

7. Historical Perspective of *Dolichandrone spathacea* (L.F.) K. Schum.

Kamlakar Patil

Department of Botany, Government of Maharashtra, Rajaram College, Kolhapur- 416004
Maharashtra, India

Sunita Toro

Department of Botany, Government of Maharashtra, Rajaram College, Kolhapur- 416004
Maharashtra, India

Abstract:

Dolichandrone spathacea belongs to family Bignoniaceae is naturally growing in Khavane creek of Vengurla Tehsil. Saline water of this area remained stagnant. The *D. spathacea* is a halophytic entity. However, this species appears to be neglected by scientific community. Hence in present piece of work, historical perspective of the species has been studied in the light of additional morphological characters to find out the status of species.

Key Words: Status, Morphological characters of *Dolichandrone spathacea*.

Introduction:

Mangroves are the plants growing in estuaries. They are not equally and regularly distributed in different regions. There is gap in classifying the plant species to a particular category such as mangroves or associates. Number of authors has designated different species as mangrove or associate on the basis of general observations like ecological conditions of habitat, physiology of salt tolerance and reproduction etc. *Dolichandrone spathacea* commonly known as Samudrashingi occurring at estuarine system in many parts of the world. On West Coast of Maharashtra, it is present only at Khavane Village of Vengurla Tehsil. Very few reports of *D. spathacea* with scanty information have been made by several researchers. Current study reveals the status and morphological aspects of *D. spathacea*.

Material Method:

In order to study historical perspective of the species, different floras were referred. The previous reports throughout world were studied for different morphological aspects as well as for status described by the various researchers. In addition, remaining morphological peculiarities were studied on field and in laboratory with the help of microscope.

Results and Discussion:

In current study, we have analysed 38 reports from 1912 to 2016 to know the exact status of *D. spathacea* as shown in table no.1. The summary of these reports is shown in table no-2. From this table, it is clear that out of 38, some indicate that *D. spathacea* is mangrove/true mangrove and some others indicate that it is mangrove associate/back mangrove/ peripheral mangrove while very few did not mention the exact status. It clearly indicates that there is gap in the knowledge of ecology and physiology of *D. spathacea*.

From these previous reports, it is clear that the species grows in saline habitats. The individuals are growing along the tidal streams, coasts, behind the mangrove, along the mangroves, in beach forest and in back water. According to Duke *et. al.* (2010), *D. spathacea* can be ranked as least concern based on IUCN rules. Some national and regional reports denote the species as endangered, rare as well as threatened.

Different workers from different regions have described the morphology of *Dolichandrone spathacea*. But almost all descriptions are limited. Most of the reports represent the part of manuals. Therefore, an attempt has been made to describe the detail morphology of *D. spathacea* in the light of previous work.

The *Dolichandrone spathacea* is not described in the Floras viz 1) Flora of Bombay Presidency by T Cooke (1904) 2) Flora of Sindhudurg by Kulkarni (1988) and 3) Flora of Maharashtra by Sharma *et.al.* (1986). We have reported its occurrence on the coast of Maharashtra (Patil *et.al.* 2015).

Numbers of morphological characters are not studied in detail by the different workers. *Dolichandrone spathacea* is neglected by the researchers which results in limited information of accurate morphology. Overall 104 morphological characters are analysed, out of which 58 characters are reported by previous workers while the remaining 46 characters are described during this study. It includes occurrence of aerial roots, phyllotaxy, leaf characters, floral characters, seed and germination pattern etc. is as shown in Plate I and Plate II.

Table no. 1. Status of *Dolichandrone spathacea* with respect to distribution

Sr No	Source	Author Year	Status	Locality
1	A flora of Manila	Merrill (1912)	Along tidal streams	Philippines
2	Species Blancoanae	Merril (1912)	Tidal streams	Philippines
3	Bulletin of miscellaneous information	Anonymous (1922)	Especially in mangrove swamps	Java, Malaya Peninsula

4	Flora of Malesiana	Van Steenis (1977)	Back Mangrove	Malaysia, New Caledonia
5	Flora of Presidency of Madras	Gamble (1957)	-	
6	The journal of BNHS	Ali and Santapau (1958)	Back water	South Canara to Travancore
7	Occasional Papers of the Delaware Museum of Natural History	Anonymous (1973)	Occurring Beach forest	-
8	Manual Floristic and Ecology of the mangrove vegetation of Papua New Guinea	Percival and Womersly (1975)	It can form almost pure stands behind the mangrove on swamp soil	
9	The Botany of Mangroves	Tomlinson (1986)	Back Mangal	Southern India Malaysia to New Caledonia
10	The Garden Bulletin Singapore	Anonymous (1986)	Common along tidal revers	Palau
11	Flora of Tamil Nadu	Henry <i>et.al.</i> (1987)	-	Chengalpattu
12	Mangrove Palynology	Thanikaimoni (1987)	Peripheral mangrove species often or occasionally recruited from fresh water swamps, salt marshes and strand flora.	-
13	Field Guide to the Mangrove of Queensland	Lovelock (1993)	True Mangrove	Queensland
14	Flora of Micronesia, 5 Bignoniaceae - Rubiaceae	Foseberg <i>et.al.</i> (1993)	Occurs around the back of the mangrove swamp	Malaysia, India and Ceylon, East Coast Bengal, Southern Indo-China
15	Tree flora of Sabah and Sarawak	Soepdmo and Wong (1995)	Mangroves	Sabah and Sarawak
16	The flora of Orissa	Saxena and Brahmam (1995)	Coastal India	India, Indonesia, New Caledonia
17	World Mangrove Atlas	Spalding <i>et. al.</i> (1997)	Mangrove	Australia
18	Biology of Mangroves	Kathiresan (2001)	Mangrove	Malay Archipelago
19	Botanical Journal of the Linean Society	Jayatissa <i>et. al.</i> (2002)	Mangrove associate	Sri Lanka
20	A review of the floral composition and	Jayatissa <i>et. al.</i> (2002)	Mangrove associate are dominant and	Sri Lanka

	distribution of mangroves in Sri Lanka		some true mangrove species occur sporadically	
21	Mangrove of Maharashtra	Bhosale (2005)	Mangrove associate	Maharashtra
22	Mangrove guidebook for Southeast Asia	Wim Giesen <i>et.al.</i> (2006)	Mangrove associate	Coast of Malabar, South east Asia, West Pacific and Solomon Island
23	Mangrove Rehabilitation Guidebook	Anonymous (2007)	Mangrove associate	Srilanka
24	Diversity and Classification of Indian Mangroves	Mandal and Naskar (2008)	Back Mangal	Sundarban, Bhitarkanika, Goa
25	Mangrove Restoration in Vietnam Key consideration and practical guide	Marchand (2008)	True mangrove	Vietnam
26	IUCN red list of Threatened species (www.iucn.org/details/full/33705/0)	Duke <i>et.al.</i> (2010)	Mangrove	World wide
27	Inhabitatory Potential against Methicillin – Resistant <i>Staphylococcus aureus</i> MRSA Of <i>Dolichandrone spathacea</i> a mangrove tree species of Malaysia.	Saiful <i>et.al</i> (2011)	Mangrove	Malaysia
28	Plants in Mangrove Forests of the lampi group of islands in Tanithary division Myanmar	Anonymous (2011)	Mangrove associate	Myanmar
29	The current status of mangrove forest in Singapore	Shufen <i>et.al.</i> (2011)	Mangrove	Singapore
30	Journal of Plant Ecology	Wang <i>et.al.</i> (2011)	Mangrove associate	-
31	A revision of Mangrove plants of Solomon Islands Vanuatu, Fiji, Tonga and Samoa	Duke <i>et.al.</i> (2012)	Mangrove	Solomon Island and Vanuatu
32	Micro algal vegetation in the selected mangrove ecosystems of Kerala. Ph. D Thesis.	Rejil (2012)	Back Mangal	Kerala
33	Mangroves of India their Biology and Uses. 1. Diversity of mangrove species in India 2. Diversity and distribution of Mangroves in the	Kathiresan <i>et.al.</i> (2013) Nayak and Andrade (2013) Bhosale (2013)	Mangrove Mangrove Mangrove associate Mangrove associate	India Karwar Maharashtra Kerala

	Kali Esturay, Karwar, West coast of India. 3. Mangroves of Ratnagiri and Sindhudurg Districts of Maharashtra 4. Fungi in Mangrove Ecosystems of Kerala, India.	Mohanani (2013)		
34	Mangroves of Goa	Dhargalkar <i>et. al.</i> (2014)	Mangrove Associate	Along east and West coast
35	Floral Composition and taxonomy of Mangroves of Andaman and Nicobar Islands	Raghavan <i>et. al.</i> (2014)	Mangrove	Andaman and Nicobar Island
36	Evaluation and planning of mangrove restoration programs in Sedari village Kerawang district, West Java: contribution of PHE – ONWJ Coastal development programme.	Nusantara <i>et. al.</i> (2015)	Mangrove associate	Java
37	A review of the Mangrove floristic of India	Raghavan <i>et. al.</i> (2016)	a) Are globally considered as true mangrove	West Bengal, Odisha, Kerala, Maharashtra
38	ENVIS. Centre of floral Diversity (Hosted by BSI Kolkata, West Bengal, and sponsored by MOEF, Forest and climate change and GOI.	Anonymous (1994)	Mangrove	Orissa and Andaman

Table no. 2. Designation of *Dolichandrone spathacea* to different ecological groups by different workers

Type of Designation	Ecological group	Number of Authors giving designation
Clear cut designation	Mangrove	11
	True Mangrove	03
	Mangrove associate	12
	Back Mangrove	05
	Peripheral Mangrove	01
	No clear categorization	02
Habitat / Situation based designation (Blur)	Along tidal stream	03
	Coastal species	01
	Behind the mangrove	01
	Especially along mangroves	01
	Beach forest	01
	Back water species	01

Bibliography:

1. Ali, S and Santapau, H. (1958). *The Journal of Bombay natural history Society*. England wheldon and Wesley ltd. Vol. 52.
2. Anonymous (1922). Bulletin of miscellaneous information. *Royal botanic garden kew*.305-306.
3. Anonymous (1973). *Nemouria* occasional papers of the Delaware museum of natural history. 8.
4. Anonymous (1986). The gardens bulletin Singapore. A periodical reflecting the interests and activities of the botanic gardens Singapore. 80.
5. Anonymous (1994). Environmental information system. Centre of floral Diversity (Hosted by BSI Kolkata, West Bengal, and sponsored by MOEF, Forest and climate change and GOI.
6. Anonymous (2007). Mangrove rehabilitation guide book published in the frame work of the EU-ASFA PRO ECO II B. Post tsunami project in Sri Lanka.
7. Anonymous (2011). Plants in mangrove forests of the Lampi group of Island in Tanintharyi division, Myanmar. *ISME/GIOMIS electronic journal* 9(2): 4-6
8. Bhosale, L. J. (2005). Field guide to Mangroves of Maharashtra. Shivaji University, Kolhapur.
9. Bhosale, L. J. (2013). Mangroves of Ratnagiri and Sindhudurg Districts of Maharashtra. *Mangroves of India: their biology and uses*. 183-190.
10. Cooke. T. (1901). The Flora of the Presidency of Bombay, Vol. 3. Botanical Survey of India, Calcutta, India.
11. Dhargalkar, K., D'Souza, R., Kavlekar, D. P. and Untawale A. G (2014) Mangroves of Goa. Published by Forest Department Government of Goa in association with Mangrove Society of India. 31.
12. Duke, N., Kathiresan, K. and Sukardjo, S. (2010). *Dolichandrone spathacea*. The IUCN Red list of Threatened species. 2010:e.T33705A9803003.
<http://dx.doi.org/10.2305/IUCN.uk.2010.RLTS.T33705A9803003.en>.
13. Duke, N., Mackenzie, J. and Wood, A. (2012). A revision of mangrove plants of the Solomon Islands, Vanuatu, Fiji, Tonga and Samoa. *Tropwater*. Centre for tropical water and aquatic ecosystem research. MESCAL mangrove biodiversity-trop water report 12/13. 5-11.
14. Foseberg, F., Sachet, H and Oliver, R. (1993). Flora of Micronesia, 5: Bignoniaceae-Rubiaceae. *Sminthsonian institution press*. WashingtonDC.

15. Gamble, J.S. (1957). Fl. Press of Madras. 2:700 (2nd report) B.S.I Calcutta.
16. Henry, A. N., Kumari, G. R. and Chithra, V. (1987). Flora of Tamilnadu, India Series-I. Botanical Survey of India. Southern circle, Combore. 135.
17. Jayatissa, L., Dahdouh-Guebas, F and Koedam, E. (2002). A review of the floral composition and distribution of mangroves in Sri Lanka. *Botanical journal of the linnean society*, 138, 29-43.
18. Kathiresan, K. and Bingham, B. L. (2001). Biology of Mangroves and mangrove ecosystems. *Advances in marine Biology*. 40:81-251.
19. Kathiresan K., Rajendran, N., Nabeel M.A., Thirutriekondan G., Manivannan S., Kavitha S. (2013). Diversity of mangrove species in India. In : Bhatt J.R., Ramkrishna, Sanjapp M.Remadevi O. K., Nilaratha B.P. and Venkataraman K. (eds) *Mangroves of India; their biology and uses*, Zoological Survey of India, 111.
20. Kulkarni, B. G. (1988). Flora of India, Series III Flora of Sindhudurg. Botanical Survey of India, Calcutta, India.
21. , C. (1993). Field guide to the mangrove of Queensland. *Australian institute of marine science*.
22. , R. N and Naskar, K. R. (2008). Diversity and classification of Indian mangroves: a review. *Tropicalecology* 49 (2): 131-146.
23. Merrill, E. D. (1912). A flora of Manila. Department of interior bureau of science Manila. Publication no. 5:429.
24. Merrill, E. D. (1918). Species Blancoanae. A critical revision of the Philippine species of plants, described by Blanco, Manila Bureau.
25. Marchand, M. (2008). *Mangrove restoration in Vietnam*, key consideration and practical guide. 11
26. Mohanan, C. (2013). Fungi in mangrove ecosystems of Kerala, India. *Mangroves of India: their biology and uses*. 207-220.
27. Nayak, V and Andrade, V. (2013). Diversity and distribution of mangroves in the Kali estuaries, Karwar, West coast of India. *Mangroves in India: their biology and uses*. 141-160.
28. Nusantara, M., Hutomo, M and Purmama H. (2015). Evaluation and planning of mangrove restoration programs in Sedari Village of Derawang district, West Java: contribution of PHE-ONWJ coastal development programs. *Science direct*.23: 207-214.

29. Percival, M. and J. S. Womersley (1975) Floristics and ecology of the mangrove vegetation of Papua New Guinea. A companion volume to the handbook of Papua New Guinea. Published by department of forest. Botany bulletin no. 8: 64-65.
30. Ragavan, P., Alok, S. R., Jayraj, P. Jhohan, K. Ravichandran, S. Saravanan and A. Vijayraghavan (2016). A review of the mangrove Floristics of India. *Taiwania*. 61(3): 224-242.
31. Rejil, T. (2012). *Microalgal vegetation in the selected mangroves ecosystem of Kerala*. Ph.D Thesis. Cochin University of Science and Technology.
32. Saiful, A. , Mastura, M. , Mazurah and Nuziah, H. (2011). Inhabitory potential against Methicillin-Resistant *Staphylococcus aureus* (MRS) of *Dolichandrone spathacea* a mangrove tree species of . *Lat. Am. J. Pharm.* 30(2): 359-362.
33. Saxena, H. O. and M. Brahmam. (1995). The flora of Orissa. Forest development co. ltd. 1297.
34. Shufen, Y., Lim, L. F., Chiou-Rong, S and Young, W. H. (2011). The current status of mangrove forests in Singapore. *Proceedings of nature society, Singapore's conference on 'nature conservation for a sustainable Singapore'*. 99-120.
35. Sharma, B. D., Karthikeyan, S, and Singh, N. P. (1986). The flora of Maharashtra state-Dicotyledons. Botanical survey of India, Culkatta, India.
36. Soepadmo, E. and Wong, K.M. (1995). *Tree Flora of Sabah and Sarawak, Volume 1*. Sabah Forestry Department, Forest Research Institute Malaysia, Sarawak Forestry Department, Malaysia. pp. 37-38.
37. Spalding, M. (1997). The global distribution and status of mangrove ecosystems. *International News letters or of coastal management Inter coastal Network*. Special edition, 1: 20-21.
38. Thanikaimoni, G. (1987). Mangrove palynology. UNDP/UNESCO regional project on training and research on mangrove ecosystems, RAS/79/002. 10.
39. Tomlinson, P. B. (1986). *The Botany of Mangroves*, Cambridge University Press, Cambridge.
40. Van steenis C.G.G.J. (1977). Flora of Malesiana. Series-Spermatophyta, flowering plants. Published by national herbarium Netherland 8(2): 144.

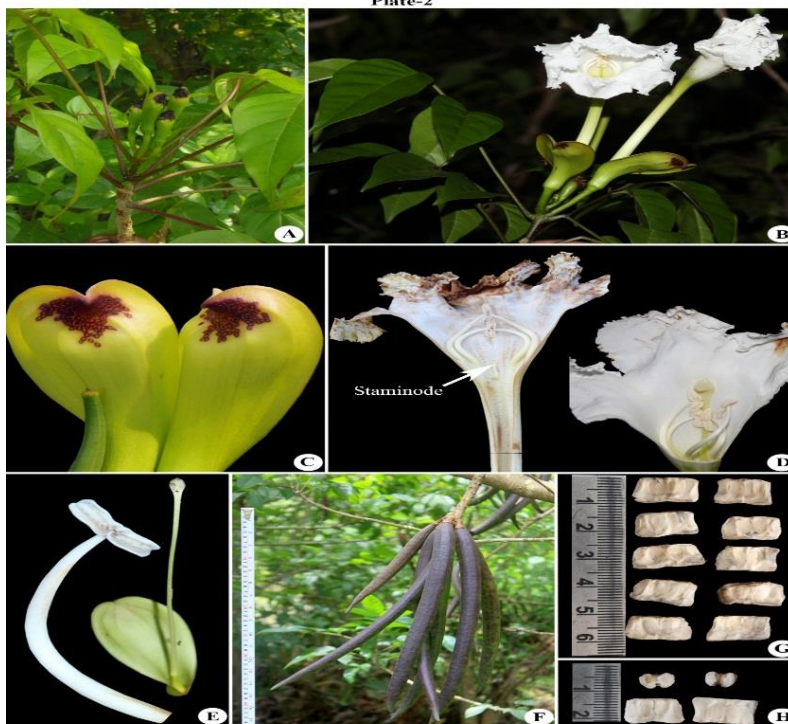
41. Wang, L., Mu, M., Li, X., Lin, P and Wang, W. (2011). Differentiation between true mangrove and mangrove associates based on leaf traits and salt contents. *Journal of plant ecology*. 4(4): 292-301.
42. Wim Giesen., S. Wulffraat., M. Zieren and L. Scholten (2006). Mangrove guidebook for Southeast Asia. Forest Resources Officer FAO Regional Office for Asia and the Pacific Maliwan Mansion Phra Atit Road, Bangkok. 156.

Plate-1



Morphology of *Dolichandrone spathacea* : A. Habit, B. Buttresses, C. Aerial roots, D. Adventitious roots, E. Lenticells on roots, F. Lenticells on young branch of stem, G. Lenticells on mature stem

Plate-2



Morphology of *Dolichandrone spathacea*: A. Floral buds, B. Flowering twig, C. Spathaceous calyx D. S. of flower, E. Stamen and carpel, F. Mature pod, G-H. Winged seed