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A Conspectus of *Ceropegia* L. (*Asclepiadaceae*) in Madagascar, and the Establishment of *C.* sect. *Dimorpha*

By

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With 3 Figures

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Summary

MEVE U. & LIEDE S. 1994. A conspectus of *Ceropegia* L. (*Asclepiadaceae*) in Madagascar, and the establishment of *C.* sect. *Dimorpha*. – *Phyton* (Horn, Austria) 34 (1): 131-141, 3 figures. – English with German summary.

An account of the 16 species out of 4 sections of the genus *Ceropegia* L. in Madagascar is given. *C. madagascariensis* (*C.* sect. *Janthina*), a leafy twiner on bushes and trees, is comprehensively described. A new section, *C.* sect. *Dimorpha* H. HUBER ex MEVE & LIEDE, is established for 8 succulent species marked by nearly 4-angled stems and terete and twining synflorescences.

Zusammenfassung

MEVE U. & LIEDE S. 1994. Ein Conspectus von *Ceropegia* L. (*Asclepiadaceae*) in Madagascar und die Aufstellung von *C.* sect. *Dimorpha*. – *Phyton* (Horn, Austria) 34 (1): 131-141, 3 Abbildungen. – Englisch mit deutscher Zusammenfassung.

Ein Überblick über die 16 Arten aus 4 Sektionen der Gattung *Ceropegia* L. auf Madagaskar wird gegeben. Die beblätterte, auf Büschen und Bäumen windende *C. madagascariensis* (*C.* sect. *Janthina*) wird ausführlich beschrieben. Für eine Gruppe von 8 sukkulenten Arten mit fast vierkantigen, vegetativen Achsen, aber runden und windenden Synfloreszenzachsen, wird die neue Sektion *C.* sect. *Dimorpha* H. HUBER ex MEVE & LIEDE aufgestellt.

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In the last revision of the genus *Ceropegia* L., HUBER 1957 accounted for six Malagasy species, predominantly belonging to the sect. *Janthina* HUBER. In the meantime, the number of taxa described for Madagascar has increased to 16, mainly through the contributions of Werner RAUH who has described 7 new succulent species (RAUH 1964, 1965, 1993, RAUH & BUCHLOH 1965). However, most of the Malagasy *Ceropegia* are extremely rare, and therefore often poorly known. This is particularly true for the most first Malagasy endemic known to science, *C. madagascariensis* DECNE. Based on living material this species is comprehensively described here for the first time. In addition, a complete survey of the Malagasy taxa, supported by herbarium and alcohol material of most of the other taxa, has been carried out.

1. *Ceropegia* sect. *Janthina* H. HUBER,
Mem. Soc. Brot. 12: 29 (1957)

Syn.: *C.* sect. *Janthina* ser. *Elegantes* H. HUBER in JACOBSEN, Sukkulenlexikon, 1. ed., 118 (1970), nom. invalid.

Type species: *C. elegans* WALL.

Delicate to robust climbers, with large, membranaceous to very small, rather succulent leaves, usually with spherical root tubers or with fleshy, fusiform roots. Corolla tube inflated basally or in the lower half, upper half subsequently expanding.

Distributed in Madagascar, tropical Africa, and on the Indian subcontinent.

1.1. *C. humbertii* H. HUBER,
Mitt. bot. Staatss. München 12: 72 (1955)

Holotype: Madagascar, Bassin supérieur du Sambirano, 1100-1200 m, HUMBERT 18542 (P!).

This species is characterized by large, lanceolate-ovate, distinctly acuminate leaves. The blackish and blunt apices of the corolla lobes result in a cut appearance of the flower. This species, endemic to the north of Madagascar, is apparently conspecific with *C. mayottae*, a name created by HUBER 1957 for the two Parisian specimens from the Comore Islands.

1.2. *C. scabra* JUM. & H. PERRIER 1908,
Ann. Inst. bot. géol. colon. Marseille, ser. 2, 6: 220 (1908)

Holotype: W Madagascar, Haut Bemarivo (Boina), bois des terrains cristallins, May 1902, PERRIER DE LA BÂTHIE 11626 (P!).

C. scabra has fairly large, lanceolate leaves with rostrate apices. The flower is extraordinarily large (\pm 6 cm in total); and the filiform corolla lobes can reach 3 cm in length. *C. scabra* is a distinct, though very rare taxon from central and western Madagascar.

1.3. *C. saxatilis* JUM. & H. PERRIER,

Ann. Inst. bot. géol. colon. Marseille, ser. 2, 6: 223 (1908),

(non MOORE 1908 = *C. bonafouxii* K. SCHUM., acc. to HUBER 1957: 161)

Holotype: NW Madagascar, Mahabo près d'Andranomavo, 1904, PERRIER DE LA BÂTHIE 1688 (P!).

Syn.: *C. contorta* JUM. & H. PERRIER, l. c.: 226 (1908).

C. saxatilis is interpreted by HUBER 1957 as the non-succulent ancestral form of *C. albisepta* (see 1.5.). It is distinguished by middle-sized, lanceolate leaves and corolla lobes with narrow, deltoid bases and rather elongated, acute apices. This rare species is only known from the north-western parts of Madagascar.

1.4. *C. madagascariensis* DECNE.

in DC., Prodr. 8: 642 (1844)

Holotype: GOUDOT s. n. (G).

Syn.: *C. petiolata* JUM. & H. PERRIER, Ann. Inst. bot.-géol. colon. Marseille 2, 6: 224 (1908). – Holotype: Madagascar, Bois voisins de Benvoay, sur les bords du Manombo, dans l'Ambongo, April 1904, PERRIER DE LA BÂTHIE 1717 (P!).

C. breviloba JUM. & H. PERRIER, Ann. Inst. bot.-géol. colon. Marseille 2, 6: 229 (1908). – Holotype: W Madagascar, Bois des bords de la Betsiboka, April 1901, PERRIER DE LA BÂTHIE 8998 (P!).

C. perrieri CHOUX, Ann. Inst. bot.-géol. colon. Marseille 4, 1: 34 (1923). – Holotype: Central Madagascar, Massif d'Andringitra, 1800 m., Jan. 1922, PERRIER DE LA BÂTHIE 14346 (P!).

Except for one poor sketch of a flower (HUBER 1957), this fourth species of section *Janthina* has never been illustrated nor described in detail before. *C. madagascariensis* is at present cultivated in the Botanic Garden of Münster, so that a detailed description can be furnished.

Description (compare Fig. 1): Plants geophytic, delicate, herbaceous climbers. Rootstock a small, roundish tuber, not exceeding 20 mm in diam.; with adventitious fibrous roots drawing the first stem divisions into the soil where they develop a rhizomataceous habit. These rhizomes can reach up to 5 mm diam. and develop roundish to depressed stem tubers of 10–20 mm diam. at the nodes. These stem tubers develop adventitious roots of 1 mm diam. In adult plants, the stem tubers finally replace the (primary) root tuber. Stems herbaceous, 1–2 mm diam., green, often with a reddish tinge, twining, glabrous. Leaf blades ovate-lanceolate to cordiform, usually acuminate, 10–45 mm long, 8–25 mm wide, membranaceous, (fresh)green; petiole 7–20 mm long, less than 1 mm wide, ± straight. Synflorescence closed, extra-axillary (vegetative growth continues from one of the axillary buds, resulting a displacement of the synflorescence into extra-axillary position, compare DEMETER 1922, TROLL 1959), few-flowered (usually 1–3 flowers), peduncle slender, 2–10 mm long, pedicels

4–15 mm long. Sepals deltoid-lanceolate, flat and appressed to the corolla tube, ± 1 mm long, 0.5 mm wide at the base. Corolla 15–30 mm in total length, abaxially glabrous. Basal half of tube forming an ovoid to clavate, cylindrical inflation, 5–10 mm long, 4–7 mm diam. merging rather gradually (though sometimes more abruptly) into a narrower, cylindrical, ascending upper half of the tube with conical mouth, 5–8 mm long, 2–4 mm wide. Inflation abaxially light green, with faint reddish brown spots around the mouth; the mouth abaxially whitish, but strongly patterned with reddish brown, elongated blotches, inside with a sparse ring of delicate white hairs (up to 0.5 mm long) at the base; free corolla lobes 6–9 mm long, ± 3 mm wide when expanded, erect, connivent at the apex and crowned by a little terminal tip, folded along the midrib for most of the length, producing a prominent, broad keel, ± 2 mm wide; basal two thirds of the lobes abaxially of the same colour as the narrowed tube, adaxially (keel) yellowish, finely spotted with reddish brown, terminal third of the lobes uniformly reddish brown; margins over their whole length ciliate with spreading, stiff, simple and whitish hairs (0.3–0.5 mm long). Corona 2–3 mm diam, 2–3 mm long, bowl-shaped with considerable depressions in staminal position, whitish; staminal corona lobes connivent-erect, linear-clavate, 2–2.5 mm long, glabrous, but finely verrucose around the apices, interstaminal corona parts bifid, forming two suberect, small-triangular, acute leaflets, ± 1 mm long, spreading or nearly connivent; upper rim of corona and interstaminal corona leaflets rarely glabrous, mostly sparsely hairy with whitish-translucent, spreading hairs (0.1–0.3 mm long). Gynostegium with a round stipe of 0.2–0.4 mm length, whitish. Pollinarium + 0.4 mm high, 0.6 mm broad, pollinium 0.3 mm long, 0.25 mm wide, yellow; corpusculum ovate, orange-brown, c. 0.1 mm long with small, rectangular and translucent translator wings.

Chromosome number: $2n = 22$ (Voucher: LIEDE 2853, Madagascar: Andringitra; in cultivation at Münster Botanic Garden; K, MSUN).

Distribution: Malagasy endemic with rather wide distribution, scattered between the southeastern woodland and the north-western part of the island.

Ecology: A delicate herb climbing on bushes and trees in forests or near forest margins.

1.5. *C. albisepta* JUM. & H. PERRIER,
Ann. Inst. bot.-géol. colon. Marseille, ser. 2, 6: 227 (1908)

Holotype: Madagascar: Andranomandavo près Andranomavo, May 1904, PERRIER DE LA BÂTHIE 1726 (P!).

C. albisepta is a subsucculent with stout, though slightly succulent, twining stems and relatively large leaves of 3 to 7 cm in length. Like all members of the sect. *Janthina* known for the island, *C. albisepta* typically

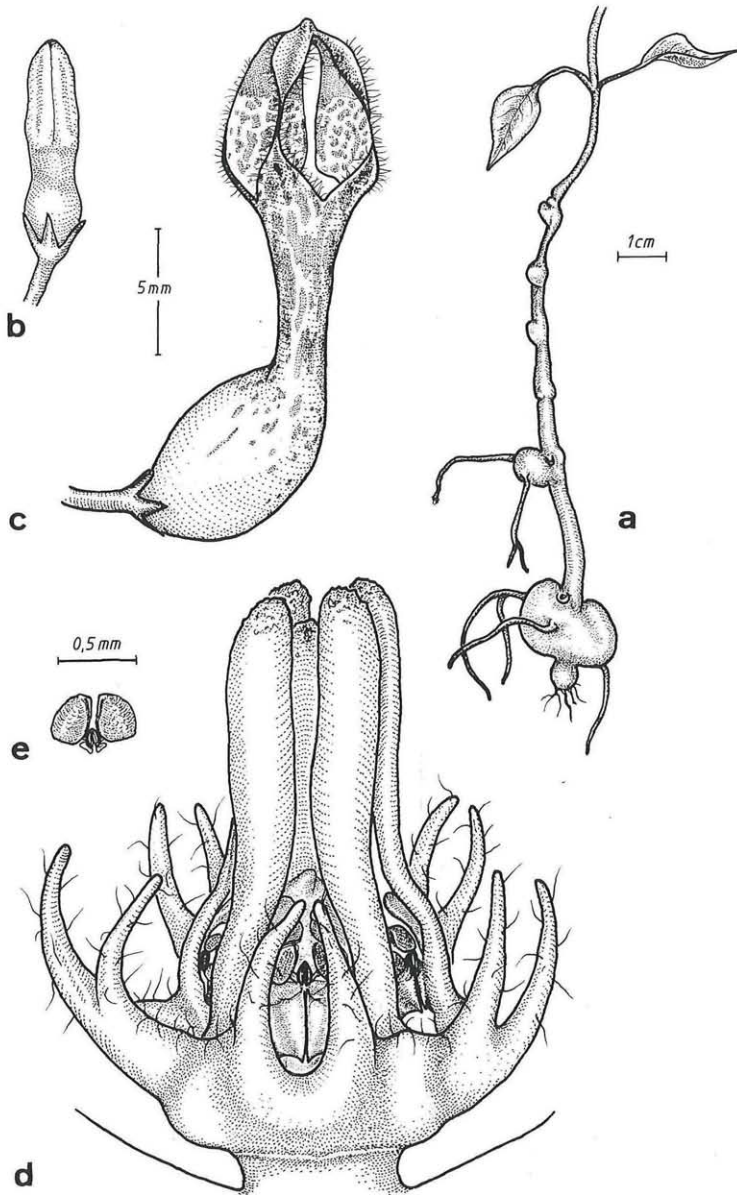


Fig. 1. *Ceropogia madagascariensis* DECNE. – a. basal stem segment with leafy section above soil level and rhizomataceous section bearing stem tubers with adventitious roots. – b. lateral view of flower bud. – c. lateral view of flower. – d. lateral view of corona. – e. pollinarium. – Drawing by U. MEVE from LIEDE 2853, Madagascar: Andringitra.

possesses small root tubers. Within the life form spectrum of Malagasy *Ceropegia*, *C. albisepta* occupies a somewhat intermediate position between the herbaceous and the true stem-succulent species.

1.6. *C. viridis* CHOUX,

Bull. Mus. Hist. nat. Paris 31: 398 (1925)

Holotype: Environs d'Ambovombé (Audroy), 16. 4. 1924, DECARY 2867 (P!).

Syn.: *C. decaryi* CHOUX, *C. helicoidea* CHOUX, *C. verrucosa* CHOUX.

C. viridis and *C. albisepta* are forming a highly variable complex. This complex was divided by HUBER 1957 into three varieties within *C. albisepta*. Later, though, for his account of *Ceropegia* in HUBER in JACOBSEN 1970, he separated var. *viridis* together with the var. *truncata* as *C. viridis* from *C. albisepta*.

The stems of *C. viridis* are more succulent than those of *C. albisepta*, the leaves only 1–4 cm long and considerably succulent, and the flowers are shorter with more blunt corolla lobe apices.

1.6.1. var. *viridis*

1.6.2. var. *truncata* (H. HUBER) H. HUBER in JACOBSEN

Sukkulentenlexikon, 1. ed.: 128 (1970)

Holotype: Vallée de la Sakamalio, affluent de la Manambolo (Bassin du Mandrare), 500–800 m, Dec 1933, HUMBERT 13306 (P!).

2. The Dimorphic Species

In addition to these species of sect. *Janthina*, a group of stem-succulent species was introduced by HUMBERT 1957. He described the most remarkable species in the whole genus, the stapelieaeform *C. dimorpha* (Fig. 2). More stem-succulents of this extraordinary affinity have been described in the last twenty years (compare RAUH 1993). All these species possess thin-stemmed synflorescences which are mostly twining, but finally weakening (compare RAUH & BUCHLOH 1989, RAUH 1993). Their corona is composed of more or less linear staminal lobes, which are erect and joint apically for a considerable distance (Fig. 2b). However, the most conspicuous features uniting this group are synapomorphic vegetative characters (Fig. 3):

- stems perennial, procumbent to erect, succulent, \pm 4-angled, rarely exceeding 20 cm in length;
- internodes shortened; nodes \pm broadened with persistent, succulent podaria;
- leaves small, weakening, with deflexed hairs along their margins.

This group of species can be considered to form a natural taxon, and thus deserves the status of a section of its own. As early as in 1970 (HUBER in JACOBSEN), HUBER delimitedated this group as a distinct taxon, ser. *Di-*

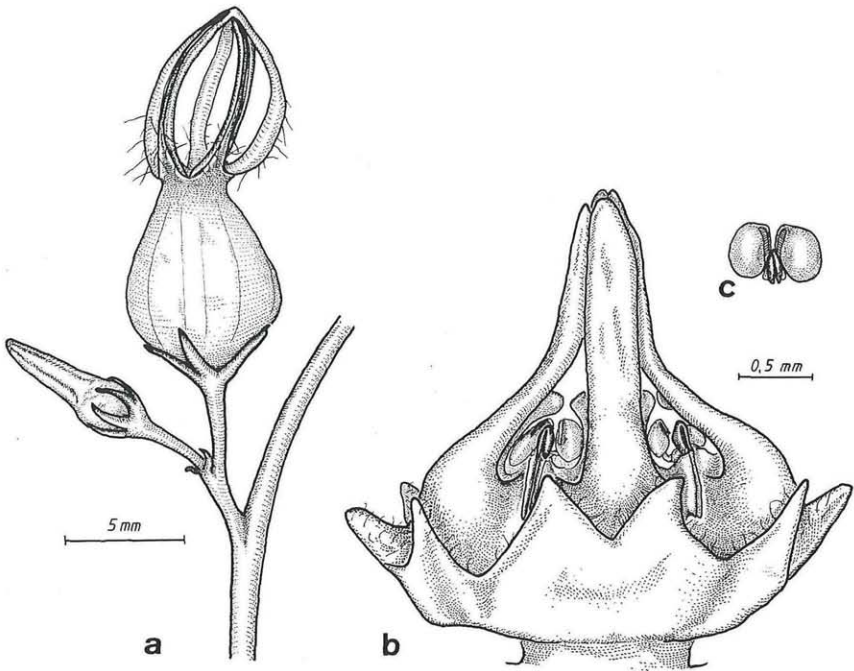


Fig. 2. *Ceropegia dimorpha* HUMBERT – a. Inflorescence with flower and bud. – b. lateral view of corona. – c. pollinarium. – Drawing by U. MEVE.

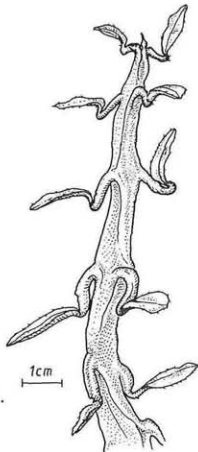


Fig. 3. *Ceropegia petignatii* RAUH. Growing young stem. Drawn after photograph published in RAUH 1993.

morpha H. HUBER, within sect. *Janthina*, uniting the other species in ser. *Elegantes* H. HUBER.

However, no Latin diagnosis is provided with the German description of both series, obviously in anticipation of a planned publication. According to the "International Code of Botanical Nomenclature" (ICBN, Art. 36.1, 1988), a taxon published after 1934 without a Latin diagnosis is not validly published. We therefore validate the name *Dimorpha* here, and simultaneously raise its rank.

2.1. *Ceropegia* sect. *Dimorpha* H. HUBER ex MEVE & LIEDE sect. nov.

Syn: *C.* sect. *Janthina* H. HUBER ser. *Dimorpha* H. HUBER in JACOBSEN, Sukkulentenlexikon, 1. ed., 118 (1970), nomen invalid.

Diagnosis: Plantae dimorphae, segmentis caulibus procumbentibus vel erectis, plerumque 5–20 cm longis, succulentis, quadrangularibus et podaribus prominentibus. Folia parva, debelia, margine pilis albis retroflexis induta. Caules floriferi tenues, rotundati, scandentes, ad pluris metris longis (sed non scandentes et rariore plus quam 30 cm longi in *C. dimorpha*).

Description: Plants with or without a root tuber, dimorphic; vegetative stem segments procumbent to erect, usually 5–20 cm long, succulent, 4-angled and \pm winged, with prominent podaria, leaves small, weak, margins with deflexed white hairs; flower bearing stem segments thin, round, twining, reaching up to several metres in length (in *C. dimorpha* non-twining, rarely above 30 cm long).

Type species: *C. dimorpha* HUMBERT

Distribution: Endemic to the semi-arid western regions of Madagascar.

2.2. The Species of *C.* sect. *Dimorpha*

Within the dimorphic *Ceropegias* two groups of species can be recognized: Group A with *C. dimorpha* and *C. leroyi* is characterized by rather long, linear leaves and a corona in which the interstaminal lobes are much shorter than the connivent-erect staminal ones (Fig. 2b). In addition, the short, single tips of each bidentate interstaminal corona part are orientated towards the tips of the neighboured one, and not to each other as in the group B, which comprises species 2.2.3 – 2.2.8. In group B the tips of the interstaminal corona lobes are much more elongated, the leaves are lanceolate to ovate, and the stems conspicuously 4-angled and verrucose.

This arrangement of species seems to reflect natural relationships better than the one of RAUH 1993 which is relying solely on similarities in the shape of corolla ("Atubuliflorae"), thus uniting *C. armandii* and *C. dimorpha* in the same group.

Although the species of the sect. *Dimorpha* are extremely rare, and often only known from the type localities, we have evidence for the supposition that the variability within the species is much higher than usually

thought. The four taxa *C. bosseri*, *C. hofstaetteri*, *C. petignatii* and *C. razafindratsirana*, for example, form a complex of very closely related elements, which possibly should be treated as a single species in future.

Group A:

- 2.2.1. *C. dimorpha* HUMBERT, Bull. Mus. Hist. nat. Paris, sér. 2, 6: 504 (1957). – Holotype: Madagascar, W Ranohira, plateaux et vallées de l'Isalo, 250 m, 1955, HUMBERT 28763 (P!).
- 2.2.2. *C. leroyi* RAUH & MARN.-LAP, Kakteen Sukk. 15: 178 (1964). – Type: Central Madagascar, Fianarantsoa, 1300 m, RAUH 10866 (holotype HEID; iso-P!).

Group B:

- 2.2.3. *C. armandii* RAUH, Adansonia 4: 419 (1964). – Holotype: Madagascar, 6 km from Itampolo, Aug. 1963, RAUH 10564 (HEID).
- 2.2.4. *C. bosseri* RAUH & BUCHLOH, Kakteen Sukk. 16: 226 (1965). – Holotype: Central Madagascar, Ihosy, BOSSER s. n. sub. B. G. H. 10668 (HEID).
- 2.2.5. *C. hofstaetteri* RAUH, Trop. subtrop. Pflanzenwelt 85: 17 (1993). – Holotype: Madagascar, Mahajanga, Ankarafantsika, Reserve Naturelle No. 7, April 1992, HOFFSTÄTTER s. n. sub B. G. H. 73340 (HEID).
- 2.2.6. *C. petignatii* RAUH, Trop. subtrop. Pflanzenwelt 85: 9 (1993). – Holotype: Madagascar, Toliara, 30 km N of Toliara, near Mora-Mora, Nov. 1990, RAUH 72226 (HEID).
- 2.2.7. *C. razafindratsirana* (RAUH & BUCHLOH) RAUH, Trop. subtrop. Pflanzenwelt 85: 25 (1993).

Syn.: *C. bosseri* RAUH & BUCHLOH var. *razafindratsirana* RAUH & BUCHLOH, Kakteen Sukk. 40: 124 (1989). – Holotype: Madagascar, Antananarivo, S of Ihosy, 1000–1200 m, RAZAFINDRATSIRA s. n. sub. B. G. H. 65533 (HEID).

- 2.2.8. *C. simonae* RAUH, Trop. subtrop. Pflanzenwelt 85: 20 (1993). – Holotype: Madagascar, Tsihombé – Ihado, April 1993, RAUH 73113 (HEID).

3. *Ceropegia* sect. *Phalaena* H. HUBER,
Mem. Soc. Brot. 12: 30 (1957)

Type species: *C. aristolochioides* DECNE.

3.1. *C. racemosa* N. E. BR. subsp. *glabra* H. HUBER,
Mem. Soc. Brot. 12: 96 (1957)

Holotype: Madagascar, Ambilobe, Massif du Marihoravoha, SW de Manambato, March 1951, HUMBERT & CAPURON 25664 (P!).

Of the two Malagasy species not belonging to sect. *Janthina* or sect. *Dimorpha*, *C. racemosa* subsp. *glabra* is a leafy twiner, but possesses fleshy fusiform roots, as usually found in its relatives, the well-known East African species *C. volubilis* N. E. BR. and *C. distincta* N. E. BR. *C. r.* subsp. *glabra* is limited to the central and northern parts of Madagascar.

4. *Ceropegia* sect. *Amphorina* H. HUBER,
Mem. Soc. Brot. 12: 35 (1957)

Type species: *C. sobolifera* N. E. BR.

4.1. *C. ampliata* E. MEYER subsp. *madagascariensis* LAVRANOS,
Adansonia, sér. 2, 13: 71 (1973)

Syn.: *C. ampliata* subsp. *insulicola* LAVRANOS, in schedis (P). – Type: Madagascar, Prov. Fianarantsoa, 4 km SW of Zazafotsy, 800 m, April 1972, LAVRANOS & MORAT 9590 (holotype PRE; iso-P!).

This subspecies was described from a single specimen collected in southern Madagascar. No remarkable difference between this and the typical subspecies can be found except for the insignificantly shorter staminal corona lobes in the Malagasy specimen. Therefore, subspecific rank is not adequate for this taxon and the name *C. ampliata* subsp. *madagascariensis* should be discarded.

On the African mainland, *C. ampliata* is fairly widely distributed between Tanzania and the Cape Province; the other few species of the sect. *Amphorina* are restricted to north-eastern Africa between Ethiopia and Tanzania.

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Recensiones

PAUWELS Luc 1993. Nzayilu N'ti. Guide des Arbres et Arbustes de la Région de Kinshasa – Brazzaville. – *Scripta botanica belgica*, Volume 4. – Lex. 8°, 495 Seiten, 261 Abbildungen; brosch. – Jardin botanique national de Belgique, B-1860 Meise. – BeF. 1530,-. ISBN 90-72619-10-2.

Der vorliegende Holzpflanzenführer deckt ein Gebiet von fast 35.000 km² um Kinshasa in Zaire und außerdem die Umgebung von Brazzaville in Congo ab. Das Buch wendet sich an alle an Pflanzen und Umwelt Interessierten und enthält dementsprechend eine einführende Einleitung mit Hinweisen auf Pflanzengeographie (mit Karte der Regionen von Congo und Zaire), Vegetation (außerhalb der dicht besiedelten Zentren vorwiegend Baumsavannen), mit einer Artenliste nach Standortstypen geordnet, Hinweisen auf Taxonomie, Nomenklatur und Klassifikation und über die Bedeutung eines Herbars sowie mit einer Benützungsanleitung; am Ende des Bandes findet sich ein Glossar für die morphologischen Fachausdrücke. 59 Seiten macht der Bestimmungsschlüssel aus. Auf 130 Seiten sind von den ca. 800 Arten des Gebietes die wichtigsten (über 300), nach Familien geordnet, beschrieben, inkl. knapper Angaben über Standort und Verbreitung; die übrigen sind nur namentlich an den entsprechenden Stellen erwähnt; außerdem sind ca. 100 kultivierte Arten berücksichtigt.

Der hervorstechendste Teil des Bandes ist die Sammlung von Abbildungen für ca. 275 Arten (p. 221–465). Die meist sehr guten Zeichnungen umfassen im allgemeinen pro Art eine Seite (in ca. 30 Fällen weniger, gelegentlich 2 Seiten) mit einem Übersichtsbild (meist Blütenzweig) und Details von Blüten und/oder Früchten. Größtenteils wurde für die Abbildungen auf vorhandene Vorlagen (aus Flore du Gabon, Flore d'Afrique centrale und anderen) zurückgegriffen, daneben sind einige Originalzeichnungen enthalten.

H. TEPPNER

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