



## **Notes on New Caledonian Pandanaceae: Identity and Typifications of *Pandanus Decumbens* (Brongn.) Solms and *Pandanus Reticulatus* Vieill., with the New Species *Pandanus Letocartiorum* Callm. & Buerki**

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# Notes on New Caledonian Pandanaceae: identity and typifications of *Pandanus decumbens* (Brongn.) Solms and *Pandanus reticulatus* Vieill., with the new species *Pandanus letocartiorum* Callm. & Buerki

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## Abstract

CALLMANDER, M. W. & S. BUERKI (2013). Notes on New Caledonian Pandanaceae: identity and typifications of *Pandanus decumbens* (Brongn.) Solms and *Pandanus reticulatus* Vieill., with the new species *Pandanus letocartiorum* Callm. & Buerki. *Candollea* 68: 51-60. In English, English and French abstracts.

The identity of three endemic New Caledonian species of *Pandanaceae* is resolved: *Pandanus decumbens* (Brongn.) Solms, *Pandanus neocaledonicus* Martelli and *Pandanus reticulatus* Viell. After careful examination of the relevant collections and the rediscovery of the fragmentary type of *Pandanus neocaledonicus*, the latter is now considered to be a synonym of *Pandanus decumbens*. A new species is described, *Pandanus letocartiorum* Callm. & Buerki, which is characterized by its habit, drupes and stigmas. The two accepted species and the new species are described in detail and their taxonomic affinities are discussed. A lectotype is designated for *Pandanus neocaledonicus*, and a neotype is chosen for *Pandanus reticulatus*. A preliminary IUCN risk of extinction assessment for each species is also provided along with colour pictures and line drawings.

## Key-words

PANDANACEAE – *Pandanus* – New Caledonia – Taxonomy – Typification – IUCN Red List

## Résumé

CALLMANDER, M. W. & S. BUERKI (2013). Notes sur de nouvelles Pandanaceae de Nouvelle-Calédonie: typifications et identité de *Pandanus decumbens* (Brongn.) Solms et de *Pandanus reticulatus* Vieill., accompagnées de la nouvelle espèce *Pandanus letocartiorum* Callm. & Buerki. *Candollea* 68: 51-60. En anglais, résumés anglais et français.

L'identité de trois espèces endémiques de Nouvelle Calédonie de *Pandanaceae* est résolue: *Pandanus decumbens* (Brongn.) Solms, *Pandanus neocaledonicus* Martelli et *Pandanus reticulatus* Viell. Après avoir examiné attentivement les collections et avoir redécouvert le type fragmentaire de *Pandanus neocaledonicus*, cette dernière espèce est maintenant considérée comme un synonyme de *Pandanus decumbens*. Une nouvelle espèce est décrite, *Pandanus letocartiorum* Callm. & Buerki caractérisée par son port, sa drupe et ses stigmates. Les deux espèces acceptées ainsi que la nouvelle espèce sont décrites en détail et leurs affinités morphologiques sont discutées. Un lectotype est désigné pour *Pandanus neocaledonicus*, et un néotype est choisi pour *Pandanus reticulatus*. L'évaluation préliminaire du risque d'extinction selon l'IUCN est aussi fournie pour chaque espèce ainsi que des photographies couleurs et des dessins aux traits.

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## Introduction

Eugène Vieillard was the first botanist to collect specimens of *Pandanus* Parkinson in New Caledonia during the second half of the XIX<sup>th</sup> century and he published the first three species to become known to science, *P. macrocarpus* Vieill., *P. minda* Vieill. and *P. reticulatus* Vieill. (VIEILLARD, 1862). BRONGNIART (1875) subsequently published a further nine New Caledonian species based on collections made by Benjamin Balansa and Jean Armand Isidore Pancher. These species were originally published in the genera *Barrotia* Brongn. and *Bryantia* Webb, but were later transferred to *Pandanus* as *P. altissimus* (Brongn.) Solms, *P. aragoensis* (Brongn.) Solms, *P. balansae* (Brongn.) Solms, *P. decumbens* (Brongn.) Solms, *P. oblongus* (Brongn.) Solms (= *P. viscidus* (Brongn.) Solms), *P. pancheri* (Brongn.) Solms, *P. sphaerocephalus* (Brongn.) Solms and *P. viscidus* (Brongn.) Solms. In the early XX<sup>th</sup> century, one more species was published by MARTELLI (1914), *P. neocaledonicus* Martelli. Some of the species were described based on fragmentary material, which has resulted in confusion and misidentification (GUILLAUMIN, 1948, 1962; STONE, 1972; ST. JOHN, 1989). Although circumscriptions of some New Caledonian *Pandanus* species have to be revised, a recent molecular phylogeny of *Pandanaceae* supported the monophyly of the endemic New Caledonian *Pandanus* species (i.e. with the exclusion of the widespread *P. tectorius* Parkinson), which form a single clade (BUERKI & al., 2012).

In the course of revising the *Pandanaceae* of New Caledonia, four field trips were carried out on the island by the authors from 2009 to 2011 to study and collect material “in situ”, and material deposited in the most relevant herbaria (BISH, G, FI, NOU, MO, P and PH) has been examined. This work already led to the description of two new species (CALLMANDER & LOWRY, 2011; CALLMANDER & al., 2011), and a completed treatment is in preparation for publication in the “Flore de la Nouvelle Calédonie et dépendances” (AUBRÉVILLE & al., 1967-). In this article we focus on three often confused and poorly known species of *Pandanus* characterized by their small infructescences: *P. decumbens*, *P. neocaledonicus* and *P. reticulatus*. Examination of herbarium specimens deposited at FI and P allowed us to relocate the fragmentary type of *P. neocaledonicus*, a species which we now consider to be a synonym of *P. decumbens*. A new species is also described, *P. letocartiorum* Callm. & Buerki characterized by its habit, drupes and stigmas. The three species are described in detail, with colour pictures and line drawings and their typification is discussed. A lectotype is designated for *P. reticulatus*, and a neotype is chosen for *P. neocaledonicus*. A preliminary risk of extinction assessment following IUCN (2001) is provided for each species based on recommendations made by CALLMANDER & al. (2007) along with notes on their morphological affinities.

***Pandanus decumbens*** (Brongn.) Solms in *Linnaea* 42: 47. 1878 (Fig. 1, 2, 3A).

= *Barrotia decumbens* Brongn. in *Ann. Sci. Nat., Bot. ser.* 6, 7: 285. 1875.

**Lectotypus:** NEW CALEDONIA: Iles des Pins, sur les pentes du Pic [N'ga], [23°20'42''S 167°27'25''E], fr., *Pancher 342* (P [P02077365]!; iso-: FI!, P [P02077364, P02077366, P02077367, P02139406]!) (lectotypified by ST. JOHN, 1989: 24).

= *Pandanus neocaledonicus* Martelli in *Webbia* 4: 416. 1914. **Lectotypus** (designated here): NEW CALEDONIA: s.d., fr., *s.coll.* (FI!; iso-: P [P00700817]!).

= *Pandanus schlechteri* Warb. in *Bot. Jahrb. Syst.* 39: 17. 1906. **Typus:** NEW CALEDONIA: Süd-Bezirk. Auf den Bergen bei Yaouhé, [22°11'45''S 166°29'54''E], 400 m, X.1902, fr., *Schlechter 15053* (holo-: B [B100 352291, image seen]!; iso-: FI!, P [P00649506]!).

– *Pandanus reticulatus sensu* Martelli in *Webbia* 4: 29, 62, 94. 1913; 4: tab. 2, fig. 7-9. 1914.

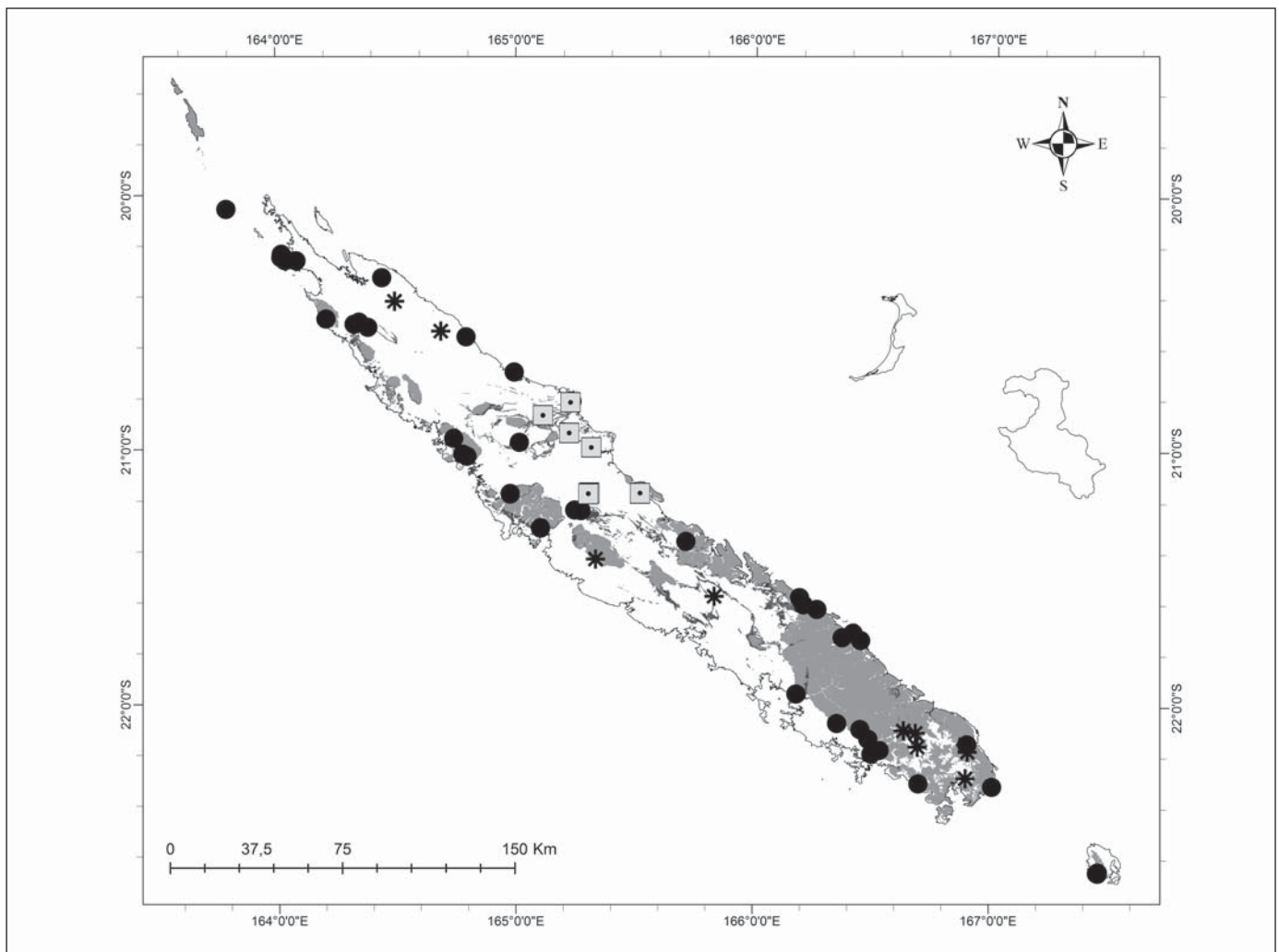
Slender-stemmed *shrub*, the stem usually decumbent, branched or not, often quite short but sometimes elongated, up to 4 m tall, with rather smooth light brown bark and a few distant blunt prickles; few prop roots, little developed, to ca. 20 cm long. *Leaves* linear-attenuate, mostly 100-135(-160) cm long, (15-)20-25(-50) mm wide, apex attenuate, sometimes sub-flagellate; thin sub-coriaceous to chartaceous, dark green and shiny axially, paler green and shiny adaxially; longitudinal veins visible on both surfaces; marginal prickles borne 7-8 cm above base to apex, antrorse, 0.5-1 mm long in the lower third, 2-8 mm apart, 0.4-0.6 mm long in the mid-third, 2-4 mm apart, to 0.2-0.4 mm long in the distal third, 1-2 mm apart, subappressed; midrib unarmed in the lower half, prickles > 0.2 mm long towards the apex, irregularly spaced but mostly 2-10 mm apart; apical ventral pleats with antrorse prickles, > 0.2 mm mm long, mostly 1-6 mm apart; sheath 5-7 cm long, ca. 2-3 cm wide at apex, 4-5 cm at base. *Infructescence* terminal, the solitary syncarp sub-cylindric, (3-)7-15 cm long, (3-)5-8 cm wide, peduncle ca. 8-15(-35) cm long, ca. 2 cm thick at apex, bearing foliaceous bracts, the proximal ones ca. 60-80 cm long, the distal one 12-14 cm long, crowded at peduncle apex and often covering the syncarp. *Drupes* numerous, 100-180, ca. 15-25 mm long, 10-20 mm wide, 4-10 mm thick, mostly (1-)3-4(-5)-celled, (4-)6-angled, obovoid, at apex truncate or shallowly concave, upper third free with smooth, dull, gently incurved faces. *Stigma* (1-)3-4(-5), ca. 1-2 mm wide, slightly heightened (ca. 2 mm) on an appressed style, forming one row, deflected toward the cephalium apex. *Endocarp* median, ca. 10 mm long, concave at apex, lateral walls 2-4 mm thick; proximal mesocarp 8-10 mm long, fibrous-fleshy, distal mesocarp 6-10 mm long, sparsely fibrous, chambered, seed locule ca. 4 × 7 mm, ellipsoid. *Staminate*

*inflorescence* a raceme of spikes, ca. 13-23 cm long; peduncle fleshy; bracts ca. 10, distal ones foliaceous, proximal ones caniculate, the distal bract ca.  $2 \times 10$  cm; spikes (4-)5, mostly 2-4 cm long, up to 15 mm diam., short cylindric, composed of crowded phalanges of stamens (*stemanophore*); its a column 4-6 mm long, apically distended, umbrella like, peltate, to ca. 4-5 mm wide, blackish when dry; stamens ca. 50-70, borne along upper part of the stemanophore and (mostly) under the apical discoid surface; filaments ca. 0.5 mm long; anthers 1.5-2.4 mm long, to 0.5 mm wide, pale yellow, apiculate; apiculus 0.2 mm long.

*Distribution and ecology.* – *Pandanus decumbens* is mostly found at lower to mid elevations (0-400 m). It grows on both serpentine and calcareous substrates, usually in rocky sites. The species is widespread along the west coast from Iles des Pins to Koumac usually in Maquis or dry forests and often along creeks (Fig. 1).

*Conservation status.* – With an EOO of 15 642 km<sup>2</sup>, an AOO of 324 km<sup>2</sup>, and 18 subpopulations, three of which are situated within the protected area network (Barrage Yaté, Mt. Panié, Vallée de la Thy), *P. decumbens* is assigned a preliminary status of Least Concern (LC) based on the IUCN Red List Categories and Criteria (IUCN, 2001).

*Notes.* – *Pandanus decumbens* was described by BRONGNIART (1875) under the basionym *Barrotia decumbens* Brongn., it was based on two syntypes: *Balansa s.n.* and *Pancher 342*. *Balansa s.n.* has not been located either at FI or at *P. Pancher 342* is a complete collection comprising leaves, young and mature syncarps and drupes at P and separate drupes at FI. ST. JOHN (1989: 24) therefore designated this collection as the lectotype. The sheet of *Pancher 342* at P [P020 77365] bears a label with “n°8” annotation (see “sonnerat-photo.mnhn.fr/2010/12/03/2/P02077365.jpg” for scanned specimen), as well as an original Pancher label with “342” clearly

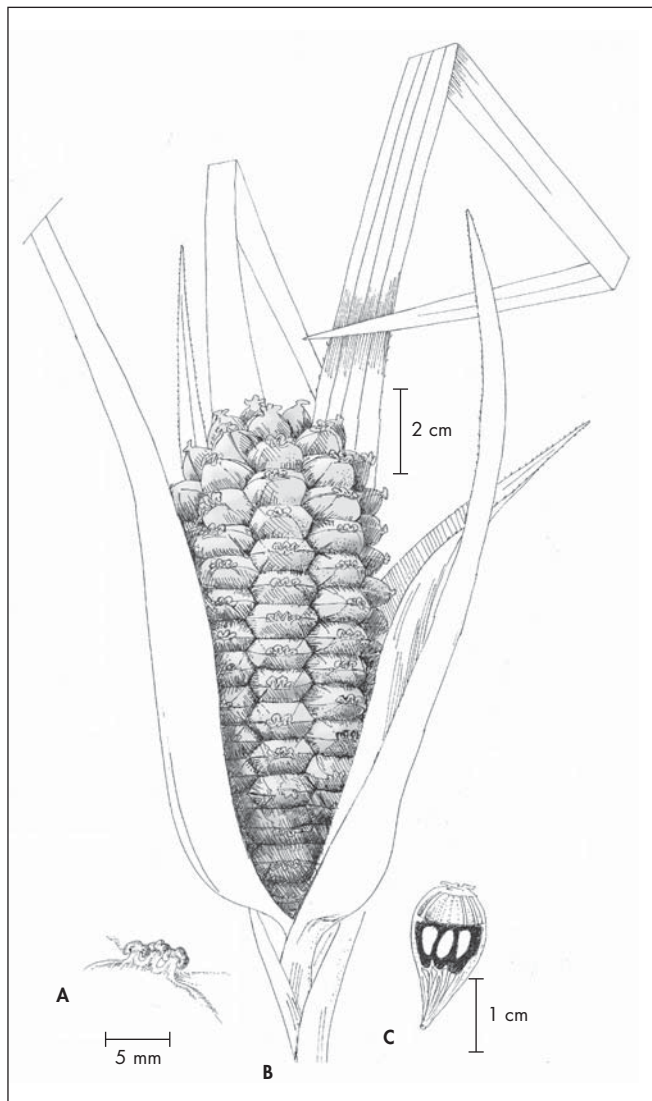


**Fig. 1.** – Distributions of *Pandanus* Parkinson species in New Caledonia showing ultramafic (light grey) and serpentine (dark grey) soils: *Pandanus decumbens* (Brongn.) Solms (solid dots), *Pandanus reticulatus* Vieill. (stars) and *Pandanus letocartiorum* Callm. & Buerki (squares).



indicated. St. John wrongly cited the collection as *Pancher 8* when he lectotypified the species. Note that St John actually cited the sheet as the holotype, but this is to be considered as an effective lectotypification since it was published before 2001 (see McNEILL & al., 2012 [art. 9.23]).

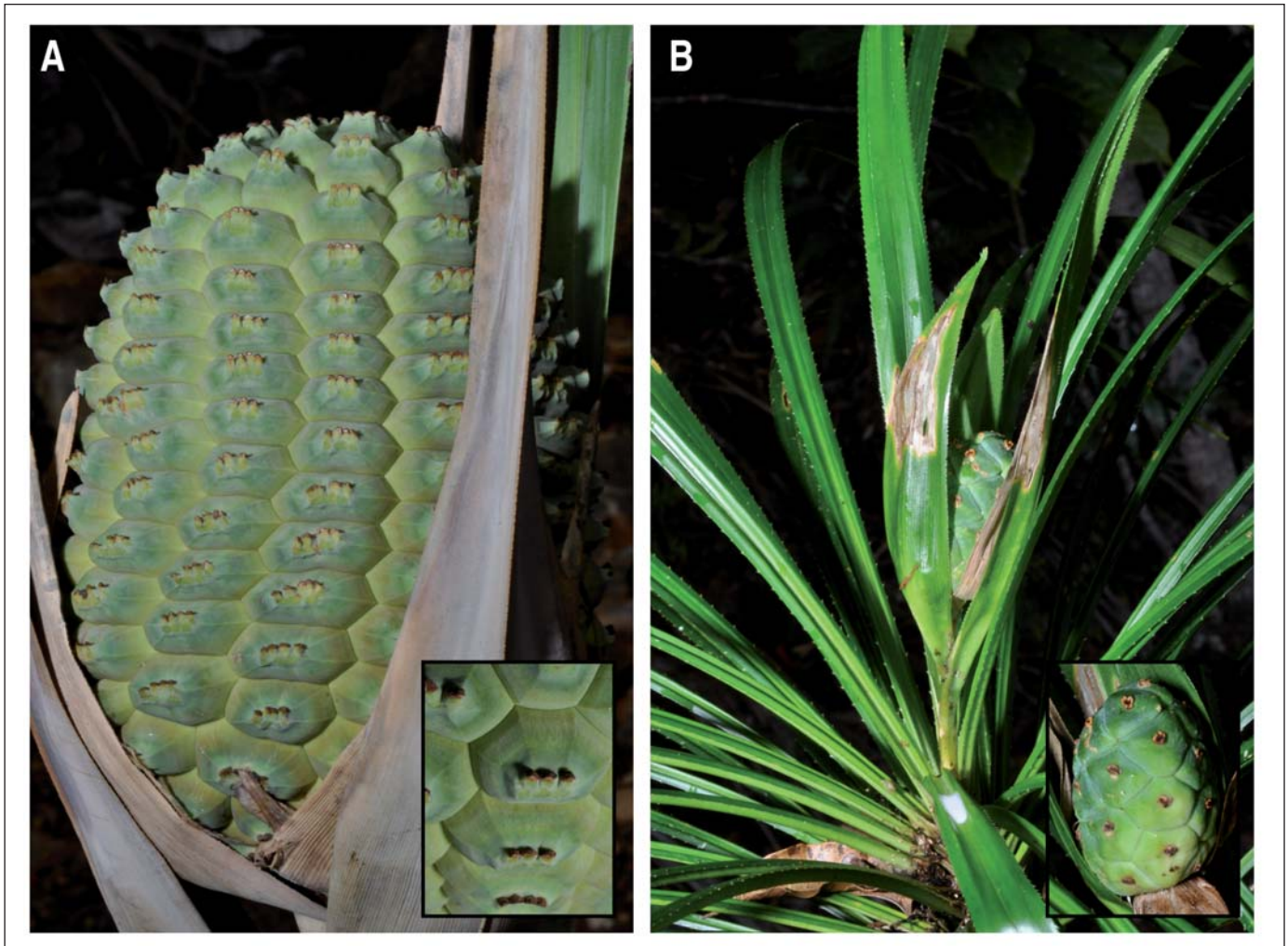
MARTELLI (1914) misinterpreted *Pandanus decumbens* and considered this species to be a synonym of *P. reticulatus* along with *P. schlechteri* Warb. He consequently described a new species, *P. neocaledonicus* Martelli, to accommodate a specimen (*s.coll.*) deposited at the Caen Museum. This material is believed to have been destroyed during World War II, but fragments of the collection have been found at FI and P. The FI sheet is designated as lectotype because it is in better condition and less fragmentary than the sheet at P. This collection



**Fig. 2.** – *Pandanus decumbens* (Brongn.) Solms. **A.** Detail of stigmas; **B.** Syncarp; **C.** Longitudinal section of a drupe showing the endocarp (black) and the seed locules. [Guillaumin & Bauman-Bodenheim 6953, G] [Drawing: C. Chatelain]

clearly belongs to *P. decumbens* with its stigma slightly raised (ca. 2 mm) on an appressed style, arranged in one row and deflected toward the cephalium apex (Fig. 2, 3A). *Pandanus neocaledonicus* is therefore considered as a synonym of *P. decumbens* along with *P. schlechteri*, the latter already being treated in this way by ST. JOHN (1989).

*Additional material examined.* – **NEW CALEDONIA:** Pic N'ga, [23°20'42''S 167°27'25''E], 29.V.1951, fr., *Bauman-Bodenheim 13696* (K, P [P02077342], Z); Pic N'ga, creek sur les pentes SW, [23°20'42''S 167°27'25''E], 30.V.1951, st., *Bauman-Bodenheim 13801* (P [P02139407]); Ouroué, [21°34'59''S 166°11'32''E], 26.VI.1951, st., *Bauman-Bodenheim 13696* (P [P02077340]); Poum, 20°14'08''S 164°01'23''E, 13.IV.2006, fr., *Barrabé 356* (NOU [NOU014166], P [P02075145]); N. of Dumbéa valley, [22°08'15''S 166°29'05''E], 150 m, 7.VII.1947, fr., *Buchholz 1178* (P [P02139409]); Mont Dzumac, 22°05'59''S 166°27'02''E, 572 m, 23.I.2010, fr., *Callmander & al. 827* (G, NOU, P [P00700824]); Sur la route de Gouapin, Nétéa, 21°14'32''S 165°14'50''E, 15 m, 16.II.2011, st. fl., *Callmander & al. 976* (G, MO, NOU); Sur la route de Gouapin, Nétéa, 21°14'41''S 165°16'25''E, fr., *Callmander & al. 977* (P [P00700859]); Massif du Boulinda, en dessous de la mine Saint-Louis, 21°18'48''S 165°06'12''E, 320 m, 18.II.2011, fr., *Callmander & al. 978* (BISH, G, MO, K); Massif du Boulinda, en dessous de la mine Saint-Louis, 21°18'44''S 165°06'11''E, 365 m, fr., *Callmander & al. 979* (MO); Massif de Poum, plaine côté E, 20°15'37''S 164°02'17''E, 8.V.2008, y. fr., *Dagostini 1603* (NOU [NOU049031]); Iles des Pins, sur les pentes du Pic, [22°39'22''S 167°27'39''E], 1862, fr., *Deplanche 143* (P [P02077336]); Iles des Pins, 1874-1876, st., *Germain s.n.* (P [P02077337, P02077338, P02077339]); Mt. Mou, [22°04'35''S 166°21'08''E], 15.X.1950, st., *Guillaumin & Bauman-Bodenheim 6898* (P [P02077335]); Mt. Mou, 300 m, [22°04'35''S 166°21'08''E], 15.X.1950, fr., *Guillaumin & Bauman-Bodenheim 6953* (G, P [P02139401], Z); Pic Tiaoué, 200-400 m, 21°10'46''S 165°01'24''E, 7.XI.2006, *Hequet (Leg. Butin) 3661* (NOU [NOU017072]); Ouégoa, St André Yallin, ca. 100 m, [20°19'47''S 164°26'29''E], 24.VII.1968, fr., *Jaffré 60* (BISH); Dumbéa N. au bas du Col., rive droite, [22°08'15''S 166°29'05''E], 6.II.1970, st. fl., *Jaffré 357* (BISH, NOU [NOU048525, NOU048526]); Dumbéa N. au bas du Col., rive droite, fr., *Jaffré 358* (BISH, NOU [NOU048528]); vallée de la Thy, [22°10'53''S 166°31'58''E], 3.VI.1973, fr., *Jaffré 1128* (NOU [NOU048535]); Iles des Pins, base du Pic N'Ga, [22°39'18''S 167°27'25''E], 10.VIII.1975, fr., *Jaffré 1443* (PH [PH0072764]); Thy vallée, [22°10'53''S 167°28'02''E], 50-100 m, 8.I.1956, st., *MacKee 3748* (BISH, K, P [P02077362]); Dumbéa Valley, [22°08'15''S 166°29'05''E], 100-200 m, 5.II.1956, fr., *MacKee 3980* (BISH, K, P [P02077361]); Dumbéa Valley below battage, [22°08'15''S 166°29'05''E], 100 m, 17.III.1956, y. fr., *MacKee 4100* (BISH, K, P [carpo]); 7 km from Kone on road to Voh, [21°01'59''S 164°47'44''E], 10 m, 1.IV.1959, fr., *MacKee 4309* (P [carpo]); Iles des Pins, slopes of Pic N'ga, [22°39'408''S 167°27'41''E], 100-200 m, 5.VII.1956, st., *MacKee 5051* (P [P02077353]); Ouroué (embouchure de la Dothio), [21°34'59''S 166°11'32''E], 10-150 m, 20.X.1965, fr., *MacKee 13633* (P [P02077352, carpo]); Vallée Koumac, [20°31'30''S 164°22'58''E], 21.VI.1967, fr., *MacKee 16968* (BISH, FI [carpo], NOU [NOU048532], P [P02077351, carpo]); Voh, Base SE, Tahafé, [20°57'44''S 165°15'35''E], 7.VII.1970, y. fr., *MacKee 22166* (BISH,



**Fig. 3.** – Syncarp with detail of stigmas (framed). **A.** *Pandanus decumbens* (Brongn.) Solms; **B.** *Pandanus reticulatus* Vieill.  
**[A:** Callmander & al. 979, MO; **B:** Callmander & al. 981, P] [Photos: P. P. Lowry]

NOU [NOU048513], P [P02077348, carpo]); Ile Yandé: Houone, [20°03'28''S 164°12'21''E], 7.X.1970, fr., *MacKee 22657* (BISH, G, MO, NOU [NOU048512], P [P02077238, P00700823, carpo]); Poum, Anse Pouani, [20°15'42''S 164°05' 03''E], 0-20 m, 5.I.1971, fr., *MacKee 23158* (G, NOU [NOU048511], P [P02077347, carpo]); Poum, Anse Pouani, 17.II.1971, fr. & st. fl., *MacKee 23348* (G, MO, NOU [NOU048524], P [P02077329]); SE de la corne de Koumac, [20°30' 44''S 164°19'32''E], 250 m, 13.IV.1972, fr., *MacKee 25240* (G, P [P02139399]); Koumac, au N du ruisseau Grand Forêt, [20°30'16''S 164°20'45''E], 250 m, 20.IX.1973, fr., *MacKee 27477* (NOU [NOU048514], P [P02139403, P02139404], PH); Hienghene, Pindache, [20°42'05''S 165°00'24''E], 100 m, 21.VIII.1976, fr., *MacKee 31791* (G, NOU [NOU048533], P [P01865133], PH [PH000 72776]); Thio, Meh, [21°37'44''S 166°15'54''E], 24.VI.1977, fr., *MacKee 33347* (NOU [NOU048510], P [P01865135], PH); Goro, Nokotaré, [22°19'16''S 167°00'31''E], XI.1978, fr., *MacKee 36094* (NOU [NOU048470], P [P02095730, carpo], PH [PH00072768]); Koua Riv., [21°21'51''S 165°42'49''E], 30 m, 4.VII.1979, fr., *MacKee*

*37082* (G, P [P02077346], PH); Yaté, [22°09'20''S 167°05'53''E], 100 m, 28.VII.1985, fr., *MacKee 42691* (NOU [NOU048536], P [P02077345], PH); S of Thio: on coastal road, between Nimbo and Camboui Rivers, 21°45'S 166°27'E, 26.IV.1984, fr., *McPherson 6514* (MO, PH [PH0072760]); Port Bouquet, Koum riv., 21°44'21''S 166°22'20''E, 155 m, 24.XI.2011, fr., *Munzinger 1040* (MO, NOU); Col de Mo, 22°02'17''S 166°10'48''E, 200 m, 24.XI.2007, fr., *Munzinger & al. 4932* (NOU [NOU050584, NOU030816]); Tango Plateau, 21°01'18''S 165°00'53''E, 350 m, 16.IV.2008, fr., *Munzinger (leg. Butin) 5116* (NOU [NOU050463]); Creek Pandanus, 21°01' 29''S 164°46'42''E, fr., *Munzinger 5787* (NOU, P [P00700841, P00700844]); Ponandou, 20°49'01''S 165°14'04''E, 30 m, 29.IX. 2009, fr., *Munzinger et al. 5860* (MO, NOU, P); Creek à Paul, [20°29'29''S 164°12'29''E], 28 m, 26.XI.2009, fr., *Munzinger & al. 6013* (NOU, P [carpo]); Base W du massif de Poum, 20°15'28''S 164°02'40''E, 23.VII.2007, fr., *Pillon 758* (NOU [NOU020033], P [P02082148, carpo]); Port Bouquet, Ile Toupeti, [21°43'14''S 166°25' 05''E], 3.XII.1982, fr., *Suprin 1919* (G, NOU [NOU048508],



P [P02077363], PH); Thio, berge de creek, [21°36'39" S 166°12'30" E], 21.II.1972, fr., *Veillon 2531* (NOU [NOU048521, NOU048522, NOU048523], P [P02139396]); Thio, [21°36'39" S 166°12'30" E], 7.V.1971, y. fr., *Veillon 2573* (NOU [NOU048538, NOU048539], P [P02139397], PH); Extrémité SE de la Pointe N'Go, [22°18'40" S 166°41'51" E], XI.1974, fr., *Veillon 3129* (MO, NOU [NOU048355, NOU048356, NOU048357, NOU048358, NOU048359, NOU048360], P [P2081996, P02139456, carp]); Montagne de Poum, creek au pied du Pic 272, [20°14'55" S 164°01'17" E], 25.III.1982, fr., *Veillon 4855* (NOU [NOU048537, NOU048443], P [P02139398, carp]), PH [PH00072762]); Mont Panié, [20°33'48" S 164°47'32" E], 300 m, 22.VII.1982, y. fr., *Veillon 5249* (NOU [NOU048478], P [P02095728], PH); Thio haute Dothio, ca. 200 m, [21°36'39" S 166°12'30" E], 20.X.1988, fr., *Veillon 6977* (NOU [NOU020752], P [P02077344, carp]).

***Pandanus reticulatus*** Vieill. in Ann. Sci. Nat., Bot. ser. 4, 16: 52. 1862 (Fig. 1, 3B, 4).

**Neotypus** (designated here): **NEW CALEDONIA:** Réserve botanique de Nodéla, flan du massif du Mé Moya, 21°26'07" S 165°20'05" E, 500 m, 19.II.2011, fr., *Callmander & al. 981* (P [P00700916]!; iso-, BISH!, BM!, FI!, G [G00368275]!, K!, MO!, NOU [NOU054165]!, P [P00700915]!, PH!).

Understory erect *shrub* to 3 m tall, with slender weak, sometimes leaning, stem, and a few branches; prop roots few, but up to 1 m long; leaf crowns dense. *Leaves* linear-attenuate, (50-)75-80(-90) cm long, 1.2-1.5 cm wide, attenuate or but slightly acuminate toward apex; subcoriaceous in the proximal half part, chartaceous in the distal half, discolour, dark green to brown abaxially, pale green adaxially when dried; longitudinal veins visible on both surfaces; marginal prickles borne 2-2.5 cm above base to apex, antrorse, 1 mm long, 4-7 mm apart in the proximal third, ca. 1 mm, 2-5 mm apart in the mid third, 0.5-1 mm long, 1-2 mm apart in the distal third, more appressed towards the apex; midrib near base unarmed to beyond the middle, after with sparse, remote prickles similar to those adjacent to margins, ca. 0.5 mm long; apical ventral pleats with a few antrorse prickles, unequally dispersed, often mostly or only on one (usually the left) side, lacking on extreme tip. *Infructescence* solitary, terminal, the syncarp oblong-ovoid, ca. 2.5-3 × 5-6 cm, on short erect, peduncle about 8 cm long, 4-5 mm thick. *Drupes* ca. 90-110, 10-15 mm long, 5-10 mm wide, 7-10 mm wide, mostly 1-celled, very rarely 2-celled, 5-6-angled, with smooth sides; pileus 3 mm long, crowned by the antrorsely excentric inclined stigma. *Stigma* unique, rounded reniform, 1-1.5 mm wide. Proximal *mesocarp* fibrous, 3-4.5 mm long, distal *mesocarp* fibrous, 2-4 mm long; *endocarp* sub-median or median, about 5 mm long, the walls ca. 1 mm thick. *Seed* locule 3 mm long. *Staminate* inflorescence to ca. 20 cm long; proximal bracts foliaceous-tipped; distal bract ca. 3 × 15 cm and decrescent,

margins and midrib finely ciliate, serrulate-prickly, navicular-ovate in outline; spikes about 5-6, short sub-cylindric, ca. 25-50 mm long, terminal spike longer, ca. 7-8 cm, merged at base with adjacent lateral spike, composed of crowded phalanges of stamens. *Stemanophore* sub-peltate, the column, ca. 2 mm in length, with a deep inverse-conic depression in the distal part, the margins bearing the stamens radially. *Stamens* about 13-18 per *stemanophore*, the filament 0.75-1 mm long; a short filamentous pediculus intervening between filament and anther, the pediculus 0.1-0.2 mm long. *Anther* oblong, acuminate, ca. 1 mm long, with an apiculus ca. 0.35 mm long, dorsally set with raphidophorus cells, at apex subentire; connective dorsally and distally with a few raphidophorus cells.

**Distribution and ecology.** – *Pandanus reticulatus* is known from lowland dense humid forest in northeastern and southern New Caledonia between 300-700 m on schist and serpentine (Fig. 1).

**Conservation status.** – With an EOO of 6979 km<sup>2</sup>, an AOO of 90 km<sup>2</sup>, and 6 subpopulations, one of which is situated within the protected area network (Barrage Yaté, Haute Yaté, Rivière Bleue, Pic du Grand Kaori), *P. reticulatus* is assigned a preliminary status of Vulnerable (VU B1ab [iii]; B2ab [iii]) based on the IUCN Red List Categories and Criteria (IUCN, 2001).

**Notes.** – *Pandanus reticulatus* was described by VIEILLARD (1864) very succinctly. This species was considered by MARTELLI (1914) and STONE (1972) to be synonym of *P. decumbens*, whereas ST. JOHN (1989: 25) treated it as a “species dubia”. BRONGNIART (1875: 286) noted the close resemblance but underlined the morphological distinction by emphasising Vieillard’s description: “drupe petite, serrées, subtétragones, couronnées par le stigmate persistant, uniloculaire”, whereas *P. decumbens* holds larger drupes with several stigmas in one row. No type material has been located, nor was any referred to by MARTELLI (1914), ST. JOHN (1989) or Stone (*pers. comm.*), therefore a neotype is required to be designated. No collections are known to exist that Vieillard might have seen. Nevertheless, the species has been collected many times in the last 65 years before our visit to New Caledonia in 2011, but only one has a mature syncarp (*MacKee 42975*). During our visit we were able to locate a large population of *P. reticulatus* in Nodéla, on the slopes of the Mé Moya massif. This collection (*Callmander & al. 981*), which is accompanied by extensive field information and photographs and comprises multiple duplicates, is chosen as the neotype. The species is now described in detail above for the first time based on this collection. The species is unique among the New Caledonian taxa in having a unilocarpellate drupe with a reniform stigma (Fig. 3B, 4). It can be easily recognized in the field by its slender habit usually with prop roots up to 1 m tall, its narrow leaves (ca. 12-15 mm wide) and tiny oblong ovoid syncarp (ca. 2.5 × 5.5 cm) with unilocarpellate drupes (Fig. 3B).

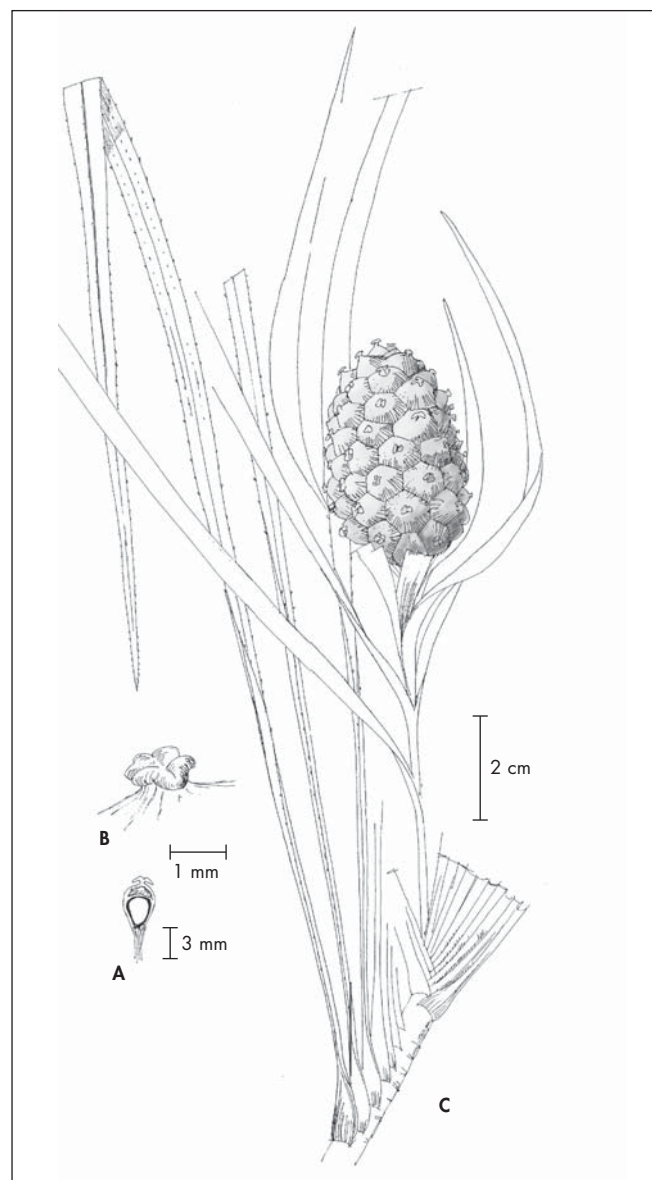
*Additional material examined.* – **NEW CALEDONIA:** Riv. Blanche, Moi de Mai, [22°07'19"S 166°38'34"E], 300 m, 23.VI.1951, st., *Baumann-Bodenheim 14099* (P [P02077341]); Dawenia, versant SW du Mont Colnett, 20°32'25"S 164°41'12"E, 575 m, 14.XI.2010, fr., *Callmänder & al. 877* (G, NOU, P [P00700842]); Réserve botanique de la Fausse Yaté, 22°11'05"S 166°54'14"E, 300-500 m, 9.X.2007, st. fl., *Dagostini 1463* (NOU [NOU031137]); Riv. Bleue, [22°06'11"S 166°37'60"E], 200 m, 22.II.1951, st., *Guillaumin & Baumann-Bodenheim 10906* (P [P02077341]); Yaté, [20°09'21"S 166°53'48"E], 300 m, 29.XII.1985, fr., *MacKee 42975* (G, NOU [NOU006188], P [P02139400], PH [PH00072777, PH00072778, PH00072779]); Haute Rivière des Pirogues: Forêt Faux Bon Secours, [22°10'02"S 166°41'33"E], 300 m, 12.I.1986, st., *MacKee 42995* (NOU [NOU048442], P [P02139389], PH [PH00072771]); Pic du Grand Kaori, 22°17'19"S 166°53'48"E, 235 m, 9.X.2009, fr., *Munzinger & al. 5978* (NOU); Hills above Riv. Bleue, [22°06'11"S 166°37'60"E], 27.VIII.1971, st., *Stone 10551* (PH [PH00072773]); Ouégoa, bassin SW de la Tendé, [20°25'22"S 164°29'39"E], 22.VII.1973, fr., *Veillon 2990* (NOU [NOU048440, NOU048441], PH [PH00072770]); Riv. Bleue, [22°01'11"S 166°37'60"E], 13.VI.1985, fr., *Veillon 5910* (NOU [NOU048446], PH [PH00072775]); Riv. Bleue, [22°06'11"S 166°37'60"E], 200-250 m, 29.I.1986, fr., *Veillon 5948* (NOU [NOU048447, NOU048448], PH [PH00072772]); Mt Rembaï, [21°34'47"S 165°49'59"E], ca. 670 m, 17.XI.1989, st. fl., *Veillon 7227* (NOU [NOU048439], P [P02139405]).

*Pandanus letocartiorum* Callm. & Buerki, **spec. nova** (Fig. 1, 5, 6).

**Typus:** NEW CALEDONIA: Tchamba, Napoé, 20°59'51"S 165°18'58"E 15 m, 29.IX. 2009, fr., *Munzinger & al. 5889* (holo-: P [P02604869, P02604870 carpo]!; iso-: G [G00368574]!, MO!, NOU!, P!).

*Haec species inter congeneros novacaledonicos habitu arbusculae erectae pauciramosae usque ad 6 m altae, syncarpio oblongo-ellipsoideo plerumque 9-13 × 6-8 cm atque drupa 2-2.8 × 2-3.5 cm cicatricibus pallide brunneis brevibus parallelis pilei atrobrunnei ex apice ad latus patentibus notata distinguitur.*

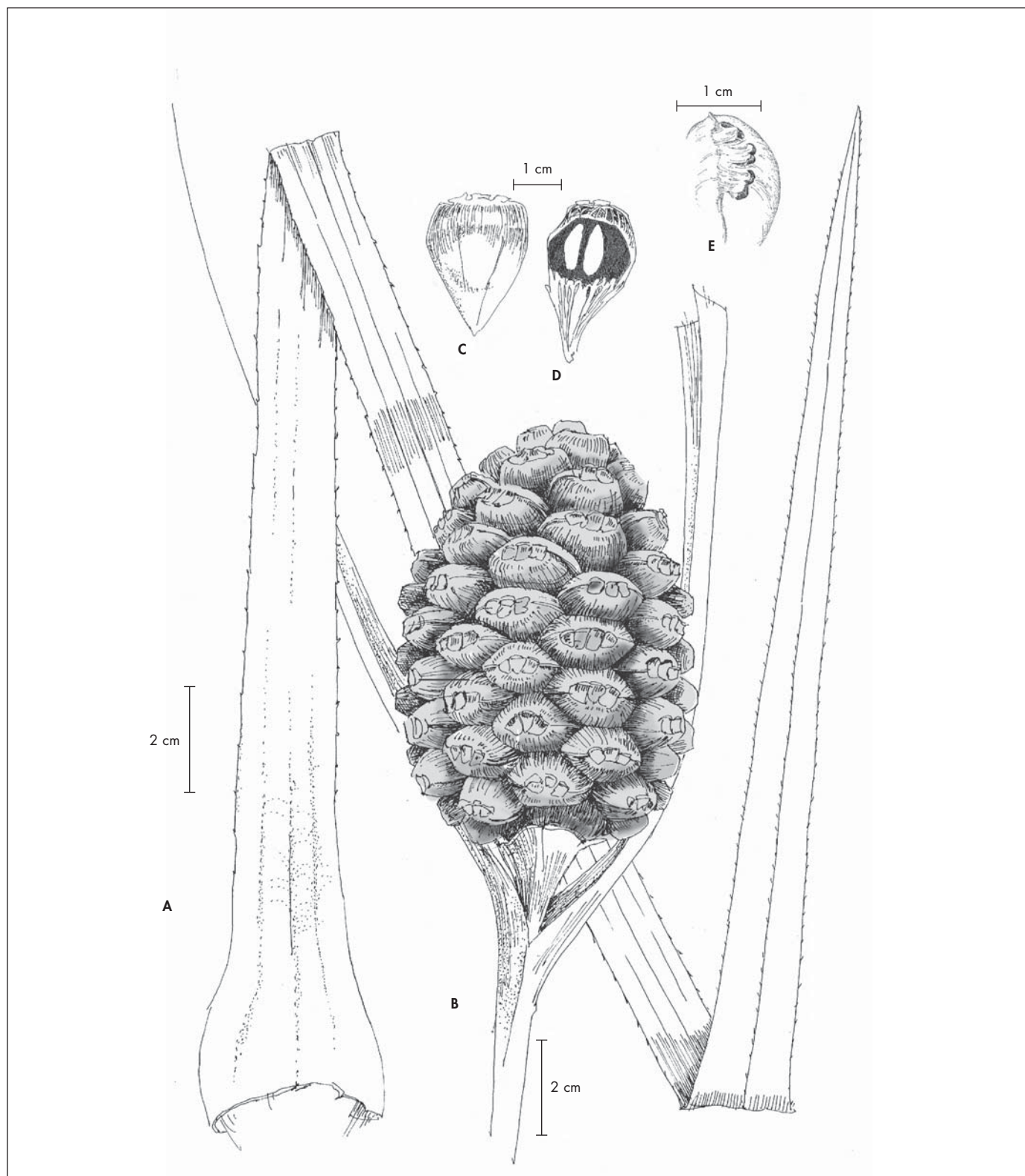
Erect and little-branched small *treelet*, 2-4(-6) m tall, 3-5 cm in diam.; prop roots slender, rather many, forming an open cone up to 4 m high. *Leaves* linear-attenuate, (80-)90-150(-190) cm long, (1.4-)2-2.5 cm wide, apex abruptly attenuate on the ca. 5 distal cm, somehow acute; dry leaves thin but firm coriaceous, abaxial face dark green, adaxial paler green *in vivo*; longitudinal veins visible on both surfaces, evident toward leaf apex; marginal prickles borne from 4-8 cm above base to apex, antrorse, 0.5-1 mm long in the lower third, mostly 1-4 mm apart, up to 0.5 mm long in the mid third, 1-2 mm apart, mostly > 0.5 mm long in the distal third, 0.5-1 mm apart; midrib near base unarmed up to about the middle; near the middle with prickles ca. 0.5 mm long, 1.5-5 mm apart; near apex, with prickles similar to those of marginal margins; distal ventral pleats sometimes prickly, with minute appressed prickles. *Infructescence* terminal, the solitary syncarp oblong-



**Fig. 4.** – *Pandanus reticulatus* Vieill. **A.** Longitudinal section of a drupe showing the endocarp (black) and the seed locules; **B.** Detail of stigmas; **C.** Syncarp. [*Callmänder & al. 981*, G] [Drawing: C. Chatelain]

ellipsoid, mostly 9-13 cm long, 6-8 cm wide, on a peduncle about 10-13 cm long, at apex 15 mm thick; lower bracts foliaceous; upper bracts navicular. *Drupes* ca. 80, connate in the mature syncarp, ca. 2.0-2.8 cm long, 2-3.5 cm wide, 0.8-1.3 cm thick, (2-)4-7(-10)-celled, 5-6-angled, obovoid compressed, truncate; pileus convex, 1/4 to 1/5 superior portion free, low convex to subconcave at apex; pileus dark brown, with short parallel light brown scars spreading from the apex on its side. *Stigma* 4-7, 1.5-2.5 mm wide, erect to oblique, or plane on apical phalanges and strongly antrorsely deflected on basal phalanges. *Endocarp* supramedian, dense, to 10 mm





**Fig. 5.** – *Pandanus letocartiorum* Callm. & Buerki. **A.** Leaf; **B.** Syncarp; **C.** Drupe; **D.** Longitudinal section of a drupe showing the endocarp (black) and the seed locules; **E.** Detail of stigmas.

[Munzinger & al. 5889, P] [Drawing: C. Chatelain]

long; proximal mesocarp to 12 mm long, fibrous-fleshy mesocarp fibromedullar, distal mesocarp up to 5 mm long. *Seed locule* to 7 mm long. *Staminate* flower unknown.

*Etymology.* – This new species is named in honour of Irène and Daniel Letocart who have a great interest in the New Caledonian flora and accompanied the authors to several places on the Island. Along with Jérôme Munzinger and Pete Lowry, they organized a memorable tour around the island in 2009 where we collected the type specimen in the Tchamba valley, their home region in northeastern New Caledonia.

*Distribution and ecology.* – *Pandanus letocartiorum* is known in lowland dense humid forest between 30–600 m on grauwacks, schist and serpentine (Fig. 1).

*Conservation status.* – With an EOO of 768 km<sup>2</sup>, an AOO of 45 km<sup>2</sup>, and 3 subpopulations, one of which is situated within a protected area (Aoupinié), *Pandanus letocartiorum* is assigned a preliminary status of Endangered (EN B1ab [iii]; B2ab [iii]) based on the IUCN Red List Categories and Criteria (IUCN, 2001).

*Notes.* – Several collections with rather small leaves and syncarp have been determined by H. St. John and B. C. Stone as *P. neocaledonicus*. Now that the taxonomy of this species and *P. decumbens* and *P. reticulatus* has been clarified (see above), it has become obvious that these collections pertain to a different undescribed species. *Pandanus letocartiorum* is the third species known in New Caledonia with fruit less than 15 cm in length, the two other species being *P. decumbens* and *P. reticulatus*. *Pandanus letocartiorum* can be easily distinguished from *P. reticulatus*, described above, by its leaves, generally smaller and narrower (mostly 90–150 cm long and 2–2.5 cm wide vs 75–80 cm long, and 1.2–1.4 cm wide in *P. reticulatus*); its larger syncarp (9–13 cm long and 6–8 cm wide vs ca. 5.5 cm long and ca. 2.5 wide); and the number and orientation of the stigmas (4–7 and erect to oblique, vs solitary and plane) (Fig. 5, 6). The new species is morphologically closer to *P. decumbens*, both species having similar sized leaves and syncarp. Nevertheless, *P. letocartiorum* can be distinguished by its habit (erect and little-branched small treelet to 6 m tall vs slender-stemmed branched or not shrub with the stem usually decumbent in *P. decumbens*); numbers of drupe per syncarp (ca. 80 vs ca. 100–180 in *P. decumbens*), longer and wider (ca. 2.0–2.8 cm long and 2–3.5 cm wide vs 1.5–2.5 cm long, 1–2 cm wide) and the short parallel light brown scars spreading from the apex on the side of the dark brown pileus (vs absent).

*Paratypes.* – Vallée de l’Amoa, [20°56’26”S 165°13’24”E], ca. 100 m, 14.I.1963, fr., *MacKee 9989* (BISH, P [P02095733]); Houaïlou, Hô, [21°10’36”S 165°31’12”E], 50 m, 29.IV.1973, y. fr., *MacKee 26656* (G, NOU [NOU048339, NOU048471], P [P02095734, carpo]); Touho, Ponandou, [20°49’12”S 165°13’45”E], 30–100 m, 15.V.1973, fr., *MacKee 26721* (G, FI, K, MO, NOU [NOU048

475], P [P02139395, carpo], PH); Ponérihouen, Pente E Mt. Aoupinié, [21°10’36”S 165°18’30”E], 600 m, 16.V.1973, fr., *MacKee 26750* (G, NOU [NOU048338, NOU048472, NOU048473], P [P02095731, carpo], PH); Ponérihouen, Mt. Aoupinié, [21°10’46”S 165°18’12”E], 700 m, 18.VIII.1981, fr., *MacKee 39467* (G, NOU [NOU048474], P [P02095729], PH); Inédète, [20°52’17”S 165°06’49”E], ca. 500 m, 25.VI.1969, fr., *Veillon 1962* (BISH, NOU [NOU04 8477, NOU048476], P [P02095726, P02095727, carpo]).

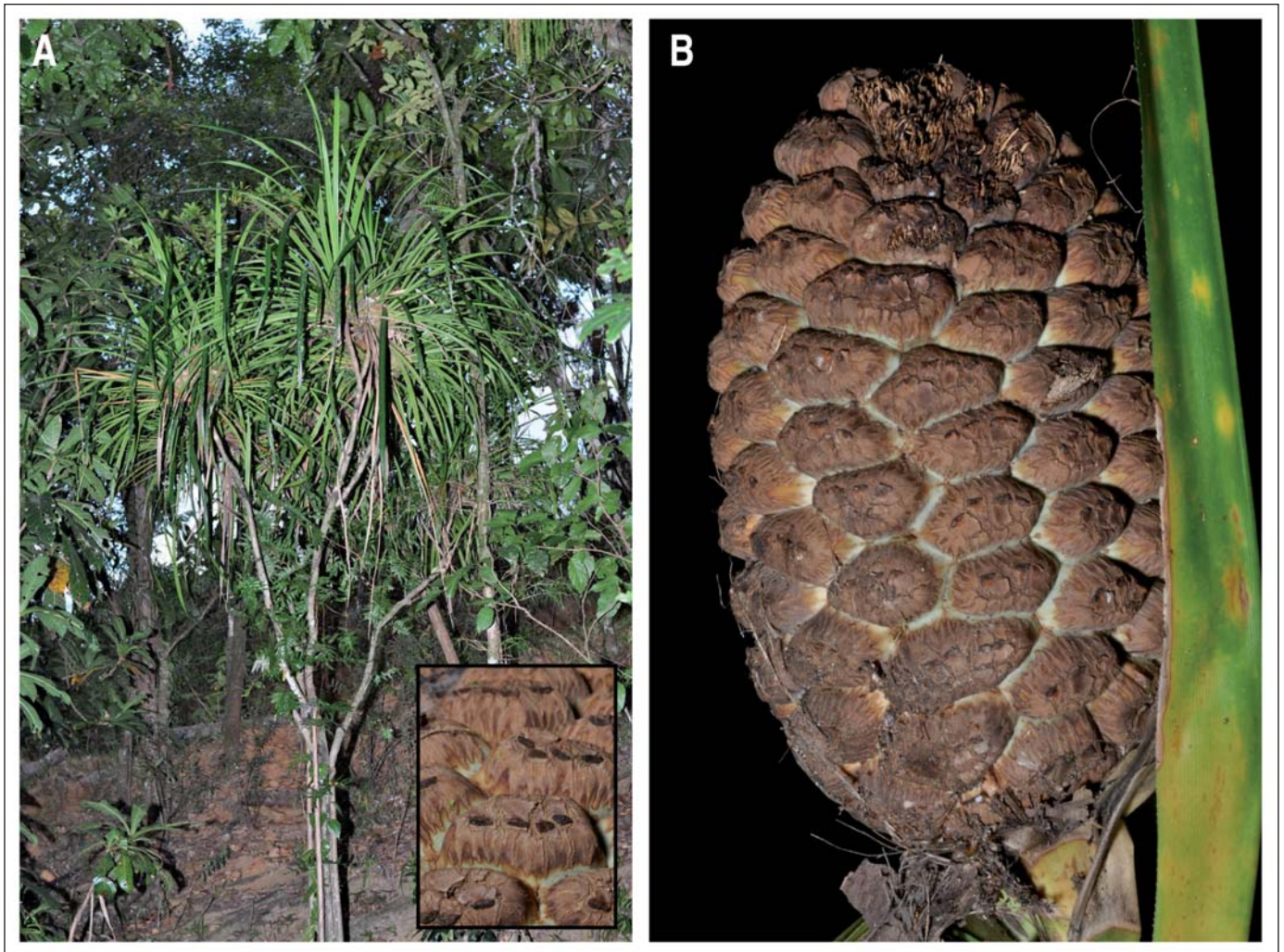
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**Fig. 6.** – *Pandanus letocartiorum* Callm. & Buerki. **A.** Habit with detail of stigmas (framed); **B.** Syncarp. [Munzinger & al. 5889, P] [Photos: P. P. Lowry]

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