

# Novitates neocaledonicae IV: Three new species of *Cryptocarya* R.Br. (Lauraceae)

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## ABSTRACT

Three endemic new species of *Cryptocarya* R.Br. are described from New Caledonia. *Cryptocarya adpressa* Munzinger & McPherson, sp. nov., is a small-leaved, pinnately veined species resembling species such as *C. leptospermoides* Kosterm. and *C. gracilis* Schltr., but differing most notably in its persistent and strongly appressed indument of the inflorescence. *Cryptocarya barrabaeae* Munzinger & McPherson, sp. nov., resembles *C. pluricostata* but can be distinguished most easily by its elliptical leaf shape and longer, straighter indument. *Cryptocarya chrysea* Munzinger & McPherson, sp. nov., resembles *C. guillauminii* Kosterm. in its ovate, densely and persistently pubescent leaves with ascendant lateral veins, but differs most notably in its prominently lenticellate stems and abaxially golden leaves. All three new species are trees occurring in dense humid forest. Two are restricted to non-ultramafic substrate while *C. chrysea*, sp. nov., occurs on both substrates. They are all known from at least three protected areas, and do not appear to be threatened; thus they are all assigned a preliminarily Least Concern IUCN status.

**KEY WORDS**  
New Caledonia,  
Lauraceae,  
conservation,  
ultramafic substrate,  
new species.

## RÉSUMÉ

*Novitates neocaledonicae IV: Trois nouvelles espèces endémiques de Cryptocarya R.Br. (Lauraceae).*  
Trois nouvelles espèces endémiques de *Cryptocarya* R.Br. sont décrites de Nouvelle-Calédonie. *Cryptocarya adpressa* Munzinger & McPherson, sp. nov., est une espèce à petites feuilles et à nervation pennée, ressemblant à des espèces comme *C. leptospermoides* Kosterm. et *C. gracilis* Schltr., mais s'en différenciant distinctement par l'indument fortement apprimé et persistant des inflorescences. *Cryptocarya barrabaeae* Munzinger & McPherson, sp. nov., ressemble à *C. pluricostata* mais s'en distingue facilement par sa feuille de forme elliptique, et par son indument plus long et plus raide. *Cryptocarya chrysea* Munzinger & McPherson, sp. nov., ressemble à *C. guillauminii* Kosterm. par sa feuille ovale, à pubescence dense et persistante et ses nervures latérales ascendantes, mais s'en distingue par ses rameaux à lenticelles très visibles et par la face abaxiale de ses feuilles dorée. Les trois espèces nouvelles sont des arbres de forêt dense humide. Deux ne sont que sur substrat non ultramafique, alors que *C. chrysea*, sp. nov., se rencontre sur les deux substrats. Elles sont toutes connues d'au moins trois aires protégées, et n'apparaissent pas menacées, si bien qu'elles sont toutes proposées avec un statut UICN non menacé.

**MOTS CLÉS**  
Nouvelle-Calédonie,  
Lauraceae,  
conservation,  
substrat ultramafique,  
espèces nouvelles.

## INTRODUCTION

While setting up the forest plots of the NC-PIPPN network (Ibanez *et al.* 2014), we encountered many problems with the identification of Lauraceae species, especially those belonging to the genus *Cryptocarya* R.Br. Since the latter is one of the genera characteristic of the « forêts denses humides de basse et moyenne altitudes » sensu Jaffré *et al.* (2012), identifications in that genus are significant. Such determinations are based, for the most part, on the treatment by Kostermans of the family Lauraceae, which was the 5<sup>th</sup> volume of the “Flore de Nouvelle-Calédonie et Dépendances” (1974), although he also published an additional species three years later (Kostermans 1977). Currently, the family includes 48 species in New Caledonia, distributed within six genera (Morat *et al.* 2012). However, as we recently pointed out, the New Caledonian flora remains poorly known, and several families, including the Lauraceae, already treated in the flora need further revision (Munzinger 2015).

*Cryptocarya* is a common genus of about 350 species occurring in tropical and subtropical regions of both the Old and the New World (Rohwer 1993). Nineteen endemic species are currently recognized in New Caledonia (Morat *et al.* 2012). *Cryptocarya* and some related genera were recently the subjects of a phylogenetic analysis (Rohwer *et al.* 2014) that indicates the genus to be monophyletic. Of the four New Caledonian species included in this study, *C. gracilis* Schltr. and *C. guillauminii* Kosterm. appear close together, well separated from *C. oubatchensis* Schltr. and *C. pluricostata* Kosterm. Although this sampling of New Caledonian species is very small, it suggests that fruit shape may be an important infrageneric character, as the former two species have globose or oblate and smooth fruits, while the latter two have ovate or ellipsoid, and more or less sulcate fruits.

Among the several well-marked new species that we have detected in Lauraceae, three of them are represented by enough material that they can be described, while several others will need additional collections. Each species is illustrated and a distribution map is provided. A preliminary conservation status following IUCN (2012) criteria is also given.

## MATERIAL AND METHODS

We used field observations and 55 specimens (40 collections) deposited at MO, MPU, NOU and P (abbreviations follow Thiers 2015); the scanned images of specimens at Z were consulted online at <http://www.herbarien.uzh.ch/en.html>. 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). When coordinates were not given on original labels of herbarium specimens, they were added post-facto using MacKee’s gazetteer (available at <http://phanero.novcal.free.fr/index-georeference-de-prospection-botanique.html>, last consultation on 25<sup>th</sup> October, 2016). We calculated EOO and AOO 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

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

**TYPUS.** — New Caledonia. Province Nord, Mandjélie, 860 m, fl., 1.X.2009, 20°23'48"S, 164°31'55"E, Munzinger *et al.* 5832 (holo-, P[P02433555]!; iso-, MO[MO-2849665]!, MPU[MPU026702]!, NOU[NOU051487]!).

**DIAGNOSIS.** — The new species resembles several other New Caledonian *Cryptocarya* species (*C. leptospermoides*, *C. gracilis*, *C. chartacea* Kosterm., *C. mackeei* Kosterm., *C. schmidii* Kosterm.) in having relatively small leaves (up to 7 × 4 cm) with pinnate venation, but can be most easily distinguished from them by its persistent and strongly appressed indument on the inflorescences (vs inflorescences glabrous or rapidly glabrate in *C. mackeei* and *C. schmidii*),



FIG. 1. — *Cryptocarya adpressa* Munzinger & McPherson, sp. nov.: **A**, flowering branch; **B, C**, inflorescences; **D, E**, flowers; **F**, fruiting branch; **G**, fruit; **A, C, E**, *McPherson et al.* 19024 (P); **B, D**, *Munzinger et al.* 4849 (P); **F, G**, *MacKee* 21378 (P). Drawn by Roger Lala Andriamiarisoa. Scale bars: A-C, F, G, 1 cm; D, E, 1 mm.

NOU[NOU030688], NSW, P[P02033421]); Roches de la Ouaième, Panié, Forêt, 947 m, fr., 4.XI.2010, 20°38'29.9"S, 164°51'38.5"E, *Munzinger et al.* 6160 (NOU[NOU063337], P); La Guen, Forêt, 785 m, fr., 21.XI.2010, 20°37'0.384"S, 164°46'52.7"E, *Munzinger et al.* 6419 (CANB, NOU[NOU063599], P); Hauts de Robinson, prop. Lavoix, 560 m, fl., 11.XI.2015, 22°11'23.06"S, 166°31'8.60"E, *Munzinger et al.* 7398 (CNS, MO, MPU, NOU, P[P02439900]); Col d'Amieu, fr., *Sarlin* 283 [P01979773]; Col d'Amieu, Forêt, 700 m, bt.fl., 30.X.1972, *Schmid* 4225 (NOU[NOU016290]); Ouégoa, bassin de la Tendé, Forêt dense et humide en sous-bois, fr., 31.VII.1973, *Veillon* 3000 (NOU[NOU016304], P[P0055346]).

#### DESCRIPTION

Tree 6-25 m. Diameter 15-20 cm. Bark brown, somewhat rough to nearly smooth. Twigs somewhat flattened, densely puberulous at first with minute, tightly appressed, essentially straight hairs, soon glabrescent, wrinkled and shallowly ridged at first, becoming smoother in the lower leaf-bearing region, lenticels not prominent; terminal buds densely appressed puberulent. Leaves alternate, blades elliptic to slightly ovate, 2.6-7.0 × 1.1-4.0 cm; base acute to broadly acute, sub-cuneate to somewhat attenuate-decurrent into the petiole; apex rounded to shortly acuminate and obtuse; margin not or only slightly thickened, typically flush; texture coriaceous; adaxial surface typically glossy, glabrous except near the base while immature, abaxial surface dull, typically glaucous at least when young, glabrous except near the base and on the midrib while immature; lateral veins (4-)6-9 on each side, uniformly pinnate, flush on both surfaces or slightly raised adaxially, lower venation obscure or very finely reticulate on both surfaces; petioles 4-7 × c. 2 mm, flat adaxially.

Inflorescences axillary or appearing terminal, 1.2-3.6 cm long, paniculate, densely appressed puberulent; peduncle 3-22 mm long, 1 mm wide; bracts up to 5 mm long, bracteoles up to 1 mm long, acute, caducous; pedicels (uppermost bracteoles to hypanthium base) of at least the central flower of each dichasium 0.5-1.0(-2.0) mm long, those of the lateral flowers often shorter. Flowers yellow-green to green, 2.5-3.5 mm long, 2-3 mm in diameter at anthesis, externally appressed puberulent, the tube 1-1.5 mm long, the tepals 1.5-2.3 mm long, erect to slightly spreading at anthesis, subequal, ovate, pubescent adaxially as well; stamens 9, all 2-celled, pubescent, c. 1.5 mm long, the filaments about as long as the anther cells, the connectives prolonged beyond the anther cells; stamens shorter than the tepals and hidden behind them; paired glands at the bases of the inner three stamens globose, c. 0.4 mm in diameter; staminodia c. 0.6 mm long, ovate; pistil glabrous, c. 2 mm long, the style not exerted; receptacle cylindrical, pubescent at the rim, otherwise glabrous. Fruits spherical or somewhat flattened, 2.0-2.5 cm in diameter × 2.0-2.1 cm high (dried), reddish to black at maturity, the pericarp 1.5-2 mm thick (dried), the embryo golden yellow to orange in cross-section.

#### NOTE

Cited as [*Cryptocarya* sp. "glauque" (*Munzinger* 5832)] in Munzinger (2013). Most of the collections identified by Kostermans (1974) as *Cryptocarya leptospermoides* Kosterm. belong to this new species.

#### *Cryptocarya barrabeae* Munzinger & McPherson, sp. nov. (Fig 3; 4)

TYPUS. — New Caledonia. Province Sud, Col d'Amieu, fl., 11.II.2005, *Barrabé, Pillon, D., I. & C. Létocart* 280 (holo-, P[P01963123!]; iso-, MO[MO-2849659!], NOU[NOU004589!], P[P01963124!]).

DIAGNOSIS. — Among New Caledonian species of *Cryptocarya*, the new species most closely resembles *C. pluricostata* in having relatively large leaves (blades mostly >7.5 cm long and petioles >10 mm long) with typically more than five pairs of lateral veins and a dense, suberect indument; however, in *C. barrabeae*, sp. nov., the leaf blade is elliptical (vs ovate in *C. pluricostata*), the longer petioles at midpoint are >2.5 mm in diameter (vs 2 mm), the indument of the inflorescence axes is longer (0.5-1

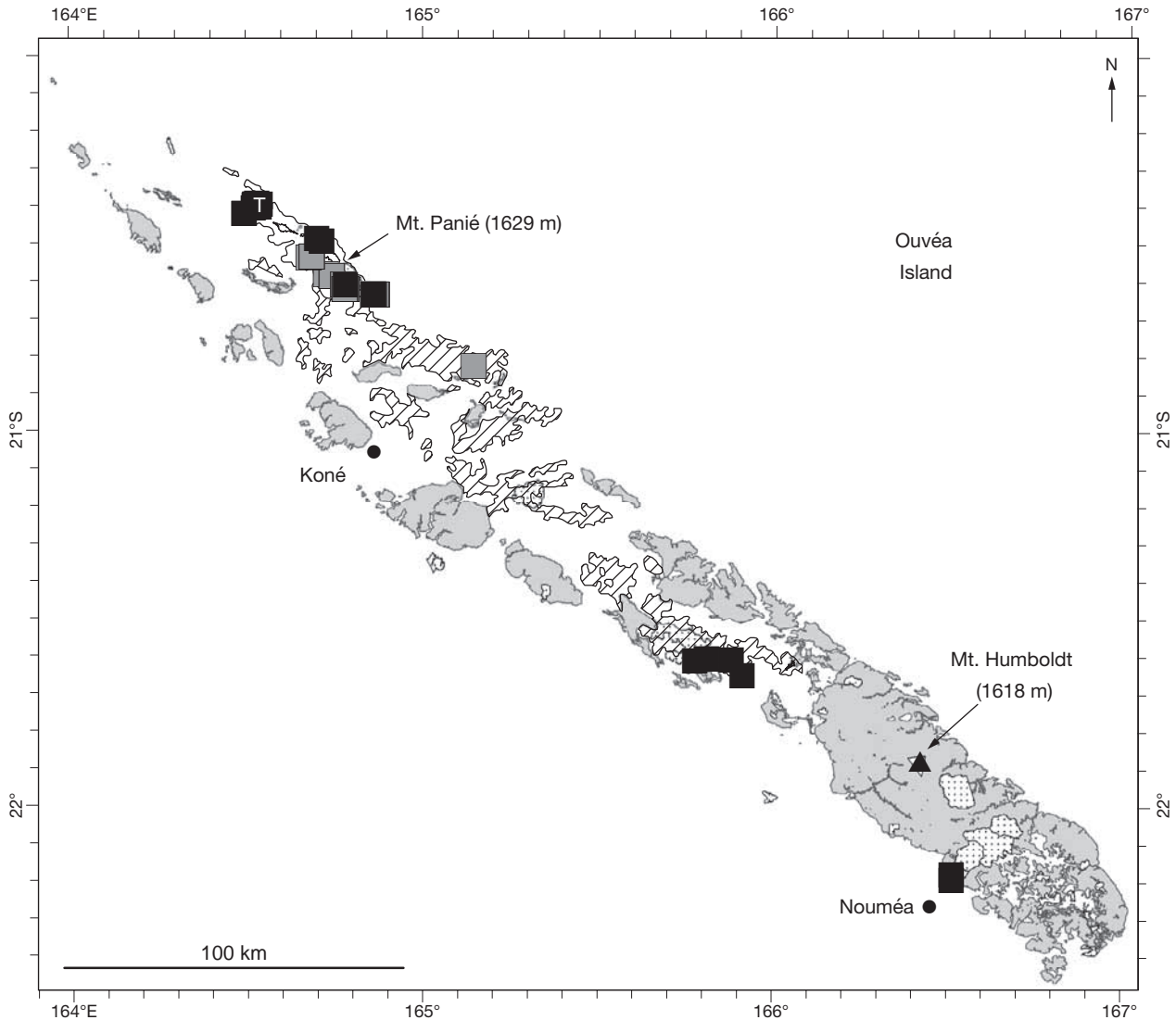


FIG. 2. — Distribution of *Cryptocarya adpressa* Munzinger & McPherson, sp. nov.: ■, herbarium specimens; ■, are observations (no voucher) from the NC-PIPPIN network (Ibanez *et al.* 2014). Abbreviation and areas: T, type specimen; grey areas, ultramafic substrates; dotted areas, protected regions; slanting lines, represent low elevation dense humid forest on volcano-sedimentary substrate (Jaffré *et al.* 2012).

#### DESCRIPTION

Tree 4–20 m; 25–50 cm in diameter. Bark brown, somewhat rough, not aromatic. Twigs subterete, densely pubescent with long, erect, reddish brown, straight to somewhat curved, persistent hairs; lenticels not evident in the leafy portions; terminal buds densely erect-pubescent. Leaves alternate; blades elliptical, 4–13.5 × 2–7(–9) cm; base broadly acute (in the smaller leaves) to obtuse (in the larger), often briefly attenuate; apex rounded to truncate or briefly acuminate to an acute or narrowly obtuse tip; margin not or only slightly revolute; texture subcoriaceous; adaxial surface glossy, scrobiculate, glabrous except on the midrib and larger veins, abaxial surface dull, sometimes glaucous, scrobiculate (sometimes only shallowly so), pubescent with long (*c.* 0.5 mm), erect, reddish brown, essentially straight hairs, the hairs persistent on mature leaves; lateral veins 5–7(–8) on each side, regularly spaced, slightly sunken on the adaxial surface, prominently raised abaxially, lower venation typically evident on both surfaces; petioles (7–)11–22 × 1.6–3.5 mm, densely pubescent, flat adaxially.

Inflorescences axillary, 2–3(–4) cm long, sometimes appearing terminal, paniculate, densely pubescent; reduced leaves of the terminal inflorescences 3–6 mm long, caducous, densely pubescent; bracts and bracteoles 1–2 mm long, caducous, densely pubescent; pedicels essentially absent, the flowers sessile or very nearly sessile above the most distal bracteoles. Flowers yellow-green, 6–7 mm long, *c.* 3 mm in diameter distally, externally densely pubescent, the tube 3–4 mm long, *c.* 2 mm in diameter, the tepals 2.5–3 mm long, 1–1.5(–2) mm wide, erect at anthesis, equal (in height), narrowly ovate, densely pubescent adaxially; stamens 9, all 2-celled, pubescent, *c.* 1.5 mm long, slightly shorter than the tepals and hidden behind them; the filaments *c.* 0.5 mm long, the anther cells *c.* 1.0 mm long, the connectives prolonged beyond the anther cells; paired glands at the bases of the inner three stamens globose, *c.* 0.5 mm in diameter; staminodia ovoid, *c.* 1 mm long; pistil glabrous, *c.* 4 mm long, the style not exerted; receptacle cylindrical, densely pubescent within. Fruits pubescent and longitudinally ridged when immature; mature fruits not known.



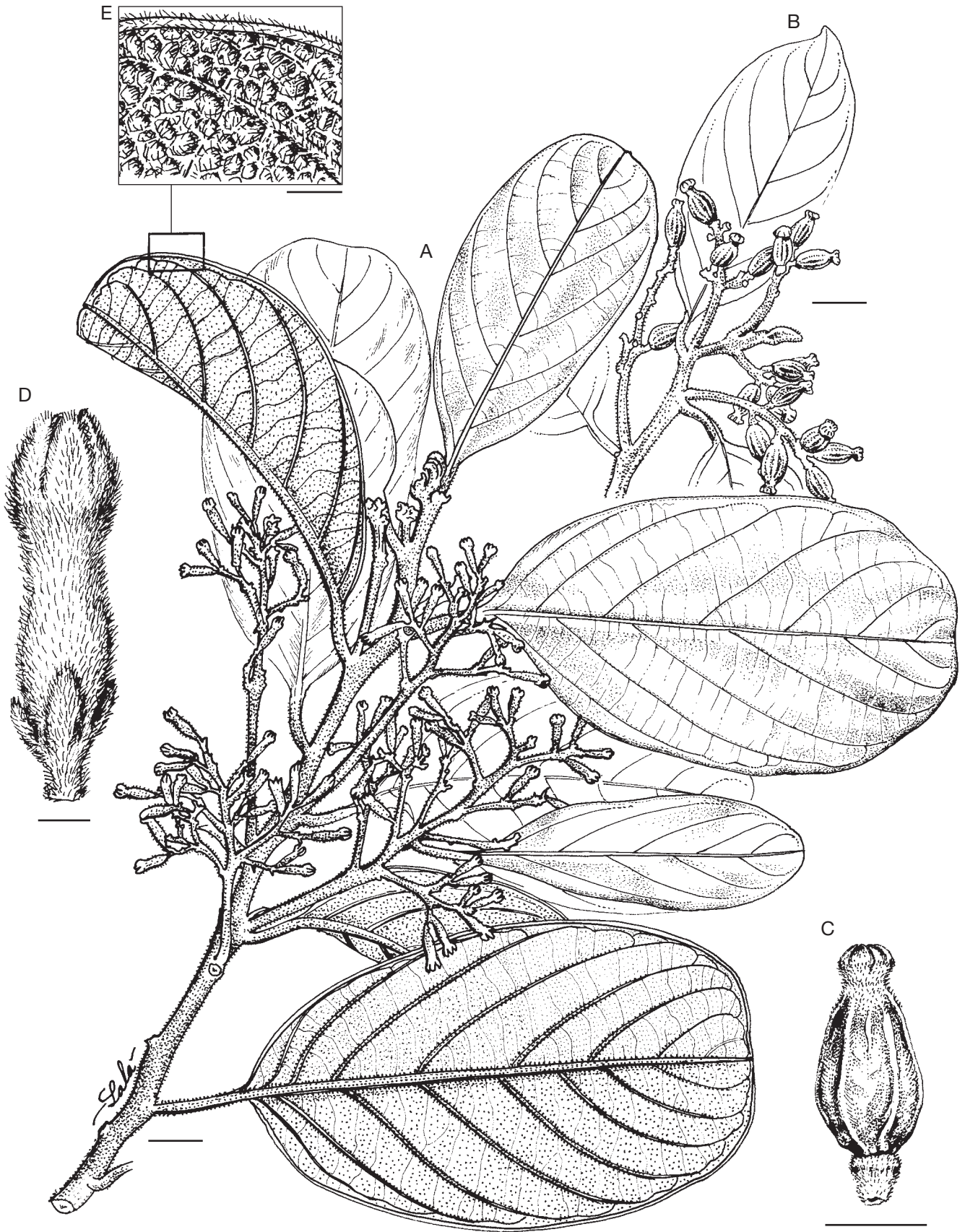


FIG. 3. — *Cryptocarya barrabeae* Munzinger & McPherson, sp. nov.: A, flowering branch; B, details of infructescence with young fruits; C, young fruit; D, flower; E, detail of the leaf. A, D, *Barrabé et al.* 280 (holotype, P); B, C, *MacKee* 26761 (P). Drawn by Roger Lala Andriamiarisoa. Scale bars: A, B, 1 cm; C, 5 mm; D, 1 mm; E, 0.4 mm.

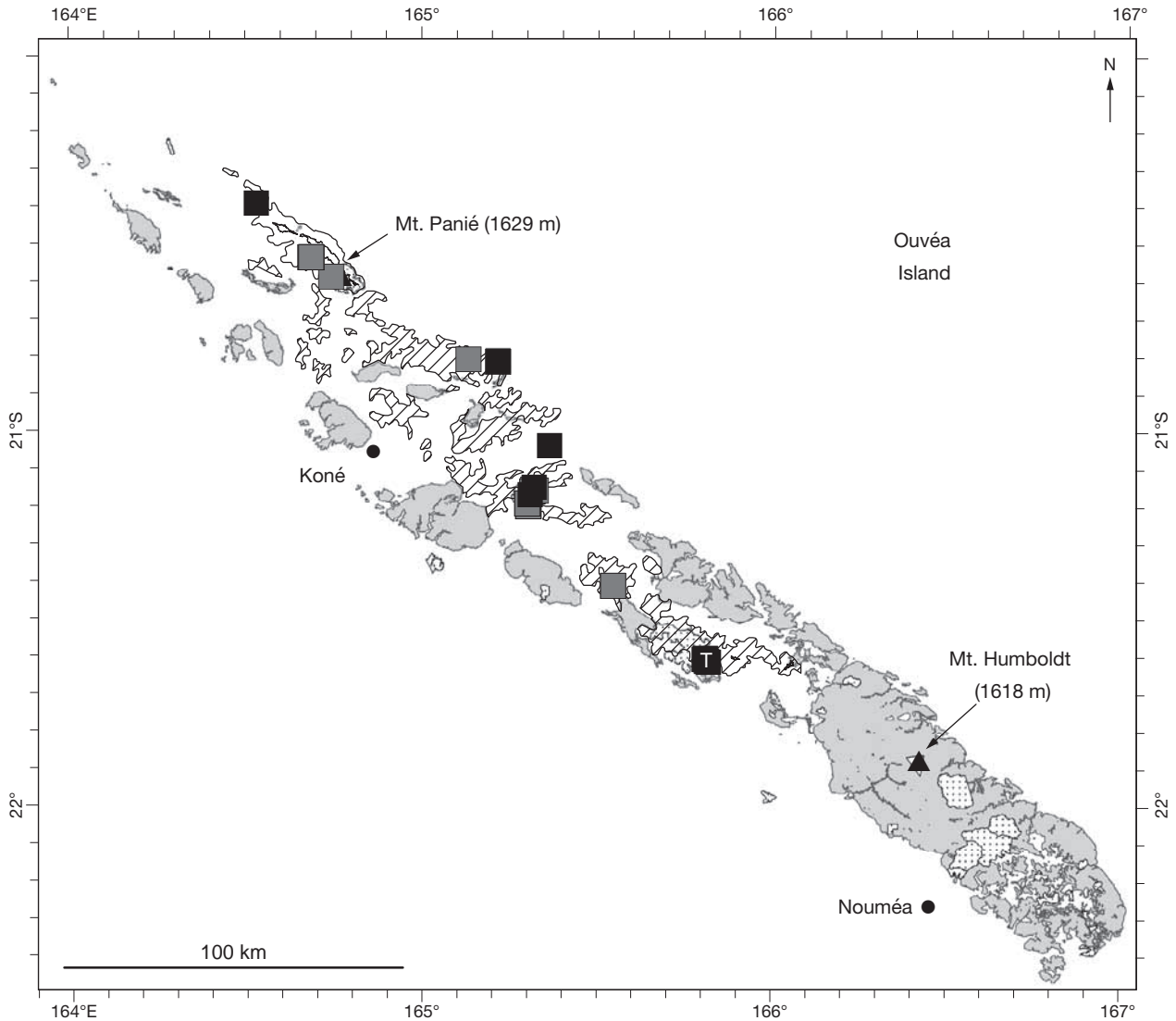


FIG. 4. — Distribution of *Cryptocarya barrabeae* Munzinger & McPherson, sp. nov. Symbols, abbreviations and areas: See Figure 2.

#### NOTE

Cited as [*Cryptocarya* sp. “aff. pluricostata” (*Barrabé 280*)] in Munzinger (2013).

#### *Cryptocarya chrysea* Munzinger & McPherson, sp. nov. (Figs 5; 6)

**TYPUS.** — **New Caledonia.** Province Nord, Aoupinié, crête, forêt humide, 900-1000 m, fl., fr., 15.XI.2007, 21°10'35”S, 165°16'4”E, *Munzinger, Lowry, Barriera, Labat, Gemmil, Le Bour, Davidson & Christoph 4792* (holo-, P[P01952876]!; iso-, MO[MO-2849674, MO-2849675]!, NOU[NOU031405]!, P[P01952875]!).

**DIAGNOSIS.** — Among the New Caledonian species of *Cryptocarya* with dense indument persisting on the abaxial leaf surface, *C. chrysea*, sp. nov., most resembles *C. guillauminii*, from which it is distinguished by its protruding lenticels abundant on the older stems, by the golden colour of the abaxial surface of its young leaves, and by its larger fruit (to 3.3 cm diameter) (vs smooth stems, glaucous abaxial surface, and fruit diameter to 2.5 cm in *C. guillauminii*).

**PHENOLOGY.** — Flowers in November and December; fruits from September to December (black = ripe in November)

**ETYMOLOGY.** — The specific epithet refers to the golden (*chryseos* in Greek) indument on the abaxial surface of leaves.

**HABITAT.** — The tree grows in “forêts denses humides de basse et moyenne altitudes sur roches volcano-sédimentaires” sensu *Jaffré et al.* (2012) and ultramafic (Sailles), at 500-1100 m.

**DISTRIBUTION.** — The species grows on both ultramafic and non-ultramafic substrates on the east coast of the main island “Grande Terre”; the southernmost locality is Forêt de Sailles, and the northernmost is Wewec (Fig. 6)

**CONSERVATION STATUS.** — The plant is known from three localities, and all of them are protected areas: Aoupinié and Panié in North Province, and Sailles forest in the South Province. The calculated EOO is 1811 km<sup>2</sup> and the AOO is 32 km<sup>2</sup> but there is no significant threat to the species. We assign *Cryptocarya chrysea*, sp. nov., a preliminary status of Least Concern (LC).

**ADDITIONAL MATERIAL EXAMINED.** — Mt Aoupinié, 900 m, Forested slopes, fl., fr., 10.XII.1980, *McPherson 3412* (MO[MO-2849660, MO-2849661], P[P01962713]); Forêt de Sailles, près du sommet

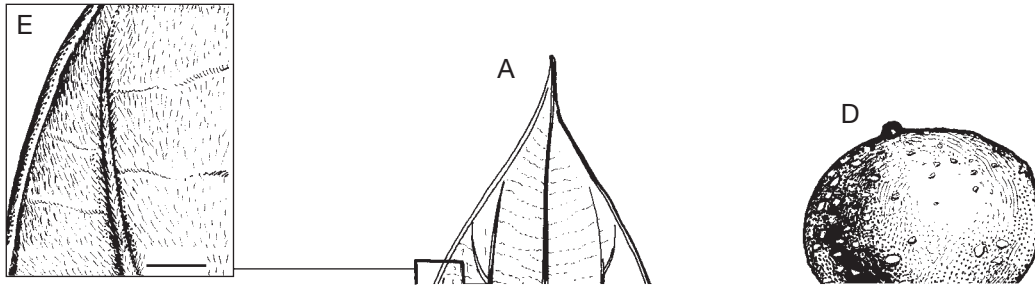


FIG. 5. — *Cryptocarya chyrysea* Munzinger & McPherson, sp. nov.: **A**, flowering branch; **B**, inflorescence; **C**, flower; **D**, fruit; **A-C**, *McPherson 3412*; **D**, *Poullain 352*; **E**, detail of the leaf. Drawn by Roger Lala Andriamiarisoa. Scale bars: A, D, 1 cm; B, 5 mm; C, 1 mm; E, 2 mm.

du pwénari, Forêt sur rochers, 1100 m, fl., 7.XII.2001, 21°39'58"S, 166°14'49"E, *Munzinger et al. 1280* (MO[MO-2849664], P[P00239698]); Aoupinié, 500-600 m, bt.fl., 2.XI.2005, *Munzinger*

*et al. 3204* ([IND, NOU[NOU010267], P[P00555334]); Aoupinié, vers l'antenne, Forêt humide, fr.vert, 2.IX.2010, *Munzinger et al. 6053* (MO[MO-2849673], NOU[NOU053688]); La Guen, Forêt,





FIG. 6. — Distribution of *Cryptocarya chrysea* Munzinger & McPherson, sp. nov. Symbols, abbreviation and areas: See Figure 2.

785 m, fr., 21.XI.2010, 20°37'0.384"S, 164°46'52.7"E, *Munzinger et al.* 6425 (CANB, MO, NOU[NOU063605], P[P06837397]); La Guen, 637 m, fr., 22.XI.2010, 20°37'28.5"S, 164°46'39.4"E, *Munzinger et al.* 6460 (MO, NOU[NOU063640], P[P06837398]); Aoupinié, entre portail et antenne, 985 m, fr., 21.IX.2010, 21°10'39.45"S, 165°16'11.57"E, *Poullain* 351 (MO[MO-2865869], NOU[NOU053718], P[P02259676]); Aoupinié, entre portail et antenne, 985 m, stér., 21.IX.2010, 21°10'39.45"S, 165°16'11.57"E, *Poullain* 352 (MO, NOU[NOU053713], P[P02259677]); Aoupinié, 950 m, fr., 10.XII.1980, *Pusset* 176 (P[P01952817]).

#### DESCRIPTION

Tree 8-10 m; 15 cm in diameter. Bark brown, somewhat rough. Twigs somewhat flattened to subterete, densely puberulous with minute, appressed, essentially straight hairs, smooth at first but older portions typically with long, shallow, narrow ridges and eventually (below the leaf-bearing nodes) with numerous prominent lenticels, these typically 1-2 mm high, 1-2 mm long; terminal buds densely golden appressed-pubescent. Leaves alternate; blades ovate, 5.0-11 × 2.5-5.6 cm; base obtuse to broadly

acute in outline but typically briefly decurrent into the petiole; apex acute, typically acuminate; margin thickened to narrowly revolute; texture coriaceous; adaxial surface glossy, glabrous except near the base, abaxial surface typically golden in colour, densely pubescent with minute, subappressed, essentially straight hairs, the hairs persistent on mature leaves; lateral veins (2-)3-4(-5) on each side, the lowest two pairs typically arising within 1 cm of the leaf base, slightly sunken on the adaxial surface, prominently raised abaxially, lower venation obscure on both surfaces; petioles 8-13 × *c.* 2.5 mm, flat adaxially.

Inflorescences axillary and pseudoterminal, 1.5-4 cm long, paniculate, densely pubescent; bracts and bracteoles *c.* 0.5 mm long, caducous, pubescent; pedicels (uppermost bracteoles to hypanthium base) *c.* 0.5 mm. Flowers yellow-green to green, 3 mm long, 2.5-3 mm in diameter distally, externally pubescent, the tube *c.* 1 mm long, the tepals *c.* 2 mm long, erect at anthesis, equal, ovate, pubescent adaxially as well; stamens 9, all 2-celled, pubescent, *c.* 1 mm long, the filaments very short, the anther cells large, the connectives prolonged beyond the

anther cells; stamens slightly shorter than the tepals and hidden behind them; paired glands at the base of the inner three stamens globose, *c.* 0.3 mm in diameter; staminodia small, narrowly ovate; pistil glabrous, *c.* 2 mm long, the style not exerted; receptacle cylindrical, pubescent near the rim, otherwise glabrous. Fruits slightly obovoid, 2.5–3 cm long, 2.3–3.3 cm in diameter (dried), black at maturity, the embryo reddish pink in cross-section.

#### NOTE

Cited as [*Cryptocarya* sp. “aurea” ined. (Munzinger 4792)] in (Munzinger 2013).

#### CONCLUSION

Three new species of *Cryptocarya* are described, bringing the number currently recognized in New Caledonia to 22. Specimens incompletely representing another 3 (maybe 4) undescribed species of *Cryptocarya* are known in the collections of NOU and P, but more fieldwork is needed to collect specimens in missing and inadequately represented stages, as well as the material necessary for phylogenetic analyses. Recent work in the Sapotaceae, the first family treated in the *Flore de Nouvelle-Calédonie et Dépendances* (Aubréville 1967), similarly revealed the need for updating that family, thus supporting the idea that many of the first volumes published may need revision (Munzinger 2015). Once the fieldwork referred to above is done, we will publish a key to the species.

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