Deltas of Chandragiri River: Refugia of Endemic and RET Plants

Dr. Subrahmanya Prasad K[1], Dr. Agretious Thomas K[2]
[1,2]*Assistant Professor, Dept. of Botany, Nehru Arts & Science College Kanhangad, Post Padnekkad – 671314, Kasaragod District, Kerala, India*

Abstract **- River Chandragiri is the longest river of Kasaragod district, Kerala. One of the characteristic features of this river is the presence of six deltas formed by deposition. These are having a history of several hundred years. An inventory on the floristic diversity of these deltas was carried out from January 2019 to December 2020 with the aim of elucidating their role in conservation of endemic and rare plants of Western Ghats. The vegetation is of moist mixed deciduous type. The flora of these deltas show variation from that of rest of Kasaragod as these have a number of plants which are sown there by the flood water from the Ghats. Present study enumerated 48 endemic angiosperms belonging to 43 genera and 30 families. These deltas also accounted for 33 species which qualify for different IUCN red list categories. Of these, 14 are vulnerable, 5 rare, 4 endangered, 4 low risk, 2 critically endangered, 3 near threatened and one data deficient species. These results are the clear indicators of their pilot role in conserving the rare as well as endemic plants of the Western Ghats. Due to increasing anthropogenic activities the natural flora of these deltas is now gradually disappearing, making the way for weeds and cultivated plants. Hence there is an urgent need for conservation.**

Index Terms **- Kasaragod, Chandragiri River, Deltas, Flora, Threat, Conservation.**

I.INTRODUCTION

Kasaragod is the northern-most district of Kerala, located between 11^0 18' & 12^0 48' N latitude and 74^0 52' & 75^0 26' E longitudes. Topographically, it consists of a coastal belt, an undulating midland and a mountainous high range. River Chandragiri is the longest among the 12 rivers of Kasaragod with a length of 105 km. It originates from Pattimala in Coorg and embraces sea at Kasaragod. Characteristic feature of this river is the presence of six deltas or braids, formed by deposition. Of these, 5 deltas have a history of several hundred years, while the sixth one is still in the formation stage with a history of only 25 years. The flora of these deltas vary from the flora of rest of Kasaragod as these have a number of rare and endangered plants which are sown there by the flood water from the Ghats [9]. Out of these 6 deltas, one is occupied by about 110 families of humans while in another one; the Kasaragod Municipality has done massive planting of *Acacia auriculiformis* (L.) Willd. Due to anthropogenic activities, the natural flora of these two deltas is almost lost and is now dominated by domesticated plants. The fate of other deltas would be the same and hence the present study has been undertaken to investigate the floristic composition of these deltas with special reference to endemic and RET plants.

II. MATERIALS AND METHODS

The deltas of Chandragiri River are selected for present study. There are located about 2 km away from the seashore. These are locally called 'thuruths' and have an elevation of 3-5 meters above MSL. Topographically the entire area is more or less plain. During monsoon, these areas hardly remain over the water, which makes them herbal treasure with some rare plants sown by the flood water. Soil is highly fertile alluvium. Climate is warm humid tropical type with very little variation in temperature. Periodic visit to the deltas were made from January 2019 to December 2020 with the aim of elucidating their role in conservation of endemic and rare plants of Western Ghats. Collected plants were identified with the help of regional floras and checklists [1], [2], [3], [4], [6], [7], [8], [10], [12], [13]. Lists of rare, endemic and threatened plants were prepared with the help of authentic publications [5], [11], [12], [14]. Voucher specimens are deposited at Nehru College Kanhangad Herbarium for future reference.

III. RESULTS AND DISCUSSION

The vegetation is of moist mixed deciduous type dominated by trees and climbers. Present study accounted for 66 species of plants coming under endemic and different RET categories. Correct botanical identity, family, habit, nature of endemism and statuses of these plants are given in Table No.1.

Analysis of their habit revealed the presence of 27 trees, followed by 15 climbers, 14 herbs and 10 shrubs. They harbour 48 species of endemic angiosperms belonging to 43 genera and 30 families. Among endemic plants, 19 are endemic to the whole Western Ghats, while 14 to Southern Western Ghats, 8 to Peninsular India, 6 Indian endemics and *Asystasia dalzelliana* Sant. endemic to South India. Further, there are 33 RET species coming under 31 genera and 25 families which qualify for different IUCN red list categories. Of these 14 are vulnerable, 5 rare, 4 endangered, 4 low risk, 2 critically endangered, 3 near threatened and *Corypha umbraculifera* L., a data deficient species. 13 plants qualify for both endemic and RET categories.

Table No. 1 – Endemic and RET plants in the deltas of Chandragiri river

Sl. No.	Botanical Name	Family	Habit	Endemism	Status
1	*Acroceras munroanum* (Balansa) Henr.	Poaceae	Herb	I	
2	*Aegle marmelos* (L.) Correa	Rutaceae	Tree		NT
3	*Aglaia elaeagnoidea* (A. Juss.) Benth.	Meliaceae	Shrub	I	LR
4	*Aglaia malabarica* Sasidh.	Meliaceae	Tree	WG	CR
5	*Alstonia scholaris* (L.) R. Br.	Apocynaceae	Tree		LR
6	*Amorphophallus commutatus* (Schott) Engl.	Araceae	Herb	WG	VU
7	*Ampelocissus indica* (L.) Planch.	Vitaceae	Climber	PI	EN
8	*Aporosa cardiosperma* (Gaertn.) Merr.	Euphorbiaceae	Tree		VU
9	*Artocarpus hirsutus* Lam.	Moraceae	Tree	SWG	VU
10	*Arundinella metzii* Hochst ex. Miq.	Poaceae	Herb	WG	
11	*Asystasia dalzelliana* Sant.	Acanthaceae	Herb	SI	
12	*Briedelia stipularis* (L.) Blume	Euphorbiaceae	Climber	PI	
13	*Bulbophyllum sterile* (Lam.) Suresh	Orchidaceae	Herb	PI	
14	*Calophyllum inophyllum* L.	Clusiaceae	Tree		LR
15	*Cinnamomum malabatrum* (Burm. f.) Blume.	Lauraceae	Tree	SWG	
16	*Corypha umbraculifera* L.	Arecaceae	Tree		DD
17	*Curcuma oligantha* Trimen var. *lutea* (R. Ansari) Bhat	Zingiberaceae	Herb	SWG	
18	*Dalbergia horrida* (Dennst.) Mabb.	Papilionaceae	Climber	SWG	
19	*Dalbergia latifolia* Roxb.	Papilionaceae	Tree		VU
20	*Dioscorea alata* L.	Dioscoreaceae	Climber	I	
21	*Embelia tsjeriam-cottam* (Roem. & Schult.) DC.	Myrsinaceae	Shrub		VU
22	*Eranthemum capense* L.	Acanthaceae	Herb	PI	
23	*Flacourtia montana* Graham	Flacourtiaceae	Tree	I	
24	*Garcinia indica* (Dupetit-Thouars) Choisy	Clusiaceae	Tree	WG	VU
25	*Gloriosa superba* L.	Liliaceae	Climber		VU
26	*Grewia umbellifera* Bedd.	Tiliaceae	Climber	WG	
27	*Helicanthes elastica* (Desr.) Danser	Loranthaceae	Shrub	WG	

28	*Holigarna arnottiana* Hook. F.	Anacardiaceae	Tree	SWG	
29	*Holigarna ferruginea* Marchand	Anacardiaceae	Tree	WG	
30	*Hopea ponga* (Dennst.) Mabb.	Dipterocarpaceae	Tree	SWG	EN
31	*Hybanthus enneaspermus* (L.) F. Muell	Violaceae	Herb		VU
32	*Hydnocarpus pentandra* (Buch.-Ham.) Oken.	Flacourtiaceae	Tree	WG	VU
33	*Impatiens minor* (DC.) Bennet.	Balsaminaceae	Herb	PI	
34	*Ipomoea aculeata* Blume	Convolvulaceae	Climber		R
35	*Ixora brachiata* Roxb.	Rubiaceae	Tree	WG	
36	*Ixora polyantha* Wight	Rubiaceae	Shrub	WG	
37	*Jasminum malabaricum* Wight	Oleaceae	Climber	WG	
38	*Justicia trinervia* Vahl.	Acanthaceae	Herb	SWG	
39	*Kammetia caryophyllata* (Roxb.) Nicolson & Suresh	Apocynaceae	Climber	SWG	
40	*Lagerstroemia microcarpa* Wight	Lythraceae	Tree	WG	
41	*Lophopetalum wightianum* Arn.	Celastraceae	Tree		LR
42	*Mammea suriga* (Buch.-Ham. Ex. Roxb.) Kostermans.	Clusiaceae	Tree		R
43	*Memecylon randerianum* SM & MR Almeida	Melastomataceae	Shrub	SWG	
44	*Moullava spicata* (Dalz.) Nicolson	Caesalpiniaceae	Climber	WG	R
45	*Mussaenda belilla* Buch.-Ham.	Rubiaceae	Climber	PI	
46	*Naregamia alata* Wight & Arn.	Meliaceae	Herb	PI	
47	*Ochlandra scriptoria* (Dennst.) C. E. C. Fisch.	Poaceae	Shrub	WG	
48	*Ochreinauclea missionis* (Wight & Arn.) Ridsd.	Rubiaceae	Tree	SWG	VU
49	*Pandanus canaranus* Warb.	Pandanaceae	Shrub	PI	
50	*Pandanus kaida* Kurz.	Pandanaceae	Shrub	I	
51	*Pterygota alata* (Roxb.) R. Br.	Sterculiaceae	Tree	WG	R
52	*Rauvolfia serpentina* (L.) Benth. Ex. Kurz.	Apocynaceae	Herb		EN
53	*Salacia fruticosa* Heyne ex. Lawson	Hippocrateaceae	Climber	WG	
54	*Santalum album* L.	Santalaceae	Tree		VU
55	*Smilax zeylanica* L.	Liliaceae	Climber		VU
56	*Stachyphrynium spicatum* (Roxb.) Schum.	Marantaceae	Herb	SWG	
57	*Strobilanthes ciliatus* Nees.	Acanthaceae	Shrub	SWG	VU
58	*Strobilanthes integrifolius* (Dalz.) O. Ktze.	Acanthaceae	Shrub	WG	
59	*Syzygium caryophyllatum* (L.) Alston	Myrtaceae	Tree		EN
60	*Syzygium travancoricum* Gamble	Myrtaceae	Tree	SWG	CR
61	*Tabernaemontana alternifolia* L.	Apocynaceae	Tree	SWG	NT
62	*Tinospora sinensis* (Lour.) Merr.	Menispermaceae	Climber		NT
63	*Torenia bicolor* Dalz.	Scrophulariaceae	Herb	WG	
64	*Trewia nudiflora* L.	Euphorbiaceae	Tree	I	
65	*Vateria indica* L.	Dipterocarpaceae	Tree	WG	VU
66	*Zanonia indica* L.	Cucurbitaceae	Climber		R

Where, CR – Critically Endangered, DD – Data Deficient, EN – Endangered, I – India, LR – Low Risk, NT – Near Threatened, PI – Peninsular India, R – Rare, SI – South India, SWG – Southern Western Ghats, VU – Vulnerable, WG – Western Ghats.

Important RET Plants of Chandragiri River Deltas

Aglaia malabarica

Amorphophallus commutatus

Ampelocissus indica

Aporosa cardiosperma

Artocarpus hirsutus

Dalbergia latifolia

Embelia tsjeriam-cottam

Garcinia indica

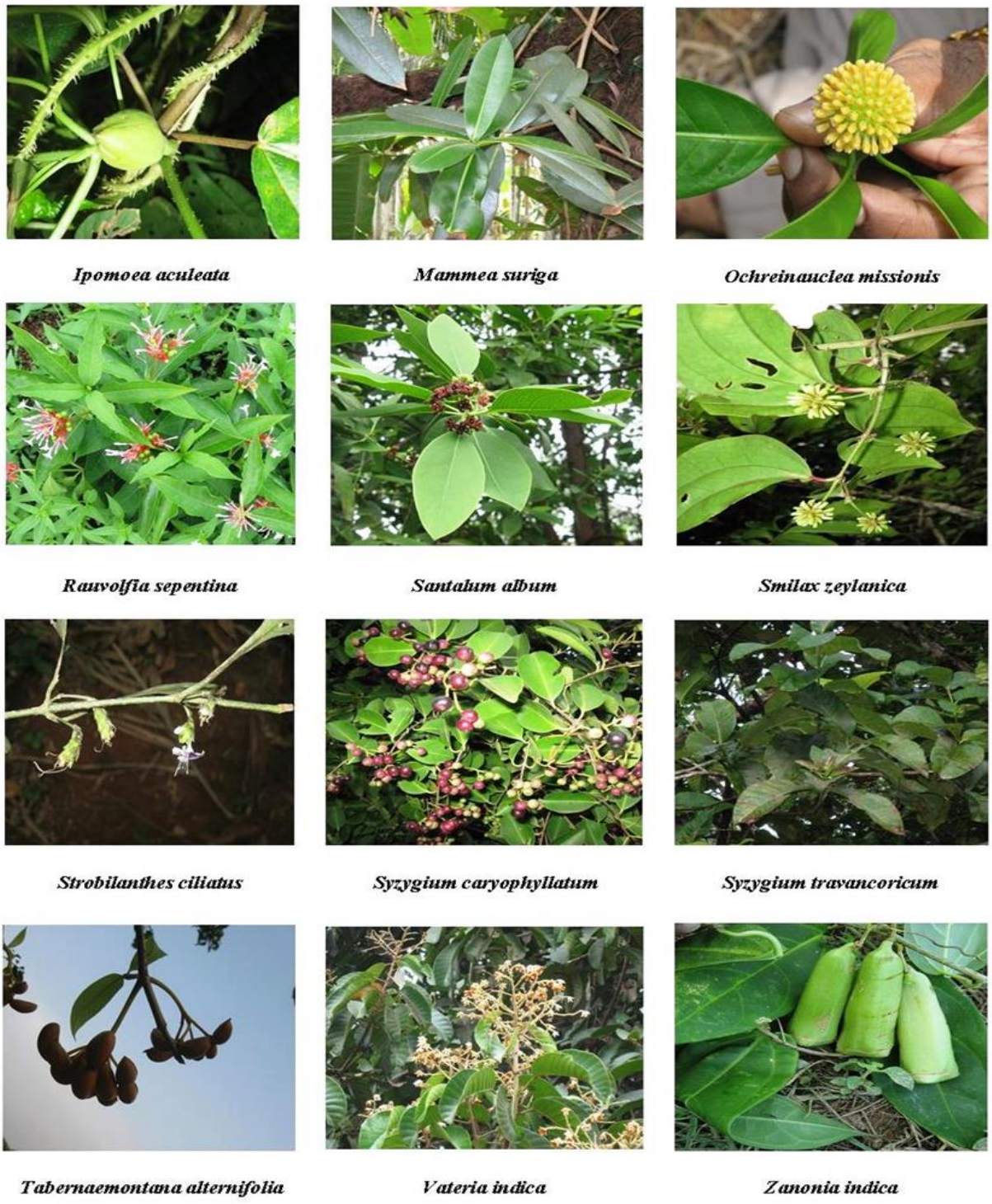
Gloriosa superba

Hopea ponga

Hybanthus enneaspermus

Hydnocarpus pentandra

Important RET Plants of Chandragiri River Deltas



Aglaia malabarica Sasidh., *Cinnamomum malabatrum* (Burm. f.) Blume., *Grewia umbellifera* Bedd., *Ipomoea aculeata* Blume, *Ixora polyantha* Wight, *Lagerstroemia microcarpa* Wight, *Mammea suriga* (Buch.-Ham. ex. Roxb.) Kostermans., *Ochlandra scriptoria* (Dennst.) C. E. C. Fisch., *Pterygota alata* (Roxb.) R. Br., *Strobilanthes integrifolius* (Dalz.) O. Ktze. and *Vateria indica* L. are some of the species which are usually found in deep forests of Western Ghats and reached these deltas

through flood. This flora is conserved here due to shallow water barrier and restricted entry. These results are the clear indicators of their pilot role in conserving the rare as well as endemic plants of the Western Ghats. Due to increasing anthropogenic activities the natural flora of these deltas is now gradually disappearing, making the way for weeds and cultivated plants. Hence there is an urgent need for conservation.

IV. ACKNOWLEDGEMENTS

The authors are thankful to the Principal and Management of Nehru Arts & Science College, Kanhangad for providing the facilities.

REFERENCES

[1] Anilkumar, N., Sivadasan, M. and Ravi, N. *Flora of Pathanamthitta,* Daya Publishing House, New Delhi, 2005.
[2] Bhat, K. G. *Flora of Udupi*, Indian Naturalist (R), Udupi, 2003.
[3] Bhat, K. G. *Flora of South Kanara*, Taxonomy Research Centre, Poornaprajna College, Udupi, 2014.
[4] Gamble, J. S. and Fischer, C. E. C. *Flora of Presidency of Madras*, 3 Vols. Adlard & Son Ltd., London, 1936.
[5] IUCN. *The 2019 IUCN Red list of Threatened Species*, IUCN, Gland, Switzerland, 2019.
[6] Manilal, K. S. and Sivarajan, V. V. *Flora of Calicut*, Bishen Singh Mahendra Pal Singh, Dehradun, 1982.
[7] Mathew, K. M. *The Flora of Tamilnadu Carnatic*, 3 Vols, The Rapinat Herbarium, St Joseph's College, Thiruchirapalli, 1984.
[8] Nayar, T. S., Rasiya Beegam, A., Mohanan, N. and Rajkumar, G. *Flowering Plants of Kerala*, TBGRI, Palode, 2006.
[9] Prasad, K. S. and Raveendran, K. Studies on the Vegetation of the deltas of Chandragiri River, Kasaragod District of Kerala, *Eco-Chronicle*. 4 (3): 185 – 191, 2009.
[10] Ramachandran, V. S. and Nair, V. J. *Flora of Cannanore*, BSI, Calcutta, 1988.
[11] Ravikumar, R. and Ved, D. K. *100 Red-listed Medicinal plants of conservation concern in Southern India*, FRLHT, Bangalore, India, 2000.
[12] Sasidharan, N. *Flowering Plants of Kerala*, ver. 2. 0. KFRI, Peechi, 2011.
[13] Sunil, C. N. and Sivadasan, M. *Flora of Alappuzha District, Kerala, India,* Bishen Singh Mahendra Pal Singh, Dehra Dun, 2009.
[14] Yesodharan, K. and Sujana, K. Status of ethnomedicinal plants in the Parambikulam Wildlife Sanctuary, Kerala, South India, *Ann. For.* 15 (2): 322 – 334, 2007.