

NOTES ON *PEMPHIS ACIDULA* J.R. FORST. & G. FORST. (MYRTALES: LYTHRACEAE) FROM ANDAMAN ISLANDS, INDIA

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Lythraceae is a cosmopolitan family consisting of 25 genera of which three viz., *Crenea* Aubl. 1775, *Pemphis* J.R. Forst. & G. Forst. 1776, *Sonneratia* L.f. 1781 are represented in mangrove communities (Tomlinson 1986). *Pemphis* is a small coastal tropical genus of shrubs and densely branched small trees, distributed from East Africa through Southeast Asia to northern Australia, Polynesia and northward to Hong Kong (Tomlinson 1986; Geisen et al. 2007). This genus comprises only two species, viz., *Pemphis acidula* J.R. Forst. & G. Forst. and an endemic Madagascan species, *P. madagascariensis* (Baker) Koehne. In this account, *Pemphis acidula* is discussed

pertinent to its distribution in Andaman and Nicobar Islands, India.

A total of 10 literature reported *Pemphis acidula* from Andaman and Nicobar Islands, of which, locality data was given in only two, viz., Kurz (1870) and Parkinson (1923) (Table 1). Neither locality nor description has been provided in the literature published subsequent to Parkinson (1923), attributable to the incomplete knowledge of its regional whereabouts. During 2003, *P. acidula* was reported near Elephant Beach of Havelock (S. Dam Roy & M. Kaliyamoorthy, pers. obs. 2003). They could not locate it in their surveys conducted subsequent to December 2004 tsunami. Recent floristic expeditions revealed the occurrence of *P. acidula* in Sir William Peel Island of Ritchie's Archipelago, and its distribution in India is discussed based on the existing literature. Herbarium specimen has been prepared and deposited to the National Botanical Collection of Andaman Nicobar Regional Centre, Botanical Survey of India, Port Blair.

Pemphis acidula J.R. Forst. & G. Forst.

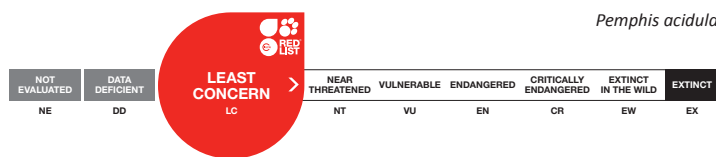
in Char. Gen. Pl. 34. 1775 (Image 1; Fig. 1).

Specimen examined: 31019 (PBL), 25.i.2014, Andaman and Nicobar Islands, South Andaman, Ritchie's Archipelago, Sir William Peel Island (12°03.777'N & 92°59.882'E), coll. M.P. Goutham Bharathi and Titus Immanuel (Fig. 2).



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Pemphis acidula



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Image 1. *Pemphis acidula* Forst. (Lythraceae) from Andaman Islands.

A - Habit; B - Young bark; C - Old bark; D - Adventitious roots; E - Flowering Shoot; F - Leaves; G - Bud; H - Flower with crumpled white petals; I - Developing fruit showing 12 angled calyx; J - Fruits showing circumsissile dehiscence; K - Fruit with persistent style, side view; L - Flowers, thrum form (L.S.); M - Seeds with corky margin or wing ($\times 25$). Scale: I,K,L = 1cm; M = 1mm). © Nitul Kumar Gogoi.

Small spreading tree, ca. 7m (up to 9.5m) high; Bark light grey to brown; deeply fissured with age; roots adventitious, spreading, exposed with no specialized adaptations. Leaves thick, decussate, narrowly elliptic to lanceolate; densely covered with silky hairs on both surfaces, 1.4–3.5 (2.61) \times 0.4–1.5 (0.99) cm with a very short petiole (up to 1mm). Buds densely hairy, young buds greenish; turning pinkish on top as they mature; flowers solitary and axillary, usually hexamerous, pentamerous

and tetramerous flowers also present, distylous, floral tube turbinate; pedicel 5–6 mm. Calyx campanulate, base tubular, 5–8 (6.45) mm long, 12-angled (ribbed with 6 pointed triangular lobes with pinkish margin; alternating with 6 thick accessory lobes). Petals white, crumpled, 4.5–6.5 (5.75) \times 3–4 (3.78) mm; Style simple and capitate; short styled (1mm) “thrum” flowers with stamens enclosing stigma; Fruits reddish to brownish on maturity, enveloped by persistent calyx, topped by style,

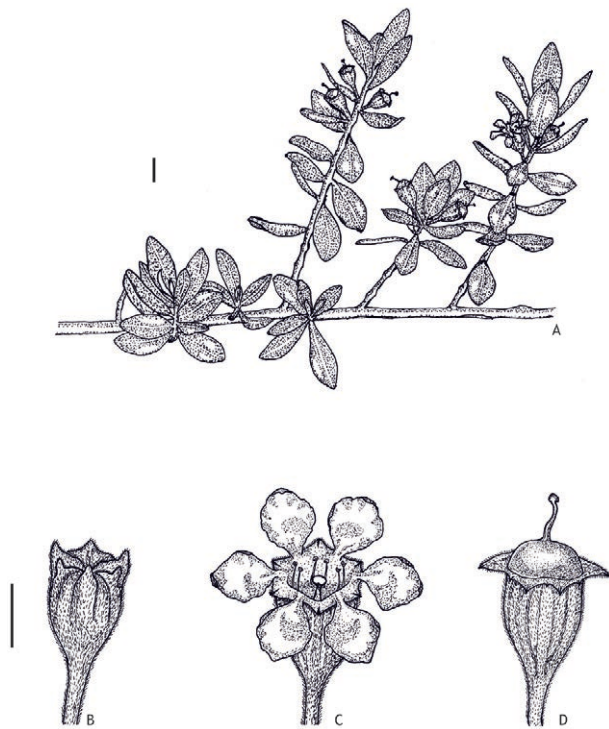


Figure 1. *Pemphis acidula* J.R. Forst. & G. Forst. (Lythraceae). A - Flowering shoot; B - Flower bud; C - Flower; D - Fruit. Scale: A = 10mm; B-D = 5 mm. (Material from Sir William Peel Island, Ritchie's Archipelago, Andaman Islands (M.P. Goutham Bharathi and Titus Immanuel, 31019 (PBL); Drawn by Titus Immanuel).

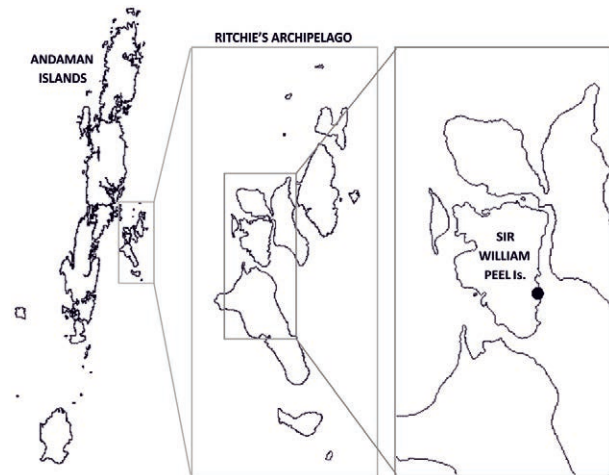


Figure 2. Map showing study area. ● indicates the locality of *Pemphis acidula*.

dehiscence circumscissile; seeds 13–16, angular, with a corky margin or wing.

Ecology: In an inlet at the seafront bordering the mangrove forests on sandy shores (strewn with washed out coral rubble) and on calcareous rocky habitats above the high tide level at the landward margin of mangroves.

Distribution: Rare; South Andaman Islands.

Floral dimorphism exists in *Pemphis acidula* (Tomlinson 1986; Geisen et al. 2007). Two different morphological forms viz., pin (long styled) and thrum (short styled) flowers occur and in natural populations the proportion of pin to thrum does not differ significantly (Gill & Kyauka 1977). However, according to Geisen et al. (2007), short styled flowers are more common (actually thrum flowers; erroneously termed as pin flowers in their report). Long styled pin flowers could not be observed in our present study. Further, pentamerous and tetramerous flowers were also observed in our surveys in addition to the hexamerous flowers. It is important to note that such plasticity has not been reported elsewhere. Seeds of *P. acidula* were found to be winged in contrast to the wingless seeds from China (eFloras 2008).

Though categorized as 'Least Concern' by International Union for Conservation of Nature (Ellison

et al. 2010; Polidoro et al. 2010), *Pemphis acidula* has perhaps been overlooked elsewhere in Southeast Asia (Geisen et al. 2007). This study provides locality data of *P. acidula* in Andaman and Nicobar Islands after a lapse of 91 years and at present, it is found to be rare in these Islands. However, the shortfall of the present study is the inadequate floristic exploration in western coasts of the Islands, which is due to intricate issues associated with accessibility. It is important to note that Parkinson (1923) has recorded *P. acidula* as a very common species from the west coasts (South Sentinel Island). In addition, it has been reported as a rare species, endemic to Gulf of Mannar (Selvam et al. 2004). Though reported from Andaman and Nicobar Islands and from Gulf of Mannar, *P. acidula* has not been added to the mangrove flora of India in some important national and international status reports (Blasco 1977; Blasco & Aizpuru 1997; Naskar & Mandal 1999; FAO 2007; Spalding et al. 1997; Mandal & Naskar 2008) and in Mangrove Reference Database Herbarium (Massó i Alemán et al. 2010) and in a recent comparative Indo-Chinese mangrove floristic study (Yao Yi-feng et al. 2011). However, it was included in the list of Indian mangroves though without locality data in a report on mangroves of the Indian Ocean region (Kathiresan & Rajendran 2005) followed by Kathiresan (2010) in which, only the restricted distribution of *P. acidula* to coral islands is mentioned.

According to Tomlinson (1986) *Pemphis acidula* is an intermediate between a strand plant and a mangrove. Among the 10 published literature on mangroves of Andaman and Nicobar Islands where *P. acidula* is mentioned, two viz., Balachandra (1988) and Devraj (2001), have categorized it as a true mangrove and

Table 1. *Pemphis acidula* J.R. Forst. & G. Forst. in Andaman and Nicobar Islands according to 10 published literatures from 1870 to 2012. '-' denotes details not available.

Locality data of <i>Pemphis acidula</i>	Categorization	Remarks	Reference
Along the western coasts north of Port Mouat	-	A few plants on sandstone rocks	Kurz 1870
-	-	-	Brandis 1907
South Sentinel and Havelock	Mangrove associate	Very common	Parkinson 1923
-	-	Maritime shrub	Ellis 1987
-	-	-	Rajagopalan 1987
-	True mangrove	-	Balachandra 1988
-	Mangrove associate	-	Dagar et al. 1991
-	True mangrove	-	Devraj 2001
-	Mangrove associate	-	Debnath 2004
-	Facultative/fringe/back mangrove	-	Singh 2012

four viz., Parkinson (1923), Dagar et al. (1991), Debnath (2004) and Singh (2012), have categorized as mangrove associate and no categorization was provided in other literature (Table 1). The classification scheme adopted by Geisen et al. (2007) for classifying the Southeast Asian mangroves was followed in the present study and accordingly, *P. acidula* is placed herein as a mangrove associate.

Our verbal interactions with regional coastal communities suggest that it is highly favoured as firewood. During our surveys, cutting and use of *P. acidula* has also been observed, which stresses the significance of adapting immediate location-specific conservation strategies in order to prevent its local extinction. Since *P. acidula* will not grow anywhere other than the suitable habitat type (Ellison et al. 2010), exploratory surveys particularly in calcareous rocky habitats may authenticate wider distribution of such rare species on the Islands.

References

- Balachandra, L. (1988). A comprehensive account of the mangrove vegetation of Andaman and Nicobar Islands. *Indian Forester* 114: 741–751.
- Blasco, F. (1977). Outlines of ecology, botany and forestry of the mangals of Indian sub-continent, pp. 241–260. In: Chapman, V.J. (ed.). *Wet Coastal Ecosystems*. Elsevier, Amsterdam.
- Blasco, F. & M. Aizpuru (1997). Classification and evolution of the mangroves of India. *Tropical Ecology* 38(2): 357–374.
- Brandis, D. (1907). *Indian Trees*. Constable, London, 767pp.
- Dagar, J.C., A.D. Mongia and A.K. Bandyopadhyay (1991). *Mangroves of Andaman and Nicobar Islands*. Oxford and IBH Publishing Co., Pvt. Ltd, New Delhi, India, 166pp.

- Debnath, H.S. (2004). *Mangroves of Andaman and Nicobar Islands: Taxonomy and Ecology*. Bishen Singh Mahender Pal Singh, Dehradun, India, xxii+133pp.
- Devraj P (2001). *Forests of Andaman Islands*. International Book Distributors, Dehradun, and IBD Publisher & Distributors, New Delhi, India, xiv+402pp.
- eFloras (2008). <<http://www.efloras.org>>. [accessed 1 Aug 2014]. Missouri Botanical Garden, St. Louis, MO & Harvard University Herbaria, Cambridge, MA.
- Ellis, J.L. (1987). *Floral composition of the nearshore vegetation of the Andamans*, pp. 24–27. In: Proceedings of the Symposium on Management of coastal ecosystems and oceanic resources of the Andamans, 17–18 July 1987, Andaman Science Association, Central Agricultural Research Institute, Port Blair.
- Ellison, J., N.E. Koedam, Y. Wang, J. Primavera, O. Jin Eong, J.W-H. Yong & V. Ngoc Nam (2010). *Pemphis acidula*. The IUCN Red List of Threatened Species. Version 2014.1. <www.iucnredlist.org>. Downloaded on 18 July 2014.
- FAO (2007). The World's Mangroves: 1980–2005. FAO Forestry Paper 153, Rome. www.fao.org/forestry/site/mangrove/statistics.
- Giesen, W., S. Wulffraat, M. Zieren & L. Scholten (2007). *Mangrove Guidebook for Southeast Asia*. Food and Agricultural Organisation & Wetlands International, Bangkok, Thailand, xii+769pp.
- Gill, L.S. & P.S. Kyauko (1977). Heterostyly in *Pemphis acidula* Forst. (Lythraceae) in Tanzania. *Adansonia* 17(2): 139–146.
- Kathiresan, K. (2010). Unique features of mangrove ecosystems in India. *ISME/GLOMIS Electronic Journal* 8(5): 9–10.
- Kathiresan, K. & N. Rajendran (2005). Mangrove ecosystems of the Indian Ocean region. *Indian Journal of Marine Sciences* 34(1): 104–113.
- Kurz, S. (1870). Report on the Vegetation of the Andaman Islands. Superintendent of Government Printing, Calcutta, 75pp.
- Mandal, R.N. & K.R. Naskar (2008). Diversity and classification of Indian mangroves: a review. *Tropical Ecology* 49(2): 131–146.
- Massó i Alemany, S., C. Bourgeois, W. Appeltans, B. Vanhoorne, N. De Hauwere, P. Stoffelen, A. Heaghebaert & F. Dahdouh-Guebbs (2010). The 'Mangrove Reference Database and Herbarium'. *Plant Ecology and Evolution* 143(2): 225–232.
- Naskar, K.R. & R.N. Mandal (1999). *Ecology and Biodiversity of Indian Mangroves*. Daya Publishing House, New Delhi, India, 754pp.
- Parkinson, C.E (1923). *A Forest Flora of the Andaman Islands*. Indian Government Central Press, Shimla, India, xiii+325pp.
- Polidoro, B.A., K.E. Carpenter, L. Collins, N.C. Duke, A.M. Ellison et al. (2010). The Loss of Species: Mangrove Extinction Risk and Geographic Areas of Global Concern. *PLoS ONE* 5(4): e10095; <http://dx.doi.org/10.1371/journal.pone.0010095>.
- Rajagopalan, M.S. (1987). Mangroves as component of coastal ecosystems of the Andamans, pp. 1–7. In: Proceedings of the Symposium on Management of Coastal Ecosystems and Oceanic Resources of the Andamans, 17–18 July 1987, Andaman Science Association, Central Agricultural Research Institute, Port Blair, 121pp.
- Selvam, V., P. Eganathan, V.M. Karunakaran, T. Ravishankar & R. Ramasubramanian (2004). *Mangrove Plants of Tamil Nadu*. M.S. Swaminathan Research Foundation, Chennai, India, 56pp.
- Singh, L.J. (2012). Mangrove Plant Diversity in Bay Islands, India and its Significance. *Marine Biodiversity*, Uttar Pradesh Biodiversity Board, 119–126.
- Spalding, M.D., F. Blasco & C.D. Field (eds.) (1997). *World Mangrove Atlas*. The International Society for Mangrove Ecosystems, Okinawa, Japan, 178pp.
- Tomlinson, P.B. (1986). *The Botany of Mangroves*. Cambridge University Press, Cambridge, xii+419pp.
- Yao Yi-feng, S. Bera, K. Naskar, W. Liao & C. Li (2011). A comparative study of mangrove floras in China and India. *Forestry Studies in China* 13(3): 173–182; <http://dx.doi.org/10.1007/s11632-011-0209-4>

