

# A Brief Account of the Mangroves of New Caledonia

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Despite a long history of published references to New Caledonian mangroves (Forster 1786; Saenger et al. 1977; Schmid 1981; Ellison 1995; Lowry et al. 1998, 2004; Jaffre et al. 2001; Munzinger & Lebigre 2005), individual species remain largely undescribed combined with an incomplete knowledge of their local whereabouts. The most comprehensive account has been the recent one by Munzinger and Lebigre (2005) who listed 22 species. This represents a marked increase on the 16 listed a decade earlier by Ellison (1995). The final list of mangrove species has yet to be finalised. Our 2006 field survey confirmed much of information Munzinger and Lebigre had reported based on their thorough review of local Herbarium collections and records. However, these field surveys now greatly extend this knowledge of species presence and distribution.

In this report, we provide: 1) a revised list showing 24 species of mangrove plants (see Table 1), consisting of three previously unreported, one newly identified endemic, with two unlikely to be present although reported previously; 2) a series of species checklists for 36 major mangrove communities around the island (Figure 1); 3) a smaller number of upriver checklists for 10 major estuaries reveal previously unknown patterns of upstream distribution; and 4) some morphological characteristics of key taxa enabling better understanding of the origins and dispersal affiliations of mangroves in the region.



**Table 1:** Mangrove plant taxa in New Caledonia (Ellison 1995; Munzinger & Lebigre 2005; Duke 2007, based on surveys conducted in November-December 2006). Total of 24 species, plus one other [\*present, not confirmed; **[A]** absent, mistaken determination]. And, *Rhizophora X neocaledonica* N.C. Duke, first collected in the current survey, is a newly described endemic taxon.

Family	Taxa	Ellison	Munzinger	Duke
Acanthaceae	<i>Acanthus ilicifolius</i>		X	X
Pteridaceae	<i>Acrostichum aureum</i>		X	X
	<i>Acrostichum speciosum</i>			X
Avicenniaceae	<i>Avicennia marina</i> var. <i>australasica</i>	X	X	X
Rhizophoraceae	<i>Bruguiera gymnorhiza</i>	X	X	X
	<i>Bruguiera sexangula</i>	X	X	<b>[A]</b>
Rhizophoraceae	<i>Ceriops tagal</i>	X	X	X
Caesalpiniaceae	<i>Cynometra iripa</i>		X	X*
Bignoniaceae	<i>Dolichandrone spathacea</i>		X	X
Euphorbiaceae	<i>Excoecaria agallocha</i>	X	X	X
Sterculiaceae	<i>Heritiera littoralis</i>	X	X	X
Combretaceae	<i>Lumnitzera littorea</i>	X	X	X
	<i>Lumnitzera racemosa</i>		X	X
	<i>Lumnitzera X rosea</i>			X
Lythraceae	<i>Pemphis acidula</i>			X
Rhizophoraceae	<i>Rhizophora apiculata</i>	X	X	X
	<i>Rhizophora X lamarckii</i>	X	X	X
	<i>Rhizophora X neocaledonica</i>			X
	<i>Rhizophora samoensis</i>	X	X	X
	<i>Rhizophora X selala</i>	X	X	X
	<i>Rhizophora stylosa</i>	X	X	X
Rubiaceae	<i>Scyphiphora hydrophyllacea</i>	X	X	X
Sonneratiaceae	<i>Sonneratia alba</i>	X	X	X
	<i>Sonneratia caseolaris</i>		X	X
Meliaceae	<i>Xylocarpus granatum</i>	X	X	X
	<i>Xylocarpus moluccensis</i>	X	X	<b>[A]</b>
>>>	<b>TOTAL Recognised</b>	<b>16</b>	<b>22</b>	<b>24</b>

## Mangrove Hybrids

New Caledonian mangrove communities are distinguished by 4 relatively widespread hybrid species. These have been derived within two common genera, the *Lumnitzera* and *Rhizophora*. In most cases, these taxa are distinguished by shared morphological characteristics of the two parents. In the field, hybrid taxa were typically located in areas where both parental species co-exist. The hybrids and their putative parents are listed as follows:-

*Lumnitzera X rosea* = *L. racemosa* X *L. littorea*

*Rhizophora X lamarckii* = *R. stylosa* X *R. apiculata*

*Rhizophora X selala* = *R. stylosa* X *R. samoensis*

*Rhizophora X neocaledonica*\* = *R. apiculata* X *R. samoensis*

\*The latter hybrid taxon is new to science, being observed and reported on for the first time for this survey. A full description of this new and only endemic mangrove species to New Caledonia is being prepared for publication.

## Regional Biogeography and Distributional Patterns

New Caledonian mangrove taxa were classified into four regional distributional groupings (based on the 36 sites visited during the current survey – respective numbers of sites for each species is given in brackets), including: 1) generalists, 2) north restricted, 3) moisture preferring, and 4) an arid specialist. Note that hybrids occur where parental distributions overlap.

**Generalists.** Seven species are widespread and may be considered ubiquitous to most estuaries around New Caledonia, including: *Rhizophora stylosa* (26), *R. samoensis* (28), their dependant hybrid *R.X selala* (21), *Acanthus ilicifolius* (18), *Avicennia marina* (28), *Bruguiera gymnorhiza* (30) and *Excoecaria agallocha* (29).

**North restricted.** Eight species appear limited to northern latitudes, including: *Ceriops tagal* (1), *Scyphiphora hydrophyllacea* (5), *Pemphis acidula* (1), *Dolichandrone spathacea* (2), *Acrostichum aureum* (2) and *Rhizophora apiculata* (10) plus dependant hybrids *R.X neocaledonica* (4) and *R.X lamarckii* (6).

**Moisture Preferring.** Ten species are more commonly found in areas of higher rainfall, including: *Acrostichum speciosum* (19), *Heritiera littoralis* (14), *Sonneratia alba* (16), *Lumnitzera littorea* (12), and *Xylocarpus granatum* (17). *Rhizophora apiculata* and its two hybrids, *R.X lamarckii* and *R.X neocaledonica* are not only restricted to north estuaries but also the more moist areas. *Sonneratia caseolaris* (5) and *Cynometra iripa* (1) prefer areas of highest rainfall.

**Arid Specialist.** One species, *Lumnitzera racemosa* (16), is largely restricted to areas of low rainfall, notably along the western coastline. Its hybrid form, *L.X rosea* (2), occurs at both northern and southern overlap zones with the moisture restricted, *L. littorea*.

## Upstream Distributional Patterns

New Caledonian mangrove taxa have been further classified into three estuarine sub-groupings based on 10 upriver checklists for the river estuaries compiled during this survey, including: Dumbea, Tontouta South, La Foa, Le Cap, Temba, Voh, Iouanga, Koumac, Diahot and Canala. These estuary groupings (respectively, with number of sites surveyed for each species given in brackets) include: 1) downstream and marine influenced, (2) intermediate within the body of the estuary, and (3) upstream where species rely more heavily on riverine flows.

**Downstream species.** *Pemphis acidula* (1); *Ceriops tagal* (1); *Rhizophora stylosa* (10); *Sonneratia alba* (3); *Avicennia marina* (10); *Lumnitzera racemosa* (7); *Excoecaria agallocha* (10).

**Intermediate upriver species.** *Rhizophora samoensis* (10); *R. X selala* (10); *R. apiculata* (2); *Bruguiera gymnorhiza* (10); *Heritiera littoralis* (6); *Scyphiphora hydrophyllacea* (3); *R. X lamarckii* (2); *R. X neocaledonica* (1); *Lumnitzera littorea* (5); *L. X rosea* (2); *Xylocarpus granatum* (6); *Acrostichum speciosum* (7).

**Upstream species.** *Dolichandrone spathacea* (1); *Acanthus ilicifolius* (9); *Acrostichum aureum* (2); *Cynometra iripa* (0\* reference to Australian occurrence in Duke 2006); *Sonneratia caseolaris* (0\* reference to Australian occurrence in Duke 2006).

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