Novitates neocaledonicae XII: Two additional new species of Cryptocarya R.Br. from New Caledonia
Jérôme Munzinger, Gordon Mcpherson

To cite this version:

HAL Id: hal-03273508
https://hal.inrae.fr/hal-03273508
Submitted on 29 Jun 2021

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L’archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d’enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Distributed under a Creative Commons Attribution 4.0 International License
Novitates neocaledonicae XII:
Two additional new species of Cryptocarya R.Br.
from New Caledonia

Jérôme MUNZINGER &
Gordon McPHERSON

art. 43 (13) — Published on 28 June 2021
www.adansonia.com
Novitates neocaledonicae XII: Two additional new species of Cryptocarya R.Br. from New Caledonia

Jérôme MUNZINGER
AMAP, Univ. Montpellier, IRD, CIRAD, CNRS, INRAE, adresse, F-34398 Montpellier (France)
jerome.munzinger@ird.fr (corresponding author)

Gordon McPHERSON
Herbarium, Missouri Botanical Garden, 4344 Shaw Blvd., St. Louis, Missouri 63166 (United States)
gordon.mcpherson@mobot.org

Submitted on 19 June 2020 | accepted on 9 November 2020 | published on 28 June 2021

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).
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).

MATERIÀL AND METHODS

We made use of field observations and photographs, and checked all specimens deposited at MO, MPU, NOU and P (abbreviations follow Thiéry 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 x 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...
Two new Cryptocarya R.Br. from New Caledonia

**Fig. 1.** — Cryptocarya conduplicate 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; 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.
Two new Cryptocarya R.Br. from New Caledonia

ADANSONIA, sér. 3 • 2021 • 43 (13)

Two new Cryptocarya R.Br. from New Caledonia

ADANSONIA, sér. 3 • 2021 • 43 (13)

[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).

T ypus. — 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).

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. con- duplicata 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.
(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[P05409290]). — Sm. loc., 186X [1876/1877], Lédard 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, apressed-pubescent with straight hairs; young stems densely pubescent with apressed, 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, apressed-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, apressed 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 apressed to sub-asending hairs; bracts and bracteoles minute, pubescent, deciduous; lateral flowers subsessile, central flowers obscurely pedicellate, the pedicel 0.5 mm long, apressed-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 apressed 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, convolute, ovate, apex acute to rounded, pubescent on both sides with apressed 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-accumulate, 0.5 mm long, subglarescent 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 deapature specimen, Lédard 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, apressed toward the apex on bud and young twigs, quickly falling, versus the longer, dense, ferrugineous subulate 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.

TYPE — 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. Apiataeri 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, Dabone 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.
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, 3.5-4.4 cm 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 intorse, 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 intorse, slightly shorter, filaments 0.5 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.

Acknowledgements
We are indebted to Odile Poncy and Serge Muller (MNHN) and the Programme Flores du MNHN, supported by the Fondation Franklinia, 2019-2022, for funding and facilitation of our studies. IRD and MNHN provided access to the collections in the framework of the RECOLNAT national Research Infrastructure (ANR-11-INBS-0004). Important field observations and pictures were made during a field trip in 2011 supported by the Idaho Botanical Foundation, special thanks to Chris Davidson and Sharon Christoph. Technical and assistance with herbarium specimens was provided by P. NOU and MPU, thanks notably to Grégoire Flament & Mathieu Donnat (P), Jacqueline Fambart-Tinel (NOU) and Caroline Loup (MPU). Valuable field information was provided by Vanessa Hequet. Thanks for Marie-Louise Dabome, Vanessa Tchoeaoua et Jenny Kowi for collecting precious flowers of Cryptocarya ovoidea, sp. nov. Thanks also to Pete Lowry and Dominique Fleuron for sharing their photographs, and to them and David Bruy for help and enthusiastic company in the field. The Environmental Services of the Province Nord and Province Sud are thanked for granting collecting permits, and we are indebted to the reviewers, Drs J. Rohwer and P. Lowry, for their most useful comments.

References

Munzinger J. & McPherson G.

Submitted on 19 June 2020; accepted on 9 November 2020; published on 28 June 2021.