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WILD AND CULTIVATED *DRACAENA FRAGRANS*

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Dracaena fragrans (L.) Ker Gawler is revised, similar species are critically compared and several of them, notably *D. deremensis* Engl. and *D. deisteliana* Engl. are reduced into synonymy. A formal classification with standard specimens for cultivated material currently in commerce is proposed.

INTRODUCTION

A previous treatment of *Dracaena fragrans* (L.) Ker Gawler (Bos, 1984) was restricted to its presence in West Africa. Its delimitation was established with particular regard to resembling species also present in the area. The present study covers the entire area of distribution of the species (Fig. 1) and it considers also the derived cultivated material. As a result the delimitation is reconsidered and the status of several taxa of *Dracaena* in Central and East Africa is revised. The identity of the cultivated material is also established.

MATERIALS

Apart from herbarium material received on loan from 29 herbaria, living plants of African origin were studied in the conservatory in Wageningen (WAG). The fourth author was able to study some of the taxa involved in the field in Kenya as well. Cultivated plants were generously provided by Te-We Wholesale Nursery, Tilburg, Netherlands, for screening tests by VKC. The Botanic Gardens of the University of Utrecht provided conservatory space and maintenance for this collection, which is gratefully acknowledged. We are also very grateful for financial support towards the colour plates in this paper that was provided by Te-We and the V.K.C.

TAXA INVOLVED IN CENTRAL AND EAST AFRICA

The taxa hitherto recognized in *Dracaena* tend to present rather striking differences in habit and overall morphology. This is well illustrated if one considers *Dracaena braunii* Engl., a stoloniferous herb of some 25cm and *D. mannii* Baker that may develop into a forest tree of over 30m tall, both present in littoral Cameroun.

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For the purpose of the present study only those species of *Dracaena* that show sufficient resemblances as to be easily confused with *D. fragrans* have been taken into account.

In Central Africa this concerns primarily *D. congoensis* Hua and *D. deistelliana* Engl. In East Africa these species do not occur, but here *D. deremensis* Engl. and *D. steudneri* Engl. var. *kilimandscharica* Engl. are dealt with. Typical *D. steudneri* is generally well distinguished in Africa, but the name was inadvertently used for cultivated *D. fragrans* material imported from East Africa and has caused some nomenclatural confusion in Dutch horticulture.

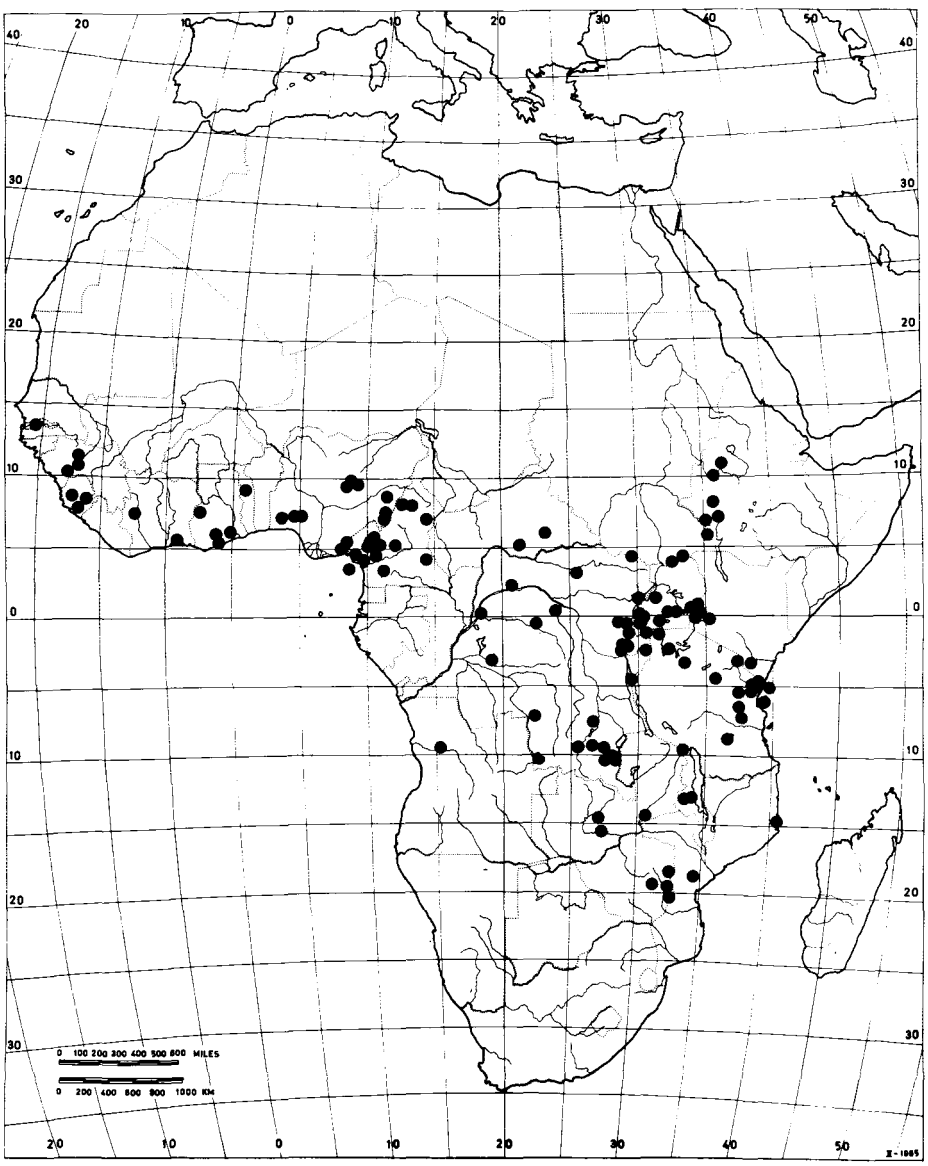

FIG. 1. Distribution of *Dracaena fragrans* (L.) Ker Gawler in Africa.

Dracaena congoensis Hua

In the West African theatre it did appear that a simple means of distinction between this species and *D. fragrans* was provided by the inflorescence. It was found to be branched in *D. fragrans*, while *D. congoensis* only produced sessile glomerules on an unbranched rhachis. Considering the entire range of the species it should be noted that *D. fragrans*, under less luxurious conditions as well as in fairly young plants, frequently produces similar unbranched inflorescences. A second difference, though not stressed previously, can be found in the narrow basal part of the leaf lamina, termed pseudopetiole. This was described for the plants in West Africa and it is usually very easily observed. West African *D. fragrans* hardly shows a comparable condition in its leaves, but in East Africa, particularly in sterile shoots, the part of the lamina above the sheathing base may be narrowed to such an extend that one could term it a pseudopetiole. It is doubtful if the length or comparative length of this pseudopetiole would provide a clear-cut differential character between both species. *D. congoensis* has its flowers arranged in multiflowered spherical glomerules like *D. fragrans*. The comparative measures of the length of the floral tube compared to that of the free lobes offer a constant and clear cut difference. *D. fragrans* flowers have a tube that nearly equals the length of the lobes. The floral tube of *D. congoensis* is always distinctly longer, usually almost twice as long, as the lobes. Recent collections from Gabon confirm this situation.

Dracaena deistelliana Engl.

Although it was previously thought that this species could be distinguished mainly on the strength of its particular habit and its small leaf size, some overlap with the smallest leaf sizes found in *D. fragrans* in West Africa did exist. It was already established that the generative organs including the inflorescence, do not provide any characters to segregate it from *D. fragrans*. Tentatively anticipated changes in the phenotype of cultivated plants as discussed earlier (Bos, 1984) have still not been observed in cultivated *D. fragrans*, discussed hereafter, but such changes cannot be ruled out either. East African material of *D. fragrans* is predominantly smaller in leafsize than the representatives in West Africa. As a result the different ranges in leaf size of *D. deistelliana* compared with West African *D. fragrans* phases out when the Central and East African material is also taken into account.

Dracaena deremensis Engl.

Notwithstanding striking similarities in the inflorescence, typical *D. deremensis* seems to be well distinguished from *D. fragrans* as it generally presents itself in West Africa. *D. deremensis*, which originates from East Africa resembles *D. deistelliana* from the Nigerian and Cameroun highlands much more. Young plants of *D. fragrans*, as well as specimens of that species that are in rather bad condition, cannot be distinguished from *D. deremensis*. The latter species usually produces rather modest sized inflorescences. The flowers are always arranged in the same spherical and well-separated glomerules. A further point to note is that in this species the length of the perianth tube almost equals that of the lobes as in *D. fragrans*.

Dracaena steudneri Engl. var. ***kilimandscharica*** Engl.

A plant collected by Volkens in Marang on Mount Kilimandjaro was referred by Engler to *D. steudneri*. As it was smaller in leafsize and as it showed some differences in its inflorescence it was proposed as the var. *kilimandscharica* in *D. steudneri*. Later when *D. deremensis* was described from the same area, confusion of both taxa was imminent. Typical *D. steudneri* is readily distinguished: its leaves are oblong, swordshaped and usually well over 1m long; the inflorescence is always very stout, much branched and borne erect; the flowers are arranged in short contracted racemes rather than in the globular glomerules of *D. fragrans*. A further point to note is the arrangement of these racemes towards the top of the inflorescence. In *D. steudneri* they never occupy an axillary position in relation to a branch, which is frequently the case with glomerules in *D. fragrans*.

Notwithstanding a considerable overlap in leaf size, *D. steudneri* var. *kilimandscharica* generally tends to be somewhat smaller in size and elliptical in shape rather than lanceolate if compared with the majority of the *D. fragrans* material available. The inflorescence clearly differs from that of typical *D. steudneri*, as it resembles that of *D. fragrans* in all respects.

CONCLUSION

The various observations on the species involved have serious consequences for the status of the taxa that were hitherto recognized. Except for typical *D. steudneri* which most obviously differs in the architecture of its inflorescence, the other taxa under discussion share the typical floral arrangements in spherical glomerules. Four out of five of the remaining taxa considered here show a striking similarity in their generative characters. Although the vegetative characters seem to differ somewhat regionally, their entire range overlaps to such an extent that segregation on a sound taxonomic level does not seem possible.

D. deistelliana seems to be generally somewhat different in habit and leaf size when compared to *D. fragrans* in West Africa, but such differences are not found when East African material of this species is taken into account. The same situation is found when comparisons are made between *D. deremensis* and *D. fragrans*. *D. steudneri* var. *kilimandscharica* was justly considered as a taxon different from *D. steudneri*, but it was not recognised as being conspecific with *D. fragrans*. When *D. deremensis* was proposed by Engler, he pointed out that the species was in his opinion closely related to *D. fragrans*, but he made no reference to *D. steudneri* var. *kilimandscharica* described by him eight years earlier.

The fifth taxon with flowers in glomerules is *D. congoensis*. Here the comparative length of the perianth tube in relation to the lobes provides a constant difference with the others. Although possibly less reliable, the presence and comparative length of the pseudopetiole provides an additional practical character by which the species may be recognized. As a result *D. congoensis* is retained, while *D. deistelliana*, *D. deremensis* and *D. steudneri* var. *kilimandscharica* are referred to synonymy of the rather variable *D. fragrans*.

An unsuspected support to this view was provided by an old propagation plant that was found in one of the commercial nurseries that provided the cultivated specimens for this study. This shows (Fig. 2) that this plant has several branches that can each be assigned to one of four different cultivars formerly belonging to either *D. deremensis* or *D. fragrans*.

Dracaena fragrans (L.) Ker Gawler. **Fig. 3.**

Ker Gawler, Bot. Mag. (1808): t. 1081; Aiton, Hort Kew. ed. 2, I(1811): 277; Link, En. Pl. 2, 1(1821): 341; Sprengel, Syst. Veg. II (1825): 92; Schultes f. in Roemer & Schultes, Syst. Veg. VII (1829): 342; Loudon, Hort. Britt. I (1830): 130; Salm-Dyck, Hort. Dyck. (1834): 95; Steudel, Nom. Bot. I (1840): 529; Kunth, Abh. K. Ac. Wiss. Berlin (1842): 26; Id., En. Pl. V (1850): 9; Koch, Berl. Allg. Gartenz. (1858): 242, 253, 262; Regel, Gartenflora 8 (1859): 329; Koch, Wochenschr. IV (1861): 396; Id., loc. X (1867): 237; Regel, Gartenflora 20 (1871): 136; Id., Act. Hort. Petrop. I (1871): 137 = Rev. (1871): 37; Id. ex André, Ill. Hort. 19 (1872): 137; Baker, J. Bot XII (1874):165; Id., J. Linn. Soc. 14 (1875): 529; Nicholson, Ill. Dict. Gard. I (1885): 491; Engler, Nat. Pfl. II–5 (1888): 75; Durand & Schinz, Consp. Fl. Afr. V (1893): 327; Vilmorin's Blumeng. I (1895): 1065; Baker in Thiselton-Dyer, Fl. Trop. Afr. VII (1898): 440; Engler in Engler & Drude, Veg. Erde IX–II (1908): 290, f. 193; Rendle, J. Linn. Soc. Bot. 40 (1911): 214; De Wildeman, Ann. Mus. Congo V–III (1912): 350; Wiegand in Bailey, St. Cycl. Hort. I (1914): 1070; De Wildeman, Bull. J. Bot. Brux. V (1916): 166 ; Chevalier, Bot. I (1920): 646 (p.p., excluding 22104 = *D. mannii* Baker); De Wildeman, Pl. Bequaert I (1921): 308; Krause in Engler, Nat. Pfl. ed. 2, 15a (1930):359, f. 145; Hutchinson in Hutchinson & Dalziel, Fl. W. Trop. Afr. II (1936): 384 (p.p. excluding Johnson 730 & Thomas 2305 = *D. congoensis* Hua); Aubreville, Fl. For. Côte d'Iv. II (1936):278 (sub *D. arborea* (Willd.) Link); Dalziel, Us. Pl. W. Trop. Afr. (1937): 493; Brenan & Greenway, Checkl. Tang. V–II (1949): 21; Tisserant, Cataloque Flore l'Oubanggui-chari (1950): 16; Chittenden, Dict. Gard. II (1951): 710; Tackholm & Drar, Fl. Egypt III (1954): 207; Brenan, Mem. N.Y. Bot. Gard. 9–1 (1954): 86; Roberty, Pet. Fl. (1954): 338; Berhaut, Fl. Senegal (1954): 188; Degener & Degener, Fl. Haw. book 6 (1958): fam 68; Pareys Blumeng. ed. 2, I (1958): 310; Aubreville, Fl. For. Côte d'Iv. ed. 2, III (1959): 320 (sub *D. arborea* (Willd.) Link); Irvine, W. Pl. Ghana (1961): 770 (p.p., excluding all specimens cited = *D. congoensis* Hua); Berhaut, Fl. Senegal ed. 2 (1967): 32; Hepper in Hutchinson & Dalziel, Fl. W. Trop. Afr. ed. 2, III–I (1967): 157 (p.p., excluding Johnson 730 & Lyon 2873 & Thomas 2305 = *D. congoensis* Hua); Bailey & Bailey, Hortus Third (1976): 398; Mouton, Adansonia ser. 1, 15 (1976): 412; Marais & Coode, Fl. Masc. 183 (1978):21; Wijnands, Bot. Comm. (1983):129.; Bos, *Dracaena* in West Africa, Agric. Univ. Wag. Papers 84(1): 69 (1984) = Belmontia new series 17: 69; Bos & Cullen in Walters et al., Eur. Garden Fl. 1: 286 (1986).

Basionym: *Aletris fragrans* L.; Linnaeus, Sp. Pl. ed. 2 (1762): 456; Id., Syst. Nat. ed. 12, II (1767): 248; Burman f., Prodr. Fl. Cap. (1768): 10; Miller, Gard. Dict. ed. 8 (1768): Aletris 5; Linnaeus, Syst. Veg. ed. 13 (1774): 277; Houttuyn, Nat. Hist. II, 12 (1780): 411; Lamarck, Enc. Meth. Bot. I (1783): 79; Linnaeus, Syst. Veg. ed. 14 (1784): 337; Aiton, Hort. Kew. I (1789): 464; Linnaeus, Syst. Veg. ed. 13, II (1791): 561; Willdenow, Sp. Pl. II (1799): 813; Andrews, Bot. Rep. V (1803): t. 306; Poiret in Lamarck, Enc. Meth. Bot. suppl. I (1810): 289. Type: Commelin, Hort. Med. Amst. II (1701): t 4 f. 2.; Homotypic synonyms: *Aloe fragrantissima* Jacq.; Jacquin, En. Strip. Vind. app. (1762): 309 (see note).; *Pleomele fragrans* (L.) Salisb.; Salisbury, Prodr. (1796): 245 (quoad basionym, see note); Id., Gen. Pl. (1866): 74; Brown, Kew Bull. 1914: 276,278; Id., loc. 1915: 259 (err. not of N. E. Br. but (L.) Salisb.); Holland, Kew Bull. add. ser. IX, 4 (1922): 704 (err. not of N. E. Br. but (L.) Salisb.); Neal M. C., Gard. Hawaii (1965): 205, 206; St. John, Summ. Flow. Pl. Hawaii (1973): 84; Smith, Fl. Vit. Nov. I (1979): 552.; *Sansevieria fragrans* (L.) Jacq.; Jacquin, Fragm. Bot. (1800): 5, t.2 f. 6; Id., loc. (1801):t. 33 f. 1 (see note).; N. E. Brown, Kew Bull. (1915): 279 (spec. excl.); *Cordyline fragrans* (L.) Planchon; Planchon, Fl. Serres VI (1851): 11, 132, 136; Goeppert, Nova Acta (1854): 53.; *Draco fragrans* (L.) Kuntze; Kuntze, Rev. Gen. Pl. II (1891): 710; Baillon, Hist. Pl. (1894): 488.

Heterotypic synonyms (in chronological order):

Agave foetida L.; Linnaeus, Amoen. Acad. III (1756): 23 (p.p. quoad Commelin fide Wijnands, Bot. Comm. (1983): 38, 129.

Dracaena smithii Baker ex Hook. f.; Hook. f., Bot. Mag. (1875): t 6169; André, Ill. Hort. 23 (1876): 36; Regel, Gartenflora 25 (1876): 244; Masters & Moore, Gard. Chron, vol. 20 new series (1883): 597;

FIG. 2. Nursery propagation plant exhibiting characteristics on different branches that can be assigned to four different cultivars. (Photo: J. W. Mugge)

Nicholson, Ill. Dict. Gard. I (1885); 491; Durand & Schinz, Consp. Fl. Afr. (1893): 331; Baker in Thiselton Dyer, Fl. Trop. Afr. VII (1898): 440; Wiegand in Bailey, St. Cycl. Hort. I (1914): 1070; Hutchinson in Hutchinson & Dalziel, Fl. W. Trop. Afr. II (1936): 384; Dalziel, Us. Pl. W. Trop. Afr. (1937): 493; Chittenden, Dict. Gard. II (1951): 711; Aké Assi, Contr. Et. Fl. Côte d'Ivoire II (1963):265 (p.p., excluding Linder 654 = *D. arborea* (Willd.) Link); Hepper in Huntchinson & Dalziel, Fl. W. Trop. Afr. ed. 2, II–I (1968): 156 (p.p., excluding Lyon 2873 = *D. congoensis* Hua). Type: Culta Kew Gardens dd. I 1874 (K lecto). Homotypic synonym: *Pleomele smithii* (Bak.) N. E. Brown; N. E. Brown, Kew Bull. (1914): 279; Aké Assi, (1963): 235 (syn).

Dracaena lindenii Hort. Linden ex André; André, Ill. Hort. 27 (1880): 85, t 384; Gard. Chron. vol. 14 new series (1880): 120, 783; Gard. Chron. vol. 15 new series (1881): 8, 574; Linden & Rodigas, Ill. Hort. 28 (1881): 163; Regel, Gartenflora 30 (1881): 415; de Vos, Belg. Hort. 31 (1881): 222; Morren, Belg. Hort. 31 (1881): 328; de Vos, Belg. Hort. 32 (1882): 330; Linden & Rodigas, Ill. Hort. 29 (1882): 117; Gard. Chron. vol. 17 new series (1882): 44, 746; Kerchove, Rev. Hort. Belge. VIII (1882): 223, 224, 225; Redaction, Rev. Hort. Belge. VIII (1882): 251; A. van Geert, Rev. Hort. Belge. VIII (1882): 196, 170 + fig.; Gard. Chron. vol. 20 new series (1883): 673; Garden 25 (1884): 442; Burbidge, Garden 26 (1884): 449; Gard. Chron. vol. 22 new series (1884): 710; Schaedtler, Deutsche Garten Zeitung (1885): 7, 8, f. 9; Nicholson, Dict. Gard. I (1885): 491; Garden 32 (1887): 509; Garden 39 (1891): 86; F. H., The Garden 41 (1892): 86; Gard. Chron. vol. 12 third series (1892): 731; Gard. Chron. vol. 21 third series (1897): 388; Kew Bull. add. IV (1900): 164; Garden 63 (1903): 77; Rade, Die Gartenwelt (1908): 231; De Schrijver de Bock catalogus 1950. Type: Ill. Hort. 27 (1880): 85, t 384. Homotypic synonyms: *Dracaena fragrans* (L.) Ker Gawler var. *Lindeni* (Linden ex André) Watson; Gard. Chron. vol. 4 third series (1888): 662; Wieg., Bailey, St. Cycl. Hort I (1914): 1070 + tab. 1345; Gard. Chron. vol. 29 third series (1901): 168 + fig; Gard. Chron. vol. 71 third series (1922): 155, fig 79; Chittenden, Dict. Gard. II (1951): 710.; *Dracaena fragrans* (L.) Ker Gawler forma *Lindeni* Lind ex U. Siebert; Vilmorin, Blumeng. I (1895): 1066.

Dracaena massangeana Hort. ex Rodigas; Rodigas, Rev. Hort. Belge. VII (1881): 210 (see note); A. van Geert, Rev. Hort. Belge. VIII (1882): 169, 170 + fig.; Kerchove, Rev. Hort. Belge. VIII (1882): 223, 224, 225; Redaction, Rev. Hort. Belge. VIII (1882): 251; Morren, Belg. Hort. 32 (1882): 55; Linden & Andre, Ill. Hort. 23 (1882): 23; Linden & Andre, Ill. Hort. 23 (1882): 117; F. H., The Garden 41 (1892): 153; Gard. Chron. vol. 12 third series (1892): 731; W. Robinson, Garden 48 (1895): 344; Kew Bull. add. IV (1900): 164; Rade, Gartenwelt 1 (1908): 231; De Schrijver de Bock catalogus 1950; Clint, Plant Life 9 (1953): 218. Type: Rev. Hort. Belge. VIII (1882): plate facing page 169. Homotypic synonym: *Dracaena fragrans* (L.) Ker Gawler var. *Massangeana* Makoy ex E. Morr.; E. Morr., Belg. Hort. 31 (1881): 327, t. 16; de Vos, Belg. Hort. 32 (1882): 330; Regel, Gartenflora 32 (1883): 180; Wieg., Bailey, St. Cycl. Hort I (1914): 1070 + tab. 1345; Chittenden, Dict. Gard. II (1951): 710.

Dracaena aureolus Bull ex Masters; Gard. Chron. vol 19 new series (1883): 404 (see note).

Dracaena fragrans (L.) Ker Gawler forma *Wacheana* Wacha ex U. Siebert; Villmorin, Blumeng I (1895): 1065 (see note).

Dracaena latifolia Regel forma *Rothiana* U. Siebert; Vilmorin, Blumeng. (1895): 1064.; *Dracaena rothiana* Hort. ex Carr. (misapplied name); Widman, Gartenflora 75 (1926): 50, 51–Veg; Bailey & Bailey, Hort. 3 ed (1976): 398 (cv. in *fragrans*).

Dracaena steudneri Engl. var. *kilimandscharica* Engl.; Engl. Pflanzenwelt Ost Afr. C (1895): 143; Mildbraed, Wiss. Erg. DZA Exped. II (1914): 62; Lebrun, Ess. For. (1935): 52; Brenan & Greenway, Tang. II (1949): 21; Robijns, Fl. Parc. Nat. Albert III (1955): 372. Type: Tanzania, Mt. Kilimandjaro, *Volkens* 1416 (BM).

Dracaena broomfieldi Sander ex Masters; Gard. Chron. vol. 20 new series (1896): 666, fig p. 667 (see note); The Garden 50 (1896): 440.

Dracaena victoria Hort. Bull; Gard. Chron. vol. 24 third series (1898): 325; Garden 54 (1898): 360; Bull Catalogue (1899): 3 + tab.; Moller's Deutsche Garten Zeitung (1899): 543; Gard. Chron. vol. 25 third series (1899): 34, 363; Gard. Chron. vol. 26 third series (1899): 315; Ned. Tuinbouwbl. 16 (1900): 6; Garden 63 (1903): 77 (ill.), 288; Gard. Chron. vol. 34 third series (1903): 278; Gard. Chron. vol. 36 third series (1904): 242; P. Schmidt, Gartenwelt 53 XII (1908): 629, fig. 632; Gard. Chron. vol. 48 third series (1910): 285; Gard. Chron. vol. 71 third series (1922): 154. Type: Plate

in Bull catalogue 1899: 3. Homotypic synonyms: *Dracaena fragrans* (L.) Ker Gawler var. *Victoria* Bull ex Cook; The Garden, (1903): 78; Gard. Chron. vol. 79 third series (1926): 30, fig. 16.; Orthographic form *Dracaena victoriae*; Moller, DGZ (1903): 218; Moller, DGZ (1903): 374 ill.; Rehmelt, Gartenwelt 13 (1909): 4; Clint, Plant Life 9 (1953): 128.

Dracaena ugandensis Baker; Baker in Thiselton-Dyer, Fl. Trop. Afr. VII (1898): 445 (see note); Gard. Chron. vol. 35 third series (1904): 131. Type: Uganda, Ruwenzori, *Scott Elliot* 7264 (BM, K). Homotypic synonyms: *Pleomele ugandensis* (Bak.) N. E. Brown; N. E. Brown, Kew Bull. (1914): 279.

Dracaena janssensii Drabs-Doms ex Masters; Gard. Chron. vol. 25 third series (1899): 287 (see note).

Dracaena albanensis Sander ex Masters; Gard. Chron. vol. 27 third series (1900): 206 (see note).

Dracaena deisteliana Engl.; Engler, Bot. Jahrb. 32 (1902): 96; Id. in Engler & Drude, Veg. Erde IX–II (1908): 291; Hutchinson in Hutchinson & Dalziel, Fl. W. Trop. II (1936): 384 (in syn. to *D. fragrans* (L.) Ker Gawler); Hepper in Hutchinson & Dalziel, Fl. W. Trop. ed. 2, III–I (1968): 157; Bos, *Dracaena* in West Africa, Agric. Univ. Wag. Papers 84–1 (1984): 67 Id. Belmontia new series vol. 17, 1985 (80): 67. Type: Cameroun, Buea, *Deistel* 497 (B lecto, A, M iso), Id., Lehmbach 16 (?B para).

Dracaena broomfieldi Sander ex Masters var. *superba* Sander ex Masters; Gard. Chron. vol. 33 third series (1903): 245 (see note); The Garden 63 (1903): 288; Rehnelt, Gartenwelt 13 (1909): 4.

Dracaena butayei Wildem.; Wildem, Ann. Mus. Congo, ser V, I (1903): 16; Dur. & Dur., Syll. Fl. Congo (1909): 564.; Type: Zaire, Nkumba-mani, *J. Gillet* 2324 (BR).

Dracaena deremensis Engl.; Engl. Jahrb. 32 (1903): 95; Engl. & Drude, Veg. Erde IX–II (1908): 290; Rendle, Journ. Linn. Soc. Bot. 40 (1911): 214; Wieg. in Bailey, St. Cycl. Hort. I (1914): 1070; Karsten & Schenk, Veg. Bild. 11 (1914): t. 47; Garten Flora 79 (1930): 243; Ib. 80 (1931): 28; Brenan & Greenway, Tang. II (1949): 20; De Schrijver De Bock Catalogus 1950; Chittenden, Dict. Gard. II (1951): 710; Pareys Blum. 2 ed. I (1958): 310; Boom (1968): 232; St John, Summ. Flow. Pl. Hawaii (1973): 84 (syn.); Bailey & Bailey, Hort. 3 ed. (1976): 398; Bos & Cullen in Walters et al., Eur. Garden Fl. 1: 286 (1986). Type: Tanzania, Usambara, *Scheffler* 66 (B) (see note). Homotypic synonym: *Pleomele deremensis* (Bak.) N. E. Brown; N. E. Brown, Kew Bull. (1914): 278; Neal, Gond. Han. (1965): 206; St. John, Summ. Flow. Pl. Hawaii (1973): 84.

Dracaena deremensis Engl. var. *Warneckei* Engl.; Engl., Garten Welt (1907): 505, 506.

Invalid names (in chronological order, generally of obscure garden origin):

Dracaena guatemalensis Koch, Wochenschrift I (1858): 395.

Dracaena fragrans latifolia Gard. Chron. (1861): 381.

Dracaena longifolia alba Hummet, DGZ (1880): 200.

Dracaena recurvata alba Linden cat. (1880): 18; Kew Bull. add. IV (1900): 165.

Dracaena fragrans variegata Gard. Chron. (1882): 442.

Dracaena (Aletris) massangeana A. van Geert, Rev. Hort. Belge.; VIII (1882): 169; Redaction, Rev. Hort. Belge. VIII (1882): 251.

Dracaena fragrans wacheana Rev. Hort. Belg. VIII (1882): 224.

Aletris fragrans Wachaeana A van Geert, Rev. Hort. Belge. VIII (1882): 169.

Dracaena fragrans f. *Massangeana* (in syn.) Vilmorin, Blumeng. I (1882):P 1065.

Dracaena fragrans aureolineatum Gard. Chron. I (1884): 749.

Dracaena wacheana Möller, DGZ (1884): 278; Rade, Gartenwelt 12 (1908): 231.

Dracaena fragrans aureostriata Gard. Chron. II (1893): 450.

Dracaena fragrans fol. *aurea-striata* Gard. Chron. II (1893): 440.

Dracaena striata aurea-lineata Gard. Chron. I (1893): 486.

Dracaena jeanenceyense Sempervirens 28 (1899): 236.

Dracaena albanense var. *stricta* (nom. nud.) Garden 57 (1900): 252.

Dracaena Auguste Victoria Möller's DZG (1901): 25.

Dracaena lindeni camaefolia Garden 64 (1903): 308.

Dracaena deremensis Bausei Gard. Chron. (1912): 320.

Dracaena warneckii Gard. Chron. (1912): 219; Gard. Chron. II (1914): 324.

Dracaena warnecki Gard. Chron. I (1914): 324.

Dracaena dermuensis Engl. var. *Bausei* Gard. Chron. (1923): 219 (see note).

Dracaena Longii Clint, Plant Life 9 (1953): 129; Bailey & Bailey, Hort 3 (1976): 398.
Dracaena craigii Clint, Plant Life 9 (1953): 128.
Pleomele rothiana Neal, Gard. Haw. (1965): 206.
Dracaena fragrans 'Queen Victoria' (in syn.) Boom, Fl. Kam. Kaspl. (1968): 231.
Dracaena amaniensis Engl. mss. name on *Greenway* 6441 (BR).

Whiplike shrubs or trees to over 15m tall, rarely branched, leaves lorate-oblanceolate, from less than ½ to 1½m long, up to 10cm wide, inflorescence a terminal, usually branched panicle, erect or pendulous, up to about 1m long, flowers in well spaced stalked or sessile multiflowered more or less spherical glomerules, accompanied by scarious white bracts, the perianth tube slightly shorter than the lobes, fruits depressed globose, less than 2cm in diameter.

Rather weak shrubs, producing one to several whiplike stems, to branched trees, 1–15m or even more tall, main trunk may surpass 30cm in diameter. *Leaves* concolorous, or variegated in cultivated plants, lorate-oblanceolate to narrowly so, the widest part usually above the middle, (12–) 20–125 (–150)cm x (1–) 2–10 (–12)cm, tip acute with a subulate mucro up to 4 (–8)mm long, narrowly cuneate towards the base, narrowest part (4–) 7–35 (–43)mm wide few cm above the sheating base enveloping the supporting stem; bright green lacking a midrib above, paler beneath, midrib usually prominent for three quarters to about two thirds of its length, parallel nervature distinct in herbarium, secondary venation if visible, irregularly transverse. *Inflorescence* a branched or unbranched terminal panicle, erect, inclined or bent over and pendulous with a zigzag main axis, (15–) 20–100 (–160)cm long, transitional leaves on the penduncle may form a series rapidly decreasing in size, with the bracts subtending the inflorescence branches. The decidous, concave, long cuspidate bracts leaving deeply V-shaped scars. Flowers arranged in well separated multiflowered stalked or sessile glomerules on main axis and branches containing usually well over 10 flowers each; the flowers accompanied by broadly triangular white scarious bracts up to 3 (–5)mm long, usually slighty shorter than the 2–5mm long persistent pedicels. *Flowers* white with some purplish tinges towards the tip, often with fine red lines down the centre of each lobe outside, (15–) 17–22 (–25)mm long, receptacle obconical, indurated, 1½–3 (–5)mm, perianth tube (5–) 8–10 (–11)mm long, shorter than the (7–) 9–11 (–12)mm long lobes, these up to 3mm wide with a single central vein, stames inserted at the throat, filaments inflated, up to ¼mm in diameter, tip subulate, 1–3mm shorter than the corresponding perianth, anthers 2–2½x1mm, ovary cylindrical to bottle-shaped, 2–3 (–4) x 1½–2mm, style terete, ¾mm in diameter, stigma 3-lobed, 1mm across, 1–3mm exserted. *Fruits* bright orange, spherical to depressed globose, 11–18mm long, 13–19mm in diameter, lobed when more seeded, with a persistent up to 5mm long receptacle. *Seeds* white turning brown when exposed, with a brown patch enveloping the raphe, rounded-rectangular to bean-shaped, 6–14mm x 5–9mm x 4–7mm. *Seedlings* produce orange roots, juvenile leaves ovate, acute, lacking the constriction above the sheathing base.

D. fragrans occurs in forests in West-Central and East Africa from Gambia to Ethiopia and south to Angola and Mozambique. Most frequently of anthropogenous origin, utilized as hedge, cemetary and fetish plant.

FIG. 3. *Dracaena fragrans* (L.) Ker Gawler. 1, inflorescence, x ⅔; 2, leaf, x ⅔; 3, open flowex x ⅔; 4, fruits x ⅔ (1 & 2, *Ake Assi* 9417; 3, *Bos* 10436 spirit collection; 4, *Laan* 1216 spirit collection WAG). Drawing by Mrs Wil Wessel-Brand.

The discussion on the availability of the epithet *fragrantissima* in *Dracaena* was presented in Bos (1984: 73–75). As the same situation still prevails, the combination *Dracaena fragrans* (L.) Ker Gawler is retained as the correct name for the species.

The reasons why the base of *Pleomele fragrans* (L.) Salisbury is restricted to its basionym only were given in Bos (1984: 75).

There is some obscurity concerning the date of publication of Jacquin's Fragmenta Botanica. According to Stafleu & Cowan, Taxonomic Literature II (1979): 413, the original work appeared between 1800 and 1809. It comprises 138 plates in 6 volumes. The accompanying text appeared integrally in a separate volume, supposedly published after the 6 volumes of plates had appeared. If the plates were originally published in equal quantities in the consecutive volumes, one might assume each volume to have contained 23 plates. In consequence plate 2 must have appeared in volume 1 and plate 33 in volume 2. These volumes are dated 1800 and 1801 respectively.

The name *Dracaena rotheana* is often misinterpreted. The original plant was cultivated by the firm of Haage & Smidt in Erfurt, Germany, in 1877. It was grown from seed collected in the Comoro Islands. Later publications showing the flowering plant prove it to be one of the many facies of *D. reflexa* Lam. In publications cited here, non-flowering cultivated plants provided with this name must be referred to *D. fragrans* instead.

The protologue of *D. massangeana* is provided by a report on the flower exposition in Gent in 1881. The same plant was pictured and this plate was published in 1882 by van Geert. In the absence of any specimen of this plant the plate must serve as its type.

D. aureolus is only known from the very summary description in the publication cited, which is to serve as its type as well. The variegation described conveniently identifies it as a variegated plant of *D. fragrans*.

The forma *wacheana* published by Vilmorin can only be considered as a superfluous name for the cv. 'Massangeana' in *D. fragrans*. In its original form the name *wacheana* was published as an invalid trinomial, *Aletris fragrans wacheana*, one year after *D. massangeana* was proposed. It was named after Mr Wacha, head gardener to the Prince of Schwarzenberg in Vienna. He obtained the plant as variegated sport from an old trunk of a green *D. fragrans* that had been discarded on a refuse heap in his nursery.

D. broomfieldi Sander ex Masters and its var. *superba* Sander ex Masters with orthographic variants as *boomfieldi*, *broomfieldii* and *bromfieldi* was said to originate from the South Sea Islands. As it is undoubtedly a variegated *D. fragrans* this origin is rather unlikely. The protologue of each name is provided with an illustration that must serve as its type. No diagnostic characters can be gleaned from the original publication of both taxa. They must be considered as cultivars that have disappeared in the meantime.

Dracaena ugandensis is nothing more than a depauperated *D. fragrans* found by Scott Elliott in a hedge.

Dracaena jansenssii Draps Dom ex Masters is only known from its very limited description in the *Gardeners Chronicle*, which serves both as the protologue and the

type. It is once more a variegated *D. fragrans* no longer in culture. The name *D. jeanenceyense* can only be considered as an orthographic variant of it.

D. albanensis Sander ex Masters is yet another variegated *D. fragrans* of which the cited protologue must serve as its type as well.

D. dermuensis var. *bausei* as described in the *Gardeners Chronicle* could possibly be construed as a valid new name. Its anonymous author does not show any intention towards a first publication as he mentions it among "newer plants" in an exposition report. In its cited orthography it is obviously a printers error of what is up till now known as *D. deremensis* cv. *bausii*, i.e. *D. fragrans*.

Specimens examined (in addition to those cited in Bos (1984))

ANGOLA: Pungo, Adongo, *Welwitsch* 3738 (BM,G,K).

CAMEROUN: Mt Cameroun (fl, Dec), *Adams C.D.* s.n. (GC); Mt Cameroun (fl, Feb), *Annet* 62 (P); sine loc. (fl, May), *Aubreville* s.n. (WAG); Jango, Cam. Mts. (fl, Apr), *Brenan* 9577 (P,B); Mt. Cameroun (fl, Feb), *Breteler* 178 (LISC,WAG); Bamenda (fl, Feb), *Brunt* 965 (K); Mt Cameroun (fl, Feb), *Dalziel* 8348 (K); Buea *Deistel* 126 (BM); Mt Cameroun (fl,fr, Apr), *Etuge & Thomas* 99 (MO,WAG); Buea (fl,fr, Mar), *Harris* s.n. (GC); Dschang (fl,fr, Dec), *Jacques-Felix* 2613 (P); Foumban (fl, Feb), *Jacques-Felix* 3037 (P); Foumban, Bango, *Leeuwenberg* 8886 (WAG); Nkongsamba (fl, Jan), *Leeuwenberg* 9260 (WAG); Badounga, 40km NW Ndikinimeki (fl, Feb), *Letouzey* 11224 (P,WAG,YA); Mbomzem 22km ESE Kumba (fl, Dec), *Letouzey* 13488 (P,WAG,YA); Mt Nlonako (fr, Mar), *Letouzey* 14470 (P,WAG,YA); Mt Rumpi, 2km SW Dikome balue (fr, Mar), *Letouzey* 14549 (P,YA); Mt Cameroun, *Linnavuori* s.n. (H); Mt Cameroun (fl, Feb), *Meurillon* 1149 (BR,P); Dschang, *Meurillon* 271 (P); Yaounde (fl, Sep), *Mpom Benoit* 233 (P); Benydon, Mt Ngoro (fr, Jun), *Ngameni Kamga* 76 (WAG); Dschang (fl, Dec), *Nkong Menek* 219 (YA); 13km NE Belel (fl, Dec), *Raynal* 12294 (P); 13km S Poli (fl, Jan), *Raynal* 13081 (P); 23km W Tchamba (fl, Jan), *Raynal* 13204 (P); Mt Kupe (fl, Feb), *Thomas* DW 5486 (MO,WAG); Bamenda (fr, May), *Ujor* FHI 30305 (K); Bamenda, Bafut-Ngemba forest (fl, Mar), *White* 8469 (FHO); Bangang-Fokam 40km NE Bangwa (fr, Apr), *Wilde de WJJO* 2384 (WAG).

CENTRAL AFRICAN REPUBLIC: Region Bambari, Boykette (fl, Dec), *Descoings* 11862 (IEC); Yalinga (fl, Jan), *Le Testu* 4470 (BM,MO,P,WAG).

CONGO REPUBLIC: Region Ouadda, Ouanda Djale (fr, April), *Descoings* 10940 (IEC,WAG).

ETHIOPIA: Bonga, Kaffa Prov. (fl, Dec), *Bos* 9384 (WAG); Mettu-Bedelle road (fl, Dec), *Friis* 1959 (C,K); Bedelle (fl, Dec), *Friis* 1999 (C,K); Bonga (fl, Jan), *Friis* 2186 (C,K); Mandura, Matakel (fl, Mar), *Kuls* 253 (FR); Bonga (fl, Jan), *Meyer* FG 7872 (K); Teppi (fr, Dec), *Meyer* FG 8945 (K); Ainamba (fl, Dec), *Meyer* FG 9017 (K,WAG); Bonga (fl, Jan), *Perdue* 6404 (WAG); Emo, *Semple* 94 (US); Ainamba-Cako, *Straube* II31 (FR); Bonga (fr, Feb), *de Wilde WJJO* 10240 (K,WAG).

FERNANDO PO: Fernando Po (fl,fr, Dec), *Boughey* 96 (B,K).

IVORY COAST: Moka (fl, Dec), *Mangenot* 1445 (ABJ).

KENYA: Sotik, Kibajet Estate (fl, Jul), *Bally* B13526 (EA); Taita Hills, Yale Rock, *Beentje* et al 915 (EA,WAG); 30 mls N of Kisumu, *Boardman* 36 (MO); 10km S of Kisii, *Breteler* 7505 (WAG); Taita Hills, Susu Forest (fl, Jul), *Dale* 3766 (BR,EA,K); Wabungu River, Kavirondo (fr, Mar), *Davidson* 280 (EA); Ngangao forest (fr, May), *Faden* et al. 199 (EA,WAG), (fr, Jun) 1049 (EA,WAG); Taita Hills (fl, Sep), *Gardner* 3014 (EA,K); Lolgorien-Kilgoris road, *Glover* et al 627 (EA); Kakamega forest (fl, Apr), *Hanssen* 888 (C,EA,K); Mt Elgon, Kakamega forest (fl, Mar), *Jack* 427 (EA,K); Mt Elgon (fl, Jan), *Jackson* 338 (EA,K); Kerecho (fl, Mar), *Jex Blake* H17/49 (EA); Cha Simba Hill *Lap* 227 (WAG); Simba Hills, *Magogo & Glover* 490 (EA); Kakamega, *Perdue & Kibuwa* 9400 (EA,K); 68km SSW Kisii, *Vuyck* 246 (WAG); Tombe-Magombo, *Vuyck* 399 (WAG); Shimba Hills, Makadara forest (fl, Jul), *van Someren* Sh99 (EA).

MALAWI: Nchisi forest reserve (fr, Mar), *Brummit & Evans* 9388 (WAG); Nchisi forest (fr, May), *Chapman* 1264 (SRGH); Kora Kora, Nchisi forest (fr, Jul), *Chapman* 814 (SRGH); Misuku hills, *Grosvenor* 1233 (SRGH); Misuku Hills, Mughese Forest (fr, Jul), *Pawek* 7065 (K,MO,SRGH); Misuku Hills (fl, Jan), *Pawek* 12172 (SRGH,WAG).

MOCAMBIQUE: Maputa (fl, Feb), *Balsinhas* (LMA); Mt Nhandora, Gorongoza (fr, May), *Torre & Paiva* 12297 (LISC); Mossurize, Mt de Espungabera (fl, Oct), *Torre* 6156 A (LISC).

SUDAN: Torrit district (fl,fr, Apr), *Jackson* 1348 bis (BM).

TANZANIA: Mt Kilimandjaro, Mamba mission, *Bally* 237 (EA); Maranga ft. of Mt Kilimandjaro (fl, Jan), *Bally* 4271 (EA,K); Pemba Island (fl, Dec), *Beentje* 4363 (WAG); Mt Kilimandjaro (fl, Jun), *Behn* 1083 (EA,SRGH); Bondwa, Uluhuru Mts (fl, Dec), *Botany Students* DSM 2178 (EA); Amani (fl, Sep), *Braun* 437 (EA); Amani-Derema (fl, Jul), *Braun* 455 (E,EA); Derema (fl, May), *Braun* 687 (EA); Uluguru (fl, Feb), *Bruce* 791 (K); Bukoba (fr, Oct), *Ford* 776 (K); Bubiba or Bubiki (fl, Jul), *Forest Herb.* 474/3213 (EA); Tanga, Mt Kilimandjaro (fl, Jun), *Geilinger* 298 (Z); Uluguru Mts (fr, Oct), *Gibbon* 6050/AA (EA); Lyamungo (fl, Aug), *Greenway* 3136 (EA,FHO,K); Kwamkuyu river, E Usambara (fl, Dec), *Greenway* 6089 (B,BR,K); Monga, E Usambara (fl, Feb), *Greenway* 6641 (BR,EA,K,PRE); Pimbe Hill (fr, May), *Greenway* 6683 (BR,EA); Amani (fl, Jul), *Herb. Amani* 455 (K,P,Z); Kigoma (fr, Mar), *Kyote Univ.* 389 (EA); Amani, E Usambara Mt. (fl, Jan), *Mwasumbi* 257 (EA,WAG); Magamba-Gare roadside (fr, Apr), *Ngoundai* 277 (EA); Lutindi, *Peter* 12901 (WAG); Kijango, *Peter* 12979 (WAG); Amani (fl, Feb), *Peter* 17045 (WAG), (fl, Feb) 17078 (WAG), 17099 (B); Ngombo, Kioumo, *Peter* 21657 (B); Amani, *Peter* 22592 (WAG); sine loc. (fl, Apr), *Peter* 23788 (B); E Usambara near Amani, *Peter* 3380 (WAG); Amani, *Peter* 3697 (WAG); Sigi (fl, May), *Peter* 3822 (B); Monga, E Usambara (fl, May), *Peter* 40156 (B); Amani, *Peter* 40190 (WAG); Miziro forest (fr, Aug), *Proctor* 661 (K); Bukoba (fl, Feb), *Rald* DSM 1003 (EA); Amani-Muheza road (fl, Apr), *Renvoize* 1604 (K,PRE,SRGH); Usambara, *Scheffler* 67 (B,BR,K); Uluhulu Mts, Mahenge Station (fl, Jan), *Schlieben* 1687 (BM,BR,G,K,P,S,Z); Morogoro, Uluhuru Mts (fl, Feb), *Schlieben* 3407 (BM,BR,G,M,P,S,Z); Mt Kilimandjaro (fl, Dec), *Schlieben* 4405 (BM,BR,G,S,Z); Kwamkoro forest (fr, Jan), *Semsei* 3173 (K,PRE); Polwe forest (fl, Dec), *Semsei* 3187 (BR,K,PRE); Chirindi forest, *Swymmerton* 724 (BM,K); Rusumo, Bulgufi, Ngara Dist. (fr, Aug), *Tanner* 5053 (BR,G,K); Mt Kilimandjaro, Marangu (fl, Nov), *Volkens* 1416 (BM,G,K); Minziro forest near Itara (fr, Feb), *Willan* 223 (EA,K); Mingiro forest Bulioba, *Willan* B (EA); Dodwe (fl, Jul), *Zimmerman* G8324 (EA); Kome Island, *Willan* 309 (EA).

UGANDA: Mpanga river (fr, Aug), *Bagshawe* 1176 (BM); Masaka road (fl, Oct), *Chandler* 1942 (BR,K); Surre Luise Gero (fl, Jul), *Chandler* 818 (K); Entebbe (fl, Mar), *Dawkins* 540 (BM,EA,K); Waisoke River, Budongo forest (fl, Sep), *Eggeling* 1423 (K), 3828 (EA,K); Mt Elgon, *Goldsmidt* 51 (EA); Kamatarisi, Ankole (fl, Mar), *Jarret* 391 (EA); Mbanga forest (fr, Nov), *Katende* 2060 (EA); 2km SE Musansala (fl, Jul), *Lye & Katende* 6513 (K); Sebutole (fl, Feb), *Osnaton* 2812 (K); Sebei District, *Porter* 45 (EA); Igara, Ankole (fl, Mar), *Purseglove* 637 (K); Ruwenzori, *Scott Elliot* 7264 (BM); West Budama County, *Sharman* 2 (EA); Kidepo Nat. Park, Kanamuja Distr (fr, May), *Synnott* 1022 (EA,K); Mugoye, Bugala,Sese (fl, Feb), *Thomas* AS 836 (BR,EA,K); Kampala (fl, Dec), *Wilson* 216 (A).

ZAIRE: Iruma (fr, Mar), *Bequaert* 2827 (BR); Lesse, bords de la Semliki (fr, May), *Bequaert* 4126 (BR); Kadongo (fl, Apr), *Charlier* 87 (BR); Kavuma-Walikale (fl, Jun), *Christiaensen* 906 (BR,WAG); Sangi (fl, Feb), *Compere* 1434 (BR,K); Eale (fl, Jan), *Corbisier-Baland* 1346 (BR); Likimi plateau (fl, Jan), *De Giorgi* 193 (BR); Bwito, Kikuku, Karima (fl, Sep), *Deru* 426 (BR); Mukulakulu (fl, Jun), *Detroyer* 112 (BR); Bambesa (fr, Jun), *Dubois* 310 (BR), (fr, Aug) 564 (BR); Gbe-Sassa (fr, Mar), *Evrard* 553 (BR); Aruwimi river, *Evrard* 2163 (BR,WAG); Yalisenga (fr, Dec), *Evrard* 5325 (BR); Bambesa (fr, May), *Gerard* 2846 (BR,WAG); Nkumba-mani, Nzuudu, *Gillet* 2324 (BR); Kanongi (fl, Feb), *Hendrickx* 3893 (BR,EA,PRE); Mt Tshikunga, Idjwi Island (fl, Jun), *Hendrickx* 6721 (BR,WAG); Isangi, *Laurent* s.n. (BR); Kasindi, Kibali-Itali (fl, Jan), *Lebrun* 4763 (BR,K); Kivu, Rutshuru (fr, Nov), *Lebrun* 8441 (BR); 4.3km ESE Lakeka (fl, Jun), *Malaisse* 4264 (BR,K,WAG); Kimbeshie (fr, Sep), *Malaisse* 4603 (WAG); Likimi (fl, Mar), *Malchair* 140 (B); Muganzo, *Pierlot* 252 (BR); Gorge de Kankima, Karonga (fr, Jul), *Quarré* 5531 (BR,WAG); Sampwe (fl, Jul), *Quarré* 5790 (BR,WAG); Mwene-Diru-Kandaka, Kasai (fl, Jul), *Risopoulos* 1154 (BR,WAG); Kiubo (fr, Sep), *Schmitz* 5576 (BR,WAG); Lukafu (fr, Aug), *Schmitz* 7342 (BR,WAG); Virunga vulcano (fl, Aug), *Stauffer* 99 (K,PRE,WAG,Z); Route Nioka, Djugu River, Ruida, *Taton* 724 (BR,WAG); Kialo, Galfoi (fl, Aug), *Thiebaud* 684 (BR); Mt Embe (fr, Apr), *Troupin* 887 (BR); pres Lukafu (fl, Aug), *VandenBrande* 4948 (BR,C,EA,K,MO,SRGH); Sampwe (fr, Jul), *VandenBrande* 5131 (BR); Karanga prov. Kukep, Kabuo (fl, Jul), *Verdick* 549 (BR); Ganza Park, Umpemba, Katanga (fl, Jun), *de Witte* 6478, 6921, 6926 (BR,WAG).

ZAMBIA: Lumangwa (fr, Mar), *Franshawe* 4020 (BR,FHO,K).

ZANZIBAR: Zanzibar (fr, Jun), *Sacleux* 893 (P).

ZIMBABWE: Chirindi Forest (fl, Jan), *Bamps* 884 (SRGH); Kukwanisa, Honzo (fl, Jan), *Bigel* 2436 (K,SRGH); Umtali, Numba Mts (fr, Jul), *Chase* 4167 (BM,SRGH); Umtali District, Vumba Mts, *Jacobson* 1506 (PRE); Melsetter, *Morkel* 4516 (K); Mt Silinda, Chirindi forest, *Obermeyer* 2192 (PRE); Mt Selinda (fr, Feb), *Plowes* 2059 (K,MO,SRGH); Chirindi forest (fl, Dec), *Swynnerton* 6520 (BM,K).

CULTIVATED MATERIAL: (fl, Aug), *Bos* 10261 (WAG); (fl, Nov), *Bos* 10272 (WAG); (fl, Apr), *Bos* 10332 (WAG); (fl, Nov), *Bos* 10378 (WAG); (fl, Dec), *Bos* 10398 (WAG); (fl, Apr), *Bos* 10406 (WAG); (fr, Dec), *Bos* 10431 (WAG); (fl, Nov), *Bos* 10436 (WAG); (fl), Herb. *Richard* s.n. (P); (fl, Apr), *Liberato* 277 (LISJC); (fl fr, Jul), *Pole Evens & Erens* 1730 (EA,K,PRE); (fl, Dec), *Teulings* 9 (WAG); 'Warneckei', *Greenway* 1678, 2367 (FHO), (fl, Feb) 4917 (FHO,K) Amani; 'Bausei', *Boom* 32380 WAG); 'Compacta' (fl, Nov), *Lemmens* s.n. (WAG); 'Warneckei', *Bailey* s.n. (BH); 'Warneckei', *Boom* 32379 (WAG).

CULTIVARS AND CULTIVAR-GROUPING IN *DRACAENA FRAGRANS*

The here proposed reduction of *Dracaena deremensis* Engl. to the synonymy of *D. fragrans* (L.) Ker Gawler. leads to an increase of cultivars to be assigned to the latter species. In horticultural practice, the recognition of variegated cultivars as belonging to either *D. deremensis* or *D. fragrans*, has never been problematical. This fact warrants the recognition of cultivar-groups in *D. fragrans* based on characters formerly used to distinguish cultivars of *D. deremensis* from those of *D. fragrans*.

THE CULTIVAR GROUP-CONCEPT

In the International Code of Nomenclature for Cultivated Plants (Brickell et al., 1980), the grouping of cultivars is mentioned in Art. 26. The reason given for grouping cultivars is similarity but no statements are made to specify similarity. Beside this, the article contains some inconsistencies which are discussed by Brandenburg and Schneider (1988). They also argue that cultivar groups should meet common practice. The latter argument serves to avoid an increase in cultivar groups with a restricted applicability and use, which would then lead to very unstable cultivar classifications. A wide applicability of a cultivar group can only be reached by its circumscription using clear morphological characters.

Following recent international discussions concerning proposals for a new ICNCP, a number of new articles will be proposed by the VKC workinggroup on nomenclature and registration of cultivated plants (Netherlands). Part of the proposed procedures concerning the establishment of cultivargroups will be used here, viz. clear morphological circumscription and the designation of nomenclatural standards. The use of nomenclatural standards was recommended by Brandenburg, Oost & v.d.Vooren (1982). The designation of the nomenclatural type of a cultivar that was once regarded a formal taxon as its standard, may depend on the opinion whether the present day cultivar is entirely co-extensive with the earlier taxon (see below). In *Dracaena* such a choice has been made for, e.g. the cultivar 'Warneckei', once introduced as *Dracaena warneckei* Engler. It is here decided that the entire co-extensivity of once formal taxa in *Dracaena* with present day cultivars cannot positively be established. Therefore of all cultivars standards have been designated, taken from plants presently in the trade.

The 'open' nature of cultivar classification (Brandenburg, 1986; Brandenburg & Schneider, 1988) provides the opportunity to group cultivars of a given (notho-)taxon, without simultaneously having to establish other cultivar groups to complete a hierarchical nomenclatural level. This is mainly the result of the conceptual notion that cultivars (and consequently groupings of cultivars) have no fixed place in a hierarchical ranking system of nomenclatural levels, simply because their modes of origin usually prevent this (ICBN, Art. 11). This also serves to argue that cultivars and their groupings

cannot be looked upon as proper taxa in the latter's present day usage (Hetterscheid & Brandenburg, in prep.).

Proper cultivars preferably show very little variation in characters as opposed to species and infraspecific taxa. Because a nomenclatural type only fixes a name to a specimen, that need not necessarily be characteristic for the taxon to which the name belongs, it is not sufficient for fixing the notion of a particular cultivar. It is important that a cultivar is represented by a characteristic specimen, by which also the cultivar epithet is fixed. This specimen then dictates the name and the character suite for that particular cultivar. Such a specimen is designated the 'standard' and may consist of living or conserved material.

When it is known that a particular taxon and a particular cultivar both cover exactly the same known material (living and/or preserved), they are said to be entirely 'co-extensive'. In such a case, the type of the name of the 'taxon' may serve as the standard for the cultivar. When there is no certainty that the co-extensivity is complete, then a standard should be chosen for the cultivar, separate from the type of the name of the taxon (e.g. in the case of *Dracaena warneckei* Engl. and *D. fragrans* 'Warneckei').

CULTIVAR GROUPS IN *DRACAENA FRAGRANS*

Nowadays and in the past the recognition of cultivars of horticultural merit in the genus *Dracaena* has mostly been based on the variegation of the leaves. In *D. fragrans* well-known cultivars of this type are 'Massangeana', 'Lindenii' and 'Victoria', with different patterns of longitudinal striations of different colours and width. On the same characters cultivars have been recognised in *D. deremensis*. Typical cultivars assigned to the latter species are 'Warneckei' and 'Bausei'. Recently very compact, small-leaved cultivars (both green and variegated) have been developed in *D. deremensis*, as well as a host of new variegated, large-leaved cultivars. The transference of all these cultivars to *D. fragrans* calls for a nomenclatural recognition of two distinct groups of cultivars, formerly assigned to *D. deremensis*. One group will be based on leaf morphology alone (Compacta group) and one on a combination of variegation and leaf morphology (Deremensis group). Since the leaf morphology of cultivars in the Deremensis group is different from that in the conventional cultivars of *D. fragrans* ('Massangeana', etc.), the latter ones will not be accomodated in this group. Similarly the conventional *D. deremensis* cultivar 'Janet Craig' will not be accomodated in the Deremensis group because of its green leaves and an instability as to leaf shape.

The remarkable instability of leaf colour patterns in both cultivar groups, which is of a chimaeral nature (Pohlheim, 1982; Tilney-Bassett, 1986), may lead to numbers of new cultivars. The circumscription of both groups will easily allow assignment of new cultivars to these groups and thus serves stability of classification and nomenclature. Consequently however, entirely new breeding developments may lead to new cultivar types that may need classifying in one or more new groups. It is strongly advised not to emend cultivar group descriptions for the sake of accomodating new types of cultivars. The consequence will be confusion as to the intentional meaning of the group. For the same reason the merging of cultivar groups (following the development of intermediate

cultivars) must lead to new names of the newly circumscribed groups (Hetterscheid & Brandenburg, in prep.).

Following ICBN rules, the full name of the cultivar 'Warneckei' may be:

Dracaena 'Warneckei'

Dracaena fragrans 'Warneckei'

Dracaena fragrans (Deremensis gr.) 'Warneckei'

The cultivar groups are circumscribed below and, for both groups, the more recent and still available cultivars are briefly diagnosed. A number of colour plates of cultivars can be found in Graven, Bos & Hetterscheid (1990).

Dracaena fragrans Deremensis group

Not or sparingly branched, slender-stemmed plants. Internodes 10–20mm long. Leaves narrowly elongate, rarely linear, leathery, from the middle gradually tapering to the sharply pointed apex, upper surface moderately glossy, with some irregular, shallow, longitudinal furrows, variegated with longitudinal bands and streaks of different tinges of white, yellow, green, bluish-green and greyish-green; length (23–) 30–60cm, width 1–7cm; usually upright and bending horizontally, rarely almost entirely erect or strongly nodding near the base, no distinct pseudopetiole.

Standard cultivar: *D. fragrans* 'Warneckei' (syn.: *D. warneckei, D. deremensis* 'Warneckei').

Dracaena fragrans Compacta group

Not or sparingly branched, slender-stemmed, compact plants. Internodes 5–10mm long. Leaves elongate to narrowly elongate, leathery, from the middle gradually tapering to the sharply pointed apex, upper surface glossy, moderately glossy or dull, with or without some irregular, shallow longitudinal furrows, entirely green or variegated with longitudinal bands and streaks of different tinges of white, yellow, green and greyish-green; length 12–25cm, width 2–4 cm; horizontal, rarely almost entirely erect, the apex sometimes more or less strongly curved downwards, no distinct pseudopetiole. The inflorescence unbranched or with strongly congested, short branches.

Standard cultivar: *D. fragrans* 'Compacta' (syn.: *D. deremensis* 'Compacta', *D. deremensis.* 'Janet Craig Compacta').

CULTIVARS OF THE DEREMENSIS GROUP

'Bausei': leaf center with a narrow, 2–5mm wide, greyish-green band, on each side a 6–11mm wide, bright ivory-white, band, leafmargins dark green; measures: 20–30 x 3.5–6cm.

Origin unknown; developes easily as bud mutation from several other cultivars (e.g. 'Warneckei', 'Compacta Variegata').

Standard specimen: Hetterscheid HDR 8, coll. at Te-We Wholesale Nursery, Tilburg, Netherlands, November 1991. Conserved at WAG.

PLATE 1. Top left, *Dracaena fragrans* Deremensis group 'Lemon Lime'; top right, *Dracaena fragrans* Deremensis group 'Monique'; bottom left, *Dracaena fragrans* Compacta group 'Surprise'; bottom right, *Dracaena fragrans* Compacta group 'White Bird'. (Photographs VKC Aalsmeer Netherlands)

'Celles' (syn.: 'Rijsenhout'): leaves linear, very stiff, erect, margins ivory-white, the center irregularly streaked with greyish-green and bluish-green; measures: 20–35 x 1–1.5cm.
Origin unknown; developes as bud mutation from 'Green Stripe'.
Standard specimen: Hetterscheid HDR 16, cult. Wageningen Botanical Garden, Netherlands, November 1991. Conserved at WAG.

'Christianne': leafcenter with a 2–3cm wide, dark greyish-green band, mostly covered by diffuse, longitudinal, interrupted, light greyish-green and ivory-white streaks, margins broad, entirely bright yellow-green; measures: 25–35 x 4.5–6cm.
Origin: Te-We Wholesale Nursery, Tilburg, Netherlands; bud mutation from 'Green Stripe'.
Standard specimen: Hetterscheid HDR 17, coll. at Te-We Wholesale Nursery, Tilburg, Netherlands, November 1991. Conserved at WAG.

'Dr. Morebe': leafcenter with a 2–3cm broad, ivory-white band with a more or less clear, central, dark greyish-green band, margins (1–1.5cm) entirely dark green; measures: 30–40 x 3.5–6.5cm.
Origin unknown, Belgium; bud mutation from 'Warneckei'.
Standard specimen: Hetterscheid HDR 18, coll. at Te-We Wholesale Nursery, Tilburg, Netherlands, November 1991. Conserved at WAG.

'Green Stripe': leaf largely streaked/banded with light and dark greyish-green, the margin a narrow (3–4mm) bright green band, on the inner side with a thin (1–2mm) white line; measures: 40–60 x 3.5–4.5cm.
Origin: Te-We Wholesale Nursery, Tilburg, Netherlands; bud mutation from 'Warneckei'.
Standard specimen: Hetterscheid HDR 2, coll. at Te-We Wholesale Nursery, Tilburg, Netherlands, November 1991. Conserved at WAG.

'Lemon Lime': leafcenter with a narrow (5–10mm) band of light and dark greyish-green streaks, on both sides a 3–5mm wide, white band, the rest bright yellow-green; measures: 30–40 x 6–7cm. The leaves often become pendulous with age. **Plate 1.**
Origin: Te-We Wholesale Nursery, Tilburg, Netherlands; bud mutation from 'Green Stripe'.
Standard specimen: Hetterscheid HDR 1, coll. at Te-We Wholesale Nursery, Tilburg, Netherlands, November 1991. Conserved at WAG.

'Longii': leafcenter an uninterrupted, 8–15mm wide, bright white band, the rest dark green. The leaf strongly and sharply nodding near the base, pendulous; measures: 23–36 x 3–3.5cm.
Origin unknown; bud mutation from 'Warneckei'.
Standard specimen: Hetterscheid HDR 11, coll. at Te-We Wholesale Nursery, Tilburg, Netherlands, November 1991. Conserved at WAG.

'Monique': leaf largely dark greyish-green, longitudinally interrupted by light greyish-green streaks, the margin (3–6mm) bright green, on the inner side with a narrow (3mm) ivory-white band, strongly widening near the leaf-base; measures: 40–50 x 3.5–5cm. **Plate 1.**
Origin: Te-We Wholesale Nursery, Tilburg, Netherlands; bud mutation from 'Green Stripe'.
Standard specimen: Hetterscheid HDR 4, coll. at Te-We Wholesale Nursery, Tilburg, Netherlands, November 1991. Conserved at WAG.

'Rhoers' Gold': young leaves at first yellowish-white with a narrow, dark green margin, then rapidly changing to the typical 'Warneckei' pattern (see below); measures: 40–50 x 3.5–5cm.
Origin unknown; mutation from 'Warneckei'.
Standard specimen: Hetterscheid HDR 6, coll. at Te-We Wholesale Nursery, Tilburg, Netherlands, November 1991. Conserved at WAG.

'Te-We': leaf margin a broad (10–20mm), bright yellow-green band, on the inner side a narrow (1–2mm) white stripe, the center streaked/banded with light and dark greyish-green; measures: 35–40 x 5–6.5cm. The colour pattern is remarkably stable throughout the year.
Origin: Te-We Wholesale Nursery, Tilburg, Netherlands.
Standard specimen: Hetterscheid HDR 15, coll. at Te-We Wholesale Nursery, Tilburg, Netherlands, November 1991. Conserved at WAG.

'Warneckei': leaf largely dark greyish-green with narrow, light greyish-green streaks, near the margin a narrow (0.5–2mm) white stripe, margin dark green. The white stripe may be placed nearer to the centre and occasionally widens to 4mm. Leaf measures: 40–60 x 3.5–4.5cm.
Origin: unknown.
Standard specimen: Hetterscheid HDR 14, coll. at Te-We Wholesale Nursery, Tilburg, Netherlands, November 1991. Conserved at WAG.

'White Stripe': like 'Warneckei' but white stripes very bright and consistently 2–4mm wide, suddenly widening near the leaf-base.
Origin: Te-We Wholesale Nursery, Tilburg, Netherlands; mutation from 'Warneckei'.
Standard specimen: Hetterscheid HDR 3, coll. at Te-We Wholesale Nursery, Tilburg, Netherlands, November 1991. Conserved at WAG.

'Yellow Stripe': leaf center mostly dark greyish-green, often interrupted by light greyish-green streaks, the margin bright yellow, on the inner side with a narrow (5–10mm), ivory white stripe; measures: 40–60 x 3.5–4.4cm.
Origin: Te-We Wholesale Nursery, Tilburg, Netherlands; selected from 'Souvenir d'August de Schrijver', the latter lacking the white stripe.
Standard specimen: Hetterscheid HDR 12, coll. at Te-We Wholesale Nursery, Tilburg, Netherlands, November 1991. Conserved at WAG.

CULTIVARS OF THE COMPACTA GROUP

'Compacta' (syn.: 'Janet Craig Compacta'): leaves green, upper surface strongly glossy and with numerous, shallow furrows, measures: 15–20 x 2.5–3.5cm.
Origin: unknown.
Standard specimen: Hetterscheid HDR 7, coll. at Te-We Wholesale Nursery, Tilburg, Netherlands, November 1991. Conserved at WAG.

'Compacta Variegata': pattern as in 'Warneckei', leaf measures: 20–25 x 3–4cm.
Origin: bud mutation from 'Warneckei'.
Standard specimen: Hetterscheid HDR 9, coll. at Te-We Wholesale Nursery, Tilburg, Netherlands, November 1991. Conserved at WAG.

'Sandra Mastaler' (syn.: 'Sandra Masteller', 'Janet Craig Sandra', 'Sandra'): similar to 'Compacta' but upper surface dull green, apex strongly curved downward, less strongly furrowed; measures: 12–19 x 3–4cm.

Origin: unknown.
Standard specimen: Hetterscheid HDR 19, coll. at Te-We Wholesale Nursery, Tilburg Netherlands, November 1991. Conserved at WAG.

'Surprise': leaf margin with a narrow (5–10mm), bright green band, slightly darkening with age, the inner margin with a narrow (1–3mm) white stripe, the center streaked/banded with light and dark greyish-green; measures: 20–25 x 3–4cm. **Plate 1.**
Origin: Te-We Wholesale Nursery, Tilburg, Netherlands; bud mutation from 'Green Stripe'.
Standard specimen: Hetterscheid HDR 13, coll. at Te-We Wholesale Nursery, Tilburg, Netherlands, November 1991. Conserved at WAG.

'White Bird': like 'Compacta Variegata' but white stripe broader (3mm), the green margin narrower; measures: 20–25 x 3cm. **Plate 1.**
Origin: Te-We Wholesale Nursery, Tilburg, Netherlands; bud mutation from 'Compacta Variegata'.
Standard specimen: Hetterscheid HDR 10, coll. at Te-We Wholesale Nursery, Tilburg, Netherlands, November 1991. Conserved at WAG.

CULTIVARS NOT ASSIGNED TO A CULTIVAR GROUP

'Janet Craig': leaves green, upper surface strongly glossy, with many shallow, longitudinal furrows, overarching, more or less suddenly narrowing near the apex, the base with a distinct pseudopetiole; measuring 25–50 x 5–9cm. Older plants loose their glossiness and are less distinctly furrowed, resembling more typical aspects of the species.
Origin: unknown but the cultivar has been found as a bud mutation from 'Compacta Variegata'.
Standard specimen: Hetterscheid HDR 5, coll. at Te-We Wholesale Nursery, Tilburg, Netherlands, November 1991. Conserved at WAG.

'Lindenii': leaves without furrows, dull upper surface, overarching, more or less suddenly narrowing near the apex, the base with a distinct pseudopetiole, with a central, broad, dark green band, interrupted by narrow, greyish-green streaks, both sides with a bright, yellow-green band, interrupted by dark and light green stripes, the margin dark green. The pattern is unstable and disappears with age or during a shortage of light. Leaves 20–60 x 3.5–9cm. The similar cultivar 'Victoria' has brighter yellow bands and is said to keep its pattern with age and light shortage.
Standard specimen: Hetterscheid HDR 22, cult. at Wageningen Botanical Garden, Netherlands, November 1991. Conserved at WAG.

'Massangeana': similar to 'Lindenii' but leafcenter with a broad, longitudinal yellowish-green band, variously interrupted by narrow, green stripes.
Standard specimen: Hetterscheid HDR 21, cult. at Wageningen Botanical Garden, Netherlands, November 1991. Conserved at WAG.

'Santa Rosa': similar to 'Lindenii' but the leafmargin with a narrow green band, the inner side with a narrow yellow-green band, the remainder of the surface dark greyish-green with some irregular, light greyish-green bands. Surface very dull. Leaves smaller than 'Lindenii', max. length 50cm, max. width 6cm.
Standard specimen: Hetterscheid HDR 20, cult. at Wageningen Botanical Garden, Netherlands, November 1991. Conserved at WAG.

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