Taxonomic novelties in Apocynaceae subfam. Asclepiadoideae from New Caledonia

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ABSTRACT
Marsdenia R.Br. represents the largest group of Asclepiadoideae in New Caledonia. With five new endemic species described here, and one new combination, the number of *Marsdenia* species increases to 18 for New Caledonia. The new species are all restricted to ultramafic substrates. *Marsdenia kaalensis* Meve, Gâteblé & Liede, sp. nov. is only known from the Mt. Kaala area in northwestern Grande-Terre, and *M. weberlingiana* Liede, sp. nov. is restricted to one locality at Hô (Houaïlou). In contrast, the other three species (*Marsdenia mackeeorum* Meve, Gâteblé & Liede, sp. nov., *M. neocaledonica* Meve, Gâteblé & Liede, sp. nov. and *M. paulforsteri* Meve, Gâteblé & Liede, sp. nov.) are fairly widely distributed and locally common. All new species are fully illustrated, and a distribution map is provided. Moreover, the new combination *Marsdenia guillauminiana* (P.T.Li) Meve, Gâteblé & Liede, comb. nov. (based on *Tylophora guillauminiana* P.T.Li) is proposed for this rare endemic, originally described as *Tylophora micrantha* Guillaumin. *Tylophora anisotomoides* Schltr., syn. nov., instead, is proposed as a new and additional synonym of *Vincetoxicum biglandulosum* (Endl.) Kunze.

KEY WORDS
Asclepiadeae,
Marsdenieae,
conservation,
Flora of New Caledonia,
new synonym,
new combination,
new species.

RÉSUMÉ
Nouveautés taxonomiques dans les Apocynaceae subfam. Asclepiadoideae de Nouvelle-Calédonie.
Marsdenia R.Br. est le groupe d'Asclepiadoideae le plus diversifié en Nouvelle-Calédonie. Avec cinq nouvelles espèces décrites ici, et une nouvelle combinaison, le nombre d'espèces de *Marsdenia* atteint 18 en Nouvelle-Calédonie. Ces nouvelles espèces sont toutes inféodées aux substrats ultramafiques. *Marsdenia kaalaensis* Meve, Gâteblé & Liede, sp. nov. est uniquement connu du massif du Kaala dans le nord-ouest de la Grande-Terre, et *M. weberlingiana* Liede, sp. nov. ne se retrouve que dans la localité de Hô (Houaïlou). À l'inverse, les trois autres espèces nouvelles (*Marsdenia mackeeorum* sp. nov., *M. neocaledonica* Meve, Gâteblé & Liede, sp. nov. et *M. paulforsteri* Meve, Gâteblé & Liede, sp. nov.) sont assez largement distribuées et localement communes. Toutes les espèces nouvelles sont entièrement illustrées et une carte de distribution géographique est présentée. Par ailleurs, la combinaison nouvelle *Marsdenia guillauminiana* (P.T.Li) Meve, Gâteblé & Liede, comb. nov. (d'après *Tylophora guillauminiana* P.T.Li) est proposée pour cette espèce rare et endémique, décrite à l'origine sous le nom de *Tylophora micrantha* Guillaumin. Le nom *Tylophora anisotomoides* Schltr., syn. nov., est quant à lui proposé comme synonyme supplémentaire de *Vincetoxicum biglandulosum* (Endl.) Kunze.

MOTS CLÉS
Asclepiadeae,
Marsdenieae,
conservation,
Flore de Nouvelle-Calédonie,
synonyme nouveau,
combinaison nouvelle,
espèces nouvelles.

INTRODUCTION

The milkweed family Asclepiadaceae, part of Apocynaceae as subfamily Asclepiadoideae (Endress *et al.* 2014), was analysed for the "Flore de la Nouvelle-Calédonie", and a first draft of a treatment for this flora was finished many years ago (S. Liede-Schumann & U. Meve, unpubl.). This treatment still awaits publication within the series. There, the contributors accepted, apart from *Gymnema tricholepis* Schltr. which is regarded as a *Marsdenia* by Forster (1995a, b), 14 species of *Marsdenia*, four of them new to science. Meanwhile, additional material of Asclepiadoideae has been collected on the archipelago (mostly by J. Munzinger, G. Gâteblé and H. Vandrot), and has been studied additionally for completion of the Flore de la Nouvelle-Calédonie treatment. Here, we are describing a set of five new species in *Marsdenia*, corroborating that the New Caledonian asclepiad biodiversity seems to be much larger than previously thought, mainly concerning the tribe Marsdenieae, and in particular the genus *Marsdenia* (see also: http://www.endemia.nc). This is not only true for Asclepiadoideae but also for many other angiosperm groups (cf. Wulff *et al.* 2013). The prediction of Morat (1993) that 5-10% of the New Caledonian flora remained to be described seems by now a fairly low estimation considering the many new endemic species recently described and the disclosure of cryptic species (Pillon *et al.* 2009, 2014; Swenson *et al.* 2015). Joppa *et al.* (2011) were unable to predict the number of undiscovered plant species in the New Caledonian biodiversity hotspot, ranging it from nearly 0 to 300%.

Molecular phylogenies are available for many genera and tribes of Asclepiadoideae and have led to quite a number of substantial reclassifications within the subfamily (cf. Endress *et al.* 2014). No satisfying phylogeny for the tribe Marsdenieae has been published so far, hence there is no modern framework to place the New Caledonian species of *Hoya* R.Br., *Marsdenia* R.Br. and *Sarcolobus* R.Br. However, the preliminary results of a comprehensive analysis (Livshultz, Liede-Schumann, Meve and Wanntorp, unpubl. data) will probably not much affect the generic constitution of New Caledonian Marsdenieae. In New Caledonian Asclepiadeae, however, generic classification has been affected by molecular phylogenies. First, *Sarcostemma* R.Br. has been included in the cosmopolitan genus *Cynanchum* L. (Liede & Täuber 2002; Meve & Liede-Schumann 2012). Second, the genus *Tylophora* R.Br. needs to be included in *Vincetoxicum* Medik. when the results of the phylogenetic analyses of Liede-Schumann *et al.* (2012, 2016) are translated into taxonomy (Liede-Schumann & Meve, pers. comm.). With regard to New Caledonia, three native elements described under *Tylophora*, *T. anisotomoides* Schltr., *T. biglandulosa* Endl., *T. guillauminiana* P.T. Li need attention. The valid combination *Vincetoxicum biglandulosum* (Endl.) Kunze is available, to which *T. anisotomoides* is assigned as a new and further synonym. For the third species, however, the new combination *Marsdenia guillauminiana*, comb. nov. is published here.

TAXONOMIC TREATMENT

Family Apocynaceae Juss.
Subfamily Asclepiadoideae R. Br. ex Burnett
Genus *Marsdenia* R.Br.

Marsdenia kaalaensis Meve, Gâteblé & Liede, sp. nov.
(Figs 1A; 2; 3)

Dwarf shrubs with suborbicular leaves that are florally most similar to the linear-leaved twiner M. neocaledonica*, sp. nov. but possessing longer pedicels (7-14 mm long vs 3-6 mm long in* M. neocaledonica*, sp. nov.), triangular corona lobes* c. *1 mm long (vs ovate, 0.5 mm long in* M. neocaledonica*, sp. nov.), anther appendages 500 µm long, erect and parallel to the elongated-conical, rostrate style-head (vs 375 µm long, appressed to the broadly conical style-head in* M. neocaledonica*, sp. nov.).*

Fig. 1. — **A**, *Marsdenia kaalaensis* Meve, Gâteblé & Liede, sp. nov., flowering at the type locality at Mt. Kaala, 20.X.2007 (Photo: J. Munzinger); **B**, **C**, *Marsdenia neocaledonica* Meve, Gâteblé & Liede, sp. nov., flowering in ultramafic maquis at Katepaik mountain, 4.V.2015 (Photo: Hervé Vandrot); **D**, *Marsdenia paulforsteri* Meve, Gâteblé & Liede, sp. nov. in habitat at Mt. Dzumac, 26.I.2010 (Photo: G. Gâteblé); **E**, *Marsdenia paulforsteri*, sp. nov. in cultivation (Photo: G. Gâteblé).

Typus. — **New Caledonia.** Grande-Terre, North Prov., Kaala-Gomen, Mount Kaala, 164°23'22"E, 20°37'6"S, 920 m alt., in maquis among peridotites, 7.XII. 2005, fl., *Y. Pillon, R. Barrière & F. Rigault 213* (holo-, P[P05208158]!; iso-, NOU[NOU009225]!).

Paratypi. — **New Caledonia.** Grande-Terre, North Prov.: Koumac/Kaala-Gomen limit, crest between Pic Pandop and Mount Kaala, 700 m alt., in degraded maquis vegetation on eroded laterites, 14.XI.2005, *G. Dagostini, F. Rigault & R. Barrière 1088* (NOU020355); Kaala-Gomen, top of Mount Kaala, 21.VI.1966, *A. Nothis 200* (NOU017720).

Etymology. — *Marsdenia kaalaensis*, sp. nov. is named after the massif of Kaala, where it grows and of which it is a micro-endemic or a narrow endemic species restricted to one location (NES 1) according to the definition of Wulff *et al.* (2013).

Distribution and habitat. — **New Caledonia.** Grande-Terre, North Prov., Kaala-Gomen and Koumac, Mont Kaala (Fig. 3).The species is strictly confined to more or less degraded maquis vegetation on lateritic soils or between peridotites blocks and grows between 700 and 1000 m altitude.

Conservation status. — So far, the only known locality of this new species is on the top of the Kaala massif in the northwest of the main island of New Caledonia. The Kaala massif is especially rich in endemic plant species of different plant families with seven micro-endemic species reported to occur only there (Wulff *et al.* 2013). Mount Kaala is not a protected area and is facing a major impact from nickel mining activity especially the top of the mountain where this new species occurs. The whole predicted area suitable for the ecology (Mount Kaala between 700 and 1000 m altitude) of *M. kaalaensis*, sp. nov. is under mining concession belonging to

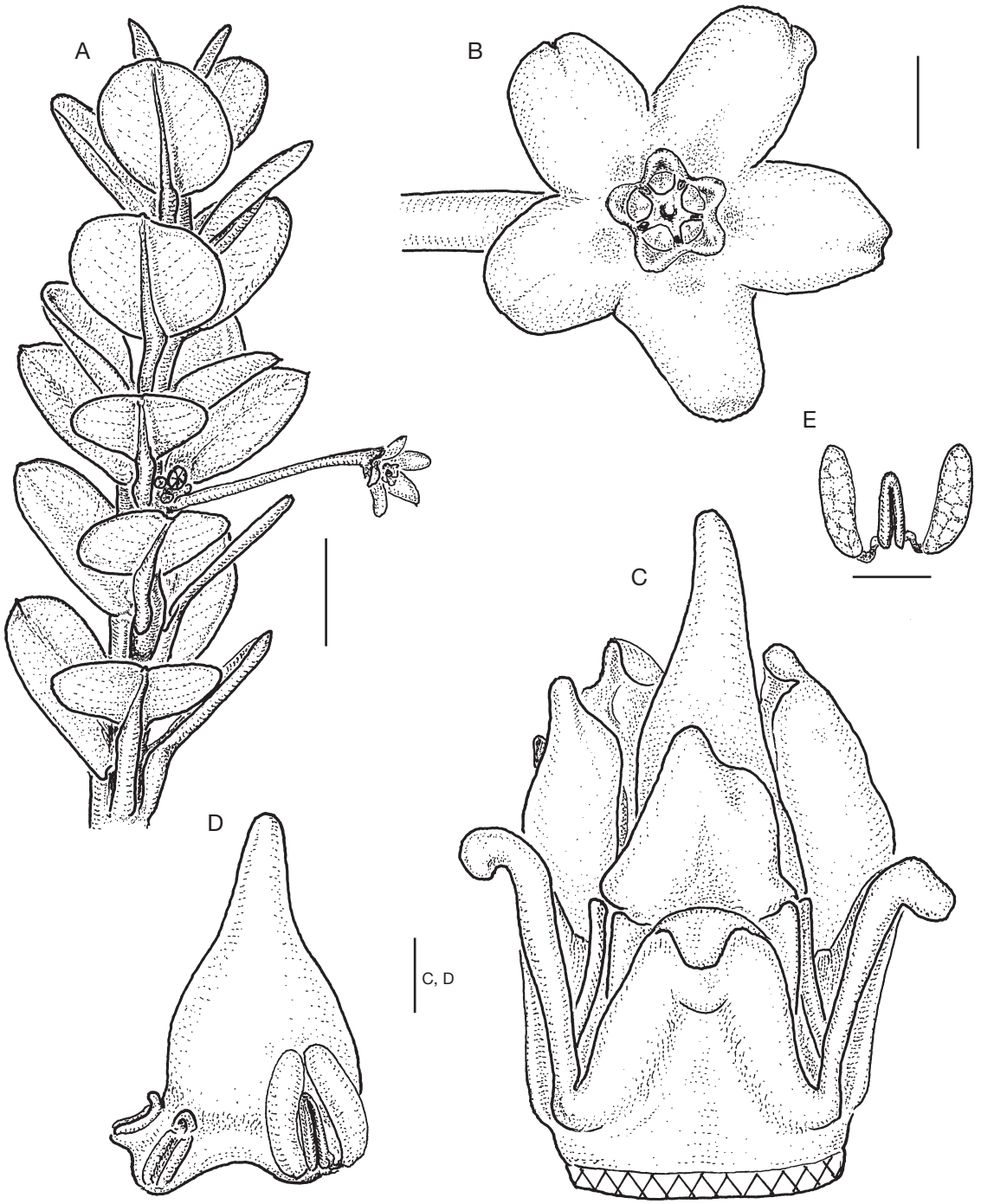

Fig. 2. — *Marsdenia kaalaensis* Meve, Gâteblé & Liede, sp. nov.: **A**, flowering stem; **B**, flower in top view; **C**, gynostegium with corona in lateral view; **D,** isolated style-head with still one pollinarium attached; **E**, pollinarium. Drawings: U. Meve from *Pillon et al. 213*, Fig. 2A drawn after a photograph taken by J. Munzinger. Scale bars: A, 5 mm; B, 2 mm; C-E, 0.2 mm.

two different mining companies. At the moment, *M. kaalaensis*, sp. nov. is only reported from the middle part of the Kaala, and there from the crest south of Piton de Pandop for the northern population and around the Kaala peak for the southern population; the whole area belonging to Société des Mines de Tontouta concessions. Thus, it is considered as a single location (sensu IUCN) with an EOO and an AAO of 4 km^2. The species is uncommon in the locality (cf. *Pillon et al. 213*) and a whole day search in the three previously reported places by three people did not locate it again on 27 April 2016. *Marsdenia kaalaensis*, sp. nov. is assigned a preliminary IUCN conservation status of "Critically endangered" [CR B1ab(ii,iii,v)+2ab(ii,iii,v)] using Red List criteria (IUCN 2012).

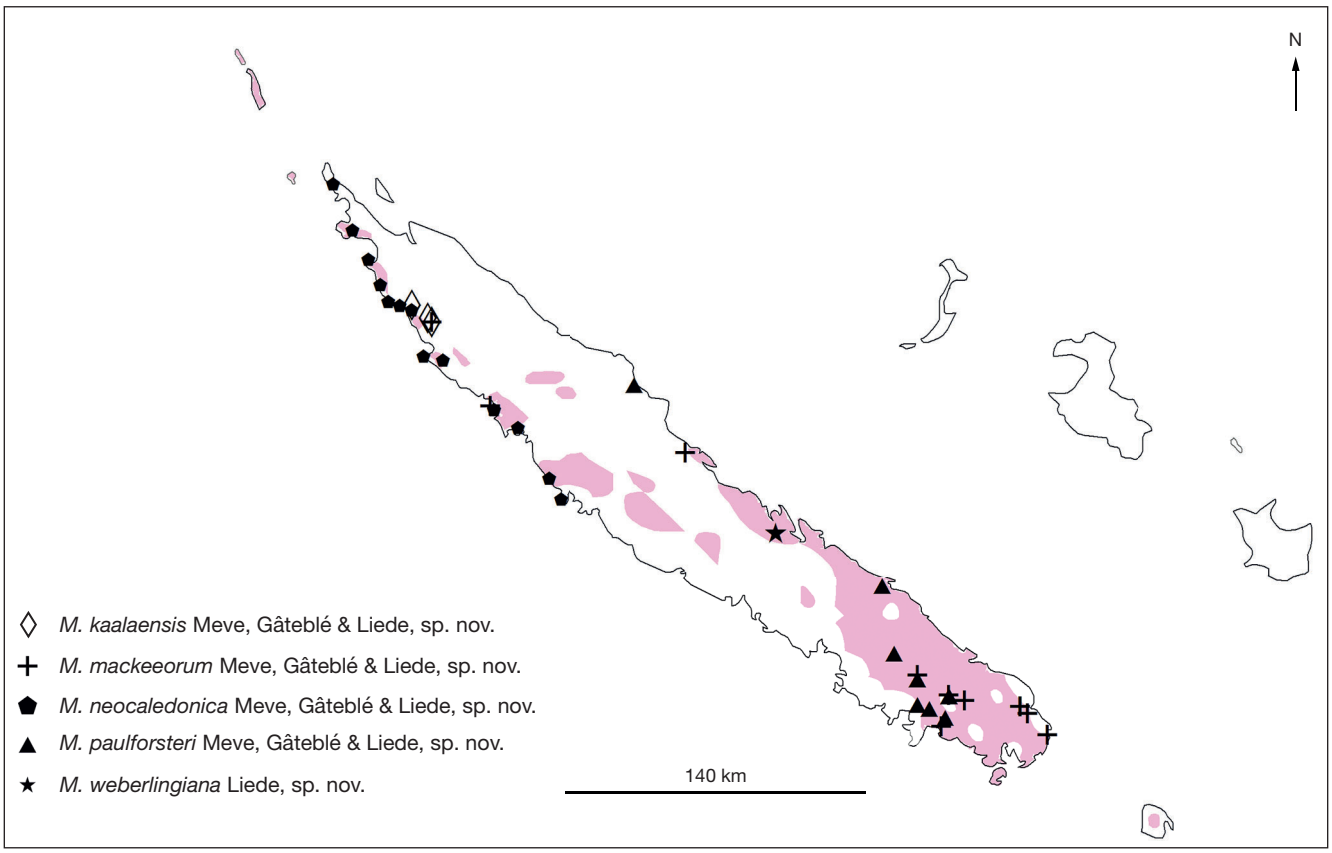

Fig. 3. — Distribution of the five new Neo-Caledonian *Marsdenia* R.Br. species.

Description

Plants

Compact, erect shrubs to 30 cm high, non-twining, branched, often trailing.

Shoots

Perennial, woody, with scattered trichomes when young; internodes 5-15 mm long, 1.5-3 mm diam.

Latex

Colour unknown.

Leaves

With petiole 10-30 mm long, spreading to ascending, pedicels 2-5 mm long, canaliculate above, with scattered trichomes when young, leaf blades without basal colleters, plain, stiff and coriaceous, 8-25 mm long, 7-17 mm wide, (broadly elliptic-) suborbicular, basally rounded, apically rounded but usually mucronate, glabrous, discolorous, adaxially dark green, abaxially bright green, with protruding rachis.

Inflorescences

Always one per node, extra-axillary, subsessile to shortly pedunculate, 2-many-flowered, sciadioidal, flowers open synchronously and in succession. Peduncles 0-1.5 mm long, persistent, glabrous or nearly so.

Flowers

Floral bracts broadly elliptic, less than 1 mm long, scattered hirsute (ciliate). Pedicels 7-14 mm long, glabrous or nearly so, bright green, occasionally spotted dark red. Flower buds *c.* 2 × 2 mm when mature, ovoid-globose.

Calyx

Free-lobed, glabrous, sepals *c.* 1.5 mm long, 1 mm wide, ovate, apically obtuse.

Corolla

Rotate-campanulate, 3-4 mm long, abaxially yellowish, adaxially bright yellow (occasionally with purple zones), glabrous; lobes fused for about a quarter of total corolla length, 1.5-2 mm long, 1.3-1.5 mm wide, horizontal to ascending, oblong, apically obtuse.

Gynostegial corona of staminal lobes (Cs)

Basally fused to each other to form a ring-like structure, yellowish, glabrous, *c.* 1 mm high, 1.5 mm diam., shorter than the gynostegium; staminal corona lobes spreading to erect, *c.* 0.7 mm long, 0.6 mm wide at base, solid, deltoid, adaxially with a central depression, with thickened, recurved margins and recurved tips.

Gynostegium

c. 1.5 mm high, 1 mm diam., elevated by a very short column; anthers twice as high as broad, *c.* 1.5 mm long, rectangular;

anther wings *c.* 300 µm long, extending along two thirds of anther length, consisting of distal ridge alone; adjacent anther wings parallel to each other in upper half, spreading in lower; connective appendages foliaceous, erect, *c.* 500 µm long, 400 µm wide, rectangular, shortly tipped.

Pollinarium
Corpusculum *c.* 200 µm long, 65 µm broad, elliptic; caudicles *c.* 60 µm long, cylindrical, with a s-shaped bent, basally inserted at the corpusculum; pollinia basally attached to the caudicles, erect, *c.* 300 µm long, 90 µm wide, ovate in cross-section, oblongoid.

Style-head
c. 0.7 mm long, 0.6 mm diam., elongated-conical, rostrate, rostrum 0.3-0.4 mm long.

Fruits and Seeds
Not seen.

Remarks
The new species makes an unusual sight, not only for *Marsdenia* in New Caledonia, with its low but compact shrubby habit and the condensed foliage of suborbicular, stiff and spreading leaves. In contrast, the flowers of *Marsdenia kaalaensis*, sp. nov. are not very spectacular except for their long pedicels that can reach 14 mm and surpass in length all New Caledonian *Marsdenia* species. A corona that is basally fused to form a ring-like structure spanning the interstaminal positions is found in other species as well (e.g. *M. neocaledonica*, sp. nov., *M. tylophoroides*) and elongate-conical and rostrate style-heads are also not unique (*M. lyonsioides*, *M. speciosa*). However, the conspicuously erect and foliaceous anther appendages are diagnostic for *M. kaalaensis*, sp. nov. alone. With regard to Asclepiadoideae, two other *Marsdenia* species are known from this locality, namely the frequent *M. microstoma* Schltr., and *M. oubatchensis* Schltr.

Marsdenia mackeeorum
Meve, Gâteblé & Liede, sp. nov.
(Fig. 4)

A slender vine with linear to slenderly elliptic, discolorous leaves as in M. microstoma *but with cymose (bostrychoid) inflorescences with persistent rachis elongating with age (vs sciadioidal inflorescences in* M. microstoma*), ascending-erect connective appendages (vs inwardly bent in* M. microstoma*), and a significantly conical style-head (vs depressed-conical style head in* M. microstoma*).*

Typus. — **New Caledonia**. Grande-Terre, South Prov., Yaté, Gouemba, 500 m, in maquis on serpentine soil, 22.III.1981, *H.S.MacKee 38863* (holo-, P[P00607333]!; iso-, P[P00607334]).

Paratypi. — **New Caledonia**. Grande-Terre: Road to Mt. Dzumac, N of Dumbéa, 8.I.2004, *P.P.Lowry et al. 6332* (NOU050203); La Coulée, 10 m, 13.VI.1971, *H.S.MacKee 23841* (P04222323); Kouaoua/Canala, Dahi, 500 m, 30.III.1977, *H.S.MacKee 32981* (P); Yaté, Haute rivière blanche, 450 m, 4.V.1981, *H.S.MacKee 39024* (NOU017827; P04222319); Yaté, 100 m, 22.XI.1985, *H.S.Mackee 42925* (NOU057812, P04593769); Plaine des lacs region, E of Grand Lac, along road to Haute Kuébini, 3 km along Kuébini rd, *c.* 300 m, 4.XI.1982, *G.McPherson 5050* (MO, NOU017828, P04222320); s.loc., 1861-1867, *E.Vieillard (leg. Pancher) 3004* (P04222321); Mont Dore-Dumbéa, Montagne des Sources, 22.VIII.1968, *G.L.Webster & R.Hildreth 14950* (P04222322).
Possibly also: Yaté, 100 m, 17.V.1992, *H.S.Mackee 45818* (P04593759), sterile.

Etymology. — Named after Hugh S. MacKee (1912-1995) and his wife Margaret E. MacKee (?1913-1990). Hugh S. MacKee was supposedly the biggest and best collector in New Caledonia ever. His wife was always helping him in collecting and preparing the samples (Morat 1995, 2010).

Distribution and habitat. — **New Caledonia**. Grande-Terre, North and South Provinces (Fig. 3). On serpentine, in moist forests or maquis, 10-700 m. *Marsdenia mackeeorum*, sp. nov. is typically found on ultramafic derived soils (serpentinite) in the southernmost part of Grande-Terre.

Conservation status. — Most of the locations are in the southernmost part of Grande-Terre south of Mt. Dzumac with one locality outside this range, between Canala and Kouaoua. All localities are on ultramafic substrate with some of them under mining concessions and some others not. Bush fires could also be a threat to the populations occurring in maquis vegetation. With more than five localities, an EOO of 1950 km² and an AAO of 32 km², we are assigning a preliminary IUCN conservation status of "Vulnerable" [VU B1ab(ii,iii,v)+2ab(ii,iii,v)] using Red List criteria (IUCN, 2012).

Description
Plants
Ascending, twining to 3 m high.

Shoots
Perennial, herbaceous, glabrous.

Latex
White (fide *MacKee 38863*, *39024*).

Leaves
With petiole 5-10 mm long, leaf blades coriaceous, with 3-5 colleters at the base, discolorous, 5-13 × 0.7-0.9 cm wide, linear to narrowly elliptic, basally rounded, apically acute, marginally revolute, glabrous on both sides.

Inflorescences
Always one per node, extra-axillary, bostrychoid, partial inflorescences geminiflorous, 12-25-flowered, 3-9 flowers open synchronously. Peduncles 5-7 mm long, glabrous; rachis 8-12 mm long, persistent, straight.

Flowers
With floral bracts *c.* 0.7 mm long, *c.* 0.5 mm wide at the base, triangular, glabrous or apically ciliate. Pedicels 4-7 mm long, with a single line of appressed, *c.* 150 µm long trichomes. Flower buds 2.5-3 × 1.5-2 mm when mature, conical.

Calyx
Entirely free, glabrous; lobes 0.6-0.8 × 1-1.2 mm, ovate, apically obtuse.

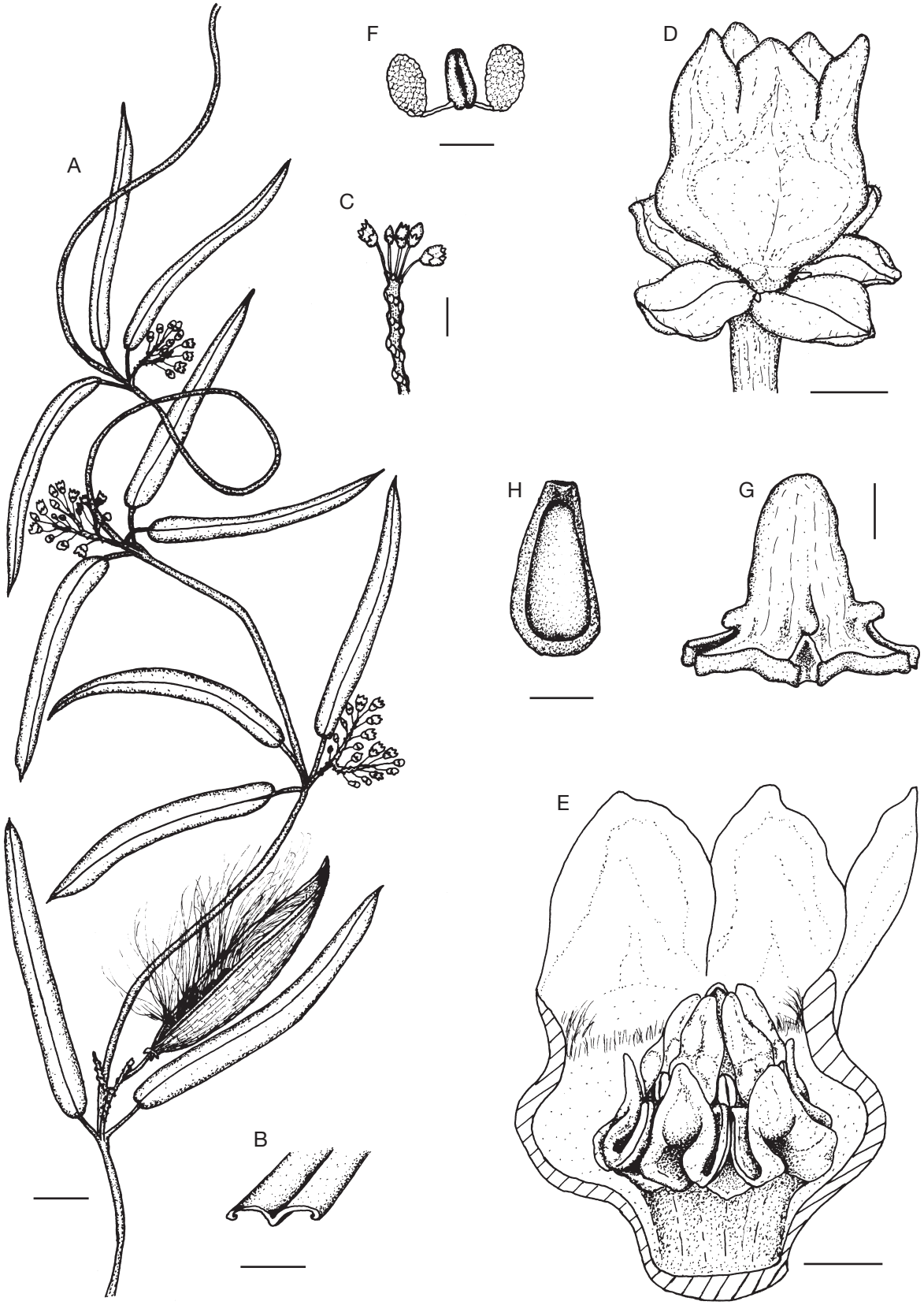

Fig. 4. — *Marsdenia mackeeorum* Meve, Gâteblé & Liede, sp. nov.: **A**, branch with inflorescences and follicle; **B**, leaf in cross-section; **C**, inflorescence; **D**, flower in lateral view; **E**, flower in lateral view, the two proximal corolla lobes removed to show the gynostegium; **F,** pollinarium; **G**, style-head; **H**, seed. Drawings: U. Frensch from *H.S. MacKee 38863* (P). Scale bars: A, 2 cm; B, C, 5 mm; D, 1 mm; E, 0.5 mm; F, G, 0.2 mm; H, 2.5 mm.

Corolla
Urceolate, 3-4 mm long, *c.* 2.5 mm diam., whitish, yellow or rose, adaxially with 350-450 µm long trichomes, concentrated on the throat of the tube; lobes fused for about half of total corolla length, *c.* 1 mm wide, incurved, triangular, apically acute.

Gynostegial corona of free staminal lobes
Glabrous, 0.6-0.8 mm long, shorter than the gynostegium; lobes laminar, triangular.

Gynostegium
1.2-1.4 mm long, 1.4-1.5 mm diam., elevated by a column of 0.5-0.7 mm length; anthers about as long as broad, rectangular, abaxially planar; anther wings 400-500 µm long, divergent, extending along the whole length of the anther, consisting of distal ridge alone; anther wings of adjacent anthers parallel to each other, basally widened, in the same plane as the anther; connective appendages 450-500 × 300-350 µm, triangular, narrower than the stamen, slightly inflexed.

Pollinarium
Corpusculum 380-400 × *c.* 100 µm, ovoid to elliptic, margins of the corpuscular cleft centrally widened; caudicles 80-100 µm long, (sub-)basally inserted at the corpusculum, cylindrical, straight, horizontal; pollinia apically attached to the caudicles, erect, *c.* 250 × 140-150 µm, round in cross-section, ovoid.

Style-head
0.7-0.8 mm long, *c.* 0.8 mm diam.; upper part *c.* 0.6 mm long, longer than the lower part, conical.

Follicles
Always one per flower, *c.* 60 × 12 mm, obclavate, round in cross-section, apically shortly beaked, wingless, dark brown, longitudinally grooved, glabrous.

Seeds
6-7 × 3.5-4 mm, ovate, dark brown; smooth on both sides, marginally with *c.* 0.3 mm wide wing with entire margin; coma *c.* 15 mm long.

Remarks
Herbarium material of this species has been previously identified as *Marsdenia oubatchensis* (syn. *M. pseudoparsonsia* Guillaumin) or *M. microstoma*. the linear-leaved *M. mackeeorum*, sp. nov. cannot be mistaken for the elliptical-ovate-leaved *M. oubatchensis* despite sharing very similar ovate-urceolate flowers. Vegetatively, the new species hardly differs from *M. microstoma*, from which it is distinguished by the bostrychoid inflorescences with a rachis that continues growth and flowering for long, whereas *M. microstoma* has sciadioidal inflorescences with all the flowers opening synchronously. In addition, long-ascending connective appendages, a conical style-head (broadly conical and depressed in *M. microstoma*) and smaller caudicles make it possible to recognize this species.

Marsdenia neocaledonica Meve, Gâteblé & Liede, sp. nov. (Figs 1B, C; 5)

Similar to M. microstoma *but differing in being erect to occasionally twining, sarmentose shrubs with densely and mostly distichously arranged, short, linear leaves, and campanulate flowers that do not exceed 3 mm in length.*

Typus. — **New Caledonia**. Grande-Terre, North Prov., Koumac, Siounda, 200 m alt., in maquis on serpentine soil, 22.IV.1967, *M.S.MacKee 16662* (holo-, P[P00607336]!).

Paratypi. — **New Caledonia**. Grande-Terre, North Prov.: Kafeate, 12.XII.1950, *M.Baumann-Bodenheim 9623* (P04258708, Z000052709); Pindai, 14.V.1992, *T.Jaffré 3156* (NOU017801, P04237233); Vallée de la Koumac, 30 m, 19.IV.1967, *H.S.MacKee 16598* (P04237234); Baaba, Pointe Sud-ouest, 5-20 m, 6.I.1971, *H.S.MacKee 23212* (P04237231); Poum, Anse de Pouani, 5 m, 17.II.1971, *H.S.MacKee 23336* (NOU057837, P04237232); Koné, Pinjen, 50 m, 25.IV.1971, *H.S.MacKee 23654* (P04237228); Gomen, Cap Deverd, 20 m, 10.IV.1975, *H.S.MacKee 30019* (NOU057777, P04237229); Plaine des Gaiacs, 20 m, 12.VIII.1977, *H.S.MacKee 33588* (NOU017800, P04237230); Koumac, Siounda, 200 m, 13.V.1978, *H.S.MacKee 35147* (NOU017802, P04237225); Néhoué, Babouillat, 5 m, 9.V.1979, *H.S.MacKee 36861* (NOU017819, P04237226); Koumac, Tangadiou, 50 m, 9.V.1979, *H.S.MacKee 36874* (P04237227); Voh, Katepaik mountain, 4.IV. 2016, *G.Gâteblé 760* (NOU); Ouaco, Néchoua, 100 m, 18.V.1981, *H.S.MacKee 39095* (NOU017818, P04237224); Montagnes de Gomonen près Gatope, 1861-1867, *E.Vieillard 2999* (P04237221, P04237222, P04237223) and *E.Vieillard 3000* (P04237219, P04237220).
The following sterile specimens probably also belong to *M. neocaledonica*, sp. nov.: Siouda, 20.I.2004, *G. Dagostini 754*, (NOU001304, P04526643); Poum, 13.XI.1990, *I.H.Müller 186* (P04564507); Pagoumene, VIII.1967, *A.Nothis 564* (P04593762).

Etymology. — While so many species of *Marsdenia* are endemic to New Caledonia, none has previously been named after the archipelago, where the new species is only found in the northwest of Grande-Terre.

Distribution and habitat. — **New Caledonia**. Grande-Terre northwest and Baaba island, North Prov. (Fig. 3). On serpentine sites at the base of northwest ultramafic massifs or on serpentine veins in maquis close to the coast, receiving comparatively little precipitation (800-1200 mm/p.a.); 5-200 m altitude.

Conservation status. — This species has a northwest pattern of distribution at low altitudes on serpentine soils between Plaine des Gaiacs in the south and Baaba island in the north. There is no or very little nickel mining in these places and bush fires are the main issue for conservation of plants in those localities. With about ten localities, an EOO of 1075 km² and an AOO of 44 km², we are assigning a preliminary IUCN conservation status of "Near Threatened" using Red List criteria (IUCN 2012).

Description
Plants
Erect to ascending shrubs, self-supporting or twining, 50-70 cm high, sarmentose, runners warty.

Shoots
Perennial, herbaceous, basally slightly corky, sparsely covered with appressed, 180-200 µm long trichomes, glabrescent; internodes 5-15 mm long, 1-2 mm diam.

Latex
Colourless, sparse.

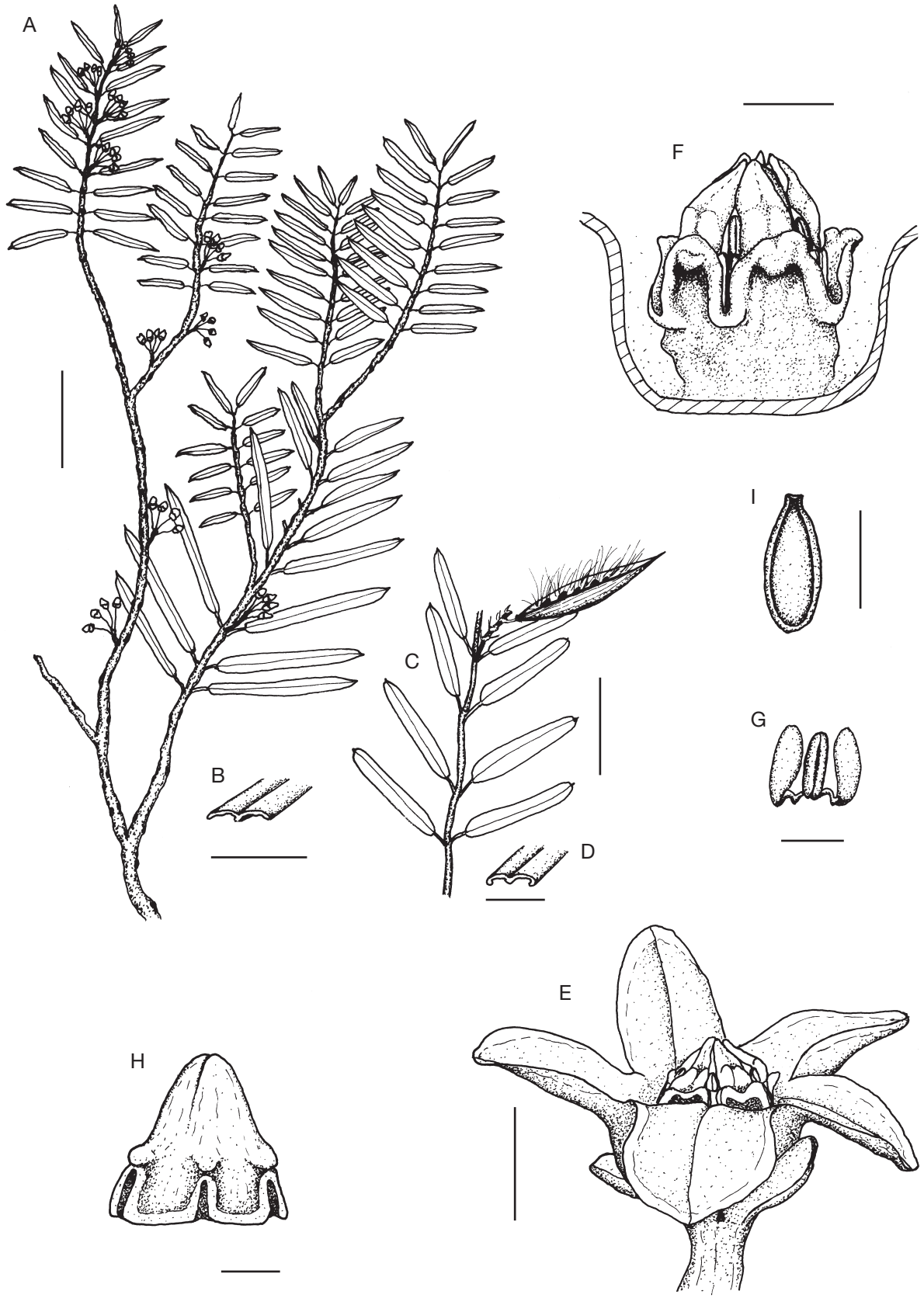

Fig. 5. — *Marsdenia neocaledonica* Meve, Gâteblé & Liede, sp. nov.: **A**, branch with inflorescences; **B**, leaf in cross-section; **C**, branch with open fruit; **D**, leaf in cross-section; **E**, flower in lateral view; **F,** gynostegium; **G**, pollinarium; **H**, style-head; **I**, seed. Drawings: **A**, **B**, **E**-**H**, U. Frensch from *H.S. MacKee 16662*; **C**, **D**, **I**, *H.S. MacKee 36874* (P). Scale bars: A, C, 2 cm; B, 5 mm; D, 7.5 mm; E, 1 mm; F, 0.5 mm; G, 0.2 mm.

Leaves
With petiole 2-5 mm long, densely and mostly distichously arranged, leaf blades coriaceous, with 2 colleters at the base, discolorous, 20-40 mm long (leaves supporting lateral shoots to 120 mm), 4-8 mm wide, elliptic, basally rounded, apically obtuse and mucronate, marginally revolute, adaxially and abaxially glabrous.

Inflorescences
Always one per node, growth continued beyond inflorescence, 3-7(-15)-flowered, all flowers open synchronously, sciadioidal. Peduncles 3-6 mm long, with sparse appressed trichomes, 180-200 µm long.

Flowers
With floral bracts *c.* 0.3 mm long, 0.2 mm wide at the base, ovate, with scattered trichomes. Pedicels 3-6 mm long, sparsely covered over the whole surface with flexuous trichomes, 180-200 µm long. Flower buds 20 × 15 mm when mature, conical.

Calyx
Entirely free, ciliate; lobes 0.6-0.8 mm long, *c.* 0.5 mm wide, ovate, apically acute.

Corolla
2-2.5 mm long, *c.* 4 mm diam., campanulate-rotate, abaxially yellow to purple, adaxially yellow, adaxially with 100-150 µm long trichomes concentrated on the tube and on the lateral parts of the lobes; lobes fused for about a third of total corolla length, 1-1.5 mm wide, patent, ovate, apically acute.

Gynostegial corona of free staminal lobes
Glabrous, 0.5-0.7 mm long, shorter than the gynostegium; lobes laminar, ovate, marginally thickened, apically recurved.

Gynostegium
0.9-1 mm long, 0.9-1 mm diam., elevated by a column of 350-400 µm length; anthers broader than long, rectangular, abaxially planar; anther wings 300-350 µm long, extending along the whole length of the anther; anther wings of adjacent anthers parallel to each other, in the same plane as the anther; connective appendages 375-400 × 300-350 µm, triangular, narrower than the stamen, slightly inflexed.

Pollinarium
Corpusculum *c.* 220 µm long, more than twice as long as broad, elliptic, margins of the corpuscular cleft sinuate; caudicles 70-100 µm long, (sub-)basally inserted at the corpusculum, cylindrical, s-shaped, concave-convex, not thickened at the insertion of the pollinium; pollinia apically attached to the caudicles, erect, 250-270 × 60-80 µm, ovate in cross-section, oblongoid.

Style-head
0.5-0.7 mm long, 0.5-0.6 mm diam., forming a nose at the upper end of the corpusculum; upper part 0.4-0.5 mm long, longer than the lower part, conical.

Follicles
Always one per flower, 30-40 × 6-8 mm, obclavate, round in cross-section, acute, apically strongly beaked, wingless, medium brown, longitudinally grooved (when dry), glabrous, endocarp shining.

Seeds
6-6.5 × 3-3.5 mm, ovate, medium brown; seta and aseta side smooth, marginally with 0.5-0.6 mm wide wing with entire margin; coma 15-20 mm long.

REMARKS
Vegetatively with the linear leaves and florally with details such as gynostegium, corona and pollinarium structure a close relationship between *M. neocaledonica*, sp. nov. and *M. mackeeorum*, sp. nov. and *M. microstoma* is indicated. However, with 4 cm as maximum length, the leaves are shortest in *M. neocaledonica*, always surpassed in length in the other two species. The epithet "microstoma" indicates that the corolla of *M. microstoma* is urceolate (urn-shaped) and fused for more than half of its length, similar to the ovoid-urceolate corolla in *M. mackeeorum*, sp. nov. The corolla of *M. neocaledonica*, sp. nov., however, is open and subcampanulate with the lobes fused for around one third of total corolla length. Finally, the corona of *M. neocaledonica*, sp. nov. is expanded to include interstaminal portions as well, a character missing in the other two species.

Marsdenia paulforsteri Meve, Gâteblé & Liede, sp. nov. (Fig. 1D, E; 6)

Similar to Marsdenia tylophoroides*, but latex white, corolla yellow and suburceolate with spreading to reflexed, ciliate, basally pilose to bearded lobes; style-head elongated conical, much exserted from the corolla tube, often bilobed. Outside New Caledonia most similar to the Australian* M. rostrata*, but with branching, bostrychoid inflorescences and a yellow suburceolate corolla with ovate lobes only basally pilose to bearded.*

TYPUS. — **New Caledonia**. Grande-Terre, South Prov., Montagne des Sources, *c.* 20 air-km NE of Nouméa, bushy slopes, 500-600 m, 19.II.1980, *G.McPherson 2451* (holo-, P[P00607338]!; iso-, MO).

ETYMOLOGY. — This new species is named after Paul I. Forster, Australian botanist, and a taxonomist/curator at the Queensland Herbarium (BRI). Forster revised the genus *Marsdenia* for Australia and Papuasia (Forster 1995b); he is author of many *Marsdenia* taxa.

DISTRIBUTION AND HABITAT. — **New Caledonia**. Grande-Terre, South Prov. (Fig. 3). On ultramafic substrate, in rainforests and maquis of the southernmost part of Grande Terre; 50-800 m.

CONSERVATION STATUS. — This new species is distributed in maquis and rainforests in the south part of the main island. There are about ten different localities *sensu* IUCN with at least three that are in protected areas. The species is not particularly threatened by nickel mining and the main threats could be bush fires especially for the low altitude populations growing in maquis. With an EOO of 1900 km² and an AAO of 52 km², we are assigning a preliminary IUCN conservation status of "Least Concern".

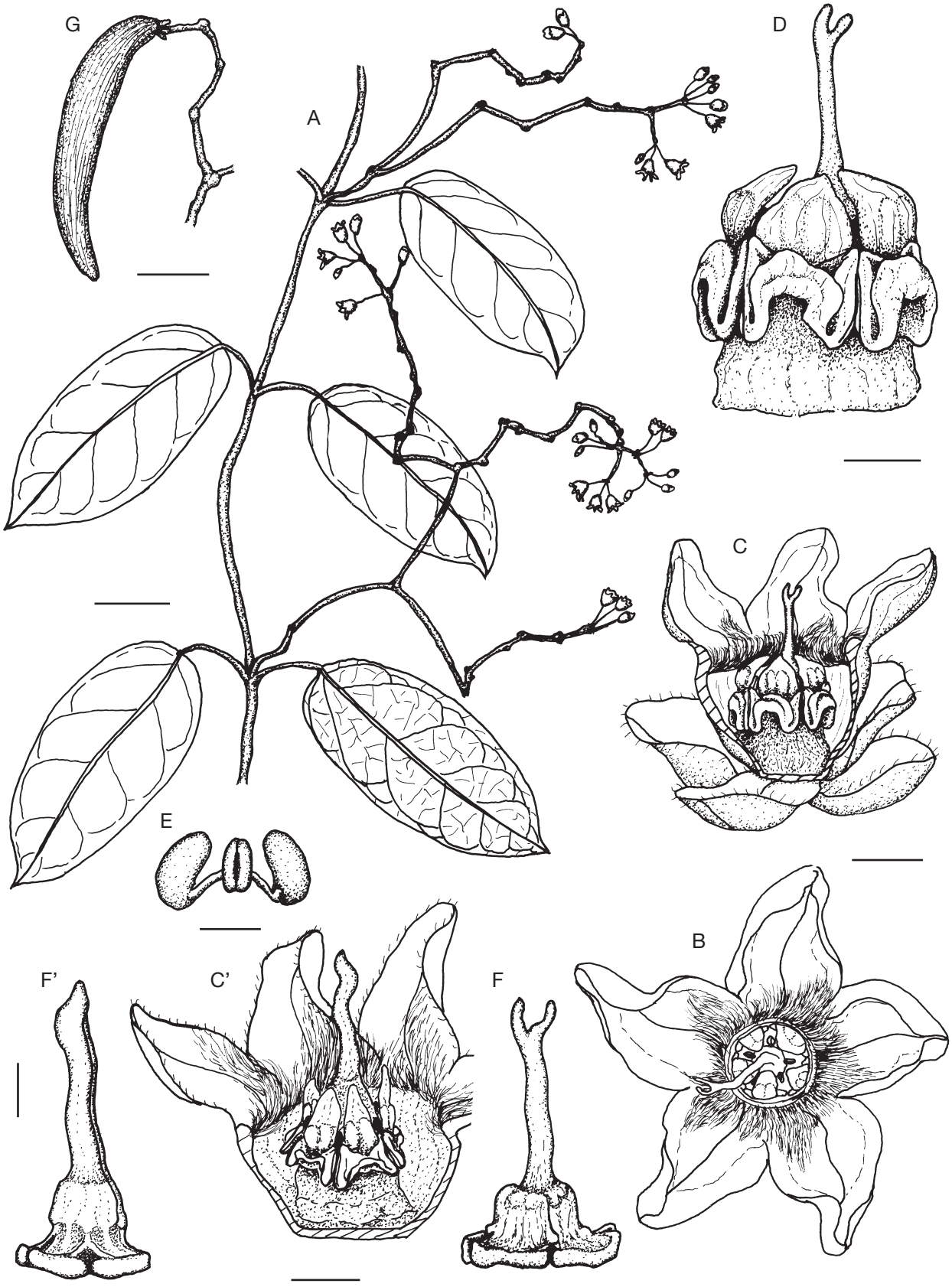

Fig. 6. — *Marsdenia paulforsteri* Meve, Gâteblé & Liede, sp. nov.: **A**, flowering stem; **B**, flower in top view; **C**, **C'**, flower in lateral view with parts of corolla removed; **D**, gynostegium with corona in lateral view; **E**, pollinarium; **F**, **F'**, isolated style-heads in lateral view; **G**, follicle. Drawings: **A**-**E**, **G**, U. Frensch from *H.S. MacKee 16458*; **C'**, **F'**, *M. MacKee 2432*. Scale bars: A, G, 2 cm; B, C, C', 1 mm; D, F, F', 0.5 mm; E, 0.2 mm.

Paratypi. — **New Caledonia.** South Prov., la Couvélée, 1.V.1951, *M.G.Baumann-Bodenheim 13053* (P04237188, Z000052731); Thy, Upper Western Extension, 14.I.1981, *H. Brinon 1108* (NOU057806); Montagne des Sources, 11.II.1983, *E. Cayrol* 50 (NOU057859, P04593777); Monts Dzumac, 166°27'51.9"E, 22°01'00.9'S, 800 m, 26.I.2010, *G.Gâteblé 337* (NOU083601); To'Ndeu (Thio) (Plante cultivée en pépiniére à SRA St. Louis, Mont Dore), 15.I.2015, *G.Karnadi 231* (NOU052046, IACNC000975); near site of old sawmill on road to Montagne des Sources, 650 m, 13.II.1955, *M.MacKee 2089* (P04237186); route de la Montagne des Sources, 600 m, 28.I.1956, *M.MacKee 3856* (P04237187); sentier du Mt. Dzumac, environs du 1er col, *c.* 600 m, 23.XII.1962, *H.S.MacKee 9823* (P04237183; NOU057809); sentier du Mt. Dzumac, au dessus de la Couvélée, 500 m, 23.II.1967, *H.S.MacKee 16458* (P04237184); *c.* 12 air-km NE of Nouméa; Thy river valley, *c.* 300 m, 15.II.1980, *G.McPherson 2432* (MO, P04237185); Mt Dzumac, *c.* 600 m, 23.II.1967, *J.M.Veillon 1051* (NOU0057811, P04593763); Mt Dzumac, *c.* 800 m, 30.III.1978, *J.M.Veillon* 3552 (P04593755); Montagne des Sources, *c.* 800 m, III.1981, *J.M.Veillon 4430* (P04593768, P04593773; NOU 057805); Piste du Dzumac, 600 m, 11.II.1988, *J.M. Veillon 6690* (NOU 057808, P04593782); "Wagap", 1861-1867, *E.Vieillard* 3003 (P04237181); environs de l'ancien campement Pages, vallée de la rivière du Humboldt, *c.* 130 m, 9.XII.1940, *R.Virot 357* (P04237182); Route de Yaté, vallée de la Numbée, *c.* 50 m, 25.XII.1945, *R.Virot 1556* (P04237179, P04237180).

Description

Plants

Ascending, twining, to 3 m high.

Shoots

Perennial, herbaceous, glabrous; internodes 10-13 cm long, 2-2.5 mm diam.

Latex

White (*fide Mackee 16458* [P04237184]).

Leaves

With petiole 15-40 mm long, leaf blades coriaceous, with 5-13 colleters at the base, 50-120 × 20-55 mm, elliptic to ovate, basally rounded to indistinctly cordate, apically acute to acuminate with acumen 5-10 mm long, glabrous on both sides.

Inflorescences

Always one per node, extra-axillary, 9-30-flowered (and more), long-lasting, 3-15 flowers open synchronously, basally dichasially branching, apically bostrychoid. Peduncles 10-40 mm long, glabrous; rachis 1-20 mm long, straight.

Flowers

With floral bracts 0.2 mm long, 0.3 mm wide at the base, deltoid, glabrous. Pedicels 5-10 mm long, glabrous. Flower buds 4-5 × 2-3 mm when mature, conical.

Calyx

Entirely free, ciliate; lobes 2-3 × 1.5-3 mm, ovate, apically obtuse.

Corolla

Suburceolate, 4-6 mm long, abaxially greenish yellow, adaxially yellow, adaxially pilose to bearded with 150-250 µm long trichomes, forming a ring on the throat; lobes fused for about half of total corolla length, 1.5-3 mm wide, patent to decurved, ovate, apically obtuse to acute, adaxially basally pilose to bearded, marginally ciliate.

Gynostegial corona of free staminal lobes

Glabrous, 0.5 mm high, shorter than the gynostegium; lobes laminar, broadly oblong.

Gynostegium

2.5-3.2 mm long, 1.4-1.7 mm diam., elevated by a column of 200-800 µm length; anthers about as long as broad, rectangular, abaxially planar, forming a basal arch; anther wings 600-800 µm long, extending along the whole length of the anther, consisting of distal and proximal ridge; anther wings of adjacent anthers parallel to each other, in the same plane as the anther; connective appendages *c.* 800 × 500 µm, ovate, equalling the stamen in width, slightly inflexed.

Pollinarium

Corpusculum *c.* 200 µm long, between 1.5 times and twice as long as broad, ovoid, margins of the corpuscular cleft centrally widened; caudicles *c.* 150 µm long, (sub-)basally inserted at the corpusculum, cylindrical, concavely recurved to straight, horizontal; pollinia subapically attached to the caudicles, erect, 250-300 µm long, 130-140 µm wide, ovate in cross-section, ovoid to oblongoid.

Style-head

1.8-2.5 mm long, 0.7-0.8 mm diam., invertedly infundibuliform, exserted from the corolla tube for around 1.5 mm, rostrate, rostrum elongated conical, 1.5-2.2 mm long, usually bifurcate.

Follicles

Always one per flower, *c.* 80 × 10-15 mm diam., obclavate, round in cross-section, apically obtuse, not beaked, wingless, grey, longitudinally grooved (when dry), glabrous, with thick pericarp.

Remarks

A vigorous and multi-flowered climber with large (up to 12 cm long) elliptic to ovate leaves and long-lasting inflorescence axes. Very characteristic are the yellow, spreading to reflexed corolla lobes exposing the unusually long, rostrate style-head much exserted from the corolla tube (Fig. 1E). With such a rostrum *M. paulforsteri*, sp. nov. shares an important character with the Australian *Marsdenia rostrata* R.Br. Other similarities concern the vegetative habit, size of flowers and apex of pollinia that points towards the corpusculum (Fig. 6E; cf. Forster 1995b: fig. 33). However, *M. rostrata* can be clearly distinguished from *M. paulforsteri*, sp. nov. by its sciadioidal inflorescences and campanulate flowers with mostly creamish corolla and lanceolate-ovate corolla lobes that are densely pilose all over.

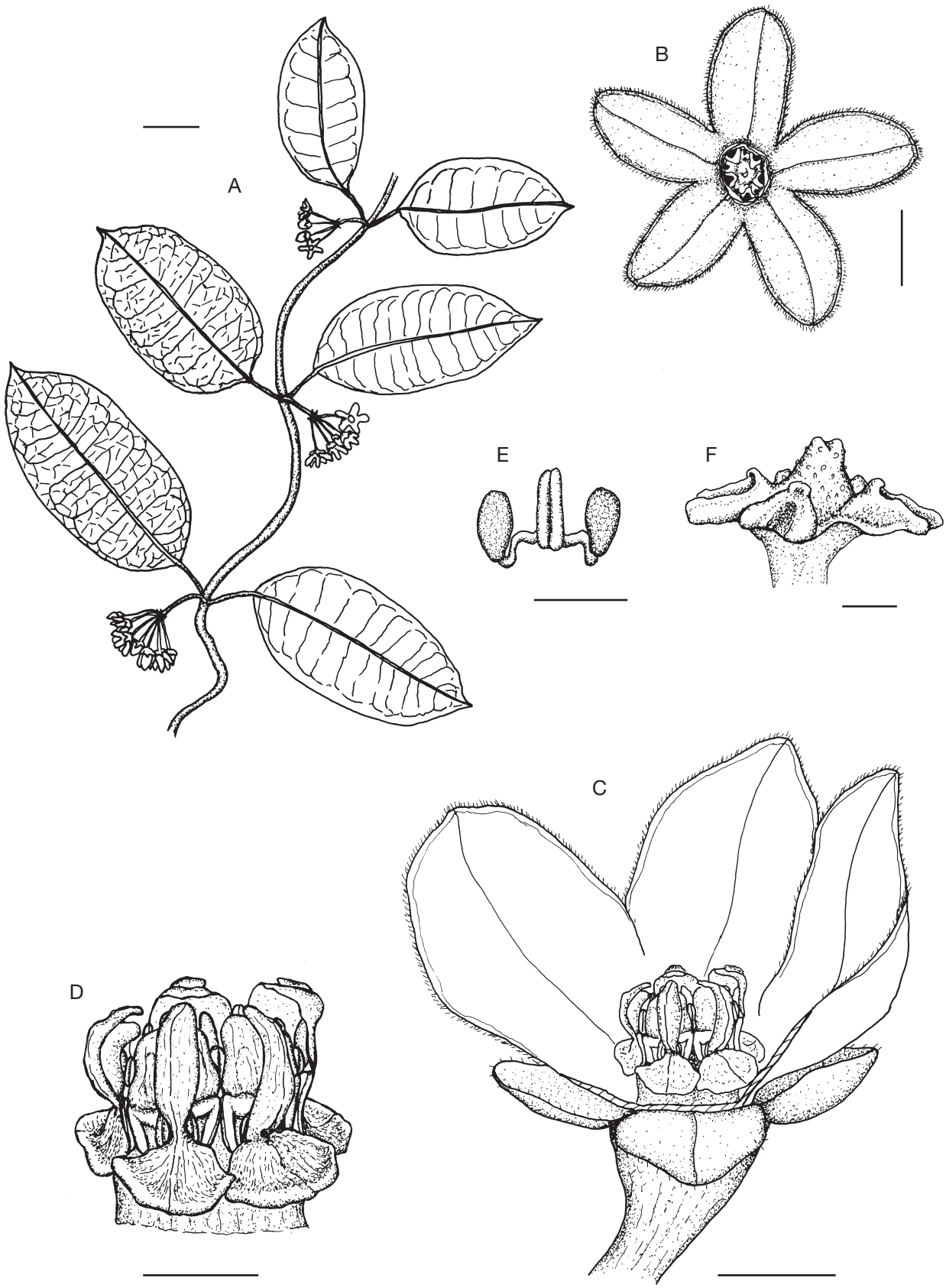

Fig. 7. — *Marsdenia weberlingiana* Liede, sp. nov.: **A**, branch with inflorescences; **B**, flower, top view; **C**, flower, side view, corolla partially removed; **D**, gynostegium; **E**, pollinarium; **F**, style-head. Drawings: U. Frensch from *M. MacKee 26650* (P). Scale bars: A, 2 cm; B, 3 mm; C, 2 mm; D, 1 mm; E, 0.5 mm; F, 0.2 mm.

Marsdenia weberlingiana Liede, sp. nov.
(Fig. 7)

A twining herb with ovate, coriacous and discolorous leaves indistinguishable from M. nigriflora *by vegetative characters, but otherwise unique within New Caledonian* Marsdenia *species because of its radiate flowers of around 12 mm diam. with adaxially glabrous corolla lobes, bipartite staminal corona lobes differentiated into a swollen, transversally ovate base and a lingulate apical part. The style-head is subconical and slightly papillate, and thus very similar to the one of* M. nigriflora.

TYPUS. — **New Caledonia**. Grande-Terre, North Prov., Hô (Houaïlou), reste de forêt sur terrain serpentineux altéré, 50 m, 29.IV.1973, *H.S.MacKee 26650* (holo-, P[P00607351]!; iso-, P[P00607352]!).

ETYMOLOGY. — Named after the late Prof. Focko Weberling (University of Ulm, Germany), well-known morphologist and inflorescence specialist. Weberling, highly respected teacher and mentor of S. Liede-Schumann, would have celebrated his 90th birthday in March 2016.

DISTRIBUTION AND HABITAT. — **New Caledonia**. Grande-Terre, North Prov. Known only from the type collection (Fig. 3). Margins of disturbed rainforest on serpentine; 50 m.

CONSERVATION STATUS. — So far, the only known locality of this new species is at Hô, just north of Houaïlou. The col de Hô region and the Cap Bocage peninsula are renowned for several rare species despite a general lack of botanical knowledge for the area. As a whole this region could be considered as an "ultramafic island". Most of the area is under nickel mining concession and the Cap Bocage peninsula is under active mining. The other main threat in this region are the severe bush fires that frequently occur. The North Province "Nature Guard" Philippe Nekotrotro has recently surveyed the type locality for this species without success. Considering that the remnants of rainforest pockets in the area are under fire and mining pressure, *M. weberlingiana* Liede, sp. nov. is assigned a preliminary IUCN conservation status of "Critically endangered" [CR B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)] using Red List criteria (IUCN, 2012) if not Extinct.

DESCRIPTION

Plants
Ascending, twining.

Shoots
Perennial, herbaceous, glabrescent, sparsely covered with appressed trichomes, 250-300 µm long; internodes 6-10 cm long, 2-2.5 mm diam.

Latex
Colorless *fide MacKee 26650*. *Leaves* with petiole 10-15 mm long, leaf blades coriaceous, with 2-4 colleters at the base, 70-100 × 30-45 mm, elliptic, basally rounded, apically acuminate with acumen 4-7 mm long, discolourous, glabrous on both sides.

Inflorescences
Always one per node, extra-axillary, 5-12 -flowered, all flowers open synchronously, sciadioidal. Peduncles 12-15 mm long, sparsely covered over the whole surface with appressed, 250-300 µm long trichomes.

Flowers
With floral bracts 1 mm long, 0.6 mm wide at the base, ovate, with scattered trichomes. Pedicels 10-15 mm long, sparsely covered over the whole surface with appressed trichomes, 150-200 µm long. Flower buds 7 × 4 mm when mature, ovoid.

Calyx
Fused for almost half of its length, campanulate, ciliate; lobes 2.5 × 1.5 mm, ovate, apically obtuse.

Corolla
Rotate, 6 mm long, abaxially green, adaxially brown to purple; lobes basally fused, 2.5-3 mm wide, horizontal, oblong, apically obtuse, marginally ciliate.

Gynostegial corona of free staminal lobes
Purplish-red, glabrous, 1.4-1.5 mm long, equalling to or longer than the gynostegium; lobes solid, massive, basally oblongoid, apically subulate, extended into a long, slender tip.

Gynostegium
c. 1.5 mm long, 0.7 mm diam., sessile. Stamens without filament; anthers broader than long, trapezoidal, abaxially planar; anther wings 450 µm long, extending along the whole length of the anther, consisting of distal ridge alone; anther wings of adjacent anthers parallel to each other, in the same plane as the anther; connective appendages *c.* 700 × 700 µm, triangular, equalling the stamen in width, strongly inflexed.

Pollinarium
Corpusculum *c.* 500 µm long, more than twice as long as broad, elliptic, margins of the corpuscular cleft parallel; caudicles *c.* 625 µm long, (sub-)basally inserted at the corpusculum, cylindrical, s-shaped, convex-concave, not thickened at the insertion of the pollinium; pollinia apically attached to the caudicles, erect, *c.* 450 × 200 µm, ovate in cross-section, ovoid.

Style-head
Slightly papillose, *c.* 0.5 mm long, *c.* 1 mm diam.; upper part *c.* 0.25 mm long, equalling the lower part, depressed-conical.

Fruits and seeds
Unknown.

REMARKS
The generic placement of this new species left some questions due to its unusual character combination. Unfortunately, the condition of the herbarium specimens was not sufficient to extract DNA for molecular analysis, so that the relationships could not be tested molecularly. Originally thought to belong to *Sarcolobus* R.Br. (cf. labels on type specimens), because of geniculate caudicles and a papillate style-head surface (cf. Forster 1991), this element is nevertheless published under *Marsdenia*, here. Latex constitution supports this placement, as colorless and clear instead of the predominant milky latex is a feature not rarely found in *Marsdenia* (Forster 1995b), especially in New Caledonian species (e.g. *M. ericoides* Schltr.,

M. koniamboensis Guillaumin). Colorless latex, in contrast, is not known to occur in *Sarcolobus* (cf. Forster 1991). Also, *Marsdenia weberlingiana* Liede, sp. nov. is not only indistinguishable from *M. nigriflora* Guillaumin with regard to vegetative characters, it shares a radiate corolla (but of 12 mm diam. versus 5 mm diam. in *M. nigriflora*), a more or less papillate style-head surface and similar pollinaria. However, pollinaria are larger in *M. weberlingiana* Liede, sp. nov. and with more distinctly geniculate caudicles. Geniculate caudicles, though fairly short ones, also occur in *M. kaalaensis*, sp. nov. (Fig. 2E).

NEW COMBINATION

Marsdenia guillauminiana
(P.T.Li) Meve, Gâteblé & Liede, comb. nov.

Tylophora guillauminiana P.T. Li, *Journal of South China Agricultural University* 15 (1): 64 (1994), replacement name for *Tylophora micrantha* Guillaumin, *Bulletin du Muséum national d'histoire naturelle, sér. 2*, 16: 82 (1944), *nom. illeg*.

Typus. — **New Caledonia**. Grande-Terre, North Prov., Balade, 1861-1867, *E. Vieillard 987* (holo-, P[P00607353]!; iso-, P[P04258524]!).

Etymology. — This species is named after André Guillaumin (1885-1974), author of the *Flore analytique et synoptique de la Nouvelle-Calédonie* (Guillaumin 1948).

Distribution and habitat. — **New Caledonia**. Grande-Terre, North Prov.

Conservation status. — Known from the type collection over 150 years ago, only, and possibly extinct.

Description

Plants
Ascending, twining, 6-10 m tall.

Shoots
Perennial, herbaceous, glabrous; internodes 3.5-5 cm long, 1.5-2 mm diam.

Leaves
With 10-15 mm long petioles, blades with 4 colleters at the base, herbaceous to coriaceous, 3-4.5 × 2-2.8 cm, elliptic, basally rounded, apically obtuse or minutely mucronate, glabrous on both sides.

Inflorescences
Always one per node, extra-axillary, forming a basal dichasium bearing two sciadioids, 10-20-flowered, all flowers open synchronously.

Peduncles
10-15 mm long, glabrous.

Flowers
With *pedicels* 2-3 mm long, glabrous.

Flower buds
c. 1.5 × 1 mm when mature, globose.

Calyx
Entirely free; lobes c.1 x.0.7 mm, ovate, apically acute.

Corolla
Rotate-campanulate, 1.5-2 mm long, *c.* 2.5 mm diam., adaxially with to 200 µm long trichomes on apical and lateral parts of the lobes; lobes fused about half of total corolla length, 0.6-0.7 mm wide, patent, ovate, apically acute.

Gynostegial corona of free staminal lobes
Glabrous, *c.* 0.6 mm long, shorter than the gynostegium; lobes laminar, oblong.

Gynostegium
c. 0.7 mm long, *c.* 0.6 mm diam., elevated by a column of *c.* 200 µm length; anthers broader than long, rectangular, abaxially planar, forming a basal arch; anther wings *c.* 300 µm long, extending along the whole length of the anther; anther wings of adjacent anthers parallel to each other, in the same plane as the anther; connective appendages *c.* 400 × 300 µm, ovate, slightly inflexed.

Pollinarium
Corpusculum *c.* 140 × 55 µm, elliptic; caudicles *c.* 30 µm long, medianly inserted at the corpusculum, cylindrical, straight, horizontal; pollinia apically attached to the caudicles, erect, *c.* 200 × 50 µm, round in cross-section, oblongoid.

Style-head
c. 0.35 mm long, *c.* 0.6 mm diam.; upper part 0.1 mm long, shorter than the lower part, umbonate.

Fruits and seeds
Not seen.

Remarks

Known only from the type. The very small flowers with their small pollinaria and the open, zig-zagging inflorescences at first point to *Tylophora/Vincetoxicum* as generic relationship of this rare species. However, repeated study of gynostegial structures showing: 1) a fringe-like corona also in interstaminal position; 2) prominent anther wings (as in *Marsdenia neocaledonica*, sp. nov., *M. tylophoroides* or *M. variifolia*); and 3) pollinaria with strictly erectly positioned, oblongoid pollinia, finally point to *Marsdenia* as only possible relationship for this element.

This species and *Tylophora anisotomoides* Schltr. have been usually regarded as synonymous (cf. to http://www.endemia.nc, https://plants.jstor.org/). However, this is clearly incorrect as the protologue of *T. anisotomoides* gives glabrous corolla lobes, but *Vieillard 987*, the type and only original material of *Tylophora micrantha*, possesses trichomes on the adaxial side of the corolla lobes. In addition, Schlechter's (1906) statement in the protologue of *T. anisotomoides* "*coronae foliolis tubo*

staminum basi alte adnatis carnosis, *lanceolato-rhomboideis*" unambiguously refers to a character highly significant for *Vincetoxicum biglandulosum* but not for *Tylophora micrantha* where the corona lobes are neither basal nor rhomboid nor carnose. Schlechter (1906) also compared his new species with *Tylophora tapeinogyne* as being most similar – the latter is a long-established synonym of *T. biglandulosa*. Finally, all further non-type specimens in P labelled "*Tylophora anisotomoides*" are found to belong to small-flowered or sterile material of *Vincetoxicum* (*Tylophora*) *biglandulosum* (cf. https://science.mnhn.fr/institution/mnhn/collection/p/item/search, last access on 3.XI.2016).

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