
MANGROVES OF THE NORTHERN TERRITORY, AUSTRALIA:

IDENTIFICATION and TRADITIONAL USE

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NORTHERN TERRITORY BOTANICAL BULLETIN No. 31

EXTRACT: *Sonneratia* (pp. 134–139)

Prepared for online viewing and download by the Department of Land Resource Management, 2015

DEPARTMENT OF NATURAL RESOURCES, ENVIRONMENT & THE ARTS
and GREENING AUSTRALIA NT

DARWIN 2006

Sonneratia**SONNERATIACEAE**

DERIVATION: *Sonneratia* in honour of Pierre Sonnerat, 1745–1814, French explorer and naturalist.

A genus of seven mangrove taxa, all confined to the tropics of the old-world. Represented by four species and three hybrids in Australia, of which the widespread *S. alba*, the restricted *S. lanceolata* and the hybrid *S. × urama*, known from a single collection, are recorded from the NT.

DESCRIPTION: Trees, evergreen, bisexual, glabrous; radial cable roots bearing conical pneumatophores. Leaves opposite, biseriate, simple, bearing vestigial stipular glands at petiole base, exstipulate, mucro reflexed. Inflorescence terminal on branchlets, 1-flowered. Flowers bisexual, subtended by 2 caducous bracts and 2 ovate bracteoles; hypanthium campanulate, coriaceous. Sepals valvate, acute, persistent. Stamens many, caducous; filaments filiform; anthers medifixed, reniform, 1.5 mm wide. Ovary superior, locules 12–20, ovules many, placentation axile; style 1, filiform, base persistent; stigma capitate. Berry obpyriform; pericarp indehiscent, subtended by persistent calyx. Seeds many, endosperm lacking.

KEY TO SPECIES:

1. Leaves obovate-ovate; fruit apex depressed.....*S. alba*
1. Leaves oblong-lanceolate; fruit apex swollen..... *S. lanceolata*

Sonneratia alba* Smith in A.Rees*Pornupan Mangrove**

DERIVATION: The Latin 'albens' means white and refers to the conspicuous white stamens of this species.

DESCRIPTION: Tree, spreading, 4–5(–8) m high; bark smooth with fine, longitudinal fissures, cream to brown; pneumatophores stout, blunt, 25 cm high. Leaf lamina coriaceous, obovate-ovate, 4.8–10.7 x 2.7–7.5 cm, base attenuate, apex blunt; petiole 6–15 mm long. Peduncle stout, terete, 1–10 mm long; mature bud broadly elliptic, 29 x 19 mm with slight medial constriction, apex blunt. Hypanthium often ribbed. Sepals 6–7, 20–25 mm long. Petals caducous or wanting, linear-spathulate, 20–24 x 1–2 mm, acute, white or red. Berry 4 x 3 cm, apex slightly depressed. Seeds falcate, 12 mm long.

HABITAT: *Sonneratia alba* is a pioneering species usually seen on the seaward fringe of mangrove areas; it is intolerant of long periods of exposure to fresh water. Preferred soils are consolidating muds and sands, though rock and gravel are also colonised. *Sonneratia alba* is frequently found in coastal situations (protected from strong wave action), down-stream estuarine areas and around

offshore islands. Associates include *Avicennia marina*, *Rhizophora stylosa* and *Aegialitis annulata*.

DISTRIBUTION: *Sonneratia alba* is widely distributed around the northern and western coasts of the NT, but is not known from the east coast. This species also occurs in Western Australia and Queensland. Extra-Australian occurrences include east Africa, India, southern China, New Guinea, New Caledonia, New Hebrides, the Solomon Islands and through south-west Oceania.

DISTINCTIVE FEATURES: Large spreading tree in coastal areas with many stout pencil-like pneumatophores, leaves broad, fruit a woody berry.

ETHNOBOTANY: For Yolngu people at Milingimbi *S. alba* is a calendar plant; flowering indicates the diamond sea mullet (*Liza vaigiensis*) are fat and sea mullet (*Mugil cephalus*) are losing their fat because they are laying their eggs (Davis 1984).

Tiwi people use the round top-shaped fruit, kurrakatu, like a spinning toy and they are spun between the fingers. There is a special song and dance associated with the fruit; when the fruit is used as a spinning top the song and dance can be undertaken. The leaves may also be used medicinally. They are boiled in water and the liquid is used as an external wash to treat skin disorders. The wood contains edible mangrove worms (*Bactronophorus thoracites*), which are highly prized for their pleasant taste and health promoting qualities (Puruntatameri et al. 2001).

Iwaidja speakers boil the leaves in water with fibre to dye the fibre a dark blue to black colour (Blake et al. 1998).

Recorded Aboriginal language names

Gokawu (Djambarrpuyngu)

Maripwanga (Tiwi)

Gukawa (Yolngu matha)

Wila (Iwaidja)

Mikukijuyibiyu (Yanyuwa)

Overseas uses include Malaysians eating the young, somewhat sour fruit of *S. alba*, producing a haemorrhage checking poultice from the fruit, and the use of the wood for fuel in periods of shortage (Watson 1928). Papuans use the roots of *Sonneratia* spp. for corks and floats (Percival & Womersley 1975).

Sonneratia alba is valued as timber for boat and house construction in the Celebes (Backer & van Steenis 1951), while in Sumba, Indonesia (Astuti et al. 2001) it is used as goat fodder and for construction. In Vietnam the young fruit are eaten in times of hardship (Hong & San 1993). The pneumatophores can be used, to make bottle corks and frames for sun-hats (Hong & San 1993).

NOTES: *Sonneratia alba* produces flowers and fruit at most times of the year, peak flowering occurs from May to July, peak fruiting occurs during July to September. Duke (unpublished data) noted seasonality in Queensland populations with flowers produced during October-November and fruit during

February. Martin (1996) concluded that *S. alba* is a protogynous outbreeder that produces abundant pollen and nectar, and is mainly pollinated by bats.

Flower morphology of *S. alba* minimises self-pollination, though geitonogamous pollination is possible and important in isolated trees and small populations. The flowers are ephemeral and nocturnal (Primack et al. 1981). Whilst hawk-moths have been observed visiting and pollinating flowers, birds and fruit bats are also important pollinators (van der Pijl 1969). Martin (1996) found that bats were the main pollinators of *S. alba* at a study site in Darwin Harbour, though the flowers are also exploited by several species of nectivorous birds. The flowers develop over a 48-hour period before shedding, and produce copious nectar, particularly during the second evening (Martin 1996).

Primack et al. (1981) consider the floral variation of *S. alba* to be a manifestation of variations in available pollination vectors. Fruit buoyancy in *S. alba* is due to the presence of air bearing tissue in the seed test (Guppy 1906).

Sonneratia alba exhibits a great deal of morphological variation. While NT populations rarely reach 8 m in height, Queensland trees are known to reach 20 m. Examination of NT specimens reveals inflorescences with one terminal bud, Duke (pers. comm.) quotes Queensland material as exhibiting 1–5 buds. Within the NT *S. alba* flowers may be apetalous, semipetalous or bear 5 caducous petals. Whilst Primack et al. (1981) explain this variability via pollination vectors, Duke (pers. comm.) notes a relationship between climatic and habitat factors and petal variation. Petal colour may be pale pink, red or green tinged at base.

Sonneratia alba bark varies with age of plant, young trees exhibit smooth, cream to brown bark, with fine longitudinal fissures, older trees have deeply fissured flaky cream bark. The presence of vestigial stipules and caducous bracts is barely mentioned in literature (Cronquist 1981), bracts are lacking in all but the youngest buds. Pneumatophores are absent when *S. alba* occurs on solid substrate.

***Sonneratia lanceolata* Blume**

River Pornupan Mangrove

DERIVATION: The Latin ‘lanceolata’ means narrow and refers to the lanceolate leaves of this species.

DESCRIPTION: Tree, columnar, 7–8(–12) m high; bark smooth with horizontal rings and orange pustules; pneumatophores thin, pointed, to 80 cm high. Leaf lamina oblong-lanceolate, 5.7–16.0 x 2.4–3.8 cm, attenuate, bluntly acute; petiole 3–5 mm. Peduncle stout, tetragonous, sometimes winged, 1–5 mm long; mature bud elliptic 25 x 18 mm, blunt. Hypanthium smooth. Sepals 5–7, 14–20 mm long. Petals 5–6, linear, 25–30 x 2–4 mm, red. Berry 4.5 x 3.5 cm, apex conical. Seeds angular, 7 mm long.

HABITAT: *Sonneratia lanceolata* is a pioneering species restricted to estuarine situations with a high degree of freshwater input. Substrates are usually fine silts or muds deposited on accreting river meanders. *Sonneratia lanceolata* may form monospecific stands or associations with *Avicennia marina*, *A. integrata*, *Aegiceras corniculatum* and *Derris trifoliata*.

DISTRIBUTION: *Sonneratia lanceolata* is uncommon on the northern NT coastline, however, it is often locally abundant where it is found. Populations are recorded from Melville Island, the Wildman and South Alligator rivers and rivers entering Arnhem Bay. It is particularly common on the Habgood River in north-east Arnhem Land where it forms a continuous closed canopy for over 20 km on the upper reaches of the river. *Sonneratia lanceolata* also occurs in Queensland, New Guinea and Indonesia.

DISTINCTIVE FEATURES: Columnar tree in riverine areas with large pneumatophores to 80 cm high, leaves narrow, fruit a woody berry.

ETHNOBOTANY: Mayali people recognise *S. lanceolata* but have no specific use (Russell-Smith 1985).

Recorded Aboriginal language names

Ngulurr (Mayali)

In Malaysia the young berries, whilst sour, are eaten, the wood is used as fuel and the buoyant pneumatophores furnish an inferior substitute for corks (Backer & van Steenis 1951).

NOTES: Northern Territory populations have been recorded with flowers and fruit in January, February, April, June, July, and October. Queensland populations flower in September and October with fruit set most numerous during December to March.

The pneumatophores of this species can be very large, up to 80 cm high and are very distinctive.

Backer and van Steenis (1951) considered *S. lanceolata* a synonym of *S. caseolaris*, but later work by Duke and Jackes (1987) allowed these species to be distinguished by leaf and staminal filament characters.

Variation between populations on neighbouring rivers in Queensland has been observed by Duke (pers. comm.). NT populations also show spatial variation between disjunct populations. Specimens collected by Graeme Wells from the Habgood River (Arnhem Land) exhibit consistently shorter, broader leaves and longer, more lanceolate calyx lobes than specimens from the South Alligator River (Kakadu National Park).

An atypical population of *S. lanceolata* on the Wildman River with lanceolate leaves and double petal numbers may represent an undescribed taxon (Duke,

pers. comm.). Further fertile collections are necessary to clarify the situation. *S. lanceolata* also exhibits vestigial stipules and caducous bracts.

***Sonneratia* × *urama* N.C.Duke**

Hybrid *Sonneratia*

A single collection of *Sonneratia* from the Goromuru River, north-east Arnhem Land (Wells s.n.; DNA 15228), represents a hybrid of *S. lanceolata* and *S. alba* (Duke & Jackes 1987) which has been formally described and named *S. × urama* (Duke 1994).

Morphological features of this collection are intermediate between the putative parents, which co-occur on this river. It is unusual for populations of these species to co-occur as their habitat preferences usually dictate spatial disjunction in the field.

Duke (1994) cited collections of *S. × urama* from Merauke in Irian Jaya and the Gulf Province in Papua New Guinea, which also exhibit shared and intermediate morphological characters, poor fruit development, larger form of tree canopy and foliage, and distribution limited to that of both putative parents.

Due to the restricted occurrence of this taxon in the NT, it has not been included in the identification keys or floristic diversity sections of this publication. However, it should be noted that *S. × urama* occurs in the most floristically diverse mangrove area in the NT, in north-east Arnhem Land.

The most distinguishing characteristics in the field are the spreading canopy, luxuriant foliage and presence of both parents; for herbarium identification the mature fruit indentation around the style base is indicative of this taxon (Duke 1994).

A search for this taxon on the South Alligator River failed to locate it in the area between and around the putative parents (pers. obs. 2006).

References: Duke & Jackes 1987, Duke 1994

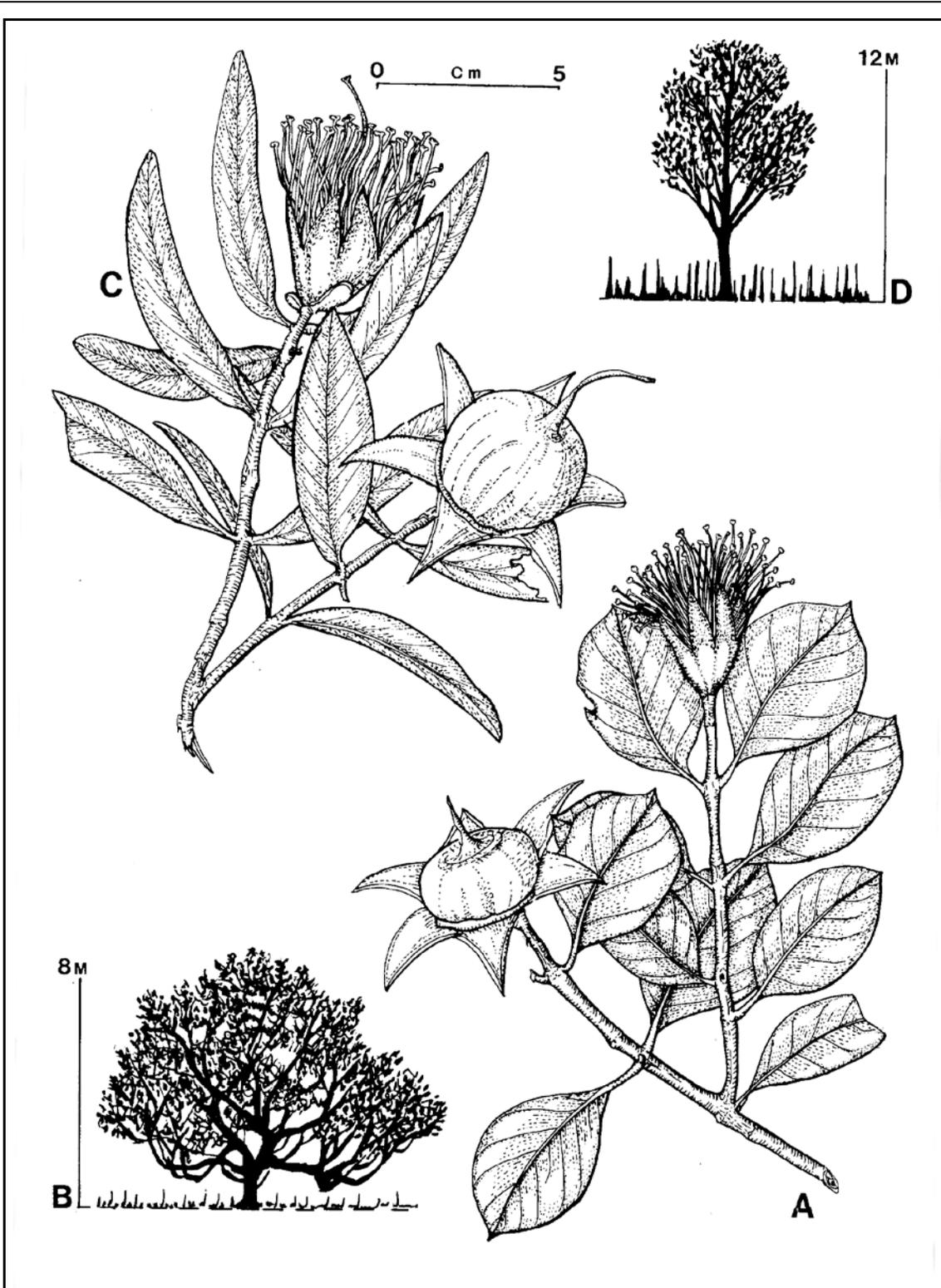


Figure 38. *Sonneratia*. A–B, *S. alba*. A, flowering and fruiting branch; B, habit and pneumatophores (A–B, G. Wightman 712, DNA). C–D, *S. lanceolata*. C, flowering and fruiting branch; D, habit and pneumatophores (C–D, M. Lazarides 9233 DNA & G. Wells s.n., DNA 9875).