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Jérôme MUNZINGER &
Gordon McPHERSON

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Novitates neocaledonicae XII: Two additional new species of *Cryptocarya* R.Br. from New Caledonia

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ABSTRACT
Two endemic species of *Cryptocarya* R.Br. are described from New Caledonia. *Cryptocarya conduplicata* Munzinger & McPherson, sp. nov. was previously confused with *C. aristata* Kosterm., which it resembles in its typically numerous lenticels and oblate fruit, but from which it differs most noticeably in its leaf blades partly folded longitudinally (vs blades flat), and its smaller fruits (13-15 mm long vs 20-30 mm long). *Cryptocarya ovoidea* Munzinger & McPherson, sp. nov. can be distinguished most easily from *C. pluricostata*, its sister species according to molecular data, by its indument (hairs sparse, whitish, cream-grey to blackish, quickly falling vs. hairs dense, ferrugineous sublanate and subpersistent in *C. pluricostata*). As well, the fruit of *C. ovoidea*, sp. nov. is ovoid and its perianth is caducous, in contrast to the fruit of *C. pluricostata*, which is ellipsoid and retains its perianth. The two new species are trees occurring in dense humid forest, and are restricted to non-ultramafic substrate. *Cryptocarya conduplicata* sp. nov. is common, known from three protected areas, and is assigned a preliminarily Least Concern IUCN status, while *C. ovoidea* sp. nov. is only known from two individuals on Mont Aoupinié, a protected area, where many inventory plots were established without finding any individuals; thus, we assign it a preliminary status of Critically Endangered (CR).

KEY WORDS
New Caledonia,
Lauraceae,
conservation,
new species.

RÉSUMÉ

Novitates neocaledonicae XII : deux espèces nouvelles supplémentaires de Cryptocarya *R.Br. de Nouvelle-Calédonie.* Deux espèces endémiques de *Cryptocarya* R.Br. sont décrites en Nouvelle-Calédonie. *Cryptocarya conduplicata* Munzinger & McPherson, sp. nov. était auparavant confondue avec *C. aristata* Kosterm. à laquelle elle ressemble par ses nombreuses lenticelles et ses fruits oblats, mais dont elle diffère surtout par ses limbes partiellement repliés longitudinalement (contre des limbes plats), et ses fruits plus petits (13-15 mm de long contre 20-30 mm de long). *Cryptocarya ovoidea* Munzinger & McPherson, sp. nov. se distingue plus facilement de *C. pluricostata*, son espèce soeur selon les données moléculaires, par son indument (poils épars, blanchâtres, gris crème à noirâtres, tombant rapidement vs. poils denses, ferrugineux sublaineux et subpersistants chez *C. pluricostata*). De même, le fruit de *C. ovoidea*, sp. nov. est ovoïde et son périanthe est caduc, contrairement au fruit de *C. pluricostata*, qui est ellipsoïde et conserve son périanthe. Les deux nouvelles espèces sont des arbres présents dans la forêt dense humide, et ne poussent que sur substrat non ultramafique. *Cryptocarya conduplicata* sp. nov. est commun, connu dans trois aires protégées, et a reçu le statut préliminaire de Préoccupation mineure de l'UICN, tandis que *C. ovoidea* sp. nov. n'est connu que de deux individus du Mont Aoupinié, une zone protégée, où de nombreuses parcelles d'inventaire ont été installées sans qu'aucun individu n'ait été trouvé ; nous lui attribuons donc un statut préliminaire en danger critique d'extinction (CR).

MOTS CLÉS
Nouvelle-Calédonie,
Lauraceae,
conservation,
espèces nouvelles.

INTRODUCTION

The Lauraceae of New Caledonia were treated in volume 5 of the *Flore de la Nouvelle-Calédonie et Dépendances* (Kostermans 1974) and a new species in the genus *Litsea* Lam. was added 3 years later (Kostermans 1977). Difficulties in identifying some collections of Lauraceae were noted in the 1990s during forest characterization work (Jaffré & Veillon 1990 [publ. 1991], 1995) and led to the suspicion that several morpho-species might represent undescribed taxa. Later, one of us (JM) also encountered difficulties of identification, particularly in the context of setting up the NC-PIPPN plot network (Ibanez *et al.* 2014), and various forest inventories (Munzinger 2013). We then undertook the revision of the family, within the framework of the *Flore de la Nouvelle-Calédonie*, in order to publish a new version, because it had become obvious that the first treatment was in need of revision, as are other early volumes of the collection (Munzinger 2015). Results thus far include the description of three new species of *Cryptocarya* (Munzinger & McPherson 2016) and the discovery that *Litsea mackeei* Kosterm. is synonymous with a species of Oleaceae (Munzinger & McPherson 2017). Among the other probably new species that had been identified but for which additional material or studies were needed, two are now sufficiently well-delimited that they can be adequately described. Thanks to the nature guards of the Northern Province, we were able to obtain flowers of one of them, and recent field observations and molecular work (the latter not presented here) allow us to validate a second species, previously confused with *C. aristata* Kosterm. Each species is illustrated, and photographs taken in the field and distribution maps are provided, as well as preliminary conservation evaluations following the IUCN Red List criteria (2012).

MATERIAL AND METHODS

We made use of field observations and photographs, and checked all specimens deposited at MO, MPU, NOU and P (abbreviations follow Thiers 2020); the scanned images of specimens at Z were consulted online at http://www.herbarien.uzh.ch/index_en.html. In addition, we studied the virtual collections of the Global Plants initiative (https://plants.jstor.org/) and used the RECOLNAT infrastructure (https://www.recolnat.org/fr/). Plant terminology follows Harris & Harris (2001). Maps were made using herbarium specimens and occurrences identified by JM in the NC-PIPPN database (Ibanez *et al.* 2014) and during botanical expeditions (Munzinger 2013; Munzinger *et al.* 2018). Coordinates not given on original labels of herbarium specimens were added post-facto using MacKee's gazetteer (available at http://phanero.novcal.free.fr/index-georeference-de-prospection-botanique.html). The year of collection for Lécard's and Gaillard's specimens was extrapolated based on Morat (2010). When citing material, any information not available on the original label is given between brackets. We applied the IUCN Red List Categories and Criteria (IUCN 2012; IUCN Standards and Petitions Subcommittee 2019) to assess the risk of extinction of each species. We calculated EOO and AOO (with a 2 × 2 km grid) using the online "geocat" software (http://geocat.kew.org; Bachman *et al.* 2011). We have indicated vernacular names and uses when information was available.

SYSTEMATICS

Family Lauraceae Juss.
Genus *Cryptocarya* R.Br.

Cryptocarya conduplicata
Munzinger & McPherson, sp. nov.
(Figs 1; 2)

From *Cryptocarya aristata*, which it resembles in its typically numerous lenticels and oblate fruit, *C. conduplicata*, sp. nov. differs most noticeably in its leaf blades often at least partly folded longitudinally

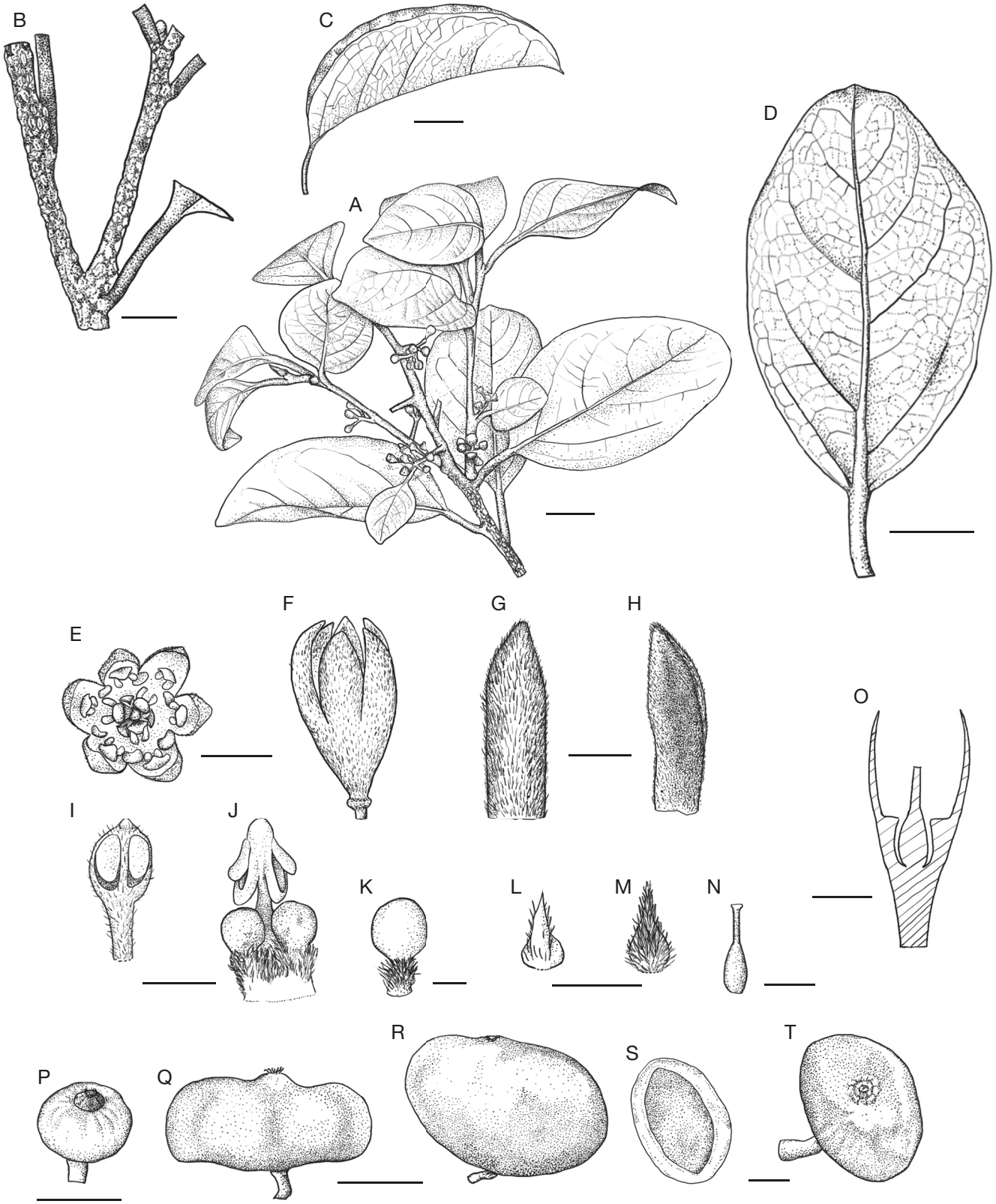

Fig. 1. — *Cryptocara conduplicata* Munzinger & McPherson, sp. nov.: **A**, flowering branch; **B**, lenticels on young twigs; **C**, leaf in lateral view; **D**, abaxial face; **E**, flower from above; **F**, flower in lateral view; **G**, external tepal, adaxial face; **H**, external tepal, abaxial face (*Munzinger et al. 6545)*; **I**, stamen of whorl I; **J**, stamen of whorl III with glands; **K**, isolated gland; **L**, staminode, abaxial face; **M**, staminode, adaxial face; **N**, gynoecium; **O**, schematic view of the longitudinal section of the hypanthium and ovary; **P**, young fruit; **Q**, ripe fruit in herb.; **R**, mature fresh fruit; **S**, fruit in transversal section; **T**, ripe fruit. Photos: **A**, from photograph in the field of *Munzinger et al. 6481*; **B**, *McPherson 19131*; **C**, *Veillon 555*; **D**, from photograph in the field of *Munzinger et al. 6534*; **E**, from photograph in the field of *Munzinger et al. 6545*; **F**-**O**, *Munzinger et al. 6545*; **P**, *Munzinger et al. 5874*; **Q**, *Veillon 4230*; **R**, after a field photograph not vouchered; **S**, **T**, from photograph in the field of *Munzinger et al. 8101.* Drawings: Laurence Ramon. Scale bars: A-D, 1 cm; E, F, M, N, 1 mm; M, N, 1 mm; G-I, K, L, O, 0.5 mm; P-T, 1 cm.

Fig. 2. — Field pictures of *Cryptocarya conduplicata* Munzinger & McPherson, sp. nov.: **A**, trunk and slash; **B**, flushing and flowering branch; **C**, flower; **D**, branch with young fruits; **E**, **F**, branch with nearly mature fruits; **G**, mature fruit in cross-section; **A**, **D**, *Munzinger et al. 5874*; **B**, *Munzinger et al. 6545*; **C**, *Munzinger et al. 6481*; **E**, *Butin 87*; **F**, **G**, *Munzinger et al. 8101*. Photographs: **A**-**E**, P. Lowry; **F**, **G**, D. Fleurot.

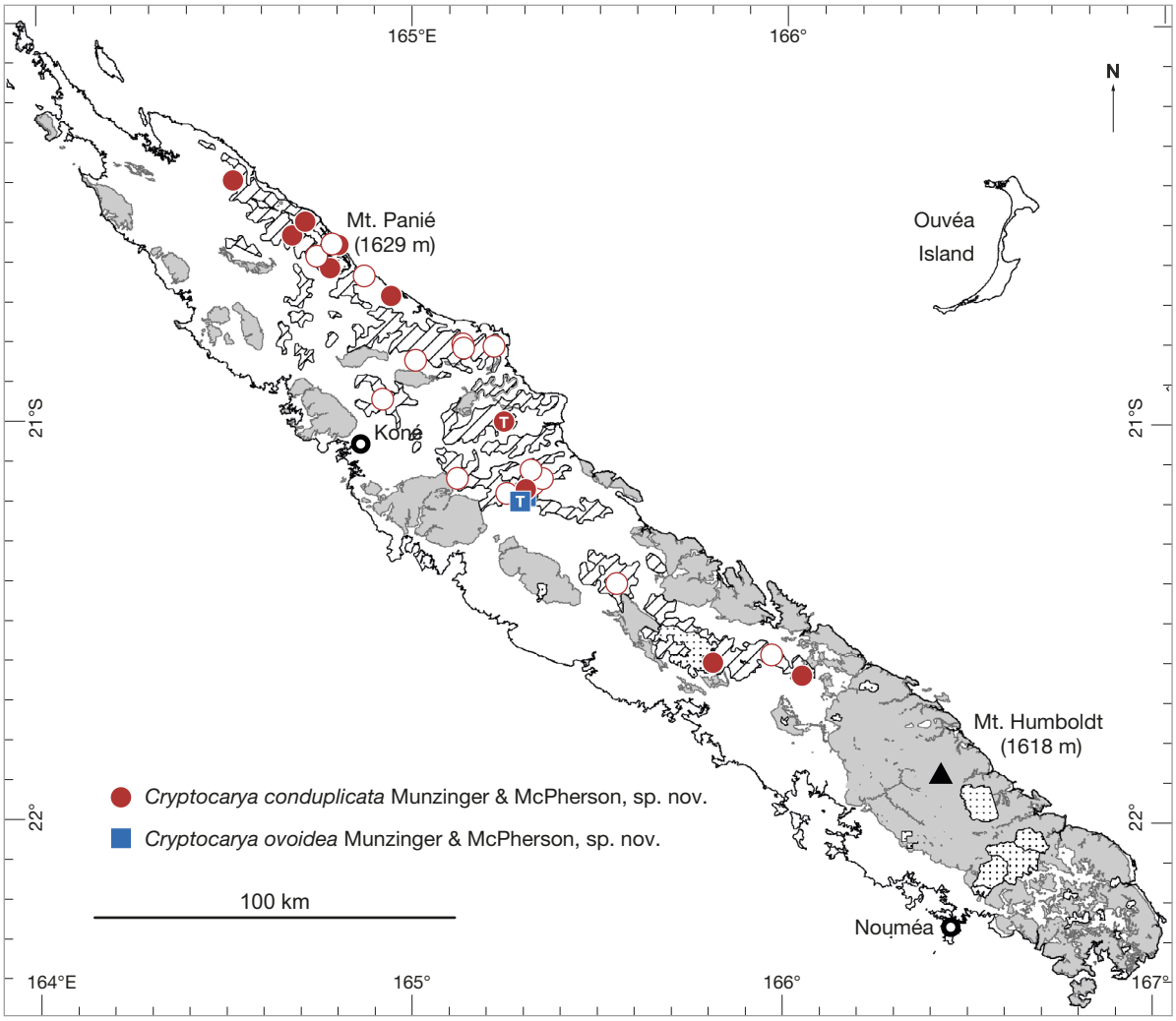

Fig. 3. — Distribution of *Cryptocarya conduplicata* Munzinger & McPherson, sp. nov. (●) and *Cryptocarya ovoidea* Munzinger & McPherson, sp. nov. (■). Full circles or squares are herbarium specimens, empty circles are observations (no voucher) from the NC-PIPPN network (Ibanez *et al.* 2014) and botanical expeditions (Munzinger 2013; Munzinger *et al.* 2018). Abbreviation: **T**, indicates Type specimen. Grey represents ultramafic substrates, slanting lines represent low elevation dense humid forest (Jaffré *et al.* 2012).

[vs blades flat], its lenticels no higher than 0.5 mm (vs 1-3 mm), and its smaller fruits (22-25 mm wide, 13-15 mm high, 10 mm thick vs 25-45 mm wide, 20-30 mm high, 20-30 mm thick); as well, its flowers are slightly smaller (tepals 1.3-1.8 mm vs 1.5-2.0 mm long, and its hypanthium distally is 1.3 mm in diameter vs 1.4-1.8 mm).

Typus. — **New Caledonia**. Province Nord, Haute Tchamba, [*c.* 500 m], 21°0'23"S, 165°14'35"E, fl, 16.II.2011, *J. Munzinger, P. Lowry, S. Buerki, M. Callmander, I. & D. Létocart, C. Davidson & S. Christoph 6545* (holo-, P! [P00819240]!, iso-, MO![6642455, 6642456], MPU! [MPU091689], NOU! [NOU052192]).

Phenology. — Flowers have been collected in November, December, and February; fruits are known from October to March (black = ripe in November, March). The flowers are noted as very fragrant (*MacKee 26524*).

Etymology. — The specific epithet refers to the often somewhat folded leaves.

Habitat. — The species grows in « forêts denses humides de basse et moyenne altitudes sur roches volcano-sédimentaires » sensu Jaffré *et al.* (2012), at 10-950 m.

Distribution. — The species grows on the east side of the main island "Grande Terre"; the southernmost locality is Nakada, and the northernmost is Mandjélia (Fig. 3).

Conservation status. — The plant is known from fourteen subpopulations, three of them in protected areas: "*Réserve de nature sauvage du massif de l'Aoupinié*" and "*Réserve de nature sauvage du mont Panié*" in the North Province, and "*Parc des Grandes Fougères*" in the South Province. The calculated EOO is 3715 km² and the AOO is 68 km². Although some subpopulations may be threatened by bushfires and/or introduced browsers, we assign *Cryptocarya conduplicata, sp. nov.* a preliminary status of Least Concern (LC).

Vernacular name. — Chêne gris (*Sarlin 282*).

Additional material examined. — **New Caledonia. Province Nord**, Diahoué, 750 m, 20°27'39.5"S, 164°40'37.58"E, fr., 14.III.2014, *Butin 87* (NOU[NOU083731]); Bwe Salada, Pouébo, 580 m, 20°21'41"S, 164°31'39"E, 27.VII.2019, green fr., *Fleurot 607* (MPU[MPU312701], NOU[NOU090493, NOU106704 (alc.)]); Hienghène, [20°41'29"S, 164°56'27"E], st., sin. dat. [1973], *Gaillard 72* (P[P02116863]); Ponérihouen, Mont Aoupinié, 700 m, [21°10'45"S, 165°18'11"E], st, 7.IV.1981, *MacKee*

Fig. 4. — Comparison of general aspect, angle of leaf presentation, and lenticels aspect between *C. aristata* (to the left in **A** and **B**, to the right in **C**) and *C. conduplicata* Munzinger & McPherson, sp. nov. (*Munzinger et al. 6545,* to the right in **A** and **B**, to the left **C**). Photographs: **A**, J. Munzinger; **B**, **C**, P. Lowry.

38927 (NOU[NOU016196], P[P02032987]); Ponérihouen, Mont Aoupinié, 700 m, [21°10'45"S, 165°18'11"E], st, 18.VIII.1981, *MacKee 39466* (NOU[NOU016195], P[P02003051]); Mont Aoupinié, 500 m, [21°9'24"S, 165°19'0"E], fr., 7.X.1982, *MacKee (leg. J.-F. Cherrier) 40861* (NOU[NOU016193]); Mont Colnett, forested eastern slopes, 800-925 m, 20°30'13"S, 164°42'52"E, green fr., 1.XI.2003, *McPherson 19131* (MO[MO-398160], P[P02033187]); Parcelle Dawenia 1, 608 m, 20°32'26"S, 164°40'41"E, fl, 12.XI.2010, *Munzinger 6263* (NOU[NOU063442], P[P06837396]); La Guen, chemin vers le plateau, parcelle 5, 700 m, [20°37'27"S, 164°46'56"E], fl, 25.XI.2010, *Munzinger et al. 6481* (NOU[NOU063661], P[P06801581, P06801582]); Tchamba, 426 m, 21°0'17"S, 165°15'0"E, fl, 15.II.2011, *Munzinger et al. 6534* (NOU[NOU063676], P[P00819221, P06801580]); Tchamba, 410 m, 21°0'19"S, 165°14'17"E, st, 3.X.2009, *Munzinger et al. 5872* (NOU[NOU051491], WAIK); Tchamba, 500 m, 21°0'25"S, 165°14'35"E, fr, 3.X.2009, *Munzinger et al. 5874* (G, MO, NSW, NOU[NOU051483, NOU054786], P[P01962723], WAIK); Tchamba, 420 m, 21°0'19"S, 165°14'57"E, st, 3.X.2009, *Munzinger et al. 5882* (NOU[NOU054591], P[P00806963]); Mandjélia, 650 m, 20°24'7"S, 164°31'21"E, fr, 25.XI.2019, *Munzinger et al. 8101* (MPU[MPU312601], P[P00864945]); Chutes de Tao, *c.* 10 m, [20°33'51"S, 164°48'10"E], fl, 14.XII.1965, *Veillon 553* (MPU[MPU091624], NOU[NOU016369], P[P02006307]). — **Province Sud**, Col d'Amieu, Mé Ongué, 600 m, [21°36'56"S, 165°48'11"E], fl, 10.IV.1973, *MacKee 26524*

(MPU[MPU091634], NOU[NOU016191], P[P01961826]); Mt Nakada, *c.* 600 m, [21°38'47"S, 166°2'45"E], fr, 13.XI.1979, *Veillon 4230* (NOU[NOU016484], P[P00555340]); Col d'Amieu, [21°36'41"S, 165°48'36"E], st, XII, *Sarlin 282* (P[P05469250]). — Sin. loc., 186X [1876/1877], *Lécard 162* (P[P01979814]).

Description

Tree (2-)5-30 m; diameter 20-55 cm; bark brown to pale grey, nearly smooth to somewhat rough, slightly aromatic, slash reddish (Fig. 2A). Terminal bud acute, appressed-pubescent with straight hairs; young stems densely pubescent with appressed, sub-persistent, straight hairs, soon roughened by the emerging lenticels; older stems abundantly lenticellate, the lenticels usually 1-3 mm long and 0.5-1 mm wide, up to 0.5 mm high. Petioles 7-15(-20) mm long, diameter 1-1.5 mm, appressed-pubescent while young, glabrescent. Blade ovate to elliptic, occasionally flat but mostly folded lengthwise at least in part (i.e. conduplicate) and drying folded or twisted, sometimes only near the apex, new leaves often appearing with the flowers, 3.5-8.8 cm long 1.7-5.1 cm wide, base broadly acute to obtuse, slightly attenuate, apex rounded or more usually slightly acuminate, the acumen typically 3-5 mm long; mature blades somewhat discolorous, often lustrous adaxially, matte and occasionally somewhat glaucous abaxially; venation pinnate, the veins 3-6(-7) per side ascending, the loops rising to within 2-3 mm of the margin; midrib flush adaxially near base, slightly sunken distally, the secondary veins visible but scarcely raised, midrib somewhat raised abaxially, the secondaries and minor veins slightly raised; young blades pubescent with minute, appressed hairs, especially abaxially, mature blades sparsely pubescent abaxially to glabrous.

Inflorescences axillary, up to 3.5 cm long, branching from or near the base, few-flowered, the axis c. 0.8 mm in diameter, pubescent with appressed to sub-ascending hairs; bracts and bracteoles minute, pubescent, deciduous; lateral flowers subsessile, central flowers obscurely pedicellate, the pedicel c.0.5 mm long, appressed-pubescent. Flowers green-white, 2.5-2.8 mm long, c. 2 mm in diameter when tepals erect, 4 mm when tepals spread; hypanthium 1.5 mm long, c. 1.3 mm in diameter distally, pubescent abaxially with appressed straight or slightly bent hairs, pubescent inside with long hairs toward the apex; tepals subequal, 1.3-1.8 mm × 0.6-0.8 mm, concave, ovate, apex acute to rounded, pubescent on both sides with appressed straight or slightly bent hairs; stamens in 3 whorls, those of whorls I and II introrse, those of whorl III lateral-extrorse, c.1 mm long, filaments 0.4 mm, pubescent, anthers ovate, 0.6 mm, sparsely pubescent abaxially, connectives slightly prolonged beyond the sporangia, tip acute to rounded, glands attached to the base of the filaments of whorl III, subglobose, 0.4 mm in diameter, borne on a pubescent stalk 0.3 mm long, the staminodes triangular-ovate, flattened, long-acuminate, 0.5 mm long, subglabrous adaxially, densely pubescent abaxially, sessile; gynoecium immersed in the hypanthium, 2.8 mm long, glabrous, the ovary gradually merging into the style with small discoid stigma.

Fruit oblate-compressed, 22-25 mm wide, 13-15 mm long, 10 mm thick, black at maturity, essentially smooth, purple in cross-section.

Note

The species was first collected nearly a century and a half ago (a depauperate specimen, *Lécard 162*, dates from 1876/1877) and adequate flowering material has been available since 1965 (*Veillon 553*). The illustrator of the treatment in the Flore, R. Fouilloy, who was acknowledged by Kostermans for his "useful additional morphological observations", apparently noticed that Veillon's specimen was different from the others, as he made a complete drawing of a dissected flower (see P02006307). However, in 1976 Fouilloy finally identified the specimen as *C. odorata*, even though his drawing reveals some obvious differences when compared to the plate of *C. odorata* provided in the Flore (Kostermans 1974); plate 9, page 49). Specimens of *C. conduplicata, sp. nov.* and *C. aristata* in the herbarium can seem quite similar, and molecular data indicate that the plants are closely related (C. Gemmill pers. comm.), but field observations, in addition to the morphological differences outlined in the diagnosis, confirm that the two entities are distinct, *C. aristata* tending to have uniformly erect leaves, while *C. conduplicata*, sp. nov. typically bears leaves diverging at wider angles. The two species can grow side by side (Fig. 4), but *C. conduplicata*, sp. nov. is restricted to non-ultramafic substrates, while *C. aristata* can be found on both ultramafic and non-ultramafic substrates.

This species was cited as [*Cryptocarya* sp. "aff. *aristata*" (*Munzinger 5874*)] in (Munzinger 2013; Munzinger *et al.* 2018).

Cryptocarya ovoidea
Munzinger & McPherson, sp. nov.
(Figs 5; 6)

From *Cryptocarya pluricostata* Kosterm., its sister species according to molecular data, *C. ovoidea*, sp. nov. differs in its short, sparse, whitish, cream-grey to blackish hairs, appressed toward the apex on bud and young twigs, quickly falling, versus the longer, dense, ferrugineous sublanate and subpersistent indument of *C. pluricostata*. As well, the secondary veins of *C. ovoidea*, sp. nov. remain concolorous on drying and the tertiaries are few, irregular and mostly areolate, whereas the secondaries of *C. pluricostata* turn obviously darker than the blade on drying, and its tertiary veins are numerous, regular and obviously oblique. Furthermore, the fruit of *C. ovoidea*, sp. nov. is ovoid, 22 mm long, 12 mm in diameter, smooth, and the perianth is caducous, in contrast to the fruit of *C. pluricostata*, which is ellipsoid, 18 mm long, 9 mm in diameter, and ribbed, and the perianth is persistent and up to 2 mm long.

Typus. — **New Caledonia**. Aoupinié, 21°11'34.18"S, 165°18'0.91"E, 640 m, 13.X.2008, fr., *J. Munzinger, L. Barrabé, F. Rigault, A. Michel, V. Apiazari 5178* (holo-, NOU[NOU049142]!).

Phenology. — Flowers have been collected in December and fruits in October.

Etymology. — The specific epithet refers to the shape of the fruit.

Habitat. — The species is restricted to the « forêts denses humides de basse et moyenne altitudes sur roches volcano-sédimentaires » sensu Jaffré *et al.* (2012), from 300 to 540 m.

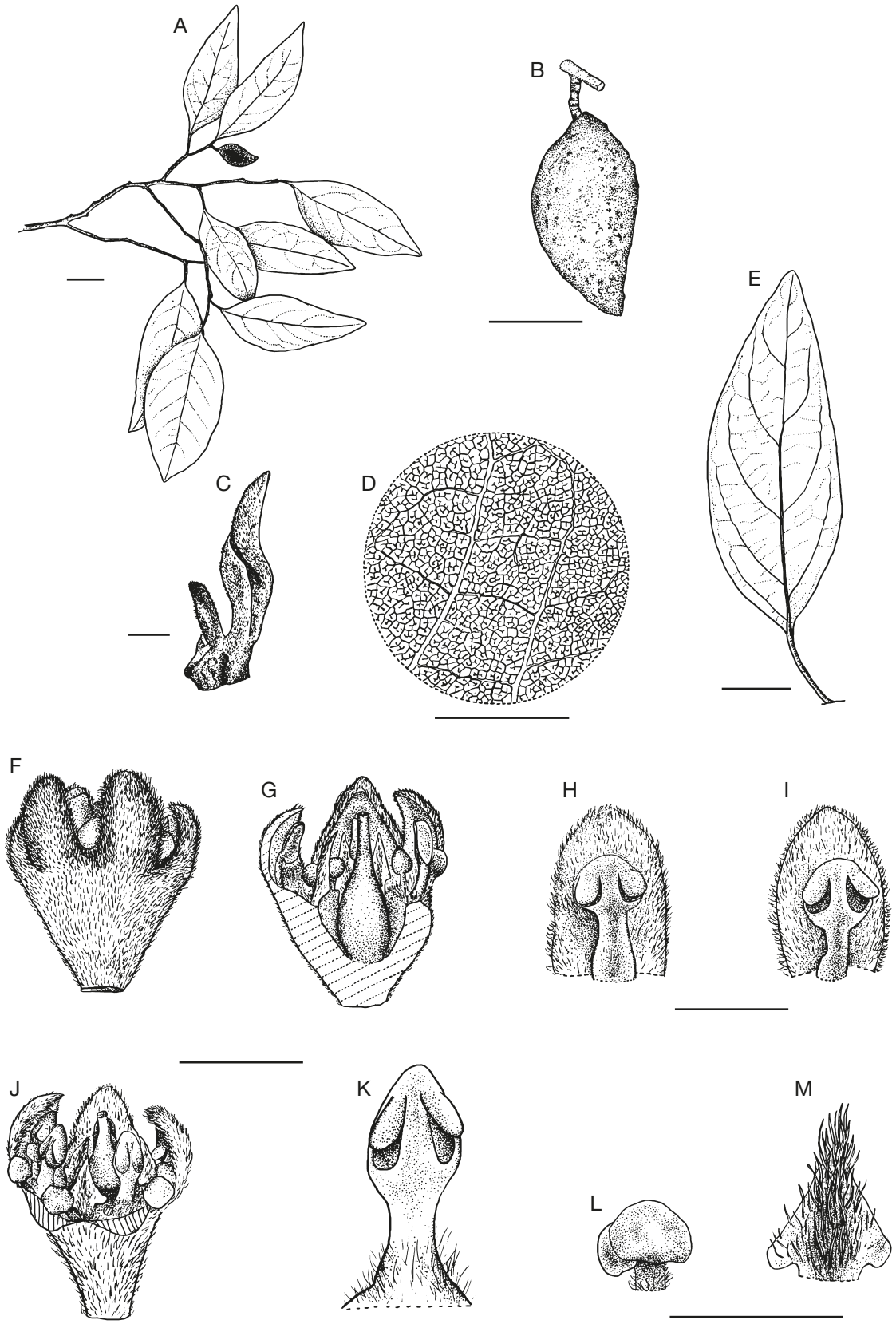

Fig. 5. — *Cryptocara ovoidea* Munzinger & McPherson, sp. nov.: **A**, fruiting branch; **B**, fruit; **C**, terminal vegetative bud; **D**, detail of venation; **E**, leaf; **F**, flower; **G**, longitudinal section of flower; **H**, exterior tepal and stamen of whorl I; **I**, interior tepal and stamen of whorl II; **J**, flower with two tepals removed; **K**, stamen of whorl III; **L**, gland; **M**, staminode, adaxial side; **A**-**E**, *Munzinger et al. 5178*; **F**-**M**, *Dabome 2*. Drawings: Laurence Ramon. Scale bars: A, 2 cm; B, E, 1 cm; C, H, I, K-M 1 mm; D, 5 mm; F, G, J, 2 mm.

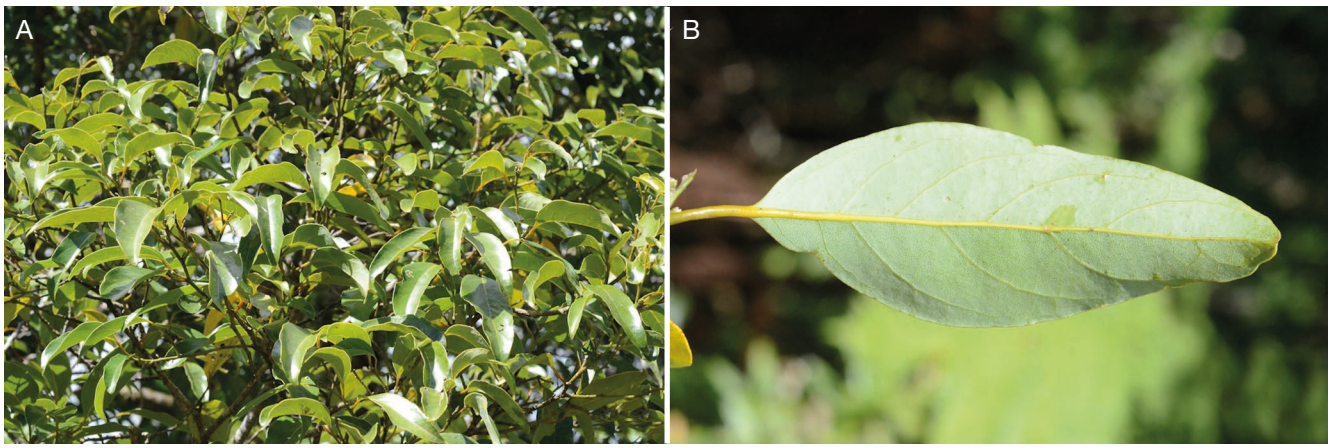

Fig. 6. — *Cryptocara ovoidea* Munzinger & McPherson, sp. nov.: **A**, habit; **B**, leaf abaxial surface. Photos: Jérôme Munzinger.

Fig. 7. — Leaves of four species of *Cryptocarya* R.Br. observed the same day on Aoupinié (left to right), *C. elliptica* Schltr., *C. longifolia* Kosterm., *C. pluricostata* Kosterm. and *C. ovoidea* Munzinger & McPherson, sp. nov. Photo: Jérôme Munzinger.

Distribution. — This tree is only known from the forests of Aoupinié in the north-east of the main-island (Fig. 4).

Conservation status. — The plant is known from just two trees, both in the protected area "*Réserve de nature sauvage du massif de l'Aoupinié*", in the North Province. EOO cannot be calculated, while AOO is 8 km². One of us (JM) participated in the establishment of 31 inventory plots (20 × 20 m; DBH≥5 cm) scattered over the Aoupinié massif, from base to summit, within the framework of the NC-PIPPN network (Ibanez *et al.* 2014). These 31 plots included 4926 trees, of which 284 were *Cryptocarya* individuals, but none were identified as *C. ovoidea*, sp. nov. Thus, as there are fewer than 50 known mature individuals, we assign *C. ovoidea*, sp. nov. a preliminary status of "Critically Endangered" (CR) according to criterion D.

Additional material examined. — **New Caledonia**. Aoupinié, 21°11'34.18"S, 165°18'0.91"E, 640 m [same tree as *Munzinger et al. 5178*], 27.XII.2017, fl., *Dabome 2* (NOU[NOU105563]); Aoupinié, Parcelle Pierric 2, 21°12'42"S, 165°17'14,8"E, 300 m, 8.IV.2014, st., *Munzinger & Lowry 7216* (MPU[MPU026705]).

Description

Small tree, up to 8 m tall; diameter unknown; bark unknown; slash unknown. Terminal bud erect, acute, appressed-pubescent, hairs short, whitish, cream-grey to blackish, appressed toward the apex; young stems immediately glabrous, drying dark reddish black, older stems shallowly lenticellate in the lower leafy internodes, more densely lenticellate below the leafy portion of the stem, lenticels evident, up to 4 mm long and 1.5 mm wide, up to 0.5 mm high. Petioles slightly canaliculate (8-)10-11(-16) mm long, up to 25 mm on juvenile (*Munzinger & Lowry 7216*), diameter 0.7-1.1 mm., quickly glabrescent. Blades ovate-elliptic to elliptic, 6.5-11.8 × 2.5-4.4 cm, base acute, often slightly attenuate, apex acute, usually slightly acuminate; midrib slightly sunken adaxially, raised abaxially; mature blades discolorous, often lustrous adaxially, matte and somewhat glaucous abaxially; secondary veins (3-)4-5, tertiaries few, irregular, areolate; fine venation reticulate, raised; the secondary and higher order venation concolorous with the blade; young abaxial surfaces sparsely and minutely appressed-pubescent.

Inflorescence axillary but subterminal, appearing while the branch is flushing, 9-30 mm long, axis ca. 1 mm in diameter, minutely appressed-pubescent; bracts caducous. Flowers subsessile (pedicel up to 0.5 mm), yellowish, 3.5-4 mm long, 2.5-3 mm diam.; hypanthium 1.5-2 mm long, 2.5 mm in diameter distally, minutely appressed-pubescent abaxially, glabrous adaxially; tepals subequal, 1.5 mm long, concave, obtuse, pubescent on both surfaces; stamens in 3 whorls, those of whorl I introrse, 1 mm long, filaments 0.5 mm, anthers 0.5 mm long, 0.6 mm wide, pubescent abaxially (more visible on dry), glabrescent adaxially, those of whorl II introrse, slightly shorter, filaments 0.3 mm, anthers 0.5 mm long, 0.6 mm wide, glabrous adaxially and abaxially, those of whorl III extrorse, 1.2 mm long, anthers ovate, 0.7 mm long, 0.5 mm wide, glabrous adaxially and abaxially; glands positioned between whorls II and III, without any apparent attachment to the base of the filaments of whorl III, subglobose, c. 0.5 mm diameter, borne on a pubescent stalk 0.15 mm long; staminodes widely triangular, 0.75 mm long × 0.5 wide, thinly pubescent abaxially, sometimes with a tuft of hairs at summit, glabrous adaxially; gynoecium immersed in the tube, 2.7 mm long, 0.8 mm in diameter, style glabrous, the ovary gradually merging into the style with small discoid stigma. Fruit ovoid, 12 mm wide, 22 mm high, black when ripe (in vivo), calyx caducous, with a few slight longitudinal lines on drying. Cross-section colour unknown.

Note

The species looks quite similar to *Cryptocarya pluricostata* in the field (Fig. 7), and may have been confused with it and thus might be under-collected. After we had found the distinctive fruit of the type collection, we paid close attention to similar trees, and were confident that *Munzinger & Lowry 7216,* even though sterile, was the same new species. This latter collection was then sequenced (C. Gemmill pers. comm.) and confirmed to be the same taxon, with both accessions appearing in a sister position to *C. pluricostata.*

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REFERENCES

Bachman S. P., Moat J., Hill A.W., De La Torre J. & Scott B. 2011. — Supporting Red List threat assessments with GeoCAT: geospatial conservation assessment tool, *in* Smith V. & Penev L. (eds), e-Infrastructures for data publishing in biodiversity science. *ZooKeys* 150: 117-126. https://doi.org/10.3897/zookeys.150.2109

Harris G. J. & Harris M. W. 2001. — *Plant Identification Terminology: an Illustrated Glossary*. Spring Lake Publishing, Utah, United States, 216 p.

Ibanez T., Munzinger J., Dagostini G., Hequet V., Rigault F., Jaffré T. & Birnbaum P. 2014. — Structural and floristic characteristics of mixed rainforest in New Caledonia: New data from the New Caledonian Plant Inventory and Permanent Plot Network (NC-PIPPN). *Applied Vegetation Science* 17: 386-397. https://doi.org/10.1111/avsc.12070

IUCN 2012. — *IUCN Red List Categories and Criteria: Version 3.1. Second edition*. IUCN Species Survival Commission, IUCN, Gland, Switzerland and Cambridge, United Kingdom.

IUCN Standards and Petitions Subcommittee 2019. — Guidelines for Using the IUCN Red List Categories and Criteria. Version 14. Prepared by the Standards and Petitions Subcommittee: Downloadable from http://www.iucnredlist.org/documents/RedListGuidelines.pdf

Jaffré T. & Veillon J. M. 1990. — Étude floristique et structurale de deux forêts denses humides sur roches ultrabasiques en Nouvelle-Calédonie. *Bulletin du Muséum national d'Histoire naturelle, section B, Adansonia, Botanique, Phytochimie* 12: 243-273. https://www.biodiversitylibrary.org/page/13739282

Jaffré T. & Veillon J. M. 1995. — Structural and floristic characteristics of a rain forest on schist in New Caledonia: a comparison with an ultramafic rain forest. *Bulletin du Muséum national d'Histoire naturelle, section B, Adansonia, Botanique, Phytochimie* 17: 201-226. https://www.biodiversitylibrary.org/page/13740089

Jaffré T., Rigault F. & Munzinger J. 2012. — La végétation, *in* Bonvallot J., Gay J.-C. & Habert É. (eds), *Atlas de la Nouvelle-Calédonie*. IRD-Congrès de la Nouvelle-Calédonie, Marseille-Nouméa: 77-80.

Kostermans A. 1974. — Lauracées, *in* Aubréville A. & Leroy J.-F. (eds), *Flore de la Nouvelle-Calédonie et Dépendances*. Muséum national d'Histoire naturelle, Paris: 1-120.

Kostermans A. 1977. — Un nouveau *Litsea* (Lauraceae) de Nouvelle-Calédonie. *Adansonia, série 2*, 17 (1): 95. https://www.biodiversitylibrary.org/page/59850046

Morat P. 2010. — Les botanistes récolteurs en Nouvelle-Calédonie de 1774 à 2005. *Adansonia,* sér. 3, 32 (2): 159-216. https://doi.org/10.5252/a2010n2a1

Munzinger J. 2013. — Inventaire botanique du massif du Panié et des roches de la Ouaième, Province Nord, Nouvelle-Calédonie, *in* Tron F., Franquet R., Larsen T. H., & Cassan J.-J. (eds), *Évaluation rapide de la biodiversité du massif du Panié et des Roches de la Ouaième, province Nord, Nouvelle-Calédonie. RAP Bulletin of Biological Assessment*, Conservation International, Arlington, VA, United States: 45-86. https://doi.org/10.1896/054.065.0111

Munzinger J. 2015. — *Novitates neocaledonicae* I: An additionnal *Planchonella* (Sapotaceae) endemic to Roches de la Ouaième. *Phytotaxa* 201: 71-78. https://doi.org/10.11646/phytotaxa.201.1.5

Munzinger J. & McPherson G. 2016. — *Novitates neocaledonicae* IV: Three new species of *Cryptocarya* R.Br. (Lauraceae). *Adansonia,* sér. 3, 38 (2): 165-174. https://doi.org/10.5252/a2016n2a3

Munzinger J. & McPherson G. 2017. — Typification of the name *Litsea mackeei* (née Lauraceae) and its reassignment to the synonymy of *Osmanthus austrocaledonicus* var. *austrocaledonicus* (Oleaceae). *Phytotaxa* 331: 137-143. https://doi.org/10.11646/phytotaxa.331.1.13

Munzinger J., Pignal M. & Bruy D. 2018. — Flore & végétation du Katalupaik, *in* Pascal O. (ed.), *La Planète revisitée, Nouvelle-Calédonie 2016-18, Volet « Forêt » 2017 en province Nord, Rapport d'étape N°1*. ProNatura/Muséum national d'Histoire naturelle, Paris: 6-16.

Thiers B. 2020 [continuously updated]. — *Index Herbariorum: a Global Directory of Public Herbaria and Associated Staff.* New York Botanical Garden's Virtual Herbarium, http://sweetgum.nybg.org/ih/

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