ISSN 1880-7682
Volume 11, No. 2 **November 2013**

ISME/GLOMIS Electronic Journal

An electronic journal dedicated to enhance public awareness on the importance of mangrove ecosystems

Sonneratia griffithii Kurz: Status and distribution in Andaman and Nicobar Islands

Background

Mangrove forests are unique plant communities of the critical interface between terrestrial, estuarine, and near-shore marine ecosystems in tropical and sub-tropical regions (Polidoro *et al*., 2010). Despite its ecological and economical values, globally mangrove areas are disappearing at the rate of approximately 1% per year (FAO, 2003, 2007). However, little is known about the effects of either widespread or localized mangrove area loss on individual mangrove species or populations due to the lack of species information. Recently, Polidoro *et al.* (2010) assessed the global status of 70 mangrove species and reported that 11 species at elevated threat of extinction. Among them, two species i.e. *Sonneratia griffithii* and *Heritiera fomes* found in India are under the IUCN category of critically endangered and endangered, respectively.

In India, *S. griffithii* is known to occur in Andaman and Nicobar Islands (ANI) and in the Mahanadi delta (Kathiresan, 2010). Information on its current status and distribution is inadequate. First reported from ANI by Parker (1925), the species is easily distinguished from other species of *Sonneratia* by its obovate leaves, large solitary white flowers with white stamens and large globose fruits with a depressed apex. Debnath (2004) noted that the identity of *S. griffithii* in ANI needs to be confirmed and whether it is extinct now. Dagar *et al*. (1991) mentioned that trees resembling *S. griffithii* were observed in Katchal Island.

Our recent floristic expedition revealed the existence of *S. griffithii* in Andaman Islands. We recorded *S. griffithii* in five sites i.e. Panchawati, Betapur creek, Parangara creek, Mohanpur and Hut bay. We found trees of *S. griffithii* growing alongside *Rhizophora* and *Xylocarpus* spp. in Betapur creek (34 trees) and Parangara creek (13 trees). In Panchawati, Mohanpur and Hut bay, the population is sparse due to the lack of tidal inundation. We recorded seven individuals in Panchawati, and one individual each in Mohanpur and Hut bay. Detailed taxonomical descriptions of *S. griffithii* are as follows:

Sonneratia griffithii Kurz
Backer, C.A., 1951. Salvadoraceae. Flora Malesiana, Ser. I, 4: 224-225; Khan, M.S., 1980. Sonneratiaceae. Flora of Bangladesh No. 12; Tomlinson, P.B., 1986. The Botany of Mangroves. Cambridge University Press, UK; Aksornkoae, S., 1993. Ecology and Management of Mangroves; IUCN Wetlands Program. Bangkok, Thailand; Marschke, M., 2000. Mangrove meanderings: learning about life in the Peam Krasaop Wildlife Sanctuary, Cambodia; Phase 1 Final Report of Participatory Management of Mangrove Resources, IDRC, Canada and Ministry of Environment, Phnom Penh, Cambodia.

Morphological features

A mosaic of photos of *S. griffithii* are shown in Fig. 1. *Trees*: up to 25 m tall, columnar to spreading, trunk not buttressed (g), bark is flaky & pale brown, smooth when young (a) & fissured when mature (e). *Pneumatophores*: numerous, vertical, stout, elongate, cone-shaped, often branching, soft flaky surface (f). *Leaves*: simple, opposite, obovate to round, apex rounded with mucronate, base cuneate, dark green, petioles short (> 0.5 cm), length 7−11 cm, width 6−10 cm, veins prominent on upper side (b−d). *Inflorescences*: solitary cyme on terminal and lateral branches. *Flowers*: mature buds 2.5−3.0 cm long with rounded apex (h & j), calyx tube 3.0−3.5 cm long and widely bell-shaped, calyx lobes 6−7 do not envelop the base of the fruit, inner side of calyx is white, filaments are white & petals absent, stamens fall within hours after anthesis (h−k), anthers yellow, dorsi-fixed, & ovary multi-locular. *Fruits*: berry is globose with a depressed apex, 2.5−3.0 cm in length & 4.0−5.5 cm in diameter, pericarp leathery, style less persistent (l & m). *Seeds*: numerous & angular (n). *Phenology*: Flowering and fruiting was observed from February to May.

Though *Sonneratia* species are uniform in vegetative characters (Tomlison, 1986), *S. griffithiii* can be distinguished by its smooth flower bud with rounded apex whereas in all other *Sonneratia* species apex of the bud is acute. Without flowers and fruits, *S. griffithii* is often wrongly identified as *Sonneratia ovata* because both the species possess obovate leaves, and flowers have white stamens and petals absent. However, *S. griffithii* differs from *S. ovata* by having a prominent mucronate at the leaf apex. The leaf tips of *S. ovata* are not mucronated.

Of the 30 countries in the Indian Ocean region, *S. griffithii* has been reported in Malaysia, Thailand, Myanmar and India (Kathiresan & Rajendran, 2005; Kathiresan, 2010) and is locally extinct in several areas within its range. Moreover, *S. griffithii* is rare in India and IUCN has categorised the species as critically endangered. Therefore, immediate measures are needed to conserve *S. griffithii* in ANI. The present observation showed the need for more extensive field survey to update its status and distribution in ANI.

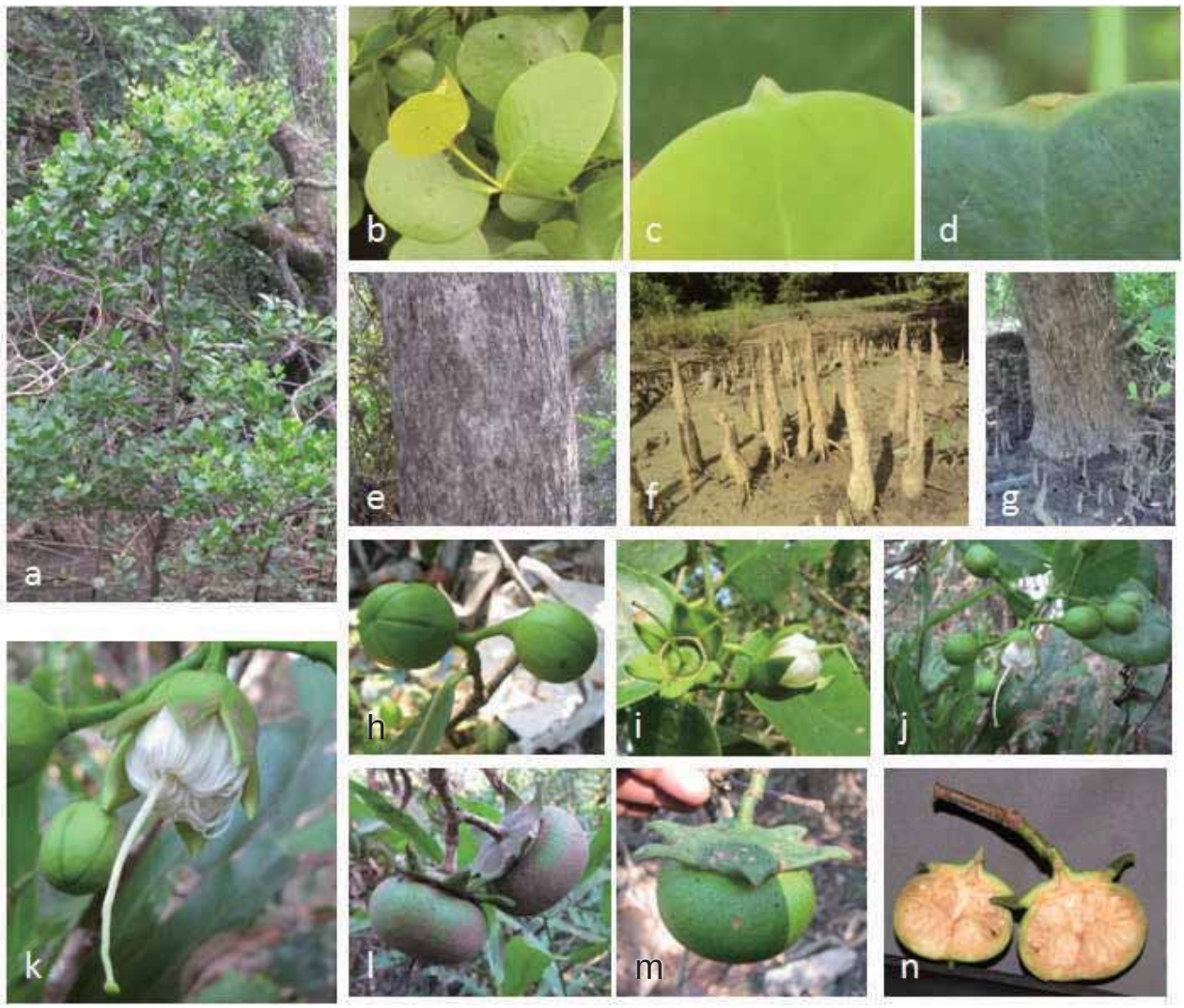

Fig. 1 Morphological features of *Sonneratia griffithii* in Andaman and Nicobar Islands

(a) habitat; (b) obovate glossy green leaves; (c) mucronate tip of young leaf; (d) folded mucronate tip of mature leaf; (e) flaky pale brown bark; (f) prominent conical pneumatophores; (g) simple stem base; (h) mature flower bud with rounded apex; (i) smooth green calyx with six lobes; (j) inflorescences; (k) flowers without petals and numerous white stamens; (l) mature fruits with flattened calyx; (m) young fruit; and (n) cross section of fruit showing multi-locular ovary.

Acknowledgements

We are highly indebted to Dr. V.K. Bahuguna, IFS, Director General, and Indian Council for Forestry Research and Education for providing the necessary support under NFRP, and to the Principal Chief Conservator of Forests, Andaman and Nicobar Islands for his guidance and necessary field support. The cooperation and support provided by the CCF (Research and Working Plan), CCF, Territorial Circle and all the Divisional Forest Officers and staff in the Department of Environment and Forests, Andaman and Nicobar Administration are much appreciated. Thanks are due to Dr. N. Krishnakumar, IFS, Director, Institute of Forest Genetics and Tree Breeding, Coimbatore for his support and encouragement. Special thanks are extended to Shri N. Prabakaran and Shri Biswajit Biswas for helping in the fieldwork.

References

Dagar, J.C., Mongia, A.D. & Bandhyopadhyay, A.K., 1991. *Mangroves of Andaman and Nicobar Islands.* Oxford and IBH, New Delhi.

Debnath, H.S., 2004. *Mangroves of Andaman & Nicobar islands: Taxonomy and Ecology (A Community Profile)*. Bishen Singh & Mahendra Pal Singh, Dehra Dun, India.

FAO, 2003. Status and trends in mangrove area extent worldwide. In: Wilkie, M.L. & Fortuna, S., eds. *Forest Resources Assessment Working Paper No. 63*. Rome: Forest Resources Division, FAO. http://www.fao.org/docrep/007/j1533e/j1533e00.htm.

FAO, 2007. *The World's Mangroves 1980-2005*, FAO Forestry Paper 153. Rome: Forest Resources Division, FAO, 77 pp.

Kathiresan, K. & Rajendran, N., 2005. Mangrove ecosystems of the Indian Ocean region. *Indian Journal of Marine Science*, 34, 104–113.

Kathiresan, K., 2010. Globally threatened mangrove species in India. *Current Science*, 98, 1551.

Parker, R.N., 1925. The genus *Sonneratia*. *Indian Forester*, 51(10), 505−510.

Polidoro, B.A., Carpenter, K.E., Collins, L., Duke, N.C., Ellison, A.M., Ellison, J.C. *et al*., 2010. The loss of species: Mangrove extinction risk and geographic areas of global concern. *PLoS ONE*, 5(4), 1-10.

Tomlinson, B.P., 1986. *The Botany of Mangroves*. Cambridge University Press, Cambridge. 419 pp.

Pandisamy Ragavan[1*], K. Ravichandran[1], P.M. Mohan[2] & Alok Saxena[3]

[1] Institute of Forest Genetics and Tree Breeding, R.S. Puram, Coimbatore, India
[2] Department of Ocean Studies and Marine Biology, Brookshabad Campus, Pondicherry University, Port Blair, India
[3] Indira Gandhi National Forest Academy, Dehradun, India

[*] E-mail of corresponding author: van.ragavan@gmail.com