schwarzem Kam Rivier im Bastardland, *Dinter 2652* (SAM, holo.).

E. mauritanica var. *foetens* Dinter ex A.C.White et al.: 961 (1941). Type: Namibia, 8 km east of Pomona, 14 June 1929, *Dinter 6418* (PRE, holo.; BOL, HBG-2 sheets, K, M, NBG, S, SAM, iso.).

E. mauritanica var. *minor* A.C.White et al.: 961 (1941). Type: South Africa, Cape, 30 miles north of Laingsburg, Aug. 1939, *Dyer 4105* (PRE, holo.; K, iso.).

E. mauritanica var. *lignosa* A.C.White et al.: 961 (1941). Type: Namibia, Namib near Lüderitzbucht, Nov. 1908, *Marloth 4638* (PRE 0248633-0, holo.; PRE, iso.).

E. mauritanica var. *corallothamnus* Dinter ex A.C.White et al.: 961 (1941). Type: Namibia, dunes near Buchberge, 1 July 1929, *Dinter 6467* (PRE, holo.; BOL, HBG-3 sheets, K, LD, M, NBG, S, SAM, iso.).

E. muraltioides N.E.Br., *Flora capensis* 5(2): 264 (1915). Type: South Africa, Albany div., Brookhuisens Valley, *MacOwan 642* (K, lecto., designated here; GRA, isolecto.). [Brown (1915) also cited *MacOwan 329* (GRA, K) and *Glass 665* (K, SAM) and wrote 'Type' on all of them.]

E. natalensis Bernh. ex Krauss *Beiträge zur Flora des Cap- und Natallandes*: 150 (1846). Type: South Africa, Natal, base of Tafelberg, Aug. 1839, *Krauss 434* (MO, holo.; BM, FI, K, M, iso.). [Krauss (1845) mentioned the number '434', though this did not appear in Krauss (1846). As for *E. kraussiana*, the holotype is at MO.]

Tithymalus capensis Klotzsch & Garcke: 98 (1860). Type: South Africa, Cape of Good Hope, *Ecklon & Zeyher* (missing), *Drège* (missing).

E. ruscifolia (Boiss.) N.E.Br., *Flora capensis* 5(2): 259 (1915). *E. sclerophylla* var. *ruscifolia* Boiss.: 169 (1862). Type: South Africa, between Kei and Gekau, *Drège 4621* (missing). Neotype (designated here): South

Africa, Cape, Krielis Country, *Bowker* (K). [Boissier (1862) cited a specimen at 'h. Bunge' that has not been located, so a neotype is selected. This was compared by N.E. Brown with *Drège 4621* in Lübeck.]

E. sclerophylla Boiss., *Centuria Euphorbiarum*: 37 (1860). Type: South Africa, Cape, ad Grahamstown, Jul. 1829, *Ecklon et Zeyher n° 11* (G, lecto., designated here; LE, MO (only piece on right hand side), SAM, W, isolecto.). [Boissier (1860) cited: Ad. Prom. B. spei, *Krebs pl. exs. n° 296* (G-DC, LE); ad Grahamstown, *Ecklon & Zeyher n° 11* (G, LE, SAM, W).]

Tithymalus multicaulis Klotzsch & Garcke: 98 (1860). Type: South Africa, Cape of Good Hope, *Krebs* (missing).

E. ovata (E.Mey. ex Klotzsch & Garcke) Boiss.: 167 (1862). *Tithymalus ovatus* E.Mey. ex Klotzsch & Garcke: 97 (1860). Type: South Africa, Cape of Good Hope, *Drège* (LD, lecto., designated here; MO, NY, isolecto.). [A lectotype is designated as it cannot be ascertained whether Klotzsch & Garcke saw any of these sheets.]

E. sclerophylla var. *myrtifolia* E.Mey. ex Boiss.: 169 (1862). Type: South Africa, near Assegaibosch, *Drège 3563* (P, holo.; K-2 sheets, iso.). [Sheets at HBG and MO do not have the number '3563' on them and are not included here.]

E. striata var. *brachyphylla* Boiss.: 170 (1862). Type: South Africa, Sterkstroom div., plains on top of Katberg, *Drège* (K 000253210, lecto., designated here). [Boissier (1862) cited 'South Africa, Sterkstroom div., plains on top of Katberg, *Drège* (K 000253210); Los Tafelberg, 5 000–6 000', *Drège*' (missing). The first specimen is of *E. ovata* = *E. sclerophylla* and so selecting it as the type means that this name becomes a synonym of *E. sclerophylla* rather than of *E. striata*.]

E. sclerophylla var. *puberula* N.E.Br.: 260 (1915). Type: South Africa, Bathurst div., Rietfontein, between Kariega River and Port Alfred, *Burchell 3961* (K, holo.).

E. stolonifera Marloth ex A.C.White et al., *The Succulent Euphorbieae* 2: 961 (1941). Type: South Africa, Cape, near Matjiesfontein and 'Dwars in die Weg', 900 m, Oct. 1920, *Marloth 9836* (PRE 0838532-0, holo.; PRE, iso.).

E. striata Thunb., *Prodromus plantarum capensium* 2: 86 (1800). *Tithymalus striatus* (Thunb.) Klotzsch & Garcke, *Abh. Königl. Akad. Wiss. Berlin* 1859: 98 (1860). Type: South Africa, *Thunberg* (UPS-THUNB 11560, holo.).

E. striata var. *cuspidata* Boiss.: 170 (1862). *E. cuspidata* Bernh. ex Krauss: 150 (1846), *nom. illegit. non.* Bertol. (1843). Type: South Africa, Natal, summit of Tafelberg, 2 000–3 000', Sept. 1839, *Krauss 441* (MO, holo.; BM, BOL, M, TCD, iso.). [Krauss (1845) mentioned the number '441', though this did not appear in Krauss (1846). Boissier (1862) did not cite any specimens and only cited Krauss' illegitimate name. Consequently the type of Boissier's name is the same as that of Krauss'. As for *E. kraussiana*, the holotype is at MO.]

3. *Euphorbia* subg. *Euphorbia*

3a. Sect. *Euphorbia*

E. aeruginosa Schweickerdt, *Bulletin of Miscellaneous Information* 1935: 205 (1935). Type: South Africa, Transvaal, Soutpan, Soutpansberg, 12 Apr. 1934, *Schweickerdt & Verdoorn 688* (K, lecto., designated here; PRE, isolecto.). [Schweickerdt (1935) cited also 'Soutpan, 23 Nov. 1932, *Obermeyer; Schweickerdt & Verdoorn 151*' (PRE) and indicated that both were 'syn-types'.]

E. avasmontana Dinter, *Sukkulentenforschung in Südwestafrika*, II. Teil: 96 (1928). Type: Namibia, near Windhoek, Awas Mtns, *Dinter* (PRE, lecto., designated here). [Although Carter (2002) cited a specimen at B, this does not exist. A specimen at PRE was annotated by Dinter himself as '*Euph. avasmontana Dtr msc*'. This is selected as lectotype.]

E. volkmanniae Dinter: 124 (1928). Type: Namibia, near Otavi, Auros, 1924, *Dinter* (B, photo).

E. hottentota Marloth: 336 (1930). Type: South Africa, Cape, Richtersveld, Kubus Kloof, 300 m, 29 Aug. 1925, *Marloth 12520* (PRE, lecto., designated here). [Marloth (1930) also cited *Marloth 13357* (missing).]

E. kalaharica Marloth: 338 (1930). Type: South Africa, Cape, Neusberg, near Kakamas, 700 m, 15 Aug. 1928, *Marloth 14039* (PRE, lecto., designated here). [Marloth (1930) also cited *Marloth 13555* (missing).]

E. sagittaria Marloth: 337 (1930). *E. avasmontana* var. *sagittaria* (Marloth) A.C.White et al.: 817 (1941). Type: South Africa, Cape, 12 miles south of Upington towards Prieska, Aug. 1929, *Marloth 14035* (PRE, lecto., designated here). [Marloth (1930) also cited *Marloth 13385* (missing).]

E. venenata Marloth: 337 (1930). Type: Namibia, Tsarris Mtns, west of Maltahöhe, *Marloth 4687* (K, holo.). [Although Carter (2002) cited a specimen at PRE, this does not exist. Marloth's description of *E. venenata* is vague about such things as the size of the cyathia and the number of glands in each cyathium. Nevertheless, the fairly weak spines of the photograph that he included (figure 7) and the type specimen show that this is not *E. virosa* but *E. avasmontana*.]

The name *E. hottentota* was maintained as distinct from *E. avasmontana* in Bruyns et al. (2006). Marloth (1930: 335) separated *E. avasmontana* and *E. hottentota* by the number of angles on the branches (7-angled in *E. avasmontana*; 5–6-angled in *E. hottentota*) but White et al. (1941: 824) pointed out that 'some of Marloth's herbarium specimens do not agree entirely with the typical form' so that the identity of this 'species' is less clear than Marloth thought. Over the large area where it occurs branches are frequently 4-angled and may have up to eight angles and no clear separation into 5–6-angled and 7-angled plants is possible. No differences in the floral structures have been detected on which they could be separated.

E. barnardii *A.C.White et al.*, The Succulent Euphorbiae 2: 965 (1941). Type: South Africa, Transvaal, Sekukuniland, farm Driekop, east of Lulu Mountain, 3 000', 6 Jan. 1937, *Barnard 449* (PRE, holo.; MO, iso.).

E. caerulescens *Haw.*, The Philosophical Magazine, or Annals of Chemistry, Mathematics, Astronomy, Natural History and General Science, Ser. 2, 1: 276 (1827). *E. virosa* var. *caerulescens* (*Haw.*) *A.Berger*: 81 (1906a). Type: South Africa, Cape of Good Hope, *Bowie*, cultivated plant at Kew Gardens, pressed Nov. 1876 by N.E. Brown (K, lecto., designated here).

Possible types for *E. caerulescens* include (1) a specimen 'Cape of Good Hope, *Bowie* (K)', which was made by N.E. Brown in November 1876 from 'the type plant (still in cultivation at Kew) dried by myself' (Brown 1915: 365) and (2) a drawing by Bond (423/292) of the apex of a branch and annotated 'drawn from the plant from which Haworth described' and 'Received in 1823 from the Cape of Good Hope by Mr Bowie'. I propose that we accept that the plant in cultivation was among those (if there were more than one) from which Haworth drew up his description so that I have designated the specimen made by N.E. Brown as the lectotype.

E. canariensis *Thunb.*: 86 (1800), *nom. illegit., non L.* (1753). Type: South Africa, *Thunberg* (UPS-THUNB 11416, holo.).

E. ledienii *A.Berger*: 80 (1906a). Type: South Africa, fl. & fr. Aug. 1906, received from collection of *F. Ledien* (NY, holo.).

E. ledienii var. *drègei* *N.E.Br.*: 366 (1915). Type: South Africa, near Port Elizabeth, received 9 Sept 1912, *I.L.Drège* (K, lecto., designated here). [For *E. ledienii* var. *drègei*, Brown (1915) cited two collections: Humansdorp div., near Zeekoe River, *Thunberg*; near Port Elizabeth, received 9 Sept 1912, *I.L.Drège* (K). He annotated both the specimen UPS-THUNB 11416 and that of Drège as 'var. *dregei*' so one is designated as lectotype.]

Brown (1915) mentioned that he had not seen any flowers of *E. caerulescens*, nor any dried specimens that he could definitely refer to it, other than the 'type'. He distinguished *E. caerulescens* and *E. ledienii* by the glaucous or bluish-green stems, with spines 6–12 mm long in the former; green, not glaucous stems, with spines 2–6 mm long in the latter (Brown 1915: 244). Dyer (1931) and White *et al.* (1941) found that these distinctions were not useful and they maintained that the only difference between *E. caerulescens* and *E. ledienii* was the rhizomatous habit of the former. This character was neither mentioned by Haworth nor is it visible in either the type specimen or the drawing by Bond. It was also not mentioned by N.E. Brown, who knew the type specimen in cultivation. Therefore the association by Dyer (1931) and White *et al.* (1941) of a rhizomatous habit with *E. caerulescens* and a non-rhizomatous habit with *E. ledienii* is erroneous and the name *E. caerulescens* must refer to the same non-rhizomatous plants as *E. ledienii*. Consequently, *E. ledienii* is a synonym of *E. caerulescens*. This confusion was not recognised in Bruyns *et al.* (2006), where *E. ledienii* was treated as a

separate species from *E. caerulescens*. The rhizomatous plants are here treated as a separate species, *E. radyeri* Bruyns and the differences between them are discussed under that species.

E. clavigera *N.E.Br.*, Flora capensis 5(2): 362 (1915). Type: Swaziland, Bremersdorp (Manzini), 1 800', 5 Jan. 1905, *Burt-Davy 3010* (K 000253371, holo.; K, PRE, iso.). [The sheet at K has two specimens of the same number mounted on it, of which the lower one is annotated as 'type'. This is therefore designated as holotype. The specimen at PRE is 'part of type'.]

E. persistens *R.A.Dyer*: t. 713 (1938). Type: Moçambique, east of Ressano Garcia, July 1936, *F.Z.van der Merwe E14 sub PRE 23395* (PRE, holo.; K, PRE, iso.).

E. clivicola *R.A.Dyer*, Bothalia 6: 221 (1951). Type: South Africa, Transvaal, Lunsclip, 20 miles north of Potgietersrust, 13 Sept. 1946, *Plowes sub PRE 28386* (PRE, holo.; K, iso.).

E. complexa *R.A.Dyer*, The Flowering Plants of South Africa 17: t. 643 (1937). Type: South Africa, Transvaal, road from Louw's Creek to Kaapmuiden, June 1936, *Van der Merwe 100 sub PRE 21373* (PRE, holo.; K-2 sheets, W, iso.).

E. confinalis *R.A.Dyer*, Bothalia 6: 222 (1951). Type: South Africa, Transvaal, Kruger Nat. Park, 2 miles east of 'The Gorge Camp', 900', 20 May 1949, *Codd & De Winter 5580* (PRE, holo.; K, NH, iso.).

E. cooperi *N.E.Br. ex A.Berger*, Sukkulente Euphorbien: 83 (1906). Type: South Africa, Natal, Umgeni Valley, 1862, *Cooper*, cultivated plant at Kew Gardens, pressed Sept. 1899 by N.E. Brown (K 00025338, lecto., designated here; K, isolecto.). [Brown made two specimens in September 1899 from the plant introduced to Kew by Cooper in 1862. He labelled both of these 'Type specimen'. Leach (1970) selected one of these specimens (though it is not specified which of them) as a neotype for *E. cooperi*. However, although Berger (1906a) described it from material at La Mortola in Italy, he was familiar with the plants at Kew and so one of Brown's specimens is taken as the lectotype.]

E. eduardoi *L.C.Leach*, Boletim da sociedade botânica 42: 161 (1968). Type: Angola, Namibe distr., Dois Irmaos, 550 m, 5 May 1960, *Mendes 3959* (LISC 011538, holo.; BM, LISC, LUAI, PRE, iso.).

E. enormis *N.E.Br.*, Flora capensis 5(2): 362 (1915). Type: South Africa, Pietersburg, Sept. 1905, *Marloth 5144* (PRE, holo.; K, iso.).

E. excelsa *A.C.White et al.*, The Succulent Euphorbiae 2: 966 (1941). Type: South Africa, Transvaal, Lydenburg distr., hills near Olifants River, Apr. 1938, *Van der Merwe 1677a* (PRE, holo.).

E. grandialata *R.A.Dyer*, The Flowering Plants of South Africa 17: t. 641 (1937). Type: South Africa, Transvaal, Penge mine, *Van der Merwe 1002 sub PRE 21372* (PRE, holo.; K, W, iso.).

E. grandicornis *A.Blanc*, Catalogue and Hints on Cacti, ed. 2: 68 (1888). Type: Illustration on left hand

side of figure on page 68 of A. Blanc, Catalogue & Hints on Cacti, ed. 2 (1888) (lecto., designated here).

E. grandicornis Goebel: 42, fig. 15 (1889), *nom. illegit., non* A. Blanc (1888).

E. grandicornis J.E.Weiss: 291 (1893), *nom. illegit., non* A. Blanc (1888).

The authorship of this species is usually given as 'Goebel' (e.g. Brown (1915); White *et al.* (1941)) or 'Goebel ex N.E.Br.' (e.g. Carter (2002)). However, while N.E. Brown (1897) published the first detailed description of *E. grandicornis*, the name was in use for a long time before this and there are several earlier brief descriptions that validated the name. The first known published appearance of the name *E. grandicornis* is Oudemans (1865), but the name was not validly described there. The earliest validation of the name is that by A. Blanc (1888), in which it is said that '*Euphorbia grandicornis* is still more remarkable on account of its tremendous spines and queer, contorted form'. According to White *et al.* (1941), a figure of *E. grandicornis* appeared in an earlier catalogue of A. Blanc of 1887, but I have not been able to trace this. The next one that has been detected is that of Goebel (1889), in which the diagnosis is similarly rudimentary but still constitutes valid publication. In J.E. Weiss' account of 1893 a more detailed diagnosis of *E. grandicornis* appeared. Since both Weiss' and Goebel's names are illegitimate, lectotypes are not selected for either of them.

E. grandidens Haw., Philosophical magazine and journal 66: 33 (1825). Type: Illustration number 807/323 by T. Duncanson at K of specimen received 1822 from Cape of Good Hope collected by Bowie (lecto., designated here).

E. evansii Pax: 86 (1909). Type: South Africa, Transvaal, Lowveld, near Barberton, *Pole Evans* (missing). [Carter (2002) cited the type specimen at PRE, but this does not exist, nor is there any material known elsewhere that could have been seen by Pax.]

Euphorbia evansii was said to differ (White *et al.* 1941) from *E. grandidens* in being shorter (reaching 10 m as opposed to 16 m), with 3- to 4-angled secondary branches with gently sinuate margins (as opposed to 3-angled or rarely 2- to 4-angled in *E. grandidens* with more prominently toothed margins), spines lacking the pairs of prickles at their bases, these often present in *E. grandidens*. None of these differences are clear-cut and I have found it impossible to separate the known collections into two distinct species. Consequently, the name *E. evansii* is placed in synonymy, although it was kept separate in Bruyns *et al.* (2006).

E. griseola Pax, Botanische Jahrbücher für Systematik 34: 375 (1904). Type: Botswana, Lobatsi, *Marloth 3413* (missing). Neotype (Leach 1967): Botswana, 2 miles north of Lobatsi, 16 Jan 1960, *Leach & Noel 121* (SRGH, duplicates at BR, G, K, LISC, PRE). [The type has not been located.]

E. groenewaldii R.A.Dyer, The Flowering Plants of South Africa 18: t. 714 (1938). Type: South Africa, Transvaal, 10 miles northeast of Pietersburg towards Mokeetsi, Nov. 1936, *B.H.Groenewald sub Van der*

Merwe 1186 (sub PRE 23397) (PRE 253379, holo.; K, PRE, iso.).

E. ingens E.Mey. ex Boiss. in A.P. de Candolle, Prodrômus 15(2): 87 (1862). Type: South Africa, Natal, in woods near Durban, *Drège 4614* (S, holo.; K, iso.). [Boissier (1862) cited a specimen at 'h. Bunge' and that at S was annotated by him, so is taken as the holotype. That at K is a 'fragment from type'.]

E. similis A.Berger, Sukk. Euph.: 69 (1906a). Type: South Africa, Natal ? (missing).

N.E. Brown pressed two specimens from plants in cultivation at Kew that were reputed to be *E. similis* and mentioned that he had sent a branch to Berger who had confirmed that this was what he named *E. similis*. However, many of the pressed branches on the two specimens at K bear foliage-leaves 15–80 mm long and consequently they cannot represent either *E. ingens* or *E. similis* in which the leaves were 'minute' according to Berger and where such foliage-leaves are only present on the young stem. P.R.O. Bally determined one of these specimens at K as *E. obovalifolia* A.Rich. (= *E. amphiphylla* Pax) and this is more likely to be the correct identity of this plant, which Brown (1915) used for his description of *E. similis*, but which is not the same as that which Berger (1906a) described.

E. kaokoensis (A.C.White *et al.*) L.C.Leach, Dinteria 12: 33 (1976). *E. subsalsa* var. *kaokoensis* A.C.White *et al.*: 965 (1941). Type: Namibia, Kaokoveld, Kauas Okawe, 28 Nov. 1939, *C.J.Hahn sub Otzen 3* (PRE, holo.).

E. keithii R.A.Dyer, Bothalia 6: 223 (1951). Type: Swaziland, western edge of Lebombo Mtns, near Stegi, fl. 1949, *Keith sub PRE 28423* (PRE, holo.; GRA, K, NH, S, SRGH, iso.).

E. knobelii Letty, The Flowering Plants of South Africa 14: t. 521 (1934). Type: South Africa, Transvaal, Enselsberg near Zeerust, Sept. 1933, *Knobel sub PRE 15854* (K, holo.). [Although Carter (2002) cited the type from PRE, the specimen is not present there. It is assumed that this was sent to K on this occasion. This specimen was collected from the same plant from which the figure was painted.]

E. knuthii Pax, Botanische Jahrbücher für Systematik 34: 83 (1904). Type: Moçambique, Ressano Garcia, 1 000', 27 Dec. 1897, *Schlechter 11949* (K, lecto., designated here; BM, BOL, BR, G-2 sheets, GRA, HBG, PRE, WAG, isolecto.). [The sheet at K was annotated by Pax ('Knuthii Pax !') and here he also scratched out Schlechter's proposed name for the plant. Nevertheless, N.E. Brown annotated it as 'part of type'. This sheet is then taken as the lectotype. Carter & Leach (2001) informally selected the specimen at K as lectotype, but this is invalid and so it is formally designated here.]

E. limpopoana L.C.Leach ex S.Carter, Kew Bulletin 54: 960 (2000). Type: Zimbabwe, Fulton's Drift, 25.5 km NNW of Beitbridge, Sept. 1963, *Leach 11582a* (SRGH, holo.).

E. malevola subsp. *bechuanica* L.C.Leach: 6 (1964). Type: Botswana, halfway between Palapye and Francis-

town, Jul. 1937, fl. 1942, *Obermeyer* (PRE 0645765-0, holo.; K, PRE, iso.).

E. louwii *L.C.Leach*, The Journal of South African Botany 46: 207 (1980). Type: South Africa, Transvaal, c. 14 km east of Marken, 900 m, 1 Nov. 1975, *Leach et al.* 15555 (PRE 0548997-0, holo.; K, PRE, SRGH, iso.)

E. lydenburgensis *Schweickerdt & Letty*, The Flowering Plants of South Africa 13: t. 486 (1933). Type: South Africa, Transvaal, Steelpoort Valley, 30 miles north of Lydenburg, 7 July 1932, *Van Balen & De Wyn sub PRE 14398* (PRE, lecto., designated here; K, isolecto.). [*Schweickerdt & Letty* (1933) cited two specimens: *Van Balen & De Wyn sub PRE 12465* (PRE) and *Van Balen & De Wyn sub PRE 14398* (PRE, K). The latter is selected as lectotype.]

E. otjingandu *Swanepoel*, S. African J. Bot. 75: 497 (2009). Type: Namibia, Kunene Region, along Van Zyl's Pass 1 km west of Otjihende, 1 305 m, 1 May 2007, *Swanepoel 268* (WIND, holo.; PRU, iso.).

E. otjipemba *L.C.Leach*, Dinteria 12: 29 (1976). Type: Namibia, north of Otjipemba, *Leach & Cannell 15044* (PRE, holo.; BM, K, LISC, M, MO, SRGH, WIND, iso.).

E. perangusta *R.A.Dyer*, The Flowering Plants of South Africa 18: t. 716 (1938). Type: South Africa, Transvaal, Koedoesrant, north of Zeerust, Jan. 1936, *Louw 99 (sub PRE 23399)* (PRE, holo.; BOL, GRA, K-2 sheets, MO, P, SRGH, iso.).

E. pseudocactus *A.Berger*, Sukkulente Euphorbien: 78 (1906). Type: Country unknown, but probably India, branch from the type plant, received from A. Berger Oct. 1910 (K, lecto., designated here).

Euphorbia radyeri *Bruyns*, sp. nov., a *E. caerulescente caulibus crassioribus, plus profunde articulatis, exterioribus rhizomatosis differt*. Type: South Africa, Cape, 20 miles from Kendrew towards Jansenville, Jan. 1930, *Dyer 2357* (GRA, holo.; PRE, iso.).

Bisexual spiny glabrous succulent shrub 1–2 m tall, 1–3 m broad, branching extensively mainly from base of similar main stem with woody and fibrous roots, with many peripheral branches spreading underground from plant for up to 0.5 m by rhizomes and then rising erect from soil. Branches 30–70 mm thick, strongly constricted into many ± spherical segments, smooth, grey-green; tubercles fused into 3–7 wing-like often sinuate angles, laterally flattened and rounded and projecting 3–10 mm from angles, spine-shields around apex and united into continuous horny and later somewhat corky brown to grey or black margin, 4–6 mm broad in upper part tapering to 2–3 mm below, bearing 2 spreading and widely diverging brown to grey spines (2–)6–15 mm long; leaf-rudiments on tips of new tubercles towards apex of branches and main stem, 1–4 mm long, 2–4 mm broad, spreading, fleeting, broadly ovate, obtuse, sessile, with green-brown obtuse ± pyramidal stipule on either side at base. Inflorescences in large numbers per branch towards apex, each a group of 1–3 cymes in axil of tubercle, on peduncle 2–4(6) mm long, 2–3 mm thick, each cyme with 3 vertically disposed cyathia, central

male, outer 2 female only (or bisexual) and developing later, with 2 ovate bracts 1.0–1.5 mm long and 1.5–2.0 mm broad subtending cyathia; cyathia cupular-conical, glabrous, 3.5–6.0 mm broad (2–3 mm long below insertion of glands), with 5 lobes with deeply incised margins, bright yellow; glands (3–)5, transversely oblong to kidney-shaped or rectangular, 2–3 mm broad, bright yellow, ascending-spreading, slightly convex to concave above, outer margins entire and slightly raised; stamens entirely glabrous, bracteoles palmate and enveloping groups of stamens, deeply and finely divided, glabrous; ovary globose, glabrous, included to slightly exerted on erect pedicel 1.5–2.0 mm long and soon becoming slightly exerted, calyx slightly extended around base; styles 2–4 mm long, branched in upper third. Capsule 6–7 mm diam., obtusely 3-angled, glabrous, erect and exerted on short pedicel 2–4 mm long.

Although *E. caerulescens* and *E. radyeri* are similar, they are easily separated. Branches around the perimeter of most plants of *E. radyeri* are usually rhizomatous and this phenomenon is unknown in *E. caerulescens*. The branches tend to have a more bluish green colour in *E. radyeri* than in *E. caerulescens*, though the colour varies greatly in the latter, with greener branches on plants from more sheltered habitats. The branches of *E. radyeri* are thicker, deeply articulated into almost spherical segments, while those of *E. caerulescens* are generally more slender and only indistinctly articulated into considerably longer, cylindrical segments. In *E. radyeri* the tubercles are often much longer and broader and the leaf-rudiments are somewhat larger than in *E. caerulescens*. Florally *E. caerulescens* and *E. radyeri* are very similar. In *E. caerulescens* the cyathia are often slightly narrower, becoming more abruptly narrow beneath the glands, while the female florets are borne on a slightly longer pedicel and are without the elongated calyx of *E. radyeri*.

E. restricta *R.A.Dyer*, Bothalia 6: 224 (1951). Type: South Africa, Transvaal, The Downs, 4 500', 14 Oct. 1947, *Codd & De Winter 3092* (PRE 0248764-0, holo.; GRA, K-2 sheets, NH, PRE-2 sheets, SRGH, iso.).

E. rowlandii *R.A.Dyer*, Bothalia 7: 28 (1958). Type: South Africa, Transvaal, Kruger Nat. Park, 8 miles north of Punda Maria, 1 600', 25 July 1951, *Rowland Jones 48* (PRE 0248767-0, holo.; K-2 sheets, PRE, SRGH-2 sheets, iso.).

E. schinzii *Pax*, Bulletin Herbarium Boissier 6: 739 (1898). Type: South Africa, Transvaal, Berea Ridge, Barberton, 3 100', 13 Feb. 1891, *Galpin 1297* (BOL, lecto., designated here; K, isolecto.). *Pax* (1898) also cited 'South Africa, Transvaal, Pretoria, *Rehmann 4347*' (missing).

E. sekukuniensis *R.A.Dyer*, The Flowering Plants of South Africa 20: t. 775 (1940). Type: South Africa, Transvaal, Steelpoort River, north of Roosenekal, Aug. 1938, *Van der Merwe 1765 (sub PRE 25475)* (PRE 0248772-1, holo.; GRA, PRE, SRGH, iso.).

E. stellata *Willd.*, Species Plantarum 2: 886 (1799). Type: Illustration in *F. le Vaillant, Reise Itin. Ed. Germ. Francof.* 4: 245, t. 11 (1797) (lecto., designated here).

E. procumbens Meerburgh: t. 55 (1789), *nom. illegit., non* Mill. (1786).

E. radiata Thunb.: 86 (1800). Type: South Africa, Cape, *Thunberg* (UPS-THUNB 11547, holo.).

E. uncinata DC.: 151 (1805). Type: Illustration in DC (1805) by Redouté opposite p. 151 (lecto., designated here). [De Candolle (1805) did not cite any specimens and none annotated as *E. uncinata* by him have been found.]

E. squarrosa Haw.: 276 (1827). Type: Illustration number 295/423 by G. Bond at K of specimen from Cape of Good Hope (lecto., designated here). [No type was designated by Haworth (1827) nor, in this case, did he refer to a collection of Bowie. There is a specimen at Kew made by N.E. Brown soon after he arrived at Kew in 1873. This was from a very old plant which was 'believed to have been introduced by Bowie and so may have been one of the original plants from which Haworth described the species'. Since there is some uncertainty surrounding whether Haworth saw this specimen, the drawing number 295/423 by G. Bond is selected as lectotype.]

E. micracantha Boiss.: 25 (1860). Type: South Africa, Cape, between Zuurberg and Klein Bruintjieshoogte, 2 000–2 500', Oct. *Drège 8206a* (K, lecto., designated here; MO, S, isolecto.). [Boissier (1860) cited 'inter Zuurbergen et Klein Bruintjieshoogte et inter Vischrivier et Fort Beaufort (*Drège n° 8206*)'. The collection from 'between Fish R. & Fort Beaufort' is now labelled *Drège 8206c* (K) and the other as *Drège 8206a* (K, MO, S).]

E. gilbertii A.Berger: 39 (1906a). Type: South Africa, Cape, *Cooper* (missing).

E. lombardensis Nel: 194 (1933b). Type: South Africa, Cape, Mortimer, 1 200–1 300 m, Dec. 1933, *M.Lombard sub SUG 1564* (NBG).

White *et al.* (1941) recognised three species: *E. micracantha* (plants with mainly 4-angled, erect branches, low tubercles less than 4 mm long and relatively long spines), *E. squarrosa* (plants with mainly 3-angled, often spreading branches, particularly prominent tubercles 4–8 mm long and relatively short spines) and *E. stellata* (plants with mainly 2-angled, spreading branches usually pressed to the ground, relatively low tubercles less than 4 mm long and relatively short spines). However, they illustrated many plants which were intermediate between these three and expressed doubt that three species could be distinguished: 'And in the event that distinct species are involved, their limits can hardly be defined accurately' (p. 730). This arrangement of three species was followed in Bruyns *et al.* (2006). However, it is quite often impossible to place a plant with certainty under one of these three names and so a broader view is taken here and a single species is recognised.

E. subsalsa subsp. *fluvialis* L.C.Leach, *Dinteria* 12: 29 (1976). Type: Angola, Ruacana Falls, *Leach & Cannell 14509* (LISC, holo.; BM, K, LUAI, M, MO, PRE, SRGH, iso.).

E. tetragona Haw., *The Philosophical Magazine, or Annals of Chemistry, Mathematics, Astronomy, Natural History and General Science* Ser. 2,1: 276 (1827). Type: Illustration number 291/1060 by G. Bond at K of specimen received in 1823 from Cape of Good Hope collected by Bowie (lecto., designated here). [There are two paintings of *E. tetragona* by Bond and this one, where details of the cyathia are shown, is selected as the lectotype.]

E. tortirama R.A.Dyer, *The Flowering Plants of South Africa* 17: t. 644 (1937). Type: South Africa, Transvaal, Bandolierskop, *Soll & S.W.Smith sub PRE 21371* (PRE 0258980-1, holo.; K, PRE, W, iso.).

E. triangularis Desf. ex A.Berger, *Sukkulente Euphorbien*: 57 (1906). Type: South Africa, Cape, cultivated plant at Kew Gardens, pressed 30 Oct. 1913 by N.E. Brown (K, lecto., designated by Dyer 1974b).

E. umfoloziensis Peckover, *Aloe* 28: 37 (1991). Type: South Africa, Natal, near Dingaanstat, 10 Apr. 1981, *Peckover* (PRE, holo.).

E. vandermerwei R.A.Dyer, *The Flowering Plants of South Africa* 17: t. 660 (1937). Type: South Africa, Transvaal, White River, Sept. 1936, *Van der Merwe sub PRE 22436* (PRE, holo.; K-2 sheets, P, SRGH, iso.). [The specimens at P, SRGH and one at K lack the PRE number but are 'from Type Specimen' so are taken as isotypes as well.]

E. venterii L.C.Leach ex R.Archer & S.Carter, *The Flowering Plants of Africa* 57: 86 (2001). Type: Botswana, near Tsessebe, c. 45 km north of Francistown, 12 Dec. 1991, *Venter et al. 174* (PRE, holo.; K, UNIN, iso.).

E. virosa Willd., *Species Plantarum* 2: 882 (1799). Type: Illustration in Paterson, *Reisen*: 60, t. 9, 10 (1790) (lecto., designated here). [These two figures were cited by Willdenow (1799) and are considered here to constitute a single plate, suitable as a lectotype. This figure was cited by Leach (1971) and Carter (2002), but in neither case was it formally designated as lectotype.]

E. bellica Hiern: 945 (1900). Type: Angola, Moçamedes distr., frequent in sandy coastal hills from Giraul up to Cape Negro, Jul. 1859, *Welwitsch 643* (BM, holo.).

E. dinterii A.Berger: 109 (1906b). Type: Namibia, Khan River, received 1904, *Dinter* (NY, holo.). [The specimen in the Alwyn Berger Herbarium consists of seeds only. These are annotated by Berger as follows: '11069, von C. Dinter als *E. virosa* eingeführt. 1904'. They are therefore the seeds which Berger (1906b) mentioned, that had been sent to him by Dinter. Their large size makes it clear that they came from plants of *E. virosa*.]

E. virosa f. *caespitosa* H.Jacobsen: 81 (1955). Type: none cited.

E. virosa f. *striata* H.Jacobsen: 81 (1955). Type: none cited.

E. waterbergensis *R.A.Dyer*, The Flowering Plants of Africa 28: t. 1095 (1951). Type: South Africa, Transvaal, 2.5 miles north of Elmerston P.O. towards Ellissras, 3 300', Apr. 1948, *Codd & Erens 4018* (PRE 0248809-0, lecto., designated here; BOL, K, PRE, SRGH, isolecto.). [There are two sheets of this at PRE, neither annotated as 'Type' and so the present one is selected as lectotype.]

E. zoutpansbergensis *R.A.Dyer*, The Flowering Plants of South Africa 18: t. 715 (1938). Type: South Africa, Transvaal, Wylliespoort, Sept. 1937, *Dyer 3873 sub PRE 23393* (PRE 0248810-0, holo.; E, K, MO, PRE-2 sheets, US, iso.).

3b. Sect. **Monadenium** (*Pax*) *Bruyns*

E. lugardiae (*N.E.Br.*) *Bruyns*, Taxon 55: 413 (2006). *Monadenium lugardiae* *N.E.Br.*: 138 (1909). Type: Botswana, foot of Kwebe Peak, Kwebe Hills, 3 500', fl. Aug. 1897 & leaves Feb. 1898, *Mrs Lugard 22* (K, holo.).

3c. Sect. **Tirucalli** *Boiss.*

E. gummifera *Boiss.*, Centuria Euphorbiarum: 26 (1860). Type: South Africa, Cape, low-lying areas between Verleptpram and the mouth of the Orange River, Sept. 1830, *Drège 2944* (P, holo.; S, iso.).

E. gregaria *Marloth*, Transactions of the Royal Society of South Africa 2: 36 (1910). Type: Namibia, Kuibis, *Marloth 4683* (PRE, holo.; K, iso.).

E. congestiflora *L.C.Leach*, Boletim da sociedade boteriana, sér. 2, 44: 197 (1970). Type: Angola, Namibe distr., between Cumilunga & Curoca Rivers, 11 Jan. 1956, *Mendes 1265* (LISC, holo.; BM, LUA, M, SRGH, iso.).

E. damarana *L.C.Leach*, Bothalia 11: 500 (1975). Type: Namibia, Damaraland, c. 64 km west of Khorixas, 27 July 1973, *Leach & Cannell 15064a* (LISC, holo.; K, M, PRE, SRGH, WIND, iso.). [Although Leach (1975b) stated that the holotype is at PRE, it is at LISC.]

4. **Euphorbia** subg. **Rhizanthium** (*Boiss.*) *Wheeler*

E. albipollinifera *L.C.Leach*, South African Journal of Botany 51: 281 (1985). Type: South Africa, Cape, Springbokvlakte, Dec. 1978, *Bruyns 1826* (NBG, holo.; K, PRE, iso.).

E. arida *N.E.Br.*, Flora capensis 5(2): 319 (1915). Type: South Africa, Cape, Britstown div., near De Aar, *Schonland* (K, holo.).

E. benthamii *Hiern*, Catalogue of the African plants collected by Dr. Friedrich Welwitsch in 1853–61, 1: 943 (1900). Type: Angola, between Lopollo and Ivantala, Feb. 1860, *Welwitsch 283* (BM, holo.; K, LISU, iso.).

E. brakdamensis *N.E.Br.*, Flora capensis 5(2): 324 (1915). Type: South Africa, Cape, Brakdam, 1 600', 7 Sept. 1897, *Schlechter 11123* (K, holo.; BOL, BR, GRA, HBG, L-2 sheets, PRE, S, WAG, iso.).

In Bruyns *et al.* (2006) *E. brakdamensis* was included under *E. filiflora*. Careful examination of Schlechter's

many pressings of the type collection of *E. brakdamensis*, shows, however, that this is not correct. In *E. filiflora* the stem and branches are very similar in shape and thickness, with the stem usually slightly longer than the branches, if it can be detected at all. In *E. brakdamensis*, on the other hand, the branches are very much more slender than the stem, which is largely buried in the ground and is greatly exceeded in height by the branches. *E. filiflora* has unusually long cyathia (often around 8 mm long), with especially long styles (7–9 mm long) and long male pedicels. The cyathia in *E. brakdamensis* do not exceed 5 mm long and the styles are not longer than 6 mm. The marginal processes on the glands in *E. brakdamensis* are much more brightly coloured than those of *E. filiflora* where, however, they are longer, more slender and considerably more numerous.

E. braunsii *N.E.Br.*, Flora capensis 5(2): 326 (1915). Type: South Africa, Cape, Aberdeen distr., without precise locality, *Brauns* (K, holo.). [Although Brown (1915) cited two specimens, he mentioned, in addition, that the species was described from the collection of Brauns and so the Brauns collection at K is taken as the holotype.]

E. rudis *N.E.Br.*: 322 (1915). Type: Namibia, sandy plains northeast of Narudas Süd, 28 Dec. 1912, *Pearson 8141* (BOL, lecto., designated here; SAM, isolecto.). [Of the collections cited by Brown (1915) only *Pearson 4310* (BOL, K) and *Pearson 8141* (BOL, SAM) have duplicates and so *Pearson 8141* is selected as the lectotype.]

E. marientalii *Dinter*: 31 (1914). Type: Namibia, Mariental, *Dinter 3164* (SAM, holo.).

E. rangeana *Dinter*: 31 (1914). Type: none cited. [*Euphorbia rangeana* was very similar to *E. marientalii* and was distinguished by 'E. rangeana ist grünbraun und graubraun' (*Dinter* 1914: 31), which does make it validly published. However, no specimens were cited here.]

Euphorbia rudis was maintained as a distinct 'species' in Bruyns *et al.* (2006). However, for *E. rudis* and *E. braunsii* White *et al.* (1941: 474) mentioned that 'there is really no sharp line of distinction between the two plants, but rather a gradation. The typical forms of the two are fairly clearly distinguishable, while many of the intermediate forms are very confusing indeed and difficult to classify satisfactorily.' The distinctions between the two included: the smaller 'average size of the main stem', the 'more slender' branches with the tubercles 'somewhat more recurved at the apex' and 'rather smaller' cyathia and 'more completely united styles' in *E. rudis*. These are all subject to considerable variation so that the name *E. rudis* has been abandoned here.

E. brevirama *N.E.Br.*, Flora capensis 5(2): 317 (1915). Type: South Africa, Cape, Jansenville div., near Klipplaat, *Schonland 1716* (K, holo.). [Carter (2002) listed a specimen at GRA but this does not exist.]

E. bruynsii *L.C.Leach*, The Journal of South African Botany 47: 103 (1981). Type: South Africa, Cape, Steytlerville, *Bruyns 1814* (PRE, holo.; SRGH, iso.).

E. bubalina Boiss., Centuria Euphorbiarum: 26 (1860). Type: South Africa, Cape, among thorn-bushes near Buffelsrivier, *Drège 4615* (P, holo.). [Boissier (1860) cited a specimen in 'h. Bunge', so this sheet is taken as the holotype.]

E. laxiflora Kuntze: 286 (1898). Type: South Africa, East London, 5 Mar. 1894, *Kuntze* (NY, holo.; K, iso.).

E. bupleurifolia Jacq., Plantarum rariorum horti caesari schoenbrunnensis descriptiones et icones 1: 55, t. 106 (1797). *Tithymalus bupleurifolius* (Jacq.) Haw.: 138 (1812). Type: Illustration in Jacq., Pl. Hort. Schönbr. 1: t. 106 (1797) (lecto., designated here).

E. proteifolia Boiss.: 92 (1862). Type: South Africa, near Umtata, *Drège 8196* (missing). [Boissier (1862) cited a specimen in 'h. Bunge', but this has not been located.]

E. caperonioides R.A.Dyer & P.G.Mey., Mitteilungen aus der Botanischen Staatssammlung München 6: 245 (1966). Type: Namibia, Kaokoland, 3 miles west of Etanga, 7 Apr. 1957, *De Winter & Leistner 5420* (PRE, holo.).

E. caput-medusae L., Species Plantarum 1: 452 (1753). Type: J. Burm., Rar. Afric. Pl.: t. 8 (1738) (lecto., designated by Wijnands 1983).

E. fructus-pini Mill.: Euphorbia no. 10 (1768). *Medusea fructus-pini* (Mill.) Haw.: 134 (1812). Neotype (designated here): J. Burm., Rar. Afric. Pl.: t. 8 (1738).

When Miller (1768) 'described' *E. fructus-pini*, he referred to Linnaeus (1737) and Boerhaave (1720: 258). He also referred to it as 'Euphorbium Afrum facie fructus pini' and then added 'African Euphorbium with the appearance of Pine fruit, commonly called Little Medusa's Head'. In the longer discussion after the literature citations, he added 'The tenth sort hath a thick short stalk, which seldom rises more than eight or ten inches high, from which come out a great number of trailing branches which are slender, and grow about a foot in length; these intermix with each other like those of the seventh sort, but they are much smaller, and do not grow near so long, but have the same appearance, from whence it is called Little Medusa's Head: the ends of these branches are beset with narrow leaves, between which the flowers come out, which are white, and shaped like those of the other species.'

Linnaeus (1737) referred to Boerhaave (1720: 258) and 'Breyne, Prodr. 2: 100'. In Boerhaave (1720: 258) one finds '8...in capitis Medusae' and '9. Euphorbium; Afrum; facie fructus pini'...*Tithymalus*, Africanus, arborescens, squamato caule, spinosis MH 3:344'. 'MH 3' refers to the third volume of 'Planta Historia universalis' (Morison 1699). On page 344 of this work, Morison referred to 'Pluk. Phyt. t. 230'. In Plukenet (1692), the phrase '*Tithymalus*, Africanus, arborescens, squamato caule, spinosis' appears under t. 230, fig. 5 as well as 'pini fructu facie'. This figure is of *E. loricata*.

Euphorbia loricata does not produce trailing branches from a 'thick short stalk', nor is it 'without spines, having tubercles furnished with very narrow

leaves'. Therefore Miller's information makes it clear that his name cannot be applied to *E. loricata*, even though some of the references he gave refer to that species. The reference to 'very narrow leaves' makes it more likely that this name refers to *E. caput-medusae* than *E. inermis*, among the species with a 'thick short stalk' and 'trailing branches'. At present no preserved material of Miller's Euphorbia no 10 is known and so a neotype is selected.

E. caput-medusae var. *geminata* Aiton: 136 (1789). Type: Illustration in J. Burm., Rar. Afric. Pl.: t. 9, fig. 1 (1738) (lecto., designated here).

E. caput-medusae var. *major* Aiton: 135 (1789). Type: Illustration in Commelijn, Praeludia Bot.: t. 7 (1703) (lecto., designated here).

E. caput-medusae var. *minor* Aiton: 135 (1789). Type: Illustration in Breyne, Prodr. rar. pl. sec.: t. 19 (1739) (lecto., designated here).

E. tuberculata Jacq.: 43, t. 208 (1797). *Dactylanthus tuberculata* (Jacq.) Haw.: 133 (1812). *Medusea tuberculata* (Jacq.) Klotzsch & Garcke: 61 (1860). Type: Illustration in Jacq., Pl. Hort. Schönbr. 2: t. 208 (1797) (lecto., designated here).

E. medusae Thunb.: 86 (1800). Type: South Africa, Cape, *Thunberg* (UPS-THUNB 11494, lecto., designated here). [Thunberg (1800) placed two of his collections under *E. medusae*, namely UPS-THUNB 11494 and 11495. The latter is a piece of *E. hamata*.]

Medusea major Haw.: 134 (1812). Type: Illustration in Commelijn, Praeludia Bot.: t. 7 (1703) (lecto., designated here).

Medusea tessellata Haw.: 135 (1812). *E. tessellata* (Haw.) Sweet: 107 (1818). Type: none cited.

E. commelinii DC.: 110 (1813). Type: Illustration in Commelijn, Praeludia Bot.: t. 7 (1703) (lecto., designated by Wijnands 1983).

E. fructus-pini var. *geminata* Sweet: 356 (1826). Type: Illustration in J. Burm., Rar. Afric. Pl.: t. 9, fig. 1 (1738) (lecto., designated here).

E. bolusii N.E.Br.: 333 (1915). Type: South Africa, Transvaal, near Middelburg?, Sept. 1886, *H. Bolus 9767* (BOL, holo.; K, iso.). [The locality given is considered to be an error (White *et al.* 1941: 372).]

E. ramiglans N.E.Br.: 306 (1915). Type: South Africa, Namaqualand, 1883, *H. Bolus sub BOL 9448* (BOL, holo.; K, iso.).

E. marlothiana N.E.Br.: 331 (1915). Type: South Africa, Cape, near Neu Eisleben, fl. Oct.-Nov. 1914, *Marloth 5733* (PRE, holo.; BOL, NBG, K, iso.).

E. muirii N.E.Br.: 331 (1915). Type: South Africa, Cape, Platbos, Still Bay, *Muir 174* (BOL, lecto., designated here; PRE, SAM, isolecto.). [Brown (1915) also cited the following: Albertinia, *Muir* (K), *Pearson sub SAM 2261* (K, SAM).]

E. tuberculatoides N.E.Br.: 332 (1915). Type: South Africa, Cape, Theefontein, Malmesbury div., *Bachmann 1042* (K, lecto., designated here). [Brown (1915) also cited the following: *Grey* (K), *Bolus 4359* (BOL).]

E. macowanii N.E.Br.: 334 (1915). *E. tuberculata* var. *macowanii* (N.E.Br.) A.C.White *et al.*: 372 (1941). Type: South Africa, Clanwilliam [wrongly labelled as Cannon Hill, Uitenhage], *MacOwan 3286* (K, lecto., designated here; SAM, WU, isolecto.). [Brown (1915) also cited the following: *Schlechter 8419* (GRA, K, PRE).]

E. confluens Nel: 193 (1933b). Type: South Africa, Cape, open flats, Kliphooogte, Sept. 1929, *Herre sub SUG 5549* (missing). Type: Illustration in *Kakteenkunde*: 194 (1933) (lecto., designated here). [Although Carter (2002) cited a specimen at STE (now incorporated into NBG), this does not exist.]

E. celata R.A.Dyer, *Bothalia* 11: 278 (1974). Type: South Africa, Vanrhynsdorp distr., Moedverloor, 100 m, 12 May 1973, *Hall 4272* (PRE, holo.).

E. miscella L.C.Leach: 341 (1984a). Type: South Africa, Cape, near Lekkersing, *Leach et al. 16545* (NBG, holo.; PRE, iso.).

E. clandestina Jacq., *Plantarum rariorum horti caesari schoenbrunnensis descriptiones et icones* 4: 43, t. 484 (1804). Type: Illustration in Jacq., *Pl. Hort. Schönbr.* 4: t. 484 (1804) (lecto., designated here).

E. clava Jacq., *Icones plantarum rariorum* 1 (4): 9, t. 85 (1784). *Treisia clava* (Jacq.) Haw.: 131 (1812). Type: Jacq., *Icon.* 1: t. 85 (1781) (lecto., designated by Wijnands 1983).

E. canaliculata Lam.: 417 (1788). Type: South Africa, collector unknown (P-LAM P00381883, holo.). [A specimen of this 'species' is present in the Lamarck herbarium at P and is taken as the holotype and Wijnands' lectotype (Wijnands 1983: 99) is set aside.]

E. coronata Thunb.: 86 (1800). Type: South Africa, Cape, *Thunberg* (UPS-THUNB 11434, holo.). *Treisia tuberculata* Haw.: 65 (1819). Type: Introduced by D. Young to Epsom, 1815, fl. Chelsea 1818 (missing).

E. pubiglans N.E.Br.: 338 (1915). Type: South Africa, Cape, near Port Elizabeth, Sept. 1912, *LL.Drège* (K, holo.).

E. clavarioides Boiss., *Centuria Euphorbiarum*: 25 (1860). Type: South Africa, Cape, Sneeuberge at Poortjie, *Drège 8200* (P; duplicates at K, S, W) (lecto., designated here). [Boissier (1860) did not state which herbarium he saw this collection in. This suggests that there was a specimen at G, but this has not been located. A lectotype is selected.]

E. clavarioides var. *truncata* (N.E.Br.) A.C.White *et al.*: 309 (1941). *E. truncata* N.E.Br.: 309 (1915). Type: South Africa, Standerton, *Burt-Davy 1953* (K, lecto., designated here). [Brown (1915) also cited the following: Transvaal, 23 Nov. 1905, *Leendertz 670* (K); *Leendertz 1873* (K) and *Wilms 1339* (missing); *Kolbe* (BOL).]

E. basutica Marloth: 408 (1910a). Type: Lesotho, Leribe, *Dieterlin* (cult. Phillips, fl. Cape Town in Mar. 1909) *sub Marloth 4671* (K, holo.; NH, PRE, SAM, iso.). [Though Marloth (1910a) cited no number, it is assumed that this is the same specimen as his type.]

E. colliculina A.C.White *et al.*, *The Succulent Euphorbiae* 2: 962 (1941). Type: South Africa, Cape, 2.5 miles north of Oudtshoorn, Aug. 1939, *Dyer 4053* (PRE 0247438-2, lecto., designated here; BOL, K, PRE, isolecto.). [According to Dyer's collecting book the number should be 4053 not 4052, as given in White *et al.* (1941); the latter has no entry next to it while the former is '*E. colliculina* WDS sp. nov. type'. White *et al.* (1941) designated *Dyer 4052* the 'type' and *Marloth 10577* (K, PRE) the 'type of capsule' so a lectotype is designated here.]

In Bruyns *et al.* (2006), *E. colliculina* was included under *E. esculenta*. However, while they bear a close resemblance to one another, there are many differences and two distinct species are involved. Mature specimens of *E. colliculina* are altogether more delicate than those of *E. esculenta* and neither the main stem nor the branches reach the thickness that are normal for *E. esculenta*. *E. esculenta* also produces several swollen roots from the base of the tap-root and this phenomenon is unknown in *E. colliculina*, where the thick taproot tapers off quite abruptly into slender, fibrous roots. Florally *E. colliculina* is also easily separated from *E. esculenta* in that the cyathial lobes and the bracteoles within the cyathium lack the densely bushy hairiness at their apices that make the cyathium of *E. esculenta* distinctively furry or woolly. The cyathial glands are also much larger than those of *E. esculenta*.

E. crassipes Marloth, *Transactions of the Royal Society of South Africa* 1: 318 (1909). Type: South Africa, Cape, Biesiespoort, *Marloth (4399)4397* (PRE, holo.; K, iso.).

E. fusca Marloth: 38 (1910b). Type: South Africa, Cape, Britstown, Sept. 1909, *Marloth 4682* (PRE, holo.; K, iso.). [In the cases of both *E. crassipes* and *E. fusca*, Brown annotated the specimens at K as parts from Marloth's type specimens and so the holotype is the specimen at PRE in each case, with isotypes at K.]

E. baliola N.E.Br.: 327 (1915). Type: Namibia, Great Karas Mountains, between 1st & 2nd outspan between Kraikluft and Narudas Süd, 5400', 26 Dec. 1912, *Pearson 8095* (K, holo.; BOL-2 sheets, GRA, SAM, iso.). [Brown annotated the specimen at K himself as 'Type' but those at BOL and SAM were not annotated by him. Therefore that at K is taken as the holotype.]

E. inornata N.E.Br.: 586 (1925). *E. inelegans* N.E.Br.: 322 (1915), *nom. illegit., non* N.E.Br. (1911). Type: South Africa, Cape, near Kimberley, Sept. 1912, *Moran (sub Schonland 1718)* (K 000253322, holo.; GRA, K, iso.). [Brown (1915) mentioned that *E. inornata* was described from a living plant sent by Schonland in 1912, grown at Kew and pressed by Brown himself in June 1913. This is the specimen 'near Kimberley, Moran, living plant sent to Kew by Schonland' (K000253322). Mounted on the same sheet is

another specimen, namely '*Moran sub Schönland 1718*' (K000253323) and both had 'Type' written on them by Brown. The former is taken as the holotype.]

E. eendoornensis Dinter: 196 (1932). Type: Namibia, between Wittsand and Eendorn, 26 Mar. 1924, *Dinter* (missing). Neotype (designated here): Namibia, Vrede, *Bruyns 11362* (NBG).

E. hopetownensis Nel: 192 (1933b). Type: South Africa, Cape, Hopetown, 1930, *E. Markoetter sub SUG 5529* (missing). Type: Illustration in *Kakteenkunde*: 192 (1933) (lecto., designated here). [Although Carter (2002) cited a specimen at STE (now incorporated into NBG), this does not exist.]

Marloth (1910b) said that *Euphorbia fusca* differed from *E. crassipes* by the non-persistent peduncles (some peduncles being persistent in *E. crassipes*). In most populations of *E. crassipes* one finds plants with persistent peduncles and others without them so this character cannot be used to distinguish between them and the type of *E. crassipes* at PRE is a typical specimen of what is usually referred to as '*E. fusca*'. White *et al.* (1941) maintained that the main differences between *E. crassipes* and *E. fusca* were the slightly more cylindrical stem, thicker branches, the deeper involucre and the green glands. However, in the description Marloth did not mention the glands at all and they were only represented in a small black and white drawing so that their colour was unknown. None of these other differences are significant in this widely distributed and quite variable species.

Although the glands of *E. inornata* were given as olive-green on their upper surface, which is unusually pale for *E. crassipes*, the shape of the plant, the relative thickness of the branches and the shape of the cyathia and glands all fit *E. crassipes*, under which it is included here.

Euphorbia hopetownensis was described from a small plant (only 5 cm broad) with ascending, relatively stout branches which bore unusually short peduncles at 5–7 mm long and 'pink-purple' glands with five teeth. The small figure in the text and these few details are strongly suggestive of *E. crassipes*, under which this name is subsumed here.

Euphorbia baliola was not listed in Bruyns *et al.* (2006) but is included here under *E. crassipes*. Brown (1915) believed it to differ from *E. crassipes* by the different manner in which the tubercles on the stem are formed (from the persistent bases of the branches), the presence of branches right to the centre of the stem and the longer pedicels of the male florets with longer hairs. However, collections made near where the type was collected are typical of *E. crassipes* except for somewhat more slender branches and it seems improbable that two distinct species are involved here.

E. crotonoides Boiss. in A.P. de Candolle, *Prodromus* 15(2): 98 (1862). Type: Sudan, Kordofan, near El Obeid in shade of *Adansonia*, *Kotschy 419* (S, holo., K, iso.). [Boissier (1862) cited a specimen in 'h. Vindob.' and since the sheet at S is from 'Herb. Musei Palat. Vindob.', this is taken as the holotype.]

E. cumulata R.A.Dyer, *Records of the Albany Museum* 4: 92 (1931). Type: South Africa, Cape, Botha Ridge, 10 miles from Grahamstown on Queen's Road, *Dyer 669* (GRA, holo.; K, iso.).

E. cylindrica Marloth *ex A.C.White et al.*, *The Succulent Euphorbieae* 2: 962 (1941). Type: South Africa, Cape, Kubiskow Mtn, 7 Sept. 1926, *Marloth 12860* (PRE, holo.).

E. davyi Pax *ex N.E.Br.*, *Flora capensis* 5(2): 305 (1915). Type: South Africa, Transvaal, near Pretoria, 19 Nov. 1901, *J.W.C. Kirk 48* (K, lecto., designated here; PRE, isolecto.). [Brown (1915) listed three specimens: *Kirk 48* (K, PRE), *Burt-Davy 2196* (K) and *Burt-Davy 5562* (K) and annotated the first and last as 'Type', so a lectotype is selected. At K there is a letter written by Pax from Breslau in Feb. 1906 to Burt-Davy that requested his permission to name this species after him.]

E. pseudohypogaea Dinter: 265 (1921a). Type: Namibia, am Wege von Oas nach Gobabis, *Dinter 3144* (missing).

E. bergii A.C.White *et al.*: 963 (1941). Type: South Africa, Orange Free State, Koffiefontein, *Scholtz* (missing).

E. pseudoduseimata A.C.White *et al.*: 963 (1941). Type: Namibia, Hohenhorst, 45 miles SW of Windhoek, Nov. 1940, *Otzen* (PRE, holo.; K, iso.). [White *et al.* (1941) cited a specimen from '45 miles SW of Windhoek, *Otzen 37*' as the type, and mentioned the farm-name 'Hohenhorst' (p. 414) as well. At PRE there is a specimen 'Hohenhorst, SW of Windhoek, Nov. 1940, *Otzen PRE 45881*'. The material at Kew lacks the number '37', but is from the same locality and was annotated by Dyer as 'Part of type specimen'. Therefore the specimen at PRE is taken as the holotype.]

E. decepta N.E.Br., *Flora capensis* 5(2): 320 (1915). Type: South Africa, Cape, near Willowmore, *Brauns 1712* (K, holo.).

E. albertensis N.E.Br.: 323 (1915). Type: South Africa, Cape, near Prince Albert, between railway and village near Prince Albert, May 1907, *Marloth 4397* (K, holo.; PRE, iso.).

E. astrophora Marx: 311 (1996). Type: South Africa, Cape, north of Klipplaat, *Marx 204* (GRA, holo.).

E. gamkensis Marx: 38 (1999a). Type: South Africa, Cape, south of Calitzdorp, *Marx 225* (GRA, holo.).

E. suppressa Marx: 33 (1999a). Type: South Africa, Cape, near Seekoegat, *Marx 227* (GRA, holo.).

According to N.E. Brown (1915), Marloth considered his number 4397 from between Prince Albert and Prince Albert Road ('the railway') to belong to *E. crassipes*. However, Brown believed that the absence of a 'flat top to the stem' was significant and that it represented a distinct species, which he named *E. albertensis*. The plants pressed (K, PRE) have a relatively slender stem (far too slender to belong to *E. crassipes*) with numerous short branches towards their apex (which are also much

more slender than in *E. crassipes*) with many long, slender, spine-like persistent, sterile peduncles. Vegetatively these plants are extremely similar to *E. decepta* and, although Brown (1915) was unable to supply much detail about the floral parts of *E. albertensis*, this name is included here under *E. decepta*.

Both *E. gamkensis* and *E. suppressa* were treated as distinct species in Bruyns *et al.* (2006). but are here relegated to synonymy.

Euphorbia suppressa was compared extensively with *E. albertensis* and *E. arida* (Marx 1999a). The basis for comparison with *E. albertensis* was mainly Figure 445 of White *et al.* (1941). However, it is uncertain whether this figure is of the 'species' described by N.E. Brown as *E. albertensis*. Apart from the fact that Dyer (GRA records) had tentatively attributed two specimens from the area between Prince Albert and Klaarstroom to *E. arida*, it remains unclear what this new species has to do with *E. arida* (a species of the north-eastern Great Karoo and southern Free State) and why it was not compared with *E. decepta*, which is fairly well-known on the southern portion of the Great Karoo between Beaufort West and Willowmore. Florally *E. arida* and *E. decepta* are not easily separated except by the somewhat shallower cyathium (and slightly shorter styles) with fewer, often obsolete teeth on the outer margins of the cyathial glands in *E. decepta* (deeper cyathium, longer style and more prominent and more numerous marginal teeth in *E. arida*). However, although the plant appears to be very similar in both species, beneath the soil plants of *E. arida* have a system of swollen tuberous roots which develop from and extend the tap-root. These structures are entirely absent in *E. decepta*. In all these respects *E. suppressa* is identical to *E. decepta* and so this name is included here under *E. decepta*.

Euphorbia gamkensis was compared extensively with *E. crassipes* (and its synonym *E. fusca*). However, it differs from *E. crassipes* by its much smaller stature (main stem at most 90 mm thick) by the considerably deeper cyathium whose glands are more-or-less without marginal processes (these are particularly prominent in *E. crassipes* and are usually strongly deflexed). Again, it ought to have been considered how it differs from *E. decepta*. Vegetatively the two are difficult to separate and I have been unable to find any reliable differences. The cyathia differ in that the styles are shorter and more deeply divided in *E. gamkensis*, but no other significant differences have been detected. As I consider this to be insufficient on which to base a separate and otherwise so similar species, I have included *E. gamkensis* under *E. decepta*.

While *E. astrophora* was compared with many species, including *E. decepta* (Marx 1996), it was said that it 'very closely resembles' *E. decepta*, differing by the slightly shorter branches and the convex glands. The glands may be concave in *E. decepta* as well, and plants of *E. decepta* are very variable in size so that there are no substantial differences between them. There are therefore no grounds for separating *E. astrophora* from *E. decepta*.

E. dregeana *E.Mey. ex Boiss.* in A.P. de Candolle, *Prodromus* 15(2): 95 (1862). Type: South Africa, Cape,

between Koussie and Silverfontein in Kaus Mtn, 2 000', 29 Aug. 1830, *Drège 2942* (P, holo.; G, K-2 sheets, S, iso.). [Boissier (1862) cited a specimen in 'h. Bunge', so the specimen in P is taken as the holotype. A specimen at MO is excluded as it is unnumbered and has been annotated 'must be 2942', for which no grounds are known.]

E. elastica Marloth: 37 (1910b), *nom. illegit., non* Poisson & Pax (1902). Type: South Africa, Cape, near Anenous, Nov. 1908, *Carstens sub Marloth 4684* (PRE, holo.).

E. duseimata *R.A.Dyer*: t. 530 (1934). Type: Botswana, ± 100 miles northwest of Molepolole, flowered in cultivation in Pretoria in Nov. 1931, *G.J.de Wyn sub PRE 12426* (PRE, holo.).

E. ecklonii (*Klotzsch & Garcke*) *Baill.*, *Adansonia* 3: 144 (1863). *Tithymalus ecklonii* *Klotzsch & Garcke*: 68 (1860). Type: South Africa, Cape of Good Hope, Swellendam district, Breede River at Swellendam (70.10), hills under 1000', Aug., *Ecklon & Zeyher, Euphorb. 16* (W, holo.; P, S, iso.).

E. pistifolia *Boiss.*: 93 (1862). Type: South Africa, Cape of Good Hope, Swellendam district, Breede River at Swellendam (70.10), hills under 1 000', Aug., *Ecklon & Zeyher, Euphorb. 16* (S, lecto., designated here; P, W, isolecto.). [Boissier (1862) also cited *Drège 8195* (S, W), which is from the same locality.]

E. esculenta *Marloth*, *Transactions of the Royal Society of South Africa* 1: 319 (1909). Type: South Africa, Cape, Klipplaat (Graaff-Reinet), received living Sept. 1907, *Marloth 4162* (PRE, holo.; BOL, K, SAM, iso.).

E. inermis var. *laniglans* *N.E.Br.*: 328 (1915). Type: South Africa, Cape, near Klipplaat, received Oct. 1912, *Marloth 5270* (K, holo.; PRE, iso.).

E. fasciculata *Thunb.*, *Prodromus plantarum capensium* 2: 86 (1800). Type: South Africa, Cape, *Thunberg* (UPS-THUNB 11456, holo.).

E. ferox *Marloth*, *Transactions of the Royal Society of South Africa* 3: 122 (1913). Type: South Africa, Cape, Klipplaat, 1905, *Marloth 5147* (PRE, holo.; BOL, iso.).

E. alternicolor *N.E.Br.*: 344 (1915). *E. aggregata* var. *alternicolor* (*N.E.Br.*) *A.C.White et al.*: 616 (1941). Type: South Africa, *N.S.Pillans* (K, holo.).

E. captiosa *N.E.Br.*: 345 (1915). Type: South Africa, Cape, near Aberdeen, flow. Sept. 1904, *Schonland 1661* (GRA, holo.).

E. filiflora *Marloth*, *Transactions of the Royal Society of South Africa* 3: 123 (1913). Type: South Africa, Cape, near Concordia, Apr. 1912, *Krapohl sub Marloth 5119* (NBG, lecto., designated here; K, PRE, isolecto.). [Marloth (1913) mentioned two collections, one made by himself at Chamis in Great Namaqualand (i.e. southern Namibia) in October 1910 and another sent to him from Concordia in Namaqualand (i.e. in north-western South Africa) by Krapohl in March 1912. He appears to have recorded both of these under his number 5119 but

I have not been able to locate any material of the collection from Chamis. He wrote 'Type' on the specimen at NBG and not on any of the other pieces distributed under this number.]

E. filiflora var. *nana* G.Will.: 49 (2003). Type: South Africa, Cape, T'Gabies Plateau, northwest of Kosies, Oct. 1999, *Williamson 5933* (BOL, holo.).

E. nelii A.C.White *et al.*: 484 (1941). *E. meyeri* Nel: 134 (1933a), *nom. illegit. non* Steud. (1840) nec Boiss. (1860). Type: South Africa, Cape, Klipfontein, c. 1 000 m, Sept. 1929, *Herre sub SUG 5545* (missing). Type: Illustration in *Kakteenkunde*: 134 (1933) (lecto., designated here). [Since the type of *E. meyeri* Nel and consequently of *E. nelii* White *et al.* is missing, a lectotype is selected.]

E. versicolores G.Will.: 284 (1995). Type: South Africa, Cape, near Eksteenfontein, *Williamson 4453* (NBG, holo.).

E. flanaganii N.E.Br., *Flora capensis* 5(2): 314 (1915). Type: South Africa, Cape, grassy slopes near Kei Mouth, 100', June 1893, *Flanagan 1800* (PRE 0254449-0, holo.; K, PRE, iso.). [The specimen at K is annotated 'branches from the Type Specimen (in Cape Town Herb.)'. There is no type specimen of this species in any Herbarium in Cape Town but there are two sheets at PRE, one of which is annotated by Brown as 'Type'. This is taken as the holotype.]

E. ernestii N.E.Br.: 307 (1915). Type: South Africa, Cape, Hospital Hill, near Queenstown, 3 600', 17 Sept. 1911, *Galpin 8066* (K 000253285, holo.; K, PRE, iso.).

E. gatbergensis N.E.Br.: 310 (1915). Type: South Africa, Cape, near Gatberg (south of Elliott), 3 000–3 500', *Baur 251* (K, holo.).

E. frankisiae N.E.Br.: 315 (1915). Type: South Africa, Natal, Camperdown, 2 000', 19 Oct. 1910, *Franks sub Medley-Wood 11727* (K, holo.; NH, PRE, iso.). [The specimens at NH and PRE were not seen by Brown, though that at NH is annotated as 'part of Type Spec.'. The sheet at K contains two specimens, one collected by Franks on 19 October 1910, pressed by Wood and sent to K (this being the other 'part of Type Spec.') and another made from two plants sent in Apr. 1913 to, and cultivated at, Kew. Only the former specimen is annotated by Brown as 'type' and is taken as the holotype.]

E. woodii N.E.Br.: 315 (1915). Type: South Africa, Natal, Clairmont Flats, *Wood 4090* (K, lecto., designated here; NH, isolecto). [Brown (1915) cited also: Clairmont Flats, *Wood 11803* (K) and *Wood 12612* (K).]

E. passa N.E.Br.: 313 (1915). Type: South Africa, Natal, *Cooper*, cult. J.Corduroy, 6 July 1905 (K 000253311, lecto., designated here, K, isolecto.). [Brown (1915) cited also: Scottsburg, *Pole Evans* (missing); Umzumbi, *Wood* (K).]

E. discreta N.E.Br.: 316 (1915). Type: South Africa, Natal, banks of Umzimkulu River near shore, 25 Feb. 1837, *Bachmann 757* (K, holo.).

Brown (1915) recognised a host of 'species' here, including *E. discreta*, *E. ernestii*, *E. flanaganii*, *E. frankisiae*, *E. gatbergensis*, *E. passa*, and *E. woodii*. White *et al.* (1941) reduced the number slightly by placing *E. discreta* and *E. passa* in synonymy under *E. woodii* and recognising *E. ernestii*, *E. flanaganii*, *E. frankisiae*, *E. gatbergensis*, and *E. woodii* as distinct species. Brown (1915: 314) commented on the remarkable extent to which these plants can vary in size; in particular, how one of them increased in size in cultivation from 30–40 branches at 3–8 inches long to 140 branches that were 9–14.5 inches long and this underlines the vegetative variability that one may observe here. Nevertheless, he distinguished *E. flanaganii* from *E. woodii* by the 'much shorter branches' (Brown (1915): 314) and *E. discreta* from *E. woodii* by the fact that the 'body of the plant is much smaller' (Brown (1915): 316). As commented on extensively by White *et al.* (1941), this makes no sense in view of such strong variation in the size of individuals. Plants producing more than one rosette of branches are not unusual and are found in many populations. Although this feature was not mentioned by Brown (1915) in his descriptions, this was supposed to separate *E. gatbergensis* from *E. ernestii* (White *et al.*, 1941: 75), but they recognised that plants of both 'species' could produce several rosettes. *E. flanaganii* and *E. woodii* were separated by 'Ovary puberulous = *E. flanaganii*'; Ovary glabrous to thinly pubescent with long hairs = *E. woodii*' (White *et al.* (1941): 75, adapted from Brown (1915): 239). In practise some populations have plants with pubescent ovaries and others with glabrous ovaries and to distinguish two species on the basis of the length and density of this pubescence is untenable. Consequently all these names are reduced here to synonymy under a single species.

E. fortuita A.C.White *et al.*, *The Succulent Euphorbiae* 2: 962 (1941). Type: South Africa, Cape, 27 miles from Ladismith towards Barrydale, Aug. 1939, *Dyer 4074* (PRE, Sheet I, holo.; K, PRE-2 sheets, iso.).

Euphorbia fortuita was included under *E. esculenta* in Bruyns *et al.* (2006). However, although in both species the cyathial glands are mostly dark and the centre of the cyathium is densely filled with white hairs, there are significant differences between them that warrant their recognition as distinct species. In *E. fortuita* the glands are much broader and the cyathium is more conical, having a rather rounded, almost spherical shape in *E. esculenta*. Furthermore, the pedicels of the male florets in *E. esculenta* are glabrous (densely pubescent in *E. fortuita*) but in *E. fortuita* the bracteoles are uniformly pubescent in their upper half, while in *E. esculenta* they are densely pubescent only at their apices. The ovary is entirely glabrous in *E. esculenta* and densely pubescent above in *E. fortuita*.

E. friedrichiae Dinter, *Neue und wenig bekannte Pflanzen Deutsch-SWA's*: 29 (1914). Type: Namibia, Warmbad, comm. Sept. 1913, *M. Friedrich sub Dinter 3253* (SAM, holo.).

E. gariiepina Boiss., *Centuria Euphorbiarum*: 28 (1860). Type: South Africa, Cape, Verleptpram, interior at Orange River, *Drège 8214* (G, holo.; K, S, W, iso.).

E. gariiepina subsp. **balsamea** (Welw. ex Hiern) L.C.Leach, *Excelsa Taxonomic Series* 2: 78 (1980). *E. balsamea* Welw. ex Hiern: 951 (1900). Type: Angola, *Welwitsch 634* (K, holo.; G, P, iso.).

E. bergeriana Dinter: 28 (1914). Type: Namibia, Okawayo near Karibib, *Dinter 1385* (SAM, holo.).

E. schaeferi Dinter: 304 (1921b). Type: Namibia, Klein Karas, *Schäfer sub Dinter 1233* (SAM, lecto., designated here). [Dinter (1921b) cited: Holoog, *Dinter 1233*; Klein Karas, *Schäfer*. Since Holoog is close to Klein Karas, it is assumed that the specimen cited here is one of these, although the details do not quite correspond.]

E. gerstneriana Bruyns, nom. nov.

E. franksiae var. *zuluensis* A.C.White *et al.*: 962 (1941). Type: South Africa, Natal, near Mahlabatini, 18 Oct. 1935, *Gerstner 687* (PRE, holo.).

E. gerstneriana is closely allied to *E. flanaganii*. In *E. flanaganii*, the branches form a dense, usually strongly spreading crown around the apex, which is itself devoid of branches. This bare apex of the stem is green with prominent tubercles and is somewhat depressed towards the centre. In *E. gerstneriana* the branches are produced right to the apex of the stem so that the apex of the stem is not visible at all. The branches in *E. flanaganii* are usually distinctly swollen towards their bases while in *E. gerstneriana* the branches are uniformly thick to their bases. They are also much less densely clustered around the apex of the stem and form an ascending, usually lax rosette. The cyathia differ in that they are pale green and distinctly red-veined on the lobes and in the subtending bracts in *E. gerstneriana*, with deep brownish purple, comparatively small glands that are widely spaced around the cyathium. In *E. flanaganii* the cyathia and their subtending bracts are yellow-green, the glands are usually bright yellow and are far broader, usually almost contiguous around the cyathium. The styles of *E. gerstneriana* are particularly broad (more than twice the breadth of those in *E. flanaganii*) and form an almost mushroom-like top to the female floret.

E. globosa (Haw.) Sims, *Curtis' Botanical Magazine* 53: t. 2624 (1826). *Dactylanthes globosa* Haw.: 382 (1823). *Medusea globosa* (Haw.) Klotzsch & Garcke: 61 (1860). Type: Illustration number 808/15 by T. Duncanson at K of specimen received 1821 from Cape of Good Hope collected by Bowie (lecto., designated here).

E. glomerata A.Berger: 104 (1906a). Type: South Africa, Cape (missing).

E. hallii R.A.Dyer, *The Journal of South African Botany* 19: 135 (1953). Type: South Africa, Cape, Botterkloof, May 1953, *Hall sub PRE 28532* (PRE, holo.; GRA, K, iso.).

E. hamata (Haw.) Sweet, *Hortus suburbanus Londinensis*: 107 (1818). *Medusea hamata* (Haw.) Klotzsch & Garcke: 251 (1859). *Dactylanthes hamata* Haw.: 133 (1812). Type: Illustration in J.Burm., *Rar. Afric. Pl.*: t. 6, figure 3 (1738) (lecto., designated here). [This figure was cited by Haworth (1812). It was cited by Carter

(2002) as 'T: icono' but this does not constitute valid lectotypification.]

E. cervicornis Boiss.: 27 (1860). Type: South Africa, Cape, Heerenlogement, *Zeyher 1530* (G, lecto., designated here; BOL, SAM, isolecto.). [Boissier (1860) also cited *Drège 2950* (missing).]

E. peltigera E.Mey. ex Boiss.: 91 (1862). Type: South Africa, Cape, on rocks at Orange River near Verleptpram, 19 Sept. 1830, *Drège 2951* (S, lecto., designated here; K, isolecto.). [Boissier (1862) cited a specimen 'in h. Bunge'. The specimen in S may be that formerly in Bunge's herbarium and could be the holotype but this is not certain and so it is chosen as lectotype. A sheet at MO, 'assumed to be 2951' is excluded.]

E. heptagona L., *Species Plantarum* 1: 450 (1753). Type: Illustration in Boerh., *Ind. Alter. Hort. Lugd.-Bat.* 1: figure opposite p. 258 (1720) (lecto., designated here). [This figure was cited by Linnaeus (1753). It was also cited by Carter (2002) as 'T: icono' but this does not constitute valid lectotypification. Jarvis (2007) stated that it remained untypified.]

Anthacantha desmetiana Lem.: 64 (1858). Type: South Africa, Cape, cult. L. Desmet (missing).

E. enopla Boiss.: 27 (1860). Type: South Africa, Cape, Witpoortsberg, 2 000–3 000', Aug., *Drège 8207* (S, holo.; BM-2 sheets, K, MO, P, W-2 sheets, iso.). [Boissier (1860) did not cite a herbarium here and so a lectotype is chosen. The specimen at MO is a mixed sheet of which only the left hand and middle pieces are this species.]

E. heptagona var. *fulvispina* A.Berger: 109 (1902b). Type: none cited.

E. morinii A.Berger: 98 (1906a). Type: South Africa, Cape, cultivated material sold by Co. Haage & Schmidt-Erfurt (missing).

E. atrispina N.E.Br.: 342 (1915). Type: South Africa, Cape, near Prince Albert, received 1912, *Pearson* (K, holo.).

E. heptagona var. *dentata* (A.Berger) N.E.Br.: 351 (1915). *E. enopla* var. *dentata* A.Berger: 95 (1906a). Type: South Africa, Cape, Witpoortsberge, *Drège* (P, lecto., designated here). [Berger (1906a) did not state where the specimen was that he saw, so a lectotype is designated.]

E. heptagona var. *ramosa* A.C.White *et al.*: 964 (1941). Type: South Africa, Cape, 17 miles north of Oudtshoorn, Aug. 1939, *Dyer 4049* (PRE, holo.; GRA, iso.).

E. heptagona var. *subsessilis* A.C.White *et al.*: 964 (1941). Type: South Africa, Cape, 17 miles east of Ladismith (15 miles west of Calitzdorp), Aug. 1939, *Dyer 4067* (PRE, holo.).

E. heptagona var. *viridis* A.C.White *et al.*: 964 (1941). Type: South Africa, Cape, 11 miles west of Calitzdorp in Huis River Pass, Aug. 1939, *Dyer 4065* (PRE, holo.).

E. enopla var. *viridis* A.C.White *et al.*: 964 (1941). Type: South Africa, Cape, 17 miles north of Jansenville towards Graaff-Reinet, Aug. 1939, *Dyer 4008* (PRE, holo.).

E. atrispina var. *viridis* A.C.White *et al.*: 964 (1941). Type: South Africa, Cape, 12–15 miles from Montagu near Ouberg Pass, Aug. 1939, *Dyer 4094* (PRE, holo.).

E. huttonae N.E.Br., *Flora capensis* 5(2): 316 (1915). *E. inermis* var. *huttonae* (N.E.Br.) A.C.White *et al.*: 395 (1941). Type: South Africa, Cape, Carlisle Bridge, on the Fish River, fl. Nov. 1903, *H. Hutton* (K, holo.; GRA, iso.). [N.E. Brown based his description on a small dried specimen sent to Kew by Schonland in June 1913. Brown kept two branches and one ‘flower’ at Kew and sent one branch back to GRA. Thus, although he annotated each as ‘Half of the type specimen’, that at Kew is actually two thirds of the specimen and is taken as the holotype.]

E. superans Nel ex Herre: 15 (1950). Type: South Africa, Eastern Cape, July 1948, *Rosenbrock sub SUG 7215* (missing). Neotype (designated here): South Africa, Carlisle Bridge, Nov. 1903, *H. Hutton* (GRA, holo.; duplicate at K). [The specimen cited here by Herre is missing (though Carter (2002) cited it as being at STE, now incorporated into NBG). The name is usually cited as ‘*E. superans* Nel’ but the article in which it was published was written by H. Herre. No photograph was included with the protologue and so a neotype is selected.]

Euphorbia huttonae is re-instated at the level of species for various reasons. Vegetatively it differs from *E. inermis* in that the rootstock does not develop a series of swollen, fusiform roots below the stem, but tapers rapidly off into fine roots. There are several clear differences in the cyathia. In *E. huttonae* the whole of the upper surface of the gland is bright yellow. Each gland may be divided deeply down the middle into two broad, convex, yellow structures which remain pressed together towards their bases or it may be an entire, solid wedge-shaped structure that is convex above. The outer edges of the glands are irregularly toothed and notched and may be slightly paler in some populations. In *E. inermis* each gland possesses a dark green part towards the base above which it is divided deeply and finely into antler-like, white processes. Other floral differences are the spreading, white cyathial lobes in *E. inermis* (rather than the pale yellowish green inwardly pressed lobes of *E. huttonae*) and the longer styles in *E. inermis* which are only divided near their apex (divided much more deeply to near their middle in *E. huttonae*).

Some confusion exists over the identity of *Euphorbia superans*, which was maintained as a distinct species in Bruyns *et al.* (2006). A figure appeared in the *Euphorbia Journal* (Vol. 2: 138, as ‘supernans’) which was cited by Carter (2002) as *E. superans*, but the slender, bright green branches and finely toothed, broad cyathial glands make it clear that this figure is of *E. flanaganii*. Herre (1950) compared *E. superans* with *E. inermis* and mentioned that the glands were ‘yellow...shortly bifid with two processes denticulate at the apex, divided [to] about a third with two diverging processes...slightly revolute’.

This is very similar to the structure of the glands in *E. huttonae* but is not similar at all to that in *E. flanaganii*. The length of the styles and the length to which they are divided also correspond closely to *E. huttonae* under which *E. superans* is now included.

E. hypogaea Marloth, *Transactions of the Royal Society of South Africa* 2: 37 (1910). Type: South Africa, Cape, on the Nieuweveld near Beaufort West, 1 300 m, Nov. 1908, *Marloth 4692* (PRE, holo.; K, iso.).

E. inermis Mill., *The Gardener’s Dictionary*, ed. 8: *Euphorbia* no. 13 (1768). Neotype (designated here): South Africa, Cape, near Swartkops R. and on hills near Addo, *Zeyher 1098* (K; duplicate at SAM.). [Miller (1768) cited no material and none is known to exist from this date. Therefore a neotype has been selected.]

E. insarmentosa P.G.Mey., *Mitteilungen aus der Botanischen Staatssammlung München* 6: 246 (1966). Type: Namibia, Outjo distr., Welwitschia, 19 Mar. 1967, *Giess, Volk & Bleissner 6128* (M, holo.).

E. jansenvillensis Nel, *Jahrbuch der Deutschen Kakteen-Gesellschaft* 1: 32 (1935). Type: South Africa, Cape, near Jansenville, Apr. 1932, *Le Roux sub SUG 6550* (missing). Neotype (designated here): South Africa, Cape, 1.5 miles east of Jansenville, *Dyer 4012* (PRE). [Although Carter (2002) cited a specimen at STE (now incorporated into NBG), this does not exist.]

E. tubiglans Marloth ex R.A.Dyer: 268 (1935). Type: South Africa, Cape, near Steytlerville, Aug. 1929, *Herre 1596* (K, holo.; PRE, iso.).

E. lignosa Marloth, *Transactions of the Royal Society of South Africa* 1: 316 (1909). Type: Namibia, near Tschaukaib, 400 m, Nov. 1908, *Marloth 4637* (PRE, holo.; BOL, K, iso.). [Brown wrote ‘Part of Type’ on a specimen of *Marloth 5070* at K, but this is incorrect.]

E. engleriana Dinter: 263 (1921a). Type: Namibia, zwischen Ababis und Habis, Apr. 1913, *Dinter 2815* (SAM, holo.).

E. curocana L.C.Leach: 111 (1975a). Type: Angola, ± 18 km southeast of Cumilunga, *Mendes 1260* (LISC, holo.; BM, COI, LUAI, iso.).

E. loricata Lam., *Encyclopédie méthodique* 2(2): 416 (1788). Type: Illustration in Pluk., *Phytographia* 3: t. 230, figure 5 (1692) (lecto., designated here). [Lamarck (1788) also cited ‘Petiver Gaz., t. 86, fig. 519’ and ‘Buc’hoz, Dec. 9, t. 3’, but of these three, Plukenet’s figure appeared first. These figures all appear to be copies (sometimes modified by the author) of the figure, assumed to be by Heinrich Claudius, that is among the collection of paintings made during the expedition of Simon van der Stel to the Copper Mountains of Namaqualand in 1685–6 and known as the *Codex Witse-nii* (Wilson *et al.* 2002). The original figure of Claudius appears to have been unknown to Lamarck. There is no specimen of this species in Lamarck’s herbarium at P.]

E. hystrix Jacq.: 43, t. 207 (1797). *Treisia hystrix* (Jacq.) Haw.: 131 (1812). Type: Illustration in Jacq., *Pl. Hort. Schönbr.* 2: t. 207 (1797) (lecto., designated here).

E. armata Thunb.: 86 (1800). Type: South Africa, Cape, *Thunberg* (UPS-THUNB 11412, holo.).

E. eustacei N.E.Br.: 122 (1913). Type: South Africa, Cape, near Matjiesfontein, Oct. 1912, *C.E. Pillans* (K 000253356, holo.; K, PRE, iso.). [From the material sent by Pillans and cultivated at Kew, N.E. Brown made and annotated three specimens on two sheets at K and also sent 'part of the type' to PRE. Brown annotated only one of them (K 000253356) as 'Type Specimen' (others as 'Type, branches from type plant' and 'Type Plant') and so this is taken as the holotype and the others as isotypes.]

In Bruyns *et al.* (2006) *E. eustacei* was maintained as distinct from *E. loricata*. This does not reflect the position correctly. Dense, low-growing and mound-forming plants with slightly broader, more obovate leaves and spines drying out white have always been taken as typical of *E. eustacei* and were assumed to be restricted to the Matjiesfontein area (White *et al.* 1941), while the more diffuse, taller plants with narrower leaves and spines drying out brown that are characteristic of the valley of the Olifants River between Citrusdal and Clanwilliam are typical of *E. loricata*. Nevertheless, White *et al.* (1941) hinted at a wider distribution for *E. loricata* and included some more densely branched plants (e.g. figure 264) in their concept of this species. Now that the respective distributions have become better known it has been found that there is a gradation from the one into the other as one progresses eastwards from the valley of the Olifants River to the Great Escarpment (rather than two disjunct and distinct species each confined to particular areas) so that *E. eustacei* and *E. loricata* are ecotypes of one considerably more widespread species.

E. maleolens *E. Phillips*, The Flowering Plants of South Africa 12: t. 459 (1932). Type: South Africa, near Bandolierskop, Dec. 1925, *C.A. Smith sub PRE 8465* (PRE, holo.).

E. mammillaris *L.*, Species Plantarum 1: 451 (1753). Type: Commelijn, *Praeludia Bot.*: t. 9 (1703) (lecto., designated by Wijnands 1983).

E. fimbriata Scopoli: 8 (1788). Type: Illustration in *Delic. Fl. Faun. Insubr.* 3: 8, t. 4 (1788) (lecto., designated here).

E. enneagona Haw.: 184 (1803). Type: none located.

E. erosa Willd.: 27 (1814). [Willdenow (1814) gave a description but cited no specimens.]

E. scopoliiana Steud.: 615 (1840), *nom. superfl.* [Steudel (1840) believed that *E. fimbriata* Scopoli was illegitimate, with the name used earlier by Raeuschel, but no such name has been traced.]

E. mammillaris var. *spinosior* A.Berger: 109 (1902b). Type: South Africa, Cape, probably ex hort. F. Ledien (missing).

E. mammillaris var. *submammillaris* A.Berger: 125 (1902c). Type: South Africa, Cape, cultivated plant from Berlin Botanic Garden (missing).

E. latimammillaris Croizat: 331 (1933). Type: none cited.

E. platymammillaris Croizat: 333 (1933). Type: none cited.

E. matabelensis *Pax*, Annalen des K. Naturhistorischen Hofmuseums 15: 51 (1900). Type: Zimbabwe (Matabeleland), *Penther 944* (W, holo.; BM, iso.).

E. currorii N.E.Br.: 545 (1911). Type: Angola, Elephant's Bay, *Curror 29* (K, holo.).

E. ohiva Swanepoel: 249 (2009). Type: Namibia, Kaokoveld, Hartmann Valley above Cunene River, 470 m, 12 Jan. 2006, *Swanepoel 250* (WIND, holo.; PRE, iso.).

E. melanohydrata *Nel*, Jahrbuch der Deutschen Kakteen-Gesellschaft 1: 31 (1935). Type: South Africa, Cape, flats at Swartwater, Oct. 1930, *Herre sub SUG 6533* (missing). Neotype (designated here): South Africa, 4 km east of Beesbank, March 1985, *Williamson 3401* (BOL). [Although Carter (2002) cited the type at STE, now incorporated into NBG, no material of the type has been located and a neotype is selected of material from the same area where the type originated.]

E. meloformis *Aiton*, Hortus Kewensis, ed. 1, 2: 135 (1789). Type: Illustration by F. Masson at BM of specimen introduced 1774 from Cape of Good Hope collected by Masson (lecto., designated here).

E. pomiformis Thunb.: 86 (1800). *E. meloformis* var. *pomiformis* (Thunb.) Marloth: 45 (1928). Type: South Africa, Zwartkops, *Thunberg* (missing).

E. falsa N.E.Br.: 586 (1925). *E. meloformis* subsp. *meloformis* f. *falsa* (N.E.Br.) Marx: 32 (1999b). *E. infausta* N.E.Br.: 358 (1915), *nom. illegit., non* N.E.Br. (1912). Type: South Africa, Cape, sheet 332, specimen annotated 'dead plant-split-1810' by Haworth (OXF) (lecto., designated here). [Brown (1915) cited two specimens: South Africa, without locality, *N.S. Pillans sub BOL 10684* (BOL) and 'Herb. Haworth'. The latter is designated as lectotype.]

E. pyriformis N.E.Br.: 359 (1915). Type: cultivated plant at Kew of unknown origin, pressed by N.E. Brown 14 Jan. 1913 (K, holo.).

E. valida N.E.Br.: 356 (1915). *E. meloformis* subsp. *valida* (N.E.Br.) G.D. Rowley: 97 (1998). Type: South Africa, Cape, Jansenville div., near Waterford, received 26 Aug. 1912, *I.L. Drège* (K, holo.).

E. meloformis var. *prolifera* Frick: 74 (1934). Type: Cultivated material from seed imported from South Africa, *A.C.S. 5-112-006* (missing).

E. meloformis subsp. *meloformis* f. *magna* R.A. Dyer ex Marx: 13 (1999b). Type: South Africa, Cape, Kwa Ncwane, Peddie (3327AA), 18 Mar. 1999, *Marx 550* (GRA, holo.).

E. monteiroi *Hook.f.*, Bot. Mag. 91: t. 5534 (1865). Type: Angola, *Monteiro* (K, holo.).

E. marlothii Pax: 36 (1889). Type: Namibia, Karibib, 1 000 m, May 1886, *Marloth 1425* (PRE, lecto., designated here). [The number of the type collection was given as 4425 by Pax (1889), but this is assumed to be an error. There is no evidence that Pax saw this specimen so it is designated as a lectotype.]

E. longibracteata Pax: 742 (1898). Type: Namibia, Rehoboth, 1892, *Fleck 447a* (Z, holo.).

E. baumii Pax: 636 (1908). Type: Angola, left bank of Cubango River above Kui marva, 1 100 m, 23 Nov. 1899, *Baum 458* (Z, holo.).

E. monteiroi subsp. *ramosa* L.C.Leach, *Kirkia* 6: 138 (1968a). Type: South Africa, Transvaal, 10 miles south of Mica, *Leach 11999* (PRE, holo.; BM, BOL, COI, G, K, LISC, M, SRGH, WIND, Z, ZSS, iso.).

E. monteiroi subsp. *brandbergensis* Nordenstam, *Dinteria* 11: 23 (1974). Type: Namibia, Brandberg, between Tsisab and Königstein, c. 1 750 m, 29 May 1963, *Nordenstam 2786* (S, holo.).

E. multiceps A.Berger, *Monatsschrift für Kakteenkunde* 15: 182 (1905). Type: South Africa, Cape, Karoo near Matjiesfontein, 950 m, *Marloth 3450* (missing). Type: South Africa (NY, lecto., designated here). [The specimen in the Herbarium of Alwyn Berger at NY consists of several small stems but has no information apart from the name on it. It was undoubtedly seen by Berger and may well be the Marloth specimen, but is designated here as lectotype.]

E. multifolia A.C.White et al., *The Succulent Euphorbiae* 2: 962 (1941). Type: South Africa, Cape, 30 miles from Laingsburg towards Ladismith, Aug. 1939, *Herre* (PRE, lecto., designated here). [White et al. (1941) listed two specimens from the same locality, collected by Smith and Herre respectively and designated that by Smith the type. This being missing, the specimen of Herre is designated as lectotype.]

E. namaquensis N.E.Br., *Flora capensis* 5(2): 325 (1915). Type: South Africa, between Aggeneys and Pella, *Pearson 2992* (BOL, lecto., designated by Williamson 2007; K, SAM, isolecto.).

E. multiramosa Nel: 29 (1935). Type: South Africa, Cape, Little Bushmanland, flats between Jakkalswater and Vioolsdrift, Oct. 1930, *Herre sub SUG 5890* (missing). Neotype (designated here): South Africa, Cape, between Jakkalswater and Vioolsdrift, 600 m, Sept. 2006, *Williamson 6048* (BOL, duplicate at E). [The specimen *SUG 5890* cited by Carter (2002) at STE, now incorporated into NBG, does not exist. In designating a neotype, Williamson (2007) cited '*Williamson 6048* (BOL, E)'. Since two specimens are cited, this neotypification was invalid and this is rectified here.]

Euphorbia namaquensis was included under *E. friedrichiae* in Bruyns et al. (2006). These two species are very similar and (among various 'medusoid' species occurring in the arid south of Namibia and north-western South Africa), they share the feature of particularly slender branches which become thicker towards their bases. The two differ in that the cyathia-bearing pedun-

cles arise in *E. friedrichiae* at or near the tips of the branches (the tip of the branch elongating into a peduncle in some cases) around the apex of the plant while in *E. namaquensis* the cyathia-bearing peduncles are shorter (and more densely tuberculate) and arise lower on the branches mainly in the lower half of the plant. The cyathia in both are of a similar size but the glands have longer and more slender processes in *E. friedrichiae*, while the ovary is densely pubescent with short styles (glabrous to pubescent with often much longer styles in *E. namaquensis*). In *E. friedrichiae* in Namibia, the capsules often have an unusual array of warts and slightly raised wing-like ridges along the three angles while they are quite without these in *E. namaquensis*. However, these excrescences are usually (though not always) absent in plants in South Africa of *E. friedrichiae* (from east of Onseepkans), where the capsules are also often larger than in Namibian plants.

White et al. (1941) expressed doubt as to whether the two names *E. multiramosa* and *E. namaquensis* represented distinct species. *E. multiramosa* was also included under *E. friedrichiae* in Bruyns et al. (2006). Williamson (2007) made extensive notes on *E. multiramosa* and *E. namaquensis*. He concluded that they represented distinct species, since 'the general appearance of both plants is quite different....Cymes in *E. multiramosa* are only produced on the leeward aspect mostly from half to the lower third of the plant....the cymes are solitary with very short peduncles and the involucre glands smaller, sessile, horizontally curving outwards with 4–8 marginal processes. The capsules are glabrous and ± 8 mm in diameter. *Euphorbia namaquensis* has a single or up to two pairs of cyathia with elongated peduncles at branch apices and with involucre glands larger, shortly stipitate, suberect to erect and with 3–6 marginal processes and capsules densely pubescent ± 10 –12 mm in diameter.' In practice, the 'general appearance' of plants from north of Steinkopf (taken to be typical of *E. multiramosa*) and those from west of Gamoep (taken to represent *E. namaquensis*) is identical; all the other features mentioned are actually very variable within populations. Consequently *E. multiramosa* and *E. namaquensis* differ only in the glabrous vs. pubescent capsules, though even this feature has been found to be variable in *E. multiramosa*.

E. namibensis Marloth, *Transactions of the Royal Society of South Africa* 1: 318 (1909). Type: Namibia, near Tschaukaib about 31 miles from Angra Pequena, 800 m, Nov. 1908, *Marloth 4635* (PRE, holo., K, SAM, iso.). [The specimen under this number at BOL is from a different locality (in desert near Lüderitzbucht, 50 m, Aug. 1909) and so is not part of the same collection, although it bears the same number.]

E. argillicola Dinter: 27 (1914). Type: Namibia, flats around Jakkalskuppe, Jan. 1910, *Dinter 3145* (SAM, holo.).

E. namuskluftensis L.C.Leach, *The Journal of South African Botany* 49: 189 (1983). Type: Namibia, Namuskluft, $\pm 1 200$ m, Oct. 1978, *Lavranos & Pehlemann 20796* (PRE holo.; WIND, iso.).

E. nesemannii R.A.Dyer, *Bulletin of Miscellaneous Information* 1934: 267 (1935). Type: South Africa,

Cape, koppie west of Robertson, 300', Jul. 1930, *Nesemann sub Dyer 2441* (GRA, lecto., designated here, K, isolecto.). [Dyer (1935) cited *Dyer 2440* (GRA, K) and *Dyer 2441* (GRA, K), so one has been selected as lecto-type.]

E. oatesii *Rolfe* in Oates, Matabeleland Victoria Falls, ed. 2, appendix V: 408 (1889). Type: Zimbabwe, Matabeleland, Apr. 1878, *F. Oates* (K, lecto., designated here). [Rolfé also cited: Zambia, *Rogers 8466* (K); Zimbabwe, 160 km northeast of Bulawayo, *Rand 218* (missing).]

E. obesa *Hook.f.*, *Curtis' Botanical Magazine* 129: t. 7888 (1903). Type: South Africa, Kendrew, near Graaff-Reinet, 2 000', Mar. 1897, *MacOwan 3153* (K, holo.).

E. symmetrica *A.C.White et al.*: 964 (1941). *E. obesa* subsp. *symmetrica* (*A.C.White et al.*) *G.D.Rowley*: 97 (1998). Type: South Africa, Cape, 19 miles northwest of Willowmore on road to Rietbron, Aug. 1939, *Dyer 4038* (PRE, lecto., designated here; K, isolecto.). [Dyer did not specify which of these specimens is the holotype and so a lectotype is selected.]

E. oxystegia *Boiss.*, *Centuria Euphorbiarum*: 27 (1860). Type: South Africa, Cape, between Goedemanskraal and Kaus, *Drège* (S; lecto., designated here; K, P, W, isolecto.). [Boissier (1860) did not cite a herbarium here and so a lectotype is selected.]

E. patula *Mill.*, *Dict.*, ed. 8: *Euphorbia* no. 11 (1768). *Dactylanthus patula* (*Mill.*) *Haw.*, *Syn. Pl. Succ.*: 132 (1812). *Medusea patula* (*Mill.*) *Klotzsch & Garcke*, *Monatsber. Königl. Akad. Wiss. Berlin* 1859: 251 (1859). Neotype (designated here): South Africa, Cape, sheet 328, specimen (one of two) labelled 'Grimwood's St' by Haworth (OXF). [There are two specimens on this sheet in Haworth's Herbarium at Oxford. The one selected here is fertile, while the other, labelled 'My own' is sterile.]

E. ornithopus *Jacq.*: 76, t. 120, fig. 2 (1809). Type: *Jacq.*, *Fragm. Bot.*, 6: t. 120, figure 2 (1809) (lecto., designated here).

The name *Euphorbia patula* *Mill.* has been a source of considerable confusion. *N.E. Brown* (1915: 293) suggested that it was a weak form of *E. mauritanica* and this was taken up by *White et al.* (1941: 120), while *Carter* (2002) referred it to *E. tridentata*. Both *Brown* (1915) and *White et al.* (1941) considered, wrongly, that *Dactylanthus patula* was published *Haworth* (1812), while it was merely a new combination for *Miller's* name *E. patula*. *White et al.* (1941) also believed that *Robert Sweet* (1818) described a new species '*Euphorbia patula*'. However, there he referred to 'H.S.', which meant 'Haworth on Succulent Plants', i.e. *Haworth* (1812). Since this provided a clear reference to *Haworth's* book and hence back to *Miller* (1768), it did not constitute publication of a new, and then illegitimate name *Euphorbia patula* *Sweet*, as was assumed in *White et al.* (1941) and *Carter* (2002) but merely referred to *Miller's E. patula*. *White et al.* (1941) also considered that *Klotzsch & Garcke* (1859) published a new name *Medusea patula* but this, too, is wrong and this was also a new combination for *E. patula* *Mill.* Consequently,

they missed the fact that *Miller's* name *E. patula* was the earliest valid name for *E. ornithopus*.

E. pedemontana *L.C.Leach*, *South African Journal of Botany* 54: 501 (1988). Type: South Africa, Cape, foot of Matsikamma, Vanrhynsdorp distr., *Lavrano & Bleck 20828* (NBG, holo.).

E. pentagona *Haw.*, *The Philosophical Magazine, or Annals of Chemistry, Mathematics, Astronomy, Natural History and General Science*, Ser. 2, 3: 187 (1828). Type: South Africa, Cape of Good Hope, received 1823, *Bowie* (missing). Neotype (designated here): South Africa, Cape, Kei River Mouth, *Flanagan 2344* (BOL; duplicates at GRA, PRE). [The painting number 296/926 at K by G. Bond represents a very weak and imperfectly developed branch without spines (as noted by *N.E. Brown* on the painting) and it is doubtful whether this is a reasonable lectotype as it could belong to one of several species. *Brown* (1915) also doubted whether it was made from the plant from which *Haworth* described the species, since *Haworth* (1828) mentioned spines and these are absent from this painting. Rather than use this painting of somewhat doubtful identity as lectotype, a neotype has been selected.]

E. pentops *Marloth ex A.C.White et al.*, *The Succulent Euphorbieae* 2: 963 (1941). Type: South Africa, Cape, near Komaggas, 10 June 1930, *Herre 5562* (PRE, holo.).

E. pillansii *N.E.Br.*, *Bulletin of Miscellaneous Information* 1913: 122 (1913). Type: South Africa, Cape, near Doornkloof River, between Muiskraal and Ladismith, Aug. 1907, *N.S.Pillans sub BOL 12543* (BOL, holo.; K, iso.). [*N.E. Brown* wrote '1 piece kept for Kew' on the specimen at BOL, which is a much larger specimen, so this is taken as the holotype.]

E. pillansii var. *albovirens* *A.C.White et al.*: 965 (1941). Type: South Africa, Cape, Paardekop near Spes Bona, 650 m, 3 Oct. 1925, *Marloth 12543* (PRE 0258928-1, lecto., designated here; PRE, isolecto.). [There are two specimens at PRE, neither was selected by the authors as type so a lectotype is selected here.]

E. pillansii var. *ramosissima* *A.C.White et al.*: 965 (1941). Type: South Africa, Cape, between Montagu and Touws River, Aug. 1939, *Dyer 4100* (missing).

E. polycephala *Marloth*, *South African Gardening & Country Life* 21: 133 (1931). Type: South Africa, Cape, near Mortimer, Aug. 1913, *Shoemith sub Marloth 5295* (PRE, lecto., designated here). [*Marloth* (1931) cited also *Marloth 12644* but this is missing.]

E. polygona *Haw.*, *Miscellanea naturalia, sive dissertationes variae ad historiam naturalem spectantes*: 184 (1803). Neotype (designated here): South Africa, Cape, Witpoortsberg, 2 000–3 000', Aug., *Drège 8212* (S 2583; duplicates at BM, HBG-2 sheets, K, MO, P, S, W-3 sheets). [*Haworth* (1803) mentioned that *E. polygona* was described from material introduced before 1790, but nothing was preserved. A neotype has therefore been selected.]

E. horrida Boiss.: 27 (1860). Type: South Africa, Cape, Witpoortsberg, 2 000–3 000', Aug., *Drège 8212* (S 2583, lecto., designated here; BM, HBG-2 sheets, K, MO, P, S, W-3 sheets, isolecto.). [Boissier (1860) did not cite a herbarium and so a lectotype is chosen.]

E. horrida var. *striata* A.C.White *et al.*: 964 (1941). Type: South Africa, Cape, 15 miles north of Steytler-ville, *Lückhoff 123* (missing).

E. horrida var. *noorsveldensis* A.C.White *et al.*: 965 (1941). Type: South Africa, Cape, 1.3 miles north of Jansenville, Aug. 1939, *Dyer 4010* (PRE, holo.).

E. horrida var. *major* A.C.White *et al.*: 965 (1941). Type: South Africa, Cape, Kruidfontein, 19 miles from Willowmore towards Rietbron, Aug. 1939, *Dyer 4041* (missing).

E. polygona var. *nivea* Schnabel: 25 (2011). Type: South Africa, Long Kloof, Kleinrivier, 508 m, 15 Nov. 2010, *Schnabel 1* (GRA, holo.).

E. polygona var. *exilis* Schnabel: 20 (2012). Type: South Africa, Eastern Cape, foothills of Kouga Mountains, 65 m, 16 Nov. 2011, *Schnabel 4* (GRA, holo.).

E. procumbens Mill., The Gardener's Dictionary, ed. 8: Euphorbia no. 12 (1768). *Medusea procumbens* (Mill.) Haw.: 134 (1812). Neotype (designated here): J.Burm., Rar. Afric. Pl.: t. 10, fig. 1 (1738). [Miller cited neither material nor figures. The figure designated here as a neotype was cited by Haworth (1812) under his 'account' of *Medusea procumbens* and so gives an indication of what was then understood by Miller's name. Haworth's association of this figure with Miller's name is unlikely to have been co-incidental. Burmann (1738: t. 10) referred to the plant in this figure as '*Euphorbium humile, procumbens,...*' so that it is likely that Miller adopted Burman's adjective '*procumbens*', as White *et al.* (1941) suggested.]

E. pugniformis Boiss.: 92 (1862). Type: J.Burm., Rar. Afric. Pl.: t. 10, fig. 1 (1738) (lecto., designated by Wijnands 1983).

E. gorgonis A.Berger: 230 (1910). Type: South Africa, Cape, neither collector nor locality (missing). [Carter (2002) cited a specimen of Burtt-Davy at PRE as the type, but this does not exist, nor is there any evidence that it could possibly be the type of Berger's name. In his discussion of *E. gorgonis*, Berger (1910) mentioned having obtained plants of the recently described *E. davyi* from Burtt-Davy but not that Burtt-Davy had supplied him with *E. gorgonis*. This appears to have been mis-interpreted by Carter (2002).]

The name *E. procumbens* was not used in Bruyns *et al.* (2006). This followed White *et al.* (1941), who did not adopt *E. procumbens* Mill. as the name for these plants, even though it antedated *E. pugniformis* (based on the same figure) by nearly 100 years, apparently because Miller's 'description is too incomplete to permit of any certainty' (p. 337) in its identity and 'that name cannot be maintained at all' (p. 338). However, its identity is clear from Haworth's references which lead to the present neotypification and the replacement of *E. pug-*

niformis by this name. White *et al.* (1941) assumed that Sweet's (1818) use of '*Euphorbia procumbens*' was a new name but, since Sweet (1818) referred to Haworth (1812) and thus indirectly to Miller, they were not correct.

E. pseudoglobosa Marloth, South African Gardening & Country Life 19: 191 (1929). Type: South Africa, Cape, near Krombeks River, Riversdale distr., Sept. 1933, *Muir 4089* (PRE, holo.).

E. frickiana N.E.Br.: 491 (1931). Type: South Africa, Riversdale div., Ferguson comm. *Frick* (K, holo.).

E. juglans Compton: 126 (1935). Type: South Africa, Cape, about 20 miles west of Ladismith, Feb. 1932, *Compton 3951* (BOL, holo.).

E. pseudotuberosa Pax, Bulletin de L'Herbier Boissier, sér. 2, 8: 637 (1908). Type: South Africa, Transvaal, Pretoria, 1892, *Fehr 43* (Z, holo.).

E. pulvinata Marloth, Transactions of the Royal Society of South Africa 1: 315 (1909). Type: South Africa, Cape, Queenstown, *Marloth 4372* (missing). Neotype (designated here): South Africa, Cape, Queenstown, Nov. 1898, *Galpin 2527* (PRE). [The type has not been located. A neotype from the same locality is selected here.]

E. quadrata Nel, Jahrbuch der Deutschen Kakteen-Gesellschaft 1: 42 (1935). Type: South Africa, Cape, near summit of Stinkfonteinberg, Oct. 1930, *Herre sub SUG 6519* (BOL, holo.). [Carter (2002) cited this specimen at STE (now incorporated into NBG) and BOL, but the former does not exist.]

E. stegmatica Nel: 43 (1935). Type: South Africa, Cape, Stinkfonteinberg, Oct. 1930, *Herre sub SUG 6518* (BOL, holo.). [Although the illustration in Nel (1935) is clearly of *E. oxystegia*, the type is a specimen of *E. quadrata*.]

E. francescae L.C.Leach: 563 (1984b). Type: South Africa, Cape, Cornellsberg, Sept. 1984, *Williamson 3248* (NBG, holo.).

E. restituta N.E.Br., Flora capensis 5(2): 339 (1915). *E. radiata* E.Mey. ex Boiss.: 90 (1862), *nom. illegit., non* Thunb. (1800). Type: South Africa, Cape, between Stinkfontein and Garies, *Pillans 5579* (BOL, lecto., designated here; K, isolecto.). [Brown (1915) also cited: *Schlechter 11098* (BOL); between Zwartdoorn R. and Groen R., Aug. *Drege 2941* (missing). The latter is probably the same as the specimen which Boissier (1862) cited: between Zwartdoorn R. and Groen R., Aug., *Drège* (S, W).]

E. graveolens N.E.Br.: 253 (1915). Type: South Africa, Cape, between Stinkfontein and Garies, Dec. 1910, *Pillans 5579* (BOL 137769, lecto., designated here; BOL, K, isolecto.). [Brown (1915) also cited: Bakhuis, *Pillans 5486* (K).]

E. schoenlandii Pax, Jahresbericht der Schlesischen Gesellschaft für vaterländische Cultur 82: 24 (1905). Type: South Africa, Cape, 'Clanwilliam (Woodfield)',

fl. May 1904, *Schonland* (GRA, lecto., designated here). [This specimen was annotated as 'Co-type' by Schonland and is unlikely to have been seen by Pax. It is presumed that the other part was sent to Pax and this part remains missing.]

E. silenifolia (Haw.) Sweet, Hortus Britannicus, ed. 1, 2: 356 (1826). *Tithymalus silenifolius* Haw.: 61 (1821). Type: Illustration number 810/147 by T. Duncanson at K of specimen received 1823 from Cape of Good Hope collected by Bowie (lecto., designated here).

E. elliptica Thunb.: 86 (1800), *nom. illegit., non* Lam (1786). *Tithymalus ellipticus* (Thunb.) Klotzsch & Garcke: 69 (1860). Type: South Africa, Cape, *Thunberg* (UPS-THUNB 11446, holo.).

Tithymalus bergii Klotzsch & Garcke: 68 (1860). Type: South Africa, Cape, *Bergius* (missing).

Tithymalus longipetiolatus Klotzsch & Garcke: 68 (1860). Type: South Africa, Cape, *Bergius* (missing).

Tithymalus attenuatus Klotzsch & Garcke: 69 (1860). Type: South Africa, Cape, *Bergius* (missing).

E. elliptica var. *undulata* Boiss.: 93 (1862). Neotype (designated here): Type: Illustration number 810/147 by T. Duncanson at K of specimen received 1823 from Cape of Good Hope collected by Bowie. [Boissier (1862) cited '*Tithymalus silenifolius* & *Tith. crispus* Haw., revis. pl. Succul. p. 61 (*ex descriptione*)', so he took these two names as applying to the same species and combined them under this variety. This view is not supported here. By selecting a neotype as above, this name becomes a synonym of *E. silenifolia*.]

E. mira L.C.Leach: 10 (1986a). Type: South Africa, Cape, near Tulbagh, *Bayer sub Leach 17175* (NBG, holo.; K, PRE, iso.).

Although the name *E. mira* L.C.Leach was maintained as a distinct species in Bruyns *et al.* (2006), observations of populations of *E. silenifolia* have made it clear how this species may begin its growth extremely early (in February, well before winter) and how narrow the leaves may be in some populations, often mixed up with plants with considerably broader leaves. Thus, while Leach (1986a: 11) believed he had found three, possibly even four geophytic species of *Euphorbia* growing together at the type locality of *E. mira*, it is clear from the photograph (Leach 1986a: figure 2) and the specimens made, that he found *E. tuberosa* and various forms of *E. silenifolia* at this locality.

E. stellispina Haw., The Philosophical Magazine, or Annals of Chemistry, Mathematics, Astronomy, Natural History and General Science, Ser. 2, 1: 275 (1827). Type: Illustration number 803/324 by T. Duncanson at K of specimen received 1822 from Cape of Good Hope collected by Bowie (lecto., designated here). [The painting selected as lectotype was made from the plants seen by Haworth (of which no material was preserved). There are two figures of *E. stellispina* by Duncanson and this one is selected as the other exhibits very odd growth and is not representative of the species.]

E. stellispina var. *astrispina* (N.E.Br.) A.C.White *et al.*: 716 (1941). *E. astrispina* N.E.Br.: 355 (1915). Type:

South Africa, Beaufort West distr., Willowmore side, *Brauns 1711* (K, holo.).

E. susannae Marloth, South African Gardening & Country Life 19: 191 (1929). Type: South Africa, Cape, Phisantefontein, Oct. 1923, *Muir 2762* (BOL 137790, lecto., designated here; BOL, PRE, isolecto.). [Marloth (1929) cited also: *Marloth 12155* (NBG, PRE).]

E. systyloides Pax subsp. ***porcaticapsa*** S.Carter, Kew Bulletin 45: 336 (1990). Type: Zimbabwe, Hurungwe distr., Zambesi Valley, Rifa R., 520 m, 24 Feb. 1953, *Wild 4085* (K, holo.; EA, SRGH, iso.).

E. trichadenia Pax, Botanische Jahrbücher für Systematik 19: 125 (1894). Type: Angola, Lunda, between Kimbundo and the Quango, Sept. 1876, *Pogge 116* (missing). Neotype (designated here): Angola, Huilla, near Lopollo towards Nene, Oct.-Nov. 1859, *Welwitsch 282* (BM; duplicates at G, K). [Although Carter (2002) cited this specimen as being at B, there is no such material there.]

E. benguelensis Pax: 741 (1898). Type: Angola, Huilla, source of Luala, *Antunes 362* (missing).

E. subfalcata Hiern: 948 (1900). Type: Angola, Huilla, near Lopollo towards Nene, Oct.-Nov. 1859, *Welwitsch 282* (BM, holo.; G, K, iso.).

E. gossweileri Pax: 88 (1909). Type: Angola, Malandsche, *Gossweiler 994* (K, lecto., designated here). [There is no sign that Pax saw this specimen although N.E. Brown wrote 'Type' on it. Consequently it is selected as lectotype.]

E. trichadenia var. *gibbsiae* N.E.Br.: 524 (1911–12). Type: Zimbabwe, near Isotye, Matopos, 5 000', Feb. 1905, *Gibbs 234* (BM, holo.; K, iso.). [Brown (1911–12) cited: *Gibbs 234* (BM, K) and Victoria, Munro. Two collections of Munro have been located, namely *Munro 141* (BM) and *Munro 1467* (BM). However, he wrote 'Type' on *Gibbs 234* (BM) and 'From the type' on *Gibbs 234* (K) and nothing of this kind on the Munro collections so it is clear that the Gibbs specimens are holotype and isotype respectively.]

E. tridentata Lam., Encyclopédie méthodique 2(2): 416 (1788). *Medusea tridentata* (Lam.) Klotzsch & Garcke: 251 (1859). Type: South Africa, *collector unknown* (P-LAM P00381880, holo.; K, iso.).

E. anacantha Aiton: 136 (1789). *Dactylanthus anacantha* (Aiton) Haw., Syn. Pl. Succ.: 132 (1812). Type: Illustration in J. Burm., Rar. Afric. Pl.: t. 7, fig. 2 (1738) (lecto., designated here). [This figure and one by D'Isnard (1720) were cited by Aiton (1789), The one selected as lectotype here corresponds more closely to the concept of *E. tridentata* adopted here, while that of D'Isnard is somewhat more suggestive of *E. patula*.]

E. tuberosa L., Species Plantarum 1: 456 (1753). *Tithymalus tuberosus* (L.) J. Hill, Hort. Kew.: 172/3 (1768). Type: Illustration in J. Burm., Rar. Afric. Pl.: t. 4 (1738) (lecto., designated here). [This figure was cited by Linnaeus (1753). It was also cited by Carter (2002) as 'T: icono' but this does not constitute valid lectotypification.]

E. crispera (Haw.) Sweet: 356 (1826). *Tithymalus crispus* Haw.: 61 (1821). Type: none located.

E. tugelensis N.E.Br., Flora capensis 5(2): 335 (1915). Type: South Africa, Natal, near Tugela River, received July 1865, *Gerrard 1626* (K, holo.; W, iso.).

E. wilmaniae Marloth, South African Gardening & Country Life 21: 133 (1931). Type: South Africa, Cape, Boetsap, *Pagan sub Marloth 6125a* (PRE, lecto., designated here). [Marloth (1931) cited two specimens: Boetsap, *MacGregor Museum 2337* (missing); Lekkersing, *Marloth 12441* (PRE). The latter belongs to *E. celata* (Leach 1984a, Bruyns 1992). A specimen annotated exactly as the first has not been found but Wilman (1946) cited this collection as 'Boetsap, 2337 Pagan' and so the specimen 'Boetsap, *Pagan sub Marloth 6125a* (PRE)' is strongly suspected to be this collection and is thus taken as the lectotype.]

E. planiceps Marloth ex A.C.White *et al.*: 963 (1941). Type: South Africa, Cape, farm near Griquatown, Sept. 1939, *Venter* (BOL, lecto., designated here). [White *et al.* (1941) designated the collection by Venter as 'type' and that by Mrs Cooke (missing) as 'type of inflorescence' so a lectotype is designated. The name was first used by Marloth (Wilman 1946).]

Excluded Names

E. aggregata A.Berger, Sukk. Euph.: 92 (1906a). Type: South Africa, Cape (missing). [No preserved material has been found of this species and it is difficult to be sure whether it falls under *E. ferox* or *E. pulvinata* or refers to the intermediates between them that occur widely over the eastern Karoo.]

E. curvirama R.A.Dyer, Rec. Albany Mus, 4: 104 (1931). Type: South Africa, Cape, 28–30 miles from Grahamstown towards Peddie, Apr. 1928, *Dyer 1403* (PRE, holo.; GRA, K, iso.). [This is considered to be a hybrid, possibly between *E. caerulescens* and *E. triangularis*.]

E. inconstantia R.A.Dyer, Rec. Albany Mus. 4: 93 (1931). Syntypes: Hellspoor, Oct. 1928, *Dyer 1076* (GRA); Grahamstown, Aug. 1927, *Dyer 1076* (GRA); 10 miles from Grahamstown on Queen's road, Nov. 1926, *Dyer 669* (GRA); Oct. 1927, *Dyer 1077* (GRA); Nov. 1926, *Dyer 669a* (GRA). [This is considered to be a hybrid, possibly between *E. heptagona* and *E. polygona*.]

E. mamillosa Lem., Illustr. Hort. II, misc.: 69 (1855). Type: unknown. [Lemaire (1855) listed 'mamillosa Nob.', of unknown origin, among 18 names in Sect. *Aculeatea* and provided a Latin diagnosis for it. White *et al.* (1941) listed the name as a synonym of *E. squarrosa* (= *E. stellata*), but it is hard to justify this from the details that Lemaire gave. White *et al.* (1941) also listed the name '*Anthacantha mamillosa* Lem.' and gave the same location as its place of publication, but this name does not exist.]

E. multifida N.E.Br., Fl. cap. 5(2): 253 (1915). Type: South Africa, Natal?, 1905, *Anon sub 10483* (NH, holo.). [The type of *E. multifida* consists of several inflo-

rescences only, is of unknown origin (though suspected of coming from 'Natal') and the collector is unknown. It is not, at present, identifiable with certainty with any known species and so is placed among the excluded names.]

E. parvimmamma Boiss. in DC., Prodr. 15(2): 86 (1862). [Boissier (1862) cited no material other than a sterile plant apparently in cultivation under the name *E. caput-medusae*, which may have originated at the Cape of Good Hope. The description is meagre and identification remains uncertain.]

E. scolopendria Donn, Hort. Cantab., ed. 3: 88 (1804). [Donn mentioned only that this was 'flat-leaved' and flowered Jun.–Aug. No region of origin was given.]

E. viminalis N.L.Burm., Prodr. Fl. Cap.: 14 (1768). [Both White *et al.* (1941) and Boissier (1862) cite this name. Actually no description or diagnosis was given by Burman and he merely listed *Euphorbia viminalis* of Linnaeus, which is the basionym of *Sarcostemma viminale* (L.) R.Br. (Apocynaceae). Here Burman (1768) cited 'Alp. aegypt. t. 190. Dill elth. t. 368' and he appears to have copied these references directly from among the five given by Linnaeus (1753) for *E. viminalis* L. (= *Sarcostemma viminale*). In fact these references are wrong. In Alpini (1735) there is no t. 190, but the figure referred to is t. 53 on page 190. This figure is the lectotype of *S. viminale*, selected by Liede & Meve (1993), though it is wrongly cited there too. Dillen's *Hortus Elthamensis* (Dillen 1732) had only 324 plates in it and here page 386 was meant, where there is no plate. This was again cited incorrectly in Liede & Meve (1993).]

E. viperina A.Berger, Monatsschr. Kakteenk. 12: 39 (1902a). Type: South Africa, Cape of Good Hope?, collector unknown (missing). [White *et al.* (1941) placed *E. viperina* under *E. inermis*. However, the description of Berger does not correspond closely to what we know today as *E. inermis*. No type has been located for *E. viperina*. Berger (1902a) compared the inflorescences of *E. viperina* to those of *E. caput-medusae* and *E. parvimmamma*, but in fact the inflorescences of the latter were never described and it is not clear that what he called *E. parvimmamma* (Berger 1899) corresponds to Boissier's concept of it.]

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