The flora of the neo-caledonian mangrove swamps

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Important mangal[1] surfaces along the shore of Pouébo were observed by two german naturalists, Johann Reinhold Forster and Georg Forster (Forster, 1786), during James Cooks visit of the North-East coast of the Grande-Terre aboard HMS Resolution's in 1774. Archaeological findings at Tiouandé (Sand, 2001) to the south suggest that these mangals have been used by autochthonous populations for the past 3000 years.

Multiple uses of mangroves were listed: fire wood, timber, medicine, and food (Virot, 1956; Rollet, 1975). For example, generations of oral tradition indicate that young plantlets of Rhizophoraceae were used as food during times of scarcity

Mangroves received little attention from the early botanists who investigated the Territory after preliminary inventories. One reason is probably the higher interest of other habitats, such as *maquis minier* (a characteristic low, sclerophyllous, evergreen, heath-like formation, largely restricted to ultramafic substrates at various altitudes on Grande Terre (Lowry, 1998)) or rain forest. Both habitats possess a very high endemism, respectively ca. 89% and 82%, and a very rich flora, respectively ca. 1 144 and 2 013 species (Jaffré *et al.*, 2001; Lowry *et al.*, 2004).

Rhizophora lamarckii Montrouz. was considered for a long time to be endemic to the North-East of the main island, which would have been exceptional for a mangrove. However, the distribution of this species is now also known to include the Queensland, the Solomon Islands and Papua-New Guinea.

The first botanical inventories were done during the 19th century and more recently by a geochemist, Frédéric Baltzer (1965 and 1969), who studied the coastal swamps of the Dumbéa river estuary and the Teremba peninsula, on the west coast of the main island. An important step was the worldwide treatment of P. B. Tomlinson (1986), who provided a list of the mangroves of New Caledonia.

Some taxonomic questions appear to be still open, for example, only *Avicennia marina* var. *resinifera* (Forst.) Bakh. is reported by Tomlinson in New Caledonia, writing that one of the distinguishable character of this variety is « *the ovary hairy only in the upper half* ». This appears surprising as several specimens in NOU show a completely hairy ovary and fruits (these specimens were identified as *A. eucalyptifolia* by some collectors). Tomlinson specifies « the uncertainty of these designations {c.i.e. *A. marina* varieties} and suggested the inclusion of New Caledonia in the range of both the typical form and var. *resinifera*».

Xylocarpus moluccensis M. Roem. is recorded in New Caledonia by Ellison (1995: 70). However, the author doesn't cite any reference for this, and no material of that species is identified in NOU, this record remains doubtful.

The question of the *Suaeda* species is also of interest. All the material identified in NOU is under *S. australis* Mor. This latest would be the synonym of *Suaeda maritima* (L.) Dumort., a name found in the checklist of the native flora of New Caledonia (Jaffré *et al.*, 2001). But *Suaeda australis* is considered as a weed in the "*Global Compendium of Weeds*" (http://www.hear.org/gcw). Thus, the native status of this species might be questionable. In any case, the lack of a good revision of the New Caledonian Chenopodiaceae appears crucial.

Only two species of *Sonneratia* are supposed to occur in New Caledonia, *S. alba* and *S. caseolaris*. These species are known to hybrid in Australia (Hewson, 1990). The hybrid is described as *Sonneratia* X *gulngai* N. Duke. No report of this taxa exists in New Caledonia but research in areas where both species exist might reveal its presence.

The number of mangrove species in New Caledonia varies between M. Schmid (1981) estimations « *ca. fifteen species of trees or shrubs* », and Ellison (1995) who indicated 16 species. But the defini-

tion of mangroves is always questionable. The genera *Rhizophora, Bruguiera, Ceriops, Avicennia, Sonneratia, Lumnitzera* are definitively restricted to coastal tropical swamps[2], contrarily to others genera such *Xylocarpus* and *Acanthus* which are not. However, the species *Xylocarpus granatum* and *Acanthus ilicifolius* must be considered as associated to the slightly salted areas of the mangals.

P.B. Tomlinson, like many other botanists, classifies *Excoecaria agallocha* and *Heritiera littoralis* as mangroves, though this should be reviewed. *Excoecaria agallocha* appears to have its optimal ecology on the littoral while *Heritiera littoralis* colonizes the slopes and river banks in some tropical regions, sometimes fairly inland as in Seychelles Islands where the tree is found one kilometre from the sea. Some individuals even grow on rocks (Friedmann, 1994). The remaining species occur in the mangal undergrowth, on salt marshes or *tannes*[3] and in swampy grassland and forests at the rear of mangals. More species are found in these areas, in particular if epiphytes, bacteria, seaweed and fungi are included.

Based on Ellison (1995) list of mangrove species, New Caledonia would be the third richest pacific island (excluding Australia) for mangrove species with 17 taxa, after Papua New Guinea (35 spp.) and Salomon Islands (22 spp.) if we exclude *Xylocarpus moluccensis* and add *Sonneratia caseolaris* along with *Lumnitzera littorea*,

The salt pans support numerous small halophytes and tall herbaceaous non ligneous succulents. The Chenopodiaceae family is well represented, as well as many grasses (Poaceae) and the Aizoaceae *Sesuvium portulacastrum*.

Acrostichum aureum ferns and several Cyperaceae dominate the undergrowth of mangals and swampy grassland. Niaouli (*Melaleuca quinquenervia*, Myrtaceae) are found in swampy forests, sometimes among mangroves on unsalted or poorly salted substrate. All these species were noted on previous reports and are not endemics.

New Caledonian mangals have been mainly impacted by urbanisation. This impact is the product of a negative image people have of mangals as well as speculation associated with property development. The conversion of mangrove swamps through land reclamation into residential and industrial settlements is an established reality in Nouméa, notably at Doniambo. Furthermore, invasive species such as *Bryophyllum pinnatum* (Lam.) Kurtz. (Crassulaceae), *Schinus terebinthifolius* Raddi (Anacardiaceae) and *Pluchea odorata* (L.) Cass. (Asteraceae) have established inner areas of the swamps. In recent years, aquaculture prawn farms established behind the mangals have increased the area of salt marsh. The main mangal areas (27 000 ha) using for crab fishing *Scylla serrata* by villagers are relatively undisturbed despite scattered garbage dumps. Nickel mining is more responsible for mangal expansion through sedimentary build up than lethal pollution. Environmental awareness of mangals has been on the increase in recent years, in particular among the young people. No reserve actually includes mangals, despite remarkable sites such the Rivière Salée mangal in Nouméa. This mangal should be protected and fitted out as an educational and resting area.

The following list is a compilation of material deposited at IRD's centre herbarium (NOU) in Nouméa and / or given in bibliographic references. Species were retained when collectors wrote the plant to be collected in a mangal or behind mangal swamps. It is also based on personal observations of the authors. More investigations, at the territory scale, might add taxa in this kind of vegetation.

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[1] We use the word "mangal" to designate the mangrove vegetation (Saenger *et al.*, 1977), "mangrove" attributed to the trees living in the mangal.

[2] The coastal swamps are areas of loose sediments subjected to the oscillation of tides, drained by channels of tides. Under tropics, these swamps are partially colonized by mangals.

[3] "*tanne*" are bare areas or areas covered in an often intermittent way with halophytes of small size which occur at the back of the mangrove swamp or include within it. They formed at the cost of this last one and are subjected to negative or positive drives governed by the climatic, sedimentary and maritime level fluctuations.

REFERENCES

BALTZER F., 1965.- Le marais de Mara. *Les Cahiers du Pàcifique,* **7**, 69-92, carte H.T.

BALTZER F., 1969.- Les formations végétales associées au delta de la Dumbéa (Nouvelle Calédonie) et leurs indications écologiques, géomorphologiques et sédimentologiques, mises en évidence par la cartographie. *Cah. ORSTOM, sér. Géol.* **1** : 59-84.

ELLISON J. C., 1995.- Systematics and Distributions of Pacific Islands Mangroves. In : Maragos, J.E., Peterson, M.N.A., Eldredge, L.G., Bardach, J.E. & Takeuchi, H.F. (eds). Marine and Coastal Biodiversity in the tropical Islands Pacific Region. Vol. 1, Species Systematics and Information Management Priorities : 59-74.

FRIEDMANN F., 1994.- *Flore des Seychelles, Dicotyledones*. ORSTOM Editions, Paris, 663p.

FORSTER J.G.A,1786.- *De plantis esculentis insularum oceani australis commentatio botanica.* Haude & Spener, Berlin, 80 p.

HEWSON H. J., 1990.- Sonneratiaceae. In: A. S. George (ed.), *Flora of Australia* **18**: 87-91.

HOFFER O., 2004.- *Les marais à mangrove des communes de Dumbéa et de Païta (Nouvelle-Calédonie) : milieu, usages et dynamiques*. Université Michel de Montaigne - Bordeaux 3, mémoire de maîtrise de Géographie, 187 p.

JAFFRÉ T., Morat P., Rigault F., Veillon J.-M., and Dagostini G., 2001.- *Composition et caractéristiques de la flore indigène de la Nouvelle-Calédonie*. IRD, Nouméa.

LEBIGRE J.-M., 2004.- *Les marais à mangrove de Nouvelle-Calédonie, un exemple de milieu « naturel » lagonaire*. Nouméa, Centre de Documentation Pédagogique, Scérén, Sce **44**, 48 p. + 20 slides

LOWRY II, P.P., 1998.- Diversity, Endemism, and Extinction in the Flora of New Caledonia: a Review. Pp. 181-206 In: C. -I Peng and P. P. Lowry II (ed.), *Rare, Threatened, and Endangered Floras of the Pacific Rim*. Institute of Botany, Academica Sinica, Monogr. Ser. No. **16**, Taipei.

LOWRY II, P.P., Munzinger J., Bouchet P., Géraux H., Bauer A., Langrand O., and Mittermeier R.A., 2004.- New Caledonia. In: Mittermeier RA, Robles_Gil P, Hoffmann M, J. Pilgrim, Brooks T, Mittermeier CG, Lamoreux JL and da_Fonseca GAB, eds. *Hotspots Revisited: Earth's Biologically Richest and Most Threatened Terrestrial Ecoregions*. Mexico: CEMEX, 193-197.

ROLLET B., 1975.- Les utilisations de la mangrove. *Journal d'Agr. Trop. Et de Bot. Appl.*, XXII, **7-8-9** (203-237) et **10-11-12** (297-340).

SAENGER P., SPECHT M.M., SPECHT R.L., CHAPMAN,V.J., 1977.- Mangals and coastal salt-marhe communities in Australasia. In: Chapman, V.J (ed) "*Wet coastal ecosystems*, New York, Elsevier: 293-345.

SAND Ch. (dir.), 2001.- *Tiouandé. Archéologie d'un massif de karst du Nord-est de la Grande Terre (Nouvelle-Calédonie)*. Les Cahiers de l'Archéologie en Nouvelle-Calédonie, vol. **12**, 136 p.

SCHMID M., 1981.- *Fleurs et plantes de la Nouvelle-Calédonie*. Papeete, Ed. du Pacifique, 164 p.

TOMLINSON P.B., 1986.- *The botany of mangroves*. Cambridge University Press, 413 p.

VIROT P., 1956.- *La végétation canaque*. Paris, Ed MNHN, 400 p.

List of plant sorted by family

ACANTHACEAE

Acanthus ilicifolius L. *Schmid 1970*, Dumbéa, 15/03/1967 (NOU); det.: H. Heine, in herb., 24/07/1984 and Heine, 1976, *Fl. Nouv.-Cal. & Dép.* **7**: 8.

ADIANTACEAE

Acrostichum aureum L. *Blanchon 1526,* Ouvéa, 24/03/1965 (NOU); det.: G. Brownlie, in herb., sept. 1965 and Brownlie, 1969, *Fl. Nouv.-Cal. & Dép.* **3**: 158.

AIZOACEAE

Sesuvium portulacastrum L. *Hoff 48,* Teremba, 31/01/1979 (NOU); without determinavit.

APOCYNACEAE

Melodinus scandens J.R.Forst. & G.Forst. *Hoff 41,* Moindou: Teremba, arrière mangrove, 31/01/1979 (NOU); without determinavit.

AVICENNIACEAE

Avicennia marina (Forsk.) Vierh. var. *resinifera* Fide Tomlinson (1986) the only taxa in New Caledonia, but he didn't annotated any specimen in NOU. *Webster 19310,* Oundjo, 14/12/1973 (NOU), det. as *A. officinalis* L. by G. Webster, in herb., 1973. MacKee 35723, Oubatche, 14/09/1978 (NOU); det as *A. eucalyptifolia* Zipp. ex Moldenke by J.-M. Veillon, in herb., 21/5/1980.

BIGNONIACEAE

Dolichandrone spathacea K.Schum. *Suprin 511,* Houailou, arbre d'arrière mangrove, 26/02/1980 (NOU); without determinavit.

CASUARINACEAE

Casuarina equisetifolia L. *Veillon 20*, Anse Vata, 7/01/1965 (NOU); without determinavit.

CHENOPODIACEAE

Atriplex jubata S.Moore *MacKee 32911*, Népoui: presqu'île Pindian, 10/03/1977 (NOU); without determinavit.

Kochia hirsuta L. *Virot 972*, Isle des Pins, 3/03/1943 (NOU); without determinavit.

Salsola kali L. *MacKee 21690*, Tontouta: Tonghouin, mars 1970 (NOU); without determinavit.

Sarcocornia quinqueflora (Bunge ex Ung.-Sternb.) A.J.Scott Syn.: *Salicornia australis* Benth *Schmid 2300*, Ouvéa, Baie de Lekin, 01/09/1967 (NOU); as *Salicornia australis*, without determina vit; also cited by Baltzer, 1969, *Cah. ORSTOM, sér. Géol.* **1:** 59.

Suaeda maritima (L.) Dumort Syn.: *Suaeda australis* Mor. *Schmid 2300*, Ouvéa, baie de Lékin, 1/09/1967 (NOU), as *S. australis*, without determinavit. No species identification of *S. maritima* in herb. The name is given in Jaffré & al., 2004, IRD: Doc. Sci. & Tech. **II4**: 58.

COMBRETACEAE

Lumnitzera littorea (Jack) Voigt *Veillon 530,* Riv. Ouinnée en arrière mangrove, 25/11/1965 (NOU); without determinavit.

Lumnitzera racemosa Willd. *Munzinger & Jourdan 2668*, Gadji, 23/02/2005 (NOU); det.: J. Munzinger, in herb., also cited by Baltzer, 1969, *Cah. ORSTOM, sér. Géol.* **1:** 59.

CYPERACEAE

Baumea juncea (R.Br.) Palla *Musselman 5340*, baie des Pirogues, 23/05/1977 (NOU); det.: K. Wilson, in herb., 23/3/1987.

Fimbristylis cymosa R. Br. *MacKee 25449*, Maré, 04/5/1972 (NOU); det.: J. Raynal, in herb., 18/01/1972.

Fimbristylis ferruginea Vahl *Veillon 93*, Saint Louis, 2/4/1965 (NOU); det.: J. Raynal, in herb., 1/12/1972.

Fimbristylis polytrichoides (Retz.) R.Br. *MacKee 24746,* Embouchure de la Tontouta, 25/12/1971 (NOU); det.: J. Raynal, in herb., 18/10/1972.

Mariscus javanicus (Houtt.) Merr. *MacKee 26114*, Néhoué, déc. 1972 (NOU); det.: J. Raynal, in herb., 2/05/1974.

Rhynchospora corymbosa (L.) Britt. *Blanchon 1618*, Nakety, 25/11/1965 (NOU); det.: J. Raynal, in herb., 1/12/1972.

Schoenoplectus littoralis subsp. *littoralis* (Trab.) S.S.Hooper, Syn.: *Scirpus subulatus* Vahl *Schmid 3417*, Nouméa, 19/09/1970 (NOU); det.: J. Raynal, in herb., 1/12/1972 (*Scirpus subulatus* Vahl). *Schoenoplectus mucronatus* (L.) Palla Syn.: *Scirpus mucronatus* L. *MacKee 24417*, Basse Tipindjé, 9/10/1971 (NOU); det.: J. Raynal, in herb., 18/10/1972 (*Scirpus mucronatus* L.).

Schoenoplectus validus (Vahl) AZ.D.Löve *MacKee (leg. Cherrier) 44564*, Nakéty, 29/08/1989 (NOU); without determinavit.

EUPHORBIACEAE

Excoecaria agallocha L. *Hoff 967*, Moindou, 15/06/1979 (NOU); det.: G. McPherson, in herb., 1987 and McPherson & Tirel, 1987, *Fl. Nouv.-Cal. & Dép.* **14***:* 32.

JUNCAGINACEAE

Triglochin striatum Ruiz & Pavon *MacKee 24256,* Koutio-Kouéta, 25/09/1971 (NOU), no species identification in herb. *Triglochin striatum* name is given in Jaffré & al., 2004, IRD: Doc. Sci. & Tech. **II4**: 46.

MALVACEAE

Hibiscus tiliaceus L. *Hoff 2253*, Port Boisé, 6/10/1980 (NOU); without determinavit. *Thespesia populnea* (L.) Sol. *MacKee 16899*, Néhoué, 18/06/1967 (NOU); det.: P.S. Green, in herb., 12/04/1977.

MELIACEAE

Xylocarpus granatum Koenig *Veillon 4795*, Neuménie, 18/12/1981 (NOU); det.: D. Mabberley, in herb., 16/09/1984 and Mabberley, 1988, *Fl. Nouv.-Cal. & Dép.* **15** : 82.

Xylocarpus moluccensis M.Roem. No specimen identified in NOU, but the species would be in New Caledonia fide Ellison (1995).

MORACEAE

Malaisia scandens (Lour.) Planch. *Webster 19311,* Oundjo, in trees behind mangrove, 14/12/1973 (NOU); det.: G.L. Webster in herb. (as *M. tortuosa* Blanco).

MYOPORACEAE

Myoporum tenuifolium G.Forst. *Hoff 902,* Nouméa, baie Tina, arrière mangrove, 18/05/1979 (NOU); det.: B. Chinnock in herb. 23/11/1987.

MYRTACEAE

Melaleuca quinquinervia Blake Dawson, 1992, *Fl. Nouv.-Cal. & Dép.* **18**: 217.

OLACACEAE

Ximenia americana L. *Musselman 5341*, Riv. des Pirogues in higher portions of Mangrove swamps, 23/05/1977 (NOU); without determinavit.

PLUMBAGINACEAE

Limonium tetragonum (Thunb.) Bullock *MacKee 14051,* Ile des Pins, Baie de Gadji, marais saumâtre, 17/12/1965 (NOU); det.: J. R. Edmondson in herb. and 1983, *Fl. Nouv.-Cal. & Dép.* **12**: 135.

PANDANACEAE

Pandanus tectorius Parkinson *Veillon 866*, Port Bouquet, 17/08/1966 (NOU); det.: B.C. Stone, in herb., 1981.

PAPILIONACEAE

Cynometra iripa Kostel. *Veillon 3143,* Embouchure de la Tiwaka, arrière mangrove, sept. 1974 (NOU); without determinavit.

Dalbergia candenatensis (Dennst.) Prain *Schmid 3448*, Pouébo, lisière de mangrove, 19/10/1970 (NOU); without determinavit.

Derris trifoliata Lour. *MacKee 39774*, Poya, 20/10/1981 (NOU); det.: I. Nielsen, in herb., 28/01/1988.

POACEAE

Cynodon dactylon (L.) Pers. *Toutain 3646*, Lifou, 06/09/1982 (NOU); det.: Ph. Morat, in herb., 03/1985.

Sporobolus virginicus (L.) Kunth *Suprin 2429*, Ilot Bailly, 28/07/1994 (NOU); det.: Ph. Morat, in herb., 04/05/1998.

RHAMNACEAE

Colubrina asiatica var. *asiatica* (L.) Brongn. *Schmid 2348,* Ouvéa-Lekin, arrière mangrove +/- rocheuse, 29/08/1967 (NOU); without determinavit.

RHIZOPHORACEAE

Rhizophora apiculata Blume *Schmid 2981*, Tipindjé, 10/09/1964 (NOU); det.: P.B. Tomlinson, in herb., 21/07/1977.

Rhizophora X lamarkii Montrouz. *MacKee 26178*, Touho, 02/01/1973 (NOU); det.: P.B. Tomlinson, in herb., 21/07/1977.

Rhizophora samoensis (Hochr.) Salv. Syn.: *R. mangle* Guppy *Tomlinson & al. s.n.,* Teremba, 18/07/1977 (NOU), det.: P.B. Tomlinson, in herb., 21/07/1977.

Rhizophora X selala (Salv.) Toml. *MacKee 11844*, Nouméa, 20/12/1964 (NOU); det.: P.B. Tomlinson, in herb., 21/07/1977.

Rhizophora stylosa Griff. *MacKee 19430*, Ile Art, 30/08/1968 (NOU); det.: P.B. Tomlinson, in herb., 21/07/1977.

Bruguiera sexangula (Lour.) Poir. Syn.: *B. eriopetala* Wight & Arn. *Hoff 2261*, Port Boisé, 10/06/1980 (NOU); without determinavit.

Bruguiera gymnorrhiza (L.) Lam. *MacKee 24725*, Nouméa: Baie Tina, 6/12/1971 (NOU); without determinavit.

Ceriops tagal Robin *Schmid 1594*, Diahot en mangrove, 21/09/1966 (NOU); without determinavit.

RUBIACEAE

Scyphiphora hydrophyllacea Gardner *Schmid 5046,* around Burundi, 11/09/1974 (NOU); without determinavit.

Guettarda speciosa L. *Musselman 5354*, Riv. des Pirogues, 23/05/1977 (NOU); without determinavit.

SONNERATIACEAE

Sonneratia alba J. Smith *MacKee 12552*, Nakety, St Pol, 8/5/1965 (NOU); without determinavit. Species cited in New Caledonia by Hewson 1990, *Fl. of Australia* **18**: 89.

Sonneratia caseolaris (L.) Engl. *Veillon 3264,* Bord de l'Amoa, 19/07/1977 (NOU); without determinavit.

STERCULIACEAE

Heritiera littoralis Dryander subsp. *littoralis MacKee 25715*, Nouméa, Baie Tina, 1/11/1972 (NOU); without determinavit.

Avicennia, Rhizophora sp. and *Bruguiera* sp., Païta

Tidal marsh and algal blanket, Gadji

Landward herbaceous swamp and mangal, Prony

Xylocarpus granatum, Dumbéa

RHYZO *Brugieria* cf. *gymnorhiza,* Prony

MALVA *Heritiera littoralis,* Prony

Sonneratia alba, Tamoa

Lumnitzera racemosa visited by *Rygchium caledonicus.* Gadji

Racines échasses de *Rhizophora* sp., Tamoa

Bruguiera sp., baie de Prony

Vieil *Avicennia marina*, Tontouta

Détail d'*Avicennia marina*, Poroukoé

Pluchea odorata en limite de tanne, Tontouta

Lumnitzera littorea, Prony

Myoporum sp., Pindaï

Rhizophora apiculata, Golone

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