

New Species, New Combinations, and Lectotypifications in New Caledonian Eugenia L. (Myrtaceae)

Authors: Snow, Neil, Dawson, John W., Callmander, Martin W., Gandhi, Kanchi, and Munzinger, Jérôme

Source: Candollea, 71(1) : 67-81

Published By: The Conservatory and Botanical Garden of the City of Geneva (CJBG)

URL: <https://doi.org/10.15553/c2016v711a9>

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

New species, new combinations, and lectotypifications in New Caledonian *Eugenia* L. (Myrtaceae)

Neil Snow, John W. Dawson, Martin W. Callmander, Kanchi Gandhi & Jérôme Munzinger

Abstract

SNOW, N., J.W. DAWSON, M.W. CALLMANDER, K. GANDHI & J. MUNZINGER (2016). New species, new combinations, and lectotypifications in New Caledonian *Eugenia* L. (Myrtaceae). *Candollea* 71: 67–81. In English, English and French abstracts. DOI: <http://dx.doi.org/10.15553/c2016v711a9>

Five new species of *Eugenia* L. (Myrtaceae) are proposed from New Caledonia: *Eugenia amosensis* N. Snow, *Eugenia homedeboana* N. Snow, *Eugenia sicifolia* J.W. Dawson & N. Snow, *Eugenia tchambaensis* J.W. Dawson & N. Snow, and *Eugenia tiwakaensis* J.W. Dawson & N. Snow. The new species are provided with detailed species descriptions, digital images, comments on morphology and ecology, and conservation assessments following IUCN Red List Categories and Criteria. The following new combinations are proposed: *Eugenia gomonenensis* (Guillaumin) J.W. Dawson & N. Snow, *Eugenia lotoides* (Guillaumin) J.W. Dawson & N. Snow, *Eugenia styphelioides* (Schltr.) J.W. Dawson & N. Snow, and *Eugenia poimbailensis* (Guillaumin) J.W. Dawson & N. Snow. The new name *Eugenia veillonii* N. Snow & Callm. is proposed and its basionym is lectotypified. Lectotypes also are designated for *Eugenia mendute* Guillaumin, *Eugenia ovigera* Brongn. & Gris, *Eugenia horizontalis* Pancher ex Brongn. & Gris and its synonym *Myrtus aemulans* Schltr., as well as for *Myrtus gomonenensis* Guillaumin, basionym of *Eugenia gomonenensis*.

Résumé

SNOW, N., J.W. DAWSON, M.W. CALLMANDER, K. GANDHI & J. MUNZINGER (2016). Nouvelles espèces, nouvelles combinaisons et lectotypifications dans les *Eugenia* L. (Myrtaceae) de Nouvelle Calédonie. *Candollea* 71: 67–81. En anglais, résumés anglais et français. DOI: <http://dx.doi.org/10.15553/c2016v711a9>

Cinq nouvelles espèces d'*Eugenia* L. (Myrtaceae) sont proposées pour la Nouvelle-Calédonie: *Eugenia amosensis* N. Snow, *Eugenia homedeboana* N. Snow, *Eugenia sicifolia* J.W. Dawson & N. Snow, *Eugenia tchambaensis* J.W. Dawson & N. Snow et *Eugenia tiwakaensis* J.W. Dawson & N. Snow. Chacune des nouvelles espèces est présentée avec des descriptions détaillées, des scans numériques, des commentaires sur la morphologie et l'écologie, ainsi que des évaluations du statut de conservation suivant les Catégories et les Critères de la Liste Rouge de l'UICN. Les nouvelles combinaisons suivantes sont proposées: *Eugenia gomonenensis* (Guillaumin) J.W. Dawson & N. Snow, *Eugenia lotoides* (Guillaumin) J.W. Dawson & N. Snow, *Eugenia styphelioides* (Schltr.) J.W. Dawson & N. Snow, et *Eugenia poimbailensis* (Guillaumin) J.W. Dawson & N. Snow. Le nouveau nom *Eugenia veillonii* N. Snow & Callm. est proposé et son basionyme est lectotypifié. Des lectotypes sont aussi désignés pour *Eugenia mendute* Guillaumin, *Eugenia ovigera* Brongn. & Gris, *Eugenia horizontalis* Pancher ex Brongn. & Gris et pour son synonyme *Myrtus aemulans* Schltr., ainsi que pour *Myrtus gomonenensis* Guillaumin, basionyme de *Eugenia gomonenensis*.

Keywords

MYRTACEAE – *Eugenia* – New Caledonia – Systematics – Conservation

Addresses of the authors :

NS: Department of Biology, Pittsburg State University, Pittsburg, KS 66762, U.S.A. E-mail: nsnow@pittstate.edu

JWD: School of Biological Sciences, Victoria University of Wellington, P.O. Box 600, Wellington 6140, New Zealand.

MWC: Conservatoire et Jardin botaniques de la Ville de Genève, C.P. 60, 1292 Chambésy, Switzerland.

KG: Harvard University Herbaria, 22 Divinity Avenue, Cambridge, MA, 02138, U.S.A.

JM: Institut de Recherche pour le Développement – Botanique et modélisation de l'architecture des plantes et des végétations (AMAP), 34000 Montpellier, France

Submitted on January 11, 2015. Accepted on February 17, 2016.

First published online on March 31, 2016.

ISSN: 0373-2967 – Online ISSN: 2235-3658 – *Candollea* 71(1): 67–81 (2016)

© CONSERVATOIRE ET JARDIN BOTANIQUES DE GENÈVE 2016

Introduction

The *Myrtaceae* are among the most species-rich families of flowering plants in New Caledonia (DAWSON 1992, 1999; MORAT et al., 2012, IBANEZ et al., 2014). Many species of the family are known from relatively few collections and at least thirty additional new species in four or five genera remain to be described in addition to those proposed here (Snow, unpubl. data).

Among the less studied genera of *Myrtaceae* for New Caledonia is *Eugenia* L., one of the largest exclusively woody genera of plants (LUCAS et al., 2007; GOVAERTS et al., 2008; BIFFIN et al., 2010). The native distribution of *Eugenia* occurring in both the neo- and paleotropics is unique among the ca. 140–150 genera of *Myrtaceae* (SNOW et al., 2011).

The greatest specific diversity of *Eugenia* occurs in the neotropics (LANDRUM & KAWASAKI, 1997; MAZINE et al., 2014). Areas of particularly high diversity include the Atlantic Coastal forests (Mâta Atlantica) of Brazil, the Caribbean, MesoAmerica (e.g., BARRIE 2005, 2009) and the Northern Andes (LANDRUM & KAWASAKI, 1997). The relative paucity of *Myrtaceae* and *Eugenia* in lowland Amazonian forests (MORI et al., 1983) may be explained partially by the relatively low stature of many species and their often irregular flowering, which may limit dispersal of fruits, range expansion and diversification rates, although low stature and irregular flowering are not universal characters among species of *Eugenia*.

In addition to its richness in the New World tropics, *Eugenia* also has substantial levels of diversity in the paleotropics, particularly in Madagascar (SNOW, 2008, 2011; BIFFIN et al., 2010; SNOW et al., 2012, 2015), southern Asia, the Comoros (BYNG et al., 2016), and New Caledonia. Given known but unpublished taxa in preparation (e.g., SNOW et al., 2015), which includes perhaps 50 additional undescribed species from Madagascar and New Caledonia, we estimate that up to 30% of the diversity of *Eugenia* may occur in the paleotropics. Critically from a phylogenetic perspective, the paleotropical diversity in *Eugenia* appears to reflect a significant part of the known morphological variation in inflorescence morphology, calyx lobe fusion and splitting, flower size, fruit size and testal morphologies, as well as some characters not (yet) known in the neotropics, such as dioecy (VAN WYK & LOWREY, 1988; BYNG et al., 2016). Inferring the phylogeny of the genus will benefit from proportional sampling across the Old and New Worlds.

Based on revisionary studies currently in progress, *Eugenia* in New Caledonia appears to comprise approximately sixty species, many of which remain to be described besides those proposed here (Snow et al., unpubl. data). The primary purpose of this paper is to propose five new species in detail, including preliminary conservation assessments following IUCN Red List Categories and Criteria (IUCN, 2012). In addition, we address needed nomenclatural transfers and matters of typification. We have seen all available material at G, NOU,

MO and P. Terminology largely follows previous recent studies of *Eugenia* by NS (e.g. SNOW et al., 2015) but includes some terminology from BRIGGS & JOHNSON (1979) regarding inflorescence structure and shapes, and other terms following BEENTJE (2010).

The new species and new combinations proposed here bring the total number of described species of *Eugenia* in New Caledonia to approximately thirty-five.

New Species

Eugenia amosensis N. Snow, **spec. nova** (Fig. 1, 2).

Typus: NEW CALEDONIA. **Prov. Nord**: Col d'Amoss, 20°17'16"S 164°25'42"E, 13.XI.2002, *Munzinger et al. 1488* (holo-: P [P00354503 sheet 1, P04884668 sheet 2]!; iso-: MO-5841143!; NOU [NOU002732]!).

Differing from congeneric species in New Caledonia by its relatively long, narrowly elliptic, sessile to subsessile leaves with cordate bases, cauliflorous inflorescence, and densely velutinous indumentum on the pedicels, hypanthium and proximal abaxial portion of the calyx lobes.

Shrubs to 3 m. *Branchlets* glabrous, eglandular, smooth, the epidermis soon becoming gray and flaking away. *Pedicels*, hypanthium and lower calyx lobes densely reddish velutinous. *Leaves* sessile to sub-sessile, coriaceous, venation brochidodromous, discolorous, surfaces matte, evenly distributed along branchlets. *Foliar colleters* absent. *Leaf blades* 15.5–37.7 × 5.0–7.4 cm, narrowly elliptic, base cordate, apex acute, margin flat, secondary and tertiary veins protruding somewhat above; adaxial surface glabrous, midvein raised; abaxial surface moderately to densely glandular (use magnification), secondary and higher-order veins prominent, intramarginal vein prominent, (1.5–)3–5 mm from margin at midpoint of blade. *Inflorescences* cauliflorous, ca. 2 cm long, of monads or short (5-flowered) botryoids. *Pedicels* 2–12 mm, rigid. *Bracteoles* ca. 0.5 × ca. 1.0 mm (material scant, possibly not fully expanded), hemispherical, broadly rounded apically. *Hypanthium* cupuliform, ca. 5 mm. *Calyx lobes* 4, ca. 1–2 mm, dimorphic, apex rounded, more or less glabrous above. *Petals* 4, 6–7 × 6–7 mm, oblate, sparsely short-ciliate on margins. *Stamens* numerous (> 100), multiseriate; filaments length uncertain (material in bud); anthers ca. 0.8 mm, ellipsoid, dorsifixed, eglandular. *Style* ca. 6 mm (limited material), moderately short-villous in lower half, stigma narrow. *Ovary* bilocular, placentation axile, ovules ca. 25 per placenta, densely but irregularly placed on somewhat triangular-shaped placenta. Fruit unknown.

Distribution, ecology and phenology. – Known only from the type gathering at Col d'Amoss (misspelled as “d'Amoss” on the type specimen) near the northern end of Grand Terre (Fig. 2). Flowering in November, fruiting unknown.

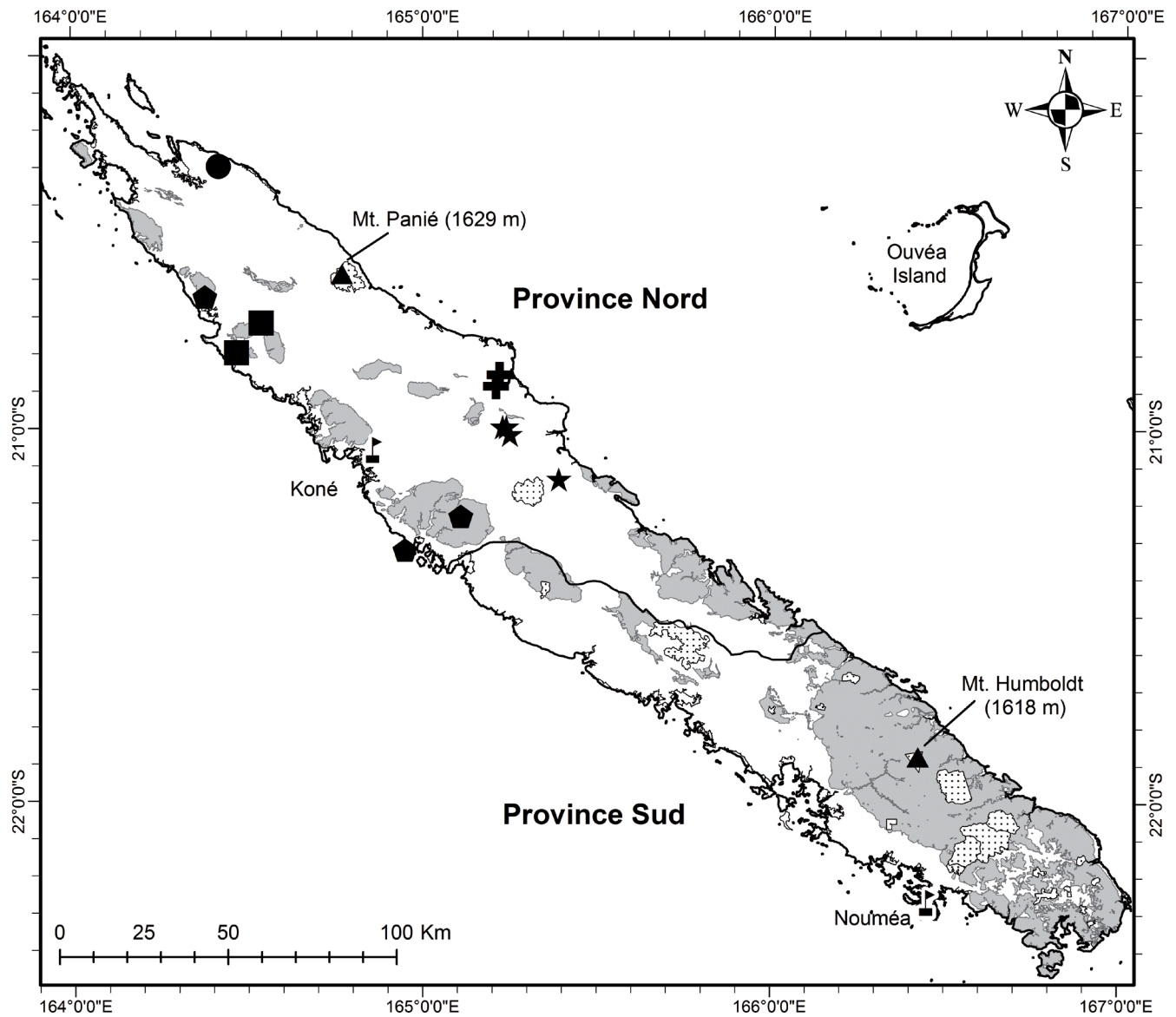


Fig. 1. – Distribution of new species of *Eugenia* L. in New Caledonia mapped on ultrabasic rocks (light grey) and protected areas (dotted stippling): *E. amosensis* N. Snow (circle), *E. homedeboana* N. Snow (squares), *E. sicifolia* J.W. Dawson & N. Snow (pentagons), *E. tchambaensis* J.W. Dawson & N. Snow (stars), and *E. tiwakaensis* J.W. Dawson & N. Snow (crosses).

Conservation status – With a single location known outside of the protected area network in a forested area heavily fragmented and regularly damaged by anthropogenic bush fires, *E. amosensis* is assigned a preliminary IUCN conservation status of “Critically Endangered” [CR B2ab(iii,v)+C2(a)+D].

Notes. – Additional collections are needed to better characterize flowering and fruiting material and their seasons. The long, narrowly elliptic, sessile to subsessile cordate leaves, coupled with the cauliflorous inflorescence with dense velutinous indumentum, collectively diagnose the species among others in New Caledonia. Although a subtle character state, the villous base of the style is also atypical for most in the genus.

Eugenia homedeboana N. Snow, **spec. nova** (Fig. 1, 3).

Typus: NEW CALEDONIA. **Prov. Nord:** Taom, Mt Homedebo, 800-900 m, 16.X.1969, *MacKee 20983* (holo-: P [P06138878]!).

Distinct among congeners in New Caledonia by the brownish velutinous abaxial leaf surface that turns grayish as the leaf matures, and its sessile clasping ovate leaves.

Shrubs to 1 m. Bark smooth or slightly rough, greyish. **Branchlets** laterally compressed, reddish-brown (when young) by virtue of short but dense velutinous indumentum. **Leaves** sessile, stiffly coriaceous, venation brochidodromous, discolorous, surfaces matte, evenly distributed along branchlets. Foliar collectors not seen. **Leaf blades** 3.5–8 × 2.5–5 cm, ovate, bases cordate and strongly clasping, apex obtuse, margins somewhat irregularly revolute; adaxial surface appearing glabrous but on close inspection (use high magnification) with moderately dense indumentum of minute, irregularly twisting to somewhat glandular grayish trichomes, midvein flush or slightly and narrowly raised proximally, secondary veins faint, intramarginal vein not visible; abaxial surface like upper surface but indumentum much denser and trichomes dark reddish-brownish when young and becoming grayish, secondary and marginal veins obscured entirely by indumentum. **Inflorescences** of solitary monads, these ramiflorous towards base of branchlets and axillary. Peduncles rigid, 6–7 mm, densely velutinous. Bracteoles ca. 1.5 × 1 mm, triangular but obscure (erect and appressed against hypanthium), rigid. **Hypanthium** cupuliform, ca. 7 mm long, densely velutinous, pinkish in bud. **Calyx lobes** 4, distinct in bud, 2.5–3 × 2–6 mm (sometimes much broader than long), broadly rounded to triangular, apex rounded to acute, velutinous abaxially, less so adaxially. **Petals** 4, 7–9 × 6–8 mm, very widely ovate to obovate, ciliate on margins, white, oil glands faint. **Stamens** numerous (> 100), multiseriate; filaments up to 4 mm long, anthers 0.7–1.0 mm, ellipsoid, basifixed, eglandular. Ovary apex densely short-hairy surrounding base of style.

Style (material scant) ca. 5 mm, glabrous; stigma narrow and barely capitate. **Fruits** 17–20 × 14–18 mm (material limited), asymmetrically sub-ellipsoid (the crowning calyx lobes offset ca. 45° from axis of petiole), based rounded or tapered and somewhat asymmetrically attached, brown-velutinous.

Distribution, ecology and phenology. – Known only from the northwest on ultramafics and maquis (Fig. 2). Flowering in October and likely into December, fruiting in December.

Conservation status. – The Tsiba locality (*MacKee 34497*) is included in an ancient mining concession, and the vegetation was mainly cleared in that area, while Mt Homedebo, the type locality, was severely damaged by fires. Thus, the new species is facing serious threat and with only two locations and an AOO of 8 km², *E. homedeboana* is assigned a preliminary IUCN conservation status of “Endangered” [EN B1ab(ii,iii,v)+2ab(ii,iii,v)].

Notes. – The leaf morphology of *E. homedeboana* closely resembles that of *E. virotii* Guillaumin, but differs its dense abaxial indumentum. It also resembles *E. kaalaensis* Guillaumin, which has an identical indumentum of the leaves, but that species is distinctly petiolate.

The type specimen is in flower (although the collection label says the fruits are brown), that of *MacKee 34497* is in bud, and *Vieillard 2593* bears two fruits.

Paratypes. – NEW CALEDONIA. **Prov. Nord:** Gatope, *Vieillard 2593* (P [P04722710]); Ouaco, Tsiba, 400 m, 31.XII.1977, *MacKee 34497* (NOU [NOU031553], P).

Eugenia sicifolia J.W. Dawson & N. Snow, **spec. nova** (Fig. 1, 4).

Typus: NEW CALEDONIA. **Prov Nord:** Massif du Boulinda, 400 m, en sous-bois de maquis paraforestier, 23.II.1978, *Morat 5947* (holo-: P [P00500636]!; iso-: P [P05094127, P05093915]!).

Differing from New Caledonian congeners by the combination of sica (dagger-shaped) leaf blades and a densely short-villous, ferruginous indumentum on the emerging branchlets, hypanthium, and abaxial calyx lobes.

Shrubs from 1–3 m. Vegetative and floral parts (where present) densely short villous (trichomes ferruginous; “hairy” henceforth) but becoming more or less glabrous. **Branchlets** rounded, epidermis becoming flaky. **Leaves** petiolate, coriaceous, venation brochidodromous, hairy below, dark green when fresh above, much lighter below, surfaces matte or somewhat glossy above, evenly distributed along branchlets. Foliar collectors linear, deep maroon coloured (relatively few



Fig. 2. – Holotype of *Eugenia amosensis* N. Snow.

[Munzinger et al. 1488, P] [© Muséum national d'Histoire naturelle, Paris. Reproduced with permission]



Fig. 3. – Holotype of *Eugenia homedeboana* N. Snow. [MacKee 20983, P] [© Muséum national d'Histoire naturelle, Paris. Reproduced with permission]

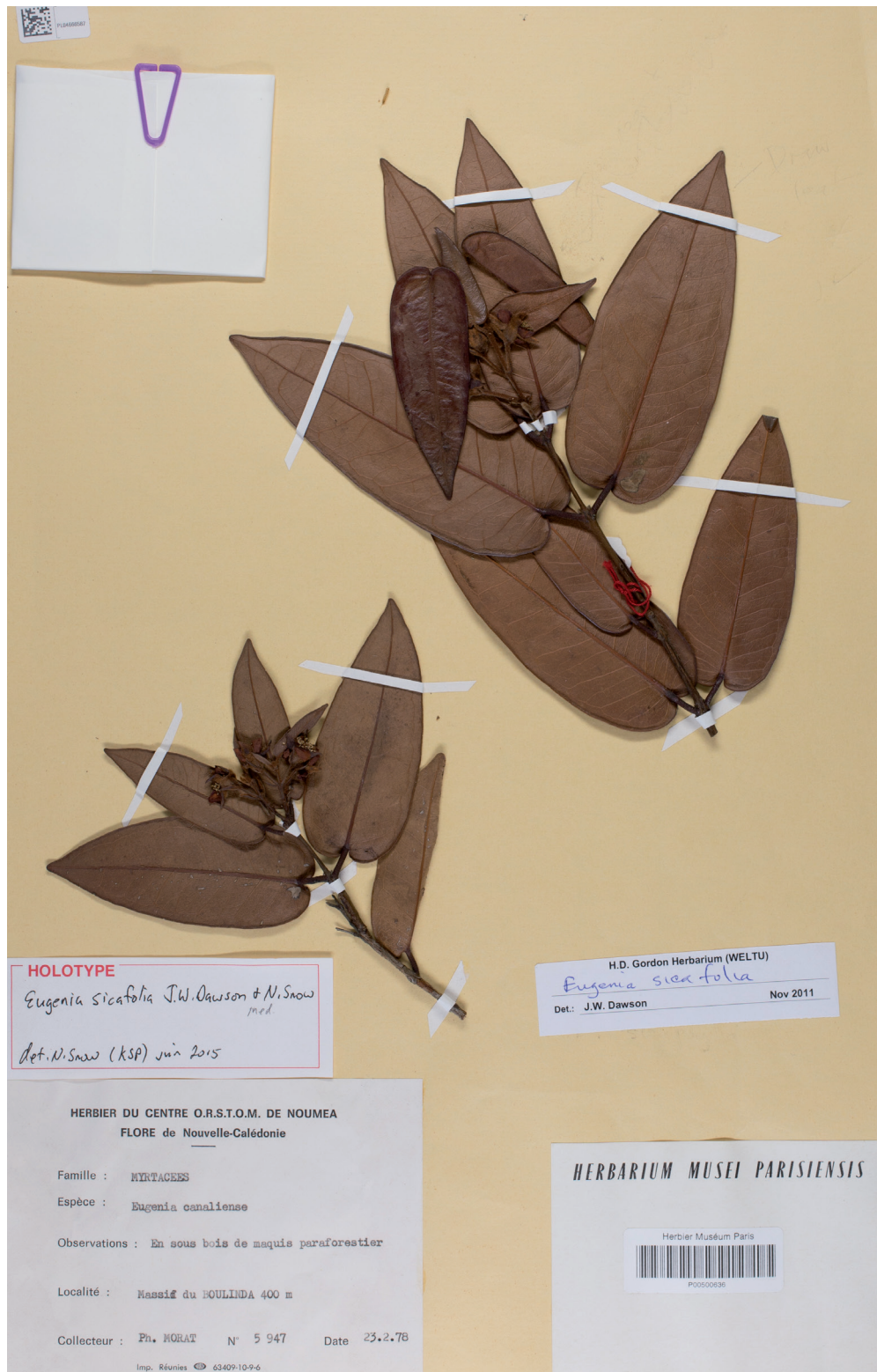


Fig. 4. – Holotype of *Eugenia sicifolia* J.W. Dawson & N. Snow.
[Morat 5947, P] [© Muséum national d'Histoire naturelle, Paris. Reproduced with permission]

and early-deciduous). Petioles (4-)8-12 mm, terete, surface somewhat transversely rugose, eglandular, hairy. *Leaf blades* (5.3-)8-13.5 × (2-)3-6.5 mm, narrowly ovate, base cordate the lobes sometimes slightly amplexicaulous relative to petiole, apex acute, margins flat, eglandular, hairy (especially below) but with minute whitish/clear fungal hyphae extruding especially near abaxial midvein (use high magnification with bright light); adaxial midvein flush to slightly sulcate proximally, protruding abaxially; secondary veins indistinct adaxially, obscure to moderately prominent abaxially; lateral vein obscure to prominent, ca. 2-3.5 mm from margin at midpoint of blade. *Inflorescence* a bracteate raceme or single flower, axillary, supraxillary or terminal, axis densely hairy, pinkish to light maroon (when fresh). Peduncles 6-12 mm, rigid, ascending, hairy. *Bracteoles* (3.5-)5-7 mm (the apex extending slightly beyond base of calyx lobes), linear to very narrowly ovate, rigid, ascending to erect, leaf-like (midvein and secondary veins faintly visible), hairy. *Hypanthium* 5-6 mm, campanulate, hairy and remaining so during anthesis. *Calyx lobes* 4, (4.5-)5-7 mm, triangular, apex acute, hairy and sometimes remaining so (especially abaxially). *Petals* 4, 4.5-5 × 3.5-4 mm, very widely ovate to oblate, based round to truncate, whitish, ciliate on margins, oil glands sparse. *Stamens* numerous (> 150), whitish or cream-coloured; staminal disk glabrous; filaments 2-4 mm; anthers 0.6-0.9 mm, ellipsoid, basifixed, eglandular. Ovary apex glabrous. *Styles* ca. 3 mm, glabrous, stigma terete (scarcely if at all capitate). *Ovary* bilocular; placentation axile; ovules numerous. *Fruits* 15-18 mm × 12-17 mm, globose, base rounded or slightly tapered, calyx lobes appressed to fruit or somewhat ascending.

Etymology. – The specific epithet is derived from the Latin elements *sica* (“dagger”) and *folia* (leaf), in reference to the shape of the leaf blades.

Distribution, ecology and phenology. – Known from four collections in the north-west, at 400 m on Mt. Boulinda and 20 m on Pindai (Fig. 2). The species occurs in maquis or “paraforestier” vegetation over ultramafic or calcareous soils and sclerophyllous forests in Pindai. Flowering in February, fruiting in March and April.

Conservation status. – The two known locations (Boulinda, Pindai) are both outside mining concessions, but the vegetation in the Boulinda is fragmented due to mining activities. Giving the restricted distribution of the new species, an AOO of only 4 km² and two known locations, *E. sicifolia* is assigned a preliminary IUCN conservation status of “Endangered” [EN B1ab(i,ii,iii,v)+2ab(i,ii,iii,v)].

Note. – The narrowly ovate leaves with their acute apices, deeply cordate bases and prominent petioles, coupled with the dense indumentum on emerging growth and portions of the flower, are diagnostic.

Paratypes. – NEW CALEDONIA. **Prov. Nord:** Pindai, 26.IV.2007, *Hequet* (leg. *Butin*) 3677 (NOU [NOU018421]); Baie des Sapins, Pindai, 18.VII.2007, *Hequet* (leg. *Butin*) 3727 (NOU [NOU022012]); Pindai, ca. 20 m, 16.XII.1998, *Veillon* (leg. *Butin*) 8189 (NOU [NOU073564]); Pindai, 66 m, 15.IV.2013, *Lebouvier* NL113 (NOU); *ibid. loc.*, 16.IV.2014, *Lebouvier* NL144 et al (NOU).

Eugenia tchambaensis J.W. Dawson & N. Snow, **spec. nova** (Fig. 1, 5).

Typus: NEW CALEDONIA. **Prov. Nord:** Haute vallée de la Tchamba, 350 m, 16.V.1984, *Veillon* 5691 (holo- : P [P04722505]!; iso- : NOU [NOU031551]!, MPU [MPU026760]).

Differing from congeneric species in New Caledonia by relatively long, thin, often erect pedicels, relatively short sessile leaves, and distinctly raised midrib of the adaxial leaf surface.

Shrubs 1.3-4 meters. *Branchlets* glabrous, laterally compressed on emergence, becoming terete. *Leaves* sessile and clasping stem, coriaceous, venation brochidodromous, glabrous, discolorous, surfaces matte, evenly distributed along branchlets. Foliar colleters absent. *Leaf blades* (2.0-)4.0-11.4 × (1.3-)2.8-6.0 cm, elliptic, base cordate and slightly conduplicate basally, apex obtuse, margin flat but surface irregularly sinuous; adaxial surface glabrous, eglandular or faintly glandular (use magnification), midvein raised in lower half of blade and sometimes nearly to the apex; abaxial surface glabrous, eglandular, secondary veins indistinct, intramarginal vein indistinct, 0.5-1.5 mm from margin at midpoint of blade. *Inflorescences* terminal, axillary, or occasionally ramiflorous, flowers solitary flowers or occasionally in fascicles. *Pedicels* (14-)20-45 mm, narrow (< 1 mm wide) but rigid, glabrous, densely glandular, often steeply ascending to nearly erect. *Bracteoles* 1-1.5 mm, narrowly triangular to triangular, glabrous, glandular, rigid, typically reflexed at 90° angle, persistent in fruit. *Hypanthium* ca. 2 mm long, cupuliform, glabrous, densely glandular. *Calyx lobes* 4, 1-2 mm initially but tearing radially during anthesis and becoming up to 5 mm, broadly rounded, glabrous above and below. *Petals* 4, 3.5-5 × 3-4 mm, oblate, minutely ciliate on margin, whitish, glandular. *Stamens* ca. 75-100, multiseriate. Filaments length unknown; anthers 0.5-0.7 mm, globular to sub-ellipsoid, sub-basifixed, eglandular. *Styles* 3-4 mm, glabrous, narrowly capitate. *Fruit* 9-17 × 14-20 mm, subglobose to subcylindrical, rounded or sometimes asymmetrical at base, glabrous, densely glandular (glands small), green (fresh) turning nearly black when dried.



Fig. 5. – Holotype of *Eugenia tchambaensis* J.W. Dawson & N. Snow. [Veillon 5691, P] [© Muséum national d'Histoire naturelle, Paris. Reproduced with permission]

Distribution and ecology. – Known from Tchamba, and vicinity from 350 to ca. 500 meters in humid forest over schistes or graywackes (Fig. 2). Flowering confirmed for January, fruiting January through July.

Conservation status. – The AOO and EOO is estimated to be 16 km² with two locations (Haute-Tchamba and ridge between Haute-Monéo and Mou), none in a protected area. Logging is no longer active in that area, *E. tchambaensis* is therefore assigned a preliminary IUCN conservation status of “Vulnerable” [VUD2].

Notes. – The relatively short sessile leaves with distinctly raised upper midribs and relatively long, thin, and often erect pedicels collectively are diagnostic. The MacKee specimen occurs at higher elevations (“600-700 m”) and has shorter leaves than the other specimens, but it otherwise accords in all other features.

Paratypes. – NEW CALEDONIA. **Prov. Nord:** Vallée de la Tchamba, 21°00'20"S, 165°14'02"E, 520 m, 13.I.2009, *Barrabé et al. 834* (NOU [NOU033931], P [P04681808]); Upper Tchamba River valley, Pondié forest, along road to Wão Uni, 21°00'25"S 165°14'27"E, 500 m, 27.IV.2002, *Lowry et al. 5684* (MO, P [P04884671]); Ponerihouen, crête entre Haute Mou et Haute Monéo, 21.VI.1973, *MacKee 26836* (P [P04722504]); Haute Tchamba, 21°00'18"S 165°13'53"E, 17.VII.2004, *Munzinger et al. 2244* (NOU [NOU006487], P [P04884649]).

Eugenia tiwakaensis J.W. Dawson & N. Snow, **spec. nova** (Fig. 1, 6).

Typus: NEW CALEDONIA. **Prov. Nord:** Basse Tiwaka, 10 m, 1.I.1979, *MacKee 36340* (holo-: P [P04722500]!).

Distinct among congeners in New Caledonia by its cordate to basally rounded, petiolate leaves, secondary veins arising from ca. 10–20° angles, glandular abaxial leaf surfaces, raised adaxial midrib, and sparsely to moderately densely short-villous ferruginous indumentum of the inflorescence axis and flowers.

Shrubs to 2 m. Indumentum (where present) ferruginous, sparsely to moderately short-villous (“hairy” below). Branchlets rounded to slightly compressed, moderately to densely short-villous (trichomes ferruginous at base but often clear or whitish apically), the epidermis sometimes slightly furrowed longitudinally and soon becoming flaky. *Leaves* petiolate, coriaceous, venation brochidodromous, glabrescent, slightly discoloured, surfaces matte or somewhat glossy above, evenly distributed along branchlets. Foliar collectors not seen. Petioles 4–7 mm, sulcate above, eglandular. *Leaf blades* 10.0–14.6 × 3.5–5.7 cm, narrowly elliptic to narrowly ovate, base rounded or cordate, apex acute, margin flat; adaxial surface glabrescent near base but otherwise glabrous, eglandular, midvein narrowly and slightly projecting proximally but becoming flush distally, secondary and tertiary veins prominent and slightly projecting

(dried material); abaxial surface glabrous, oil glands common and distinct; secondary veins prominent, intramarginal vein prominent and 3–6 mm from margin at midpoint of blade (also visible adaxially). *Inflorescences* terminal, axillary or ramiflorous; flowers solitary, paired, fascicled, or in short brachyblasts. Peduncles 4–12 mm, rigid, more or less ascending, hairy. *Bracteoles* 2, 1.0–1.2 mm, triangular, ascending to erect and appressed against hypanthium, glandular above, hairy, soon deciduous. *Hypanthium* 3–4 mm, obconic, prominently glandular, sparsely to moderately hairy. *Calyx lobes* 4, 2–3 mm, broadly rounded, prominently glandular, ciliate and sparsely hairy below. *Petals* 4, 5–9 × 3–5 mm, obovate, sparsely short ciliate, glands sparse. *Stamens* ca. 75–125, multiseriate; filaments 5–8 mm; anthers 1.0–1.2 mm, globose to subellipsoid, sub-basifixed, eglandular; staminal disc short-villous. Ovary apex (surrounding style) glabrous. *Style* length not confirmed (but glabrous below). *Fruit* not seen but said to be reddish.

Distribution and ecology. – *Eugenia tiwakaensis* at present is known only from two collections near the northwest coast, growing in a transitional zone between schistes and serpentines or over ultramafics from ca. 10 m to an unspecified “middle altitude” (*Vandrot 629*) on Tiwaka (Fig. 2). Flowering in January, fruiting in September.

Conservation status. – The recent collection (*Vandrot 629*) indicates the species is a common local shrub in a very small patch of remnant forest of ca. 2,931 ha. on a plateau that was nearly completely burned. The MacKee locality “basse Tiwaka, 10 m” is vague, but this general area has been burned widely and intentionally during political protests over the past 35 years. With only three recent collections from a single reliable location in a highly threatened forest remnant, *E. tiwakaensis* is assigned a preliminary IUCN conservation status of “Critically Endangered” [CR B1ab(v)+2ab(v)+2(a)+D].

Notes. – *Eugenia tiwakaensis* most closely resembles *E. sicifolia*, although the triangular bracteoles and broadly rounded calyx lobes of *E. tiwakaensis* differ from the linear and proportionally longer bracteoles and acute calyx lobes of *E. sicifolia*. A note on the holotype label indicates the plant was frequented by bees.

Paratypes. – NEW CALEDONIA. **Prov. Nord:** Tiwaka, Plateau de Kokingone, 29.IX.2012, 165°13'57"E 20°51'35"S, 365 m, *Vandrot 629* (NOU [NOU079951], P [P02089724]).



Fig. 6. – Holotype of *Eugenia tiwakaensis* J.W. Dawson & N. Snow.
 [MacKee 36340, P] [© Muséum national d'Histoire naturelle, Paris. Reproduced with permission]

New combinations, a new name, and lectotypifications

Eugenia gomonenensis (Guillaumin) J.W. Dawson & N. Snow, **comb. nova.**

- ≡ *Myrtus gomonenensis* Guillaumin in Bull. Soc. Bot. France 85: 631. 1939.
- ≡ *Uromyrtus gomonenensis* (Guillaumin) Burret in Notizbl. Bot. Gart. Berlin-Dahlem 15: 493. 1941.
- ≡ *Austromyrtus gomonenensis* (Guillaumin) Burret in Notizbl. Bot. Gart. Berlin-Dahlem 15: 493. 1941.

Lectotypus (here designated): **NEW CALEDONIA. Prov. Nord:** Collines de Gomonen, Gatope, s.d., *Vieillard 2615* (P [P00500633]!). **Syntypus:** **NEW CALEDONIA. Prov. Nord:** Montagnes de Gatope, *Vieillard 2620* (P, not found).

Notes. – The protologue of *Myrtus gomonenensis* included two syntypes (GUILLAUMIN, 1939); *Vieillard 2615* is chosen over *Vieillard 2650* because the other syntype was not found at P. BURRET (1941: 493) made combinations for both *Uromyrtus* Burret and *Austromyrtus* Burret, reflecting his uncertainty into which genus the taxon ultimately should be placed.

Eugenia horizontalis Pancher ex Brongn. & Gris in Bull. Soc. Bot. France 12: 179. 1865.

Lectotypus (here designated): **NEW CALEDONIA. Prov. Sud:** Port-de-France, 1855-1860, *Vieillard 512* (P [P00637576]!; isolecto-: P [P00543870]!). **Syntypus:** **NEW CALEDONIA:** *sine loc.*, 1862, *Pancher s.n.* (P [P06670059, P00696289, P00696290]!); Balade, 1855-1860, *Vieillard 513* (P [P00637577]!).

- = *Myrtus aemulans* Schltr. in Bot. Jahrb. Syst. 40 (Beibl. 92): 29. 1908. **Lectotypus** (here designated): **NEW CALEDONIA. Prov. Sud:** Dumbea, *Le Rat 46* (P [P00543869]!).

Notes. – The three syntypes mentioned in the protologue for *Eugenia horizontalis* are represented by six sheets at P. Although the selected lectotype, *Vieillard 512*, has limited flowering material, it is representative of the species.

The holotype of *Myrtus aemulans* has been destroyed at B and the isotype at P is here designated as the lectotype.

As currently recognized, *Eugenia horizontalis* has glabrous, more or less pendulous flowers arising from elongated, slender pedicels. The species is restricted to the leeward side of New Caledonia in the southcentral part of the island in sclerophyllous forest or maquis. It is one of several species with significantly reduced flowers and leaves.

Eugenia lotoides (Guillaumin) J.W. Dawson & N. Snow, **comb. nova.**

- ≡ *Myrtus lotoides* Guillaumin in Bull. Soc. Bot. France 85: 632. 1939.
- ≡ *Austromyrtus lotoides* (Guillaumin) Burret in Notizbl. Bot. Gart. Berlin-Dahlem 15: 504. 1941.

Typus: **NEW CALEDONIA. Prov. Nord:** Montagnes de Oua Tendé près Gatope, 1861-1867, *Vieillard 2616* (holo-: P [P02428351]!; iso-: P [P00543872]!).

Note. – *Eugenia lotoides* is one of several species with small leaves and flowers. As currently understood, specimens often have three leaves per node.

Eugenia mendute Guillaumin in Bull. Soc. Bot. France 85: 638. 1939.

- ≡ *Austromyrtus mendute* (Guillaumin) Burret in Notizbl. Bot. Gart. Berlin-Dahlem 15: 505. 1941.

Lectotypus (here designated): **NEW CALEDONIA. Prov. îles-Loyauté:** Lifou, VII.1869, *Balansa 2083* (P [P02428359]!; isolecto-: P [P00543864, P00543865]!). **Syntypi:** **NEW CALEDONIA. Prov. îles-Loyauté:** am Ostrand des Plateau, Ouvéa, 7.VIII.1925, *Däniker 1969 (Bogen 2)* (Z [Z-000092725] image seen); an der Ostküste von Ouvéa, 22.IX.1925, *Däniker 1969 (Bogen 1)* (Z [Z-000092724] image seen); Südküste von Muli, Ouvéa, 3.X.1925, *Däniker 1969a* (Z [Z-000092727] image seen); am Cap Bernard auf Lifou, 2.XI.1925, *Däniker 1969b* (Z [Z-000092726] image seen); Lifou, comm. 1861, *Deplanche 7* (P [P00543866, P00696288]!).

Notes. – Five syntypes are cited in the protologue, three of which were collected by Albert Ulrich Däniker (1894-1957) that are deposited at Z. One of these collections, *Däniker 1969* clearly represent two gatherings collected at different dates and localities and is here cited as two separate syntypes, making a total of five remaining syntypes. The designated lectotype [P02428359] has mature or nearly mature fruits, whereas the indicated isolectotypes at P are sterile [P00543864, P00543865].

Eugenia ovigera Brongn. & Gris in Bull. Soc. Bot. France 12: 179. 1865.

- ≡ *Calycorectes ovigera* (Brongn. & Gris) Guillaumin in Bull. Mus. Natn. Hist. Nat. 25: 503. 1919.
- ≡ *Stereocaryum ovigerum* (Brongn. & Gris) Burret in Notizbl. Bot. Gart. Mus. Berlin-Dahlem 15: 547. 1941.

Lectotypus (here designated): **NEW CALEDONIA. Prov. Sud:** Bord de la Rivière d'Unia, 1855-1860, *Vieillard 473* (P [P00402692]!; isolecto-: P [P00402773, P00402774]!). **Syntypus:** **NEW CALEDONIA. Prov. Sud:** île des Pins, 1861, *Pancher s.n.* (P [P00402713]!).

Notes. – The two syntypes indicated in the protologue are represented by four sheets at P. Although the selected lectotype has only one mature fruit, it exhibits the floral and young fruiting morphology.

Eugenia ovigera is one of several species in New Caledonia in which the calyx lobes split radially during anthesis towards and often beyond the staminal disc.

Eugenia poimbailensis (Guillaumin) J.W. Dawson & N. Snow, **comb. nova.**

- ≡ *Myrtus poimbailensis* Guillaumin in Bull. Soc. Bot. France 85: 633. 1939.
- ≡ *Austromyrtus poimbailensis* (Guillaumin) Burret in Notizbl. Bot. Gart. Berlin-Dahlem 15: 505. 1941.

Typus: NEW CALEDONIA. **Prov. Nord:** Wagap, bord des torrents à «Poisbeilla», 1861-1867, *Vieillard 2605* (holo-: P [P00632556]!).

Note. – The 4-merous flowers, globular seeds, dibrachiate hairs on the emerging foliage, and the relatively new understanding that *Myrtus* L. is confined to Europe and North Africa (SNOW et al., 2003), support the transfer of this taxon into *Eugenia*.

Eugenia styphelioides (Schltr.) J.W. Dawson & N. Snow, **comb. nova.**

- ≡ *Myrtus styphelioides* Schltr. in Bot. Jahrb. Syst. 40 (Beibl. 92): 31. 1908.
- ≡ *Austromyrtus styphelioides* (Schltr.) Burret in Notizbl. Bot. Gart. Berlin-Dahlem 15: 504. 1941.

Lectotypus (here designated): NEW CALEDONIA. **Prov. Sud:** Bord Dumbea, *Le Rat & Le Rat 166* (P [P00637568]!).

Note. – The holotype of *Myrtus styphelioides* has been destroyed at B and the isotype at P is here designated as the lectotype.

Eugenia veillonii N. Snow & Callm., **nom. nov.** (Fig. 7).

- ≡ *Spermolepis rubiginosa* Brongn. & Gris in Bull. Soc. Bot. France 10: 577. 1863 [non *Eugenia rubiginosa* Cambess. in A. St.-Hil., Fl. Bras. Merid. 2: 338. 1832].
- ≡ *Schizocalyx rubiginosa* (Brongn. & Gris) Brongn. & Gris in Ann. Sci. Nat., Bot., sér. 5, 13: 380. 1871.
- ≡ *Calycorectes rubiginosus* (Brongn. & Gris) Guillaumin in Not. Syst. (Paris) 2: 131. 1911.
- ≡ *Stereocaryum rubiginosum* (Brongn. & Gris) Burret in Notizbl. Bot. Gart. Mus. Berlin-Dahlem 15: 546. 1941.
- ≡ *Myrtomera rubiginosa* (Brongn. & Gris) B. C. Stone in Pacific Sci. 16: 241. 1962.

Lectotypus (here designated): NEW CALEDONIA: *sine loc.*, 1862, *Pancher s.n.* (P [P00637569]!).

Notes. – The only gathering mentioned within the protologue for *Spermolepis rubiginosa* is: “hab. in collibus ferrugineis Novae Caledoniae (Pancher, 1862)” (BRONGNIART & GRIS, 1863: 577). Even though several collections by Pancher are deposited at P, only two of them are dated 1862 [P00402683, P00637569]. Of these two specimens, the latter [P00637569] shows the habitat as “coteaux ferrugineux”, which closely matches the prologue information, and thus can reasonably be considered as the holotype. This assessment is strengthened by the fact that Brongniart and Gris were working in P. However, some authors might consider the protologue citation as insufficient to consider this specimen [P00637569] as the holotype as discussed below.

Within the protologue, Brongniart and Gris did not mention “Pancher, 1862” at P as being most representative. Since two Pancher specimens at P show the date 1862, one may argue that there is no evidence that the two specimens belong to two gatherings, that it is uncertain that Brongniart and Gris based their new species only on P00637569 specimen alone, and that therefore, a lectotype designation is needed (MCNEILL et al. 2014). Because of the uncertainty, we designate the P00637569 specimen as the lectotype, and at the same time we do not rule out the possibility that it could be a holotype.

Eugenia veillonii was described by Brongniart & Gris in what they believed was a new genus: *Spermolepis* Brongn. & Gris 1864 (non Raf. 1825). Later, they transferred the preceding species to *Schizocalyx* O. Berg 1856 (non Scheele 1843). Subsequently Guillaumin transferred the species into the neotropical genus *Calycorectes* O. Berg because of the fused calyx lobes associated with that genus (see LANDRUM & KAWASAKI, 1997).

No preliminary molecular data are available for species of *Eugenia* in New Caledonia that have the splitting calyx lobes typical of *E. veillonii* (Fig. 7). However, preliminary phylogenetic studies show *Calycorectes* to be nested within *Eugenia* s.l. (LUCAS et al., 2007; MAZINE et al., 2014), the members of which also have fused calyx lobes that split during anthesis. This character likely has arisen in parallel, given that it recurs in the Malagasy *E. ambanizanensis* N. Snow (Snow, 2008), another undescribed species from Madagascar (Snow, ined.), several in the Mascarenes described initially in *Monimiastrum* J. Guého & A.J. Scott by SCOTT (1980) but transferred later into *Eugenia* (SNOW, 2008), and the recently described *Eugenia rara* Rigueira & Sobral from Brazil (SOBRAL et al., 2015).

A new name is needed because the epithet *rubiginosa* is unavailable in *Eugenia*. The new epithet “*veillonii*” honours our colleague Jean-Marie Veillon (b. 1939). Jean-Marie is an expert on the flora of New Caledonia and has made over 8000 collections from the Island. His numerous works, including two volumes of the “Flore de Nouvelle-Calédonie et Dépendances”, have contributed significantly towards overall progress on the knowledge of New Caledonia’s flora.



Fig. 7. – Fruiting plant of *Eugenia veillonii* N. Snow & Callm. [Callmander et al. 1241] [Photo: P. Lowry]

Acknowledgements

We thank Odile Poncy and Pete Lowry for coordinating and assisting with research visits and preparation of loans at the Muséum national d'Histoire naturelle in Paris. Support to the first author to work in Paris in 2015 was provided by the Muséum National d'Histoire Naturelle and from a Summer Research Fellowship from Graduate and Continuing Education at Pittsburg State University in Kansas. We thank the Curators at G, MO, NOU and P for access to specimens. NS thanks Mathieu Donnat (P) for assistance processing and annotating specimens and organizing large amounts of material for exchange and loans. We also thank Pete Lowry for the nice photo of Fig. 7 and the Red List Authority (RLA) in New Caledonia, especially Stéphanie Chanfreau and Vincent Tanguy, for advice on the conservation status assessments. Finally, we thank Peter Wilson and an anonymous referee for their careful reviews.

References

- BARRIE, F.R. (2005). Thirty-five new species of *Eugenia* (Myrtaceae) from Mesoamerica. *Novon* 15: 4-49.
- BARRIE, F.R. (2009). *Eugenia* L. In: DAVIDSE, G. et al. (ed.), *Fl. Mesoamericana* 4(1): 81-129. Universidad Nacional Autónoma de México.
- BEENTJE, H. (2010). *The Kew plant glossary: An illustrated dictionary of plant terms*. Royal Botanic Gardens, Kew.
- BIFFIN, E., E.J. LUCAS, L.A. CRAVEN, I.R. DA COSTA, M.G. HARRINGTON & M.D. CRISP (2010). Evolution of exceptional species richness among lineages of fleshy-fruited Myrtaceae. *Ann. Botany (Oxford)* 106: 79-93.
- BRIGGS, B.S. & L.A.S. JOHNSON (1979). Evolution in the Myrtaceae—evidence from inflorescence structure. *Proc. Linn. Soc. New South Wales* 102: 157-256.
- BURRET, M. (1941). Myrtaceen-Studien. *Notizbl. Bot. Gart. Berlin-Dahlem* 15: 479-550.

- BYNG, J.W., F. BARTHELAT, N. SNOW & B. BERNARDINI (2016). A revision of *Eugenia* and *Syzygium* (Myrtaceae) from the Comoros. *Phytotaxa* 242: 163-184.
- DAWSON, J.W. (1992). Myrtaceae: Leptospermoideae. In: MORAT, P. & H.S. MACKEE (ed.), *Fl. Nouvelle-Calédonie et Dépendances* 18.
- DAWSON, J.W. (1999). Myrtaceae, Myrtoideae I: *Syzygium*. In: MORAT, P. (ed.), *Fl. Nouvelle-Calédonie et Dépendances* 23.
- GOVAERTS, R., M. SOBRAL, P. ASHTON, F. BARRIE, B.K. HOLST, L.L. LANDRUM, K. MATSUMOTO, F.F. MAZINE, E. NIC LUGHADHA, C. PROENÇA, L.H. SOARES-SILVA, P.G. WILSON & E. LUCAS (2008). *World checklist of Myrtaceae*. Royal Botanic Gardens, Kew.
- IBANEZ, T., J. MUNZINGER, G. DAGOSTINI, V. HEQUET, F. RIGALT, T. JAFFRÉ & P. BIRNBAUM (2014). Structural and floristic diversity of mixed tropical rain forest in New Caledonia: new data from the New Caledonian Plant Inventory and Permanent Plot Network (NC-PIPPN). *Appl. Veg. Sci.* 17: 386-397.
- IUCN (2012). *IUCN Red List Categories and Criteria: version 3.1*. 2nd ed. IUCN Species Survival Commission, Gland & Cambridge.
- LANDRUM, L.R. & M.L. KAWASAKI (1997). The genera of Myrtaceae in Brazil: an illustrated synoptic treatment and identification keys. *Brittonia* 49: 508-536.
- LUCAS, E.J., S.A. HARRIS, F.F. MAZINE, S.R. BELSHAM, E.M. NIC LUGHADHA, A. TELFORD, P.E. GASSON & M.W. CHASE (2007). Suprageneric phylogenetics of Myrteae, the generically richest tribe in Myrtaceae (Myrtales). *Taxon* 56: 1105-1128.
- MAZINE, F.F., V.C. SOUSA, M. SOBRAL, F. FOREST & E. LUCAS (2014). A preliminary phylogenetic analysis of *Eugenia* (Myrtaceae: Myrteae), with a focus on Neotropical species. *Kew Bull.* 69: 1-14.
- MCNEILL, J. (2014). Holotype specimens and type citations: general issues. *Taxon* 63: 1112-1113.
- MORAT, P., T. JAFFRÉ, F. TRONCHET, J. MUNZINGER, Y. PILLON, J.-M. VEILLON & M. CHALOPIN (2012). Le référentiel taxonomique Floral et les caractéristiques de la flore vasculaire indigène de la Nouvelle-Calédonie. *Adansonia* ser. 3, 34: 177-219.
- MORI, S.A., B.M. BOOM, A.M. CARVALINO. & T.S. SANTOS (1983). Ecological importance of Myrtaceae in an eastern Brazilian wet forest. *Biotropica* 15: 69-70.
- SCOTT, A.J. (1980). Notes on Myrtaceae in the Mascarenes with some recombinations for taxa from Aldabra, Malaya, New Caledonia. *Kew Bull.* 43: 473-498.
- SNOW, N. (2008). Studies of Malagasy *Eugenia* (Myrtaceae) - I: Two new species from the Masoala Peninsula and generic transfers from *Monimiastrum*. *Syst. Bot.* 33: 343-348.
- SNOW, N. (2011). Studies of Malagasy *Eugenia* (Myrtaceae) – II: Four new species, including one eaten by black lemurs on Nosy Be. *Syst. Bot.* 36: 677-689.
- SNOW, N., M.W. CALLMANDER & P.B. PHILLIPSON (2015). Studies of Malagasy *Eugenia* – IV: Seventeen new endemic species, one new combination, and three lectotypifications; with comments on emerging distributional, ecological and evolutionary patterns. *PhytoKeys* 49: 59-121.
- SNOW, N., G.P. GUYMER, & G. SAWVEL (2003). Systematics of *Austromyrtus*, *Lenwebbia*, and the Australian species of *Gossia* (Myrtaceae). *Syst. Bot. Monogr.* 65.
- SNOW, N., J. MCFADDEN, T. EVANS, A. SALYWON, M.F. WOJCIECHOWSKI & P. G. WILSON (2011). Morphological and molecular evidence of polyphyly in *Rhodomyrtus* (Myrtaceae: Myrteae). *Syst. Bot.* 36: 390-404.
- SNOW, N., J. RABENANTOANDRO, F. RANDRIATIFIKA, D. RABEHIVITRA, N.D. RAZAFIMAMONJY & S. CABLE (2012). Studies of Malagasy *Eugenia* (Myrtaceae) – III: Seven new species of high conservation concern from the eastern littoral forests. *Phytotaxa* 48: 39-60.
- SOBRAL, M., J.A.E. FARIA JR., M.U. IBRAHIM, E. J. LUCAS, D. RIGUEIRA, A. STADNIK & D. VILLAROEEL (2015). Thirteen new Myrtaceae from Brazil. *Phytotaxa* 224: 201-231.
- VAN WYK, A.E. & T.K. LOWREY (1988). Studies on the reproductive biology of *Eugenia* L. (Myrtaceae) in Southern Africa. *Monogr. Syst. Bot. Missouri Bot. Gard.* 25: 279-293.