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A Preliminary study of the Wetland flora of Pariyapurath Chali, Ramanattukara Municipality, Kozhikode

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Abstract

A detailed floristic survey of '*Pariyapurath chali*', a large wetland of more than 30 acres situated in the Ramanattukara Municipality of Kozhikode district was attempted. About 210 flowering plant species could be collected from the area, which belonged to 165 genera under 59 families that comprised of 131 herbs, 29 shrubs, 28 climbers/twiners and 22 trees. Among the Pteridophytes, there were 13 species which came under 11 genera and 6 families. The distributional statuses of the species, representation of species in the various regional floras, biodiversity threats, ecosystem services rendered by the area and its conservational importance are also discussed.

1. Introduction

Wetlands are patchy, dynamic and life supporting ecosystem that sustained human lives and communities over the millennia. They are performing numerous valuable functions such as recycling of nutrients, storing of sediments, purifying of water, attenuating floods, maintaining the stream flow, recharging of ground water, serves in providing drinking water, fish, fodder, fuel, wildlife habitat, control urban runoff and recreation to the society (Prasad *et al*., 2002; Selvam, 2003).

They are also considered as the "*Kidney of landscape*" as they function as the downstream receivers of water and waste from both natural and human sources (Mitsch and Gosselink, 2000). Wetlands are the most productive environment, which exhibit enormous diversity according to their genesis, geographical location, water regime and chemistry, dominant species, and soil and sediment characteristics (Ghermandi *et al*., 2008; Malik and Joshi, 2013). Due to its rich biodiversity and extensive food chain, wetlands are called as the "*Biological Super markets*" (Mitsch and Gosselink, 2000). The wetlands in any city serve as a balancing reservoir for sustaining native flora and fauna (Grimmett and Inskipp, 2007; Surana *et al*., 2007).

According to Ramsar convention, under the text of Article 1.1 wetlands are broadly defined as "Areas of marsh, fen, peat land or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters".

The wetlands are having higher value per hectare than the terrestrial habitats. The UN Millennium Assessment, 2005 categorized the wetland ecosystem services in to four types. The Economics of Ecosystems and Biodiversity (TEEB) has adopted these with some minor modification such as Provisioning,

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Regulating, Habitat and Cultural services. The global average ecosystem services of wetlands are estimated at a minimum of 33 trillion US$ per year. The recent assessment of TEEB (2010), estimates that the average annual wetland values at Rs. 22,24,350/ha.

Human communities in India are closely associated with wetlands since the Indus valley civilization. In the recent estimations, totally 67,429 wetlands have been identified in India, of which 2,175 are the natural and remaining 65,254 are the manmade (Ramachandra, 2001). The Ramsar convention had designated 26 wetlands as the Ramsar sites in India. But several sites were added to this later, so that now there are 49 Ramsar sites in India. This includes the two new Ramsar sites viz. *Khijadia Wildlife Sanctuary* in Gujarat and *Bakhira Wildlife Sanctuary* in Uttar Pradesh, announced on the World Weland Day, 2022 (Press Information Bureau (PIB), Government of India – 02/02/2022).

In Kerala, there are about 217 wetland areas which accounts for as much as one fifth of the land area of the State. The unique wetland ecosystems of Kerala include marshy and water logged areas, paddy cultivation areas associated with backwaters, and lakes and the Myristica Swamps in the Western Ghat forests. Besides, Kerala contains a few wetlands of International/ National importance. These include *Vembanad – Kole, Ashtamudi* and *Sasthamcotta lakes* which are also designated as Ramasar sites of Kerala.

The present biodiversity exploration and ecological studies were conducted during 2019-21 period in a big wetland area named as '*Pariyapurath chali*' somewhat near our college campus, so that the data gathered may be be helpful to assess the biodiversity potential of this area, thereby helping the authorities to plan environmentally sustainable policies and programmes for its conservation and management.

2. Study Area

The area of study is located in the Ramanattukara Muncipality of Kozhikode district, Kerala State. This wetland area is the largest of its kind where paddy cultivation is done successfully, eventhough majority of the regions remain as uncultivated waterlogged area. The area got its name from the name of the old land lords of the area, '*Pariyapurath*' and '*chali*' means a stream. It comprises of the valleys of the adjacent plots starting from *Chengottu thazham, Melath thazham, Maleeri thazham, Kuttiyil thazham, Perekodakkattil thazham, Kattekkat thazham, Muthirappotta thazham, Mannamgot-Palliyali thazham, Kolleri thazham, Kalarikkal thazham* and ending up near the Surabhi theatre region near Ramanattukara byepass road.

The area has been worsely affected for the last two years by floods resulting in massive crop loss in addition to the loss of biodiversity. The area which comprises more than 30 acres falls under three wards viz. Adivaram (6), Maleri (7) and 22 (Thirichilangadi) of the muncipality. A stream (*Chethupalam thodu*) originating from the area is flowing towards Ramanattuakara which initially merges to Neelithodu and later to Canoli canal at Pulliparamba/ Kallampara and finally empties into the Chaliyar river at Chaliyam estuary. Hence, during the post monsoon and summer periods, saline water from the Arabian sea reaches the area during the hightides, making the area unsuitable/unprofitable for paddy cultivation. Eventhough a bund/shutter to prevent the salt water entry is there at Muttiyara, where it joins the Canoli canal, it is not fully functional. As a result, atleast along the stream banks, we can see some mangrove associate species.

This area is now under threats due to several so called 'developmental activities' such as land filling, building, stadium and road constructions. Hence conservation of this area is extremely important for

conserving the biodiversity and also to maintain the water table.

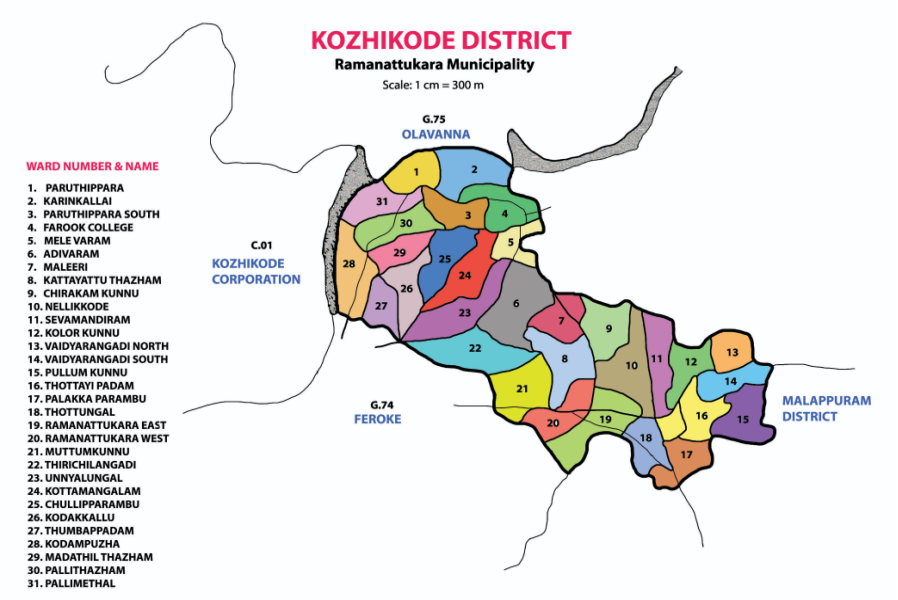

Fig. 1. Ward map of the Ramanattukara Municipality (as on 2020)

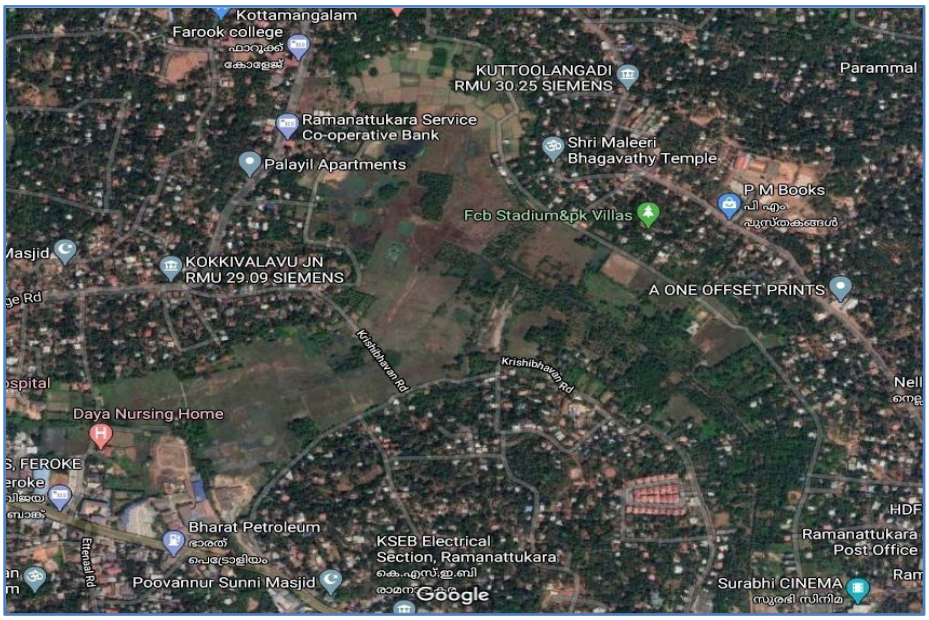

Fig 2. Google satellite map of Pariyapurath Chali and surroundings

2. Materials and Methods

After having reviewed many literature pertaining to wetlands and after obtaining basic information about the study area from the municipality authorities, a few reconnaissance surveys were conducted to find out the nature and extent of the area. Later, regular field trips to area were conducted covering all the different seasons. Two specimens of each species were collected for the herbaria purpose. All the species were photographed from the field, for preparing colour plates which can be used as a field guide for further identifications. Collections were brought to the department and herbaria prepared on the same day as per standard procedure (Fosberg and Sachet, 1965; Bridson and

Forman, 1991). All the specimens were deposited in the herbaria maintained by the Botany department of our college.

The specimens were critically studied and identifications were done initially with the help of the *Aquatic and Wetland flora of Kerala: Flowering plants* (Ansari *et al,* 2016), *Flowering plants of Kerala* (Sasidharan, 2004; 2011). Further, other regional floras such as *Flora of Calicut* (Manilal & Sivarajan, 1982), *Flora of Malappuram* (Babu, 1990) and *Flora of the Presidency of Madras* (Gamble & Fischer, 1915-1936), *Flora of Kerala – Grasses* (Sreekumar & Nair, 1991) etc were verified to check their representation in these floras. Several literature on phytogeographical studies, phenology etc were also referred in addition to the websites such as *ipni.org, the plantlist.org, indiabiodiversity.org, flowersofindia.net* etc to obtain the world distribution and phenological details of each species. Those specimens, especially grasses, which needed further confirmation, were referred to experts in the concerned groups. Identification of the pteridophyte specimens were done mainly using *Pteridophyte flora of the Western Ghats – South India* (Manickam and Irudayaraj, 1992). Interviews with the experts in the field, local people, ward members etc were also done to learn about the biodiversity and ecosystem threats prevailing in the area and also to learn the history of the past cultivation practices.

4. Result and Discussion

About 210 flowering plant species could be collected from the area which belonged to 165 genera under 59 families. In total, there were 131 herbs, 29 shrubs, 28 climbers and 22 small or medium trees. There were 155 dicot species under 43 families and 122 genera, and 55 monocot species under 16 families and 43 genera. The most dominant families were *Asteraceae*, *Fabaceae* and *Cyperaceae, Poaceae* and *Euphorbiaceae*, while the most dominant genera were *Ipomoea*, *Cyperus*, *Phyllanthus*, *Ficus* and *Lindernia*. The angiosperms comprised of 131 herbs, 29 shrubs, 28 climbers/twiners and 22 small or medium trees. Among the Pteridophytes, there were 13 species coming under 11 genera and 6 families, *Pteridaceae* being the dominant family with 5 genera and 7 species. The checklist is given below.

Table1 : Checklist to the Flora of Pariyapurath Chali, Farook College

1. ANGIOSPERMS

No	Scientific name	Local Name	Habit	Family	World Distribution
1	**Asystasia dalzelliana** Sant.	Uppu thali	Erect or diffuse herbs	Acanthaceae	Tropical Asia and Africa
2	**Dipteracanthus prostratus** (Poir.) Nees	Thuppa lam potti	Diffuse herbs	Acanthaceae	Endemic to India
3	**Hemigraphis alternata** (Burm. f.) T. Anderson	Muri kootti	Decumba nt herbs	Acanthaceae	Native of Central America
4	**Hygrophila ringens** (L.) Steud.	Neer chulli	Erect sub shrubs	Acanthaceae	Indo-Malesia

5	**Hygrophila schulli** (Buch.-Ham.) M. R. & S. M. Almeida	Vayal chulli	Thorny Sub shrubs	Acanthaceae	India, Myanmar and Indo-China
6	**Justicia gendarussa** Burm. f.	Vatham kolli	Shrubs	Acanthaceae	Tropical Africa and Asia
7	**Justicia procumbens** L.	Water willow	Diffuse herbs	Acanthaceae	Indo-Malesia and Australia
8	**Achyranthes aspera** L.	Kadala di	Erect herb	Amaranthaceae	Pantropical
9	**Aerva lanata** (L.) Juss. ex Schult.	Cherool a	Erect herb	Amaranthaceae	Widespread in the tropics and subtropics
10	**Alternanthera bettzickiana** (Regel) Voss	Calico-plant	Bushy perennial herbs	Amaranthaceae	Native of Tropical America; now getting naturalised in Asia
11	**Alternanthera brasiliana** (L.) Kuntze	Joy weed	Diffuse herbs	Amaranthaceae	Native of Tropical America
12	**Alternanthera sessilis** (L.) R. Br. ex. DC.	Kozhup pa cheera	Decumbe nt herbs	Amaranthaceae	Pantropical
13	**Amaranthus viridis** L.	Kuppa cheera	Herbs	Amaranthaceae	Pantropical
14	**Cyathula prostrata** (L.) Blume	Cheru kadalad i	Diffuse herbs	Amaranthaceae	Pantropical
15	**Crinum viviparum** (Lam.) R. Ansari & V.J. Nair	Velutha pola thali	Bulbous herbs	Amaryllidaceae	Endemic to India and Sri Lanka
16	**Anacardium occidentale** L.	Kasu mavu	Medium trees	Anacardiaceae	Native of South America; cultivated in Asia and Africa
17	**Mangifera indica** L.	Mavu	Evergree n trees	Anacardiaceae	Indo-Malesia
18	**Annona muricata** L.	Mullan chakka	Small trees	Annonaceae	Native of Central America and West Indies, introduced elsewhere
19	**Centella asiatica** (L.) Urban	Mutthil	Herbs, rooting at nodes	Apiaceae	Tropical Asia and Africa
20	**Alocasia macrorrhiza** (L.) G. Don	Aana chembu	Perennial herbs	Araceae	Tropical Asia
21	**Colocasia esculenta** (L.) Schott	Kaattu chembu	Tuberous herbs	Araceae	Pantropical
22	**Pothos scandens** L.	Ana paruva	Epiphytic shrub	Araceae	India to Malesia and Madagascar

23	**Areca catechu** L.	Kavungu	Medium trees	Arecaceae	Cultivated: India to Solomon Islands and in Africa and Tropical America
24	**Caryota urens** L.	Aana pana	Medium trees	Arecaceae	Indo-Malesia
25	**Cocos nucifera** L.	Thengu	Medium trees	Arecaceae	Cultivated in the tropics
26	**Wattakaka volubilis** (L. f.) Stapf	Kakkalan kodi	Climber	Asclepiadaceae	Indo-Malesia and China
27	**Ageratum conyzoides** L.	Kattappa	Erect herbs	Asteraceae	Pantropical
28	**Blumea axillaris** (Lam.) DC.	Blumea	Herbs	Asteraceae	Indo-Malesia to Australia and Africa
29	**Centratherum punctatum** Cass.	Brazilian Button flower	Herbs	Asteraceae	Native of South America
30	**Chromolaena odorata** (L.) King & Robins.	Communist pacha	Shrubs	Asteraceae	Native of America; naturalised in Tropical Asia
31	**Crassocephalum crepidioides** (Benth.) S. Moore	Red-flower rag leaf	Tall herbs	Asteraceae	India, Sri Lanka, China, Africa and Madagascar
32	**Eclipta prostrata** (L.) L.	Kanjunni	Herbs	Asteraceae	Pantropical
33	**Elephantopus scaber** L.	Aana chuvadi	Scapigerous herbs	Asteraceae	Pantropical
34	**Eleutheranthera ruderalis** (Sw.) Sch.-Bip.	Ogiera	Annual herbs	Asteraceae	Native of Tropical America; established in Asian countries
35	**Emilia sonchifolia** (L.) DC.	Muyal chevian	Erect or diffuse herbs	Asteraceae	Tropical and Subtropical Africa and Asia
36	**Epaltes divaricata** (L.) Cass.	Narrow leaf Epaltes	Erect herbs	Asteraceae	India, China, Myanmar, Indonesia and Java
37	**Grangea maderaspatana** (L.) Poir.	Nelampala	Prostrate herbs	Asteraceae	Indo-Malesia and Africa
38	**Mikania micrantha** Kunth	Vayara	Climber	Asteraceae	Pantropical
39	**Sphaeranthus africanus** L.	Vella Adakkamaniyan	Herbs	Asteraceae	Indo-Malesia, China and Australia

40	**Sphaeranthus indicus** L.	Adakkya maniyan	Diffuse aromatic herbs	Asteraceae	Indo-Malesia, Australia and Africa
41	**Spilanthes ciliata** HBK	Pallu-vedana chedi	Diffuse herbs	Asteraceae	Neotropics; growing natural in Western Peninsular India
42	**Synedrella nodiflora** (L.) Gaertn.	Mudian pacha	Erect branched herbs	Asteraceae	Native of West Indies; naturalised in India, China, Malesia and Polynesia
43	**Tridax procumbens** L.	Thel kuthi	Procumbent herbs	Asteraceae	Native of Tropical America; widespread throughout tropics and subtropics
44	**Vernonia cinerea** (L.) Less.	Poovan kurunal	Annuals herbs	Asteraceae	Pantropical
45	**Vernonia elliptica** DC.	Curtain plant	Climbing pendulous shrubs	Asteraceae	India, Myanmar and Thailand
46	**Wedelia trilobata** (L.) A. S. Hitchc.	Singapore daisy	Perennial herbs	Asteraceae	Native of Tropical America
47	**Coldenia procumbens** L.	Cheru pulladi	Trailing herbs	Boraginaceae	Pantropical
48	**Heliotropium indicum** L.	Thelkkada	Pubescent herbs	Boraginaceae	Pantropical
49	**Sphenoclea zeylanica** Gaertn.	Goose weed	Erect herb	Campanulaceae	Pantropical
50	**Cleome burmannii** Wight & Arn.	Kattu kadugu	Decumbent herbs	Capparaceae	Indo-Malesia
51	**Cleome viscosa** L.	Karim kadugu	Woody annual herbs	Capparaceae	Pantropical
52	**Quisqualis indica** L.	Kula mariyan	Woody climbers	Combretaceae	Native of Myanmar
53	**Terminalia catappa** L.	Badam	Medium trees	Combretaceae	Malaysia to North Australia & Polynesia, planted in the tropics
54	**Commelina diffusa** Burm. f.	Creeping flower	Diffuse herbs	Commelinaceae	Pantropical
55	**Aniseia martinicensis** (Jacq.) Choisy	Ven thiruthali	Slender wiry climbers	Convolvulaceae	Pantropical
56	**Hewittia malabarica** (L.) Suresh	Ohanam valli	Twining herbs	Convolvulaceae	Asia, Africa and South America
57	**Ipomoea aquatica** Forssk.	Kozhuppa	Creeping aquatic herbs	Convolvulaceae	Pantropics

58	**Ipomoea batatas** (L.) Lam.	Madura kizhangu	Perennial twining herbs	Convolvulaceae	Native of Tropical South America; widely cultivated
59	**Ipomoea cairica** (L.) Sweet	Kolambi poo	Extensive climbers	Convolvulaceae	Paleotropics
60	**Ipomoea carnea** Jack. **ssp. fistulosa** (Mart. ex Choisy) Austin	Neyveli katta	Erect shrubs	Convolvulaceae	Native of America; now Pantropical
61	**Ipomoea marginata** (Desr.) Manitz	Chutti thiruthali	Extensive twiners	Convolvulaceae	Paleotropics
62	**Ipomoea obscura** (L.) Ker-Gawl.	Thiruthali	Extensive twiners	Convolvulaceae	China, Tropical Asia and Africa
63	**Merremia hederacea** (Burm. f.) Hall. f.	Ivy Wood rose	Twining herbs	Convolvulaceae	Paleotropics
64	**Costus speciosus** (Koenig) J.E. Smith	Channa koova	Rhizomatous herbs	Costaceae	Indo-Malesia
65	**Benincasa hispida** (Thunb.) Cogn.	Kumbalam	Tendril climbers	Cucurbitaceae	Wild in Java; now widely naturalised in Tropical Asia
66	**Coccinia grandis** (L.) Voight	Kovakka	Tendril climbers	Cucurbitaceae	Endemic to Peninsular India and Sri Lanka
67	**Cucumis melo** L.	Kani Vellari, Vellari	Tendril climbers	Cucurbitaceae	Widely cultivated
68	**Cucurbita maxima** Duch.	Mathanga	Tendril climbers	Cucurbitaceae	Widely cultivated
69	**Diplocyclos palmatus** (L.) Jeffrey	Pambu kodi	Tendril climbers	Cucurbitaceae	Indo-Malesia, China and Africa
70	**Lagenaria siceraria** (Molina) Standley	Churakka	Tendril climbers	Cucurbitaceae	Tropical Asia and Africa; cultivated in tropics
71	**Momordica charantia** L.	Kaippa	Tendril climbers	Cucurbitaceae	Paleotropics; widely cultivated
72	**Trichosanthes anguina** L.	Padavalam	Tendril climbers	Cucurbitaceae	Tropical Asia and Africa
73	**Cyperus compactus** Retz.	Compact Sedge	Perennial herbs	Cyperaceae	South and South East Asia
74	**Cyperus compressus** L.	Poorland Flat Sedge	Annual herbs	Cyperaceae	Pantropical
75	**Cyperus distans** L. f.	Slender Cyperus	Perennial herbs	Cyperaceae	Pantropical

76	**Cyperus haspan** L.	Sheathed flat sedge	Perennial herbs	Cyperaceae	Pantropical
77	**Cyperus javanicus** Houtt.,	Javanese flat sedge	Annual herbs	Cyperaceae	Pantropical
78	**Cyperus tenuispica** Steud.	Slender spiked sedge	Annual herbs	Cyperaceae	Tropical and Subtropical Africa and Asia
79	**Eleocharis acutangula** (Roxb.) Schult.	Acute Spike Rush	Perennial herbs	Cyperaceae	Pantropical
80	**Eleocharis retroflexa** (Poir.) Urban **ssp. chaetaria** (Roem. & Schult.) Koyama	Coastal Plain Spike Rush	Annual herbs	Cyperaceae	Paleotropics
81	**Eleocharis spiralis** (Rottb.) Roem. & Schult.	Cherupotta	Perennial herbs	Cyperaceae	Paleotropics
82	**Fimbristylis argentea** (Rottb.) Vahl	Fringe Rush	Annual herbs	Cyperaceae	South and South East Asia
83	**Fimbristylis dichotoma** (L.) Vahl ssp. **glauca** (Vahl) Koyama	Forked Fimbry	Annual herb	Cyperaceae	India to Malesia, Micronesia & Polynesia
84	**Fimbristylis quinquangularis** (Vahl) Kunth	Five angle fimbry	Annual herbs	Cyperaceae	Tropical Africa, Iraq to Tropical and Subtropical Asia and North Australia
85	**Fuirena ciliaris** (L.) Roxb.	Umbrella Grass	Annual herb	Cyperaceae	Pantropical
86	**Kyllinga nemoralis** (J. R & G. Forst.) Dandy ex Hutch. & Dalz.	Peemuthanga	Rhizomatous perennial herbs	Cyperaceae	Pantropical
87	**Pycreus flavidus** (Retz.) Koyama	Yellow Flat sedge	Annual herbs	Cyperaceae	South Europe, Africa and Central and South Asia
88	**Pycreus polystachyos** (Rottb.) P. Beauv.	Bunchy sedge	Annual herbs	Cyperaceae	Widely distributed in the tropical and subtropical regions
89	**Schoenoplectiella articulata** (L.) Lye	Chelli	Perennial herbs	Cyperaceae	Indo-Malesia
90	**Dioscorea alata** L.	Kaachil	Tuberous climbers	Dioscoreaceae	Endemic to India
91	**Breynia retusa** (Dennst.) Alston	Aatta cherukola	Shrubs	Euphorbiaceae	Sri Lanka to Indo-China
92	**Bridelia retusa** (L.) A. Juss.	Mullankayini	Medium trees	Euphorbiaceae	Indo-Malaya

93	**Euphorbia heterophylla** L.	Kuzhi nagha Chedi	Annual herbs	Euphorbiaceae	Native of Central America; now a Pantropical weed
94	**Euphorbia hirta** L.	Kuzhi naga pala	Annual herbs	Euphorbiaceae	Native of Tropical America; now Pantropical
95	**Glochidion ellipticum** Wight	Chatha kkadam bu	Medium trees	Euphorbiaceae	Endemic to Western Ghats
96	**Glochidion zeylanicum** (Gaertn.) A. Juss.,	Neervet ti	Small trees	Euphorbiaceae	Indo-Malesia
97	**Manihot esculenta** Crantz.	Kappa, Mara cheeni	Shrubs	Euphorbiaceae	Native of Brazil; now common throughout the tropics
98	**Microstachys chamaelea** (L.) Muell.-Arg.	Kodiya vannak ku	Erect or diffuse herbs	Euphorbiaceae	Indo-Malesia to Australia
99	**Phyllanthus airy-shawii** Brunel & Roux	Keezha r nelli	Erect herbs	Euphorbiaceae	Endemic to Peninsular India and Sri Lanka
100	**Phyllanthus amarus** Schum. & Thonn.	Keezha r nelli	Erect herbs	Euphorbiaceae	Tropics
101	**Phyllanthus reticulatus** Poir.	Neeroli	Scandent shrubs	Euphorbiaceae	Paleotropics
102	**Phyllanthus virgatus** G. Forst.	Virgate Leaf flower	Erect or diffuse herbs	Euphorbiaceae	Indo-Malesia to Polynesia and China
103	**Senna alata** (L.) Roxb.	Malam thakara	Erect shrubs	Fabaceae (Caesalpinioideae)	Pantropical
104	**Tamarindus indica** L.	Valan puli	Small trees	Fabaceae (Caesalpinioideae)	Native of Tropical Africa; introduced in India and other parts of tropics
105	**Vigna unguiculata** (L.) Walp.	Kotta payar	Twining herbs	Fabaceae (Faboideae)	Cultivated in South Asia
106	**Abrus precatorius** L.	Kunni kuru	Twining shrubs	Fabaceae (Faboideae)	Pantropical
107	**Aeschynomene americana** L.	Americ an Joint Vetch	Erect or decumbe nt herbs	Fabaceae (Faboideae)	Central America; now naturalised in some parts of Peninsular India
108	**Alysicarpus monilifer** (L.) DC.	Buffalo clover	Prostrate herbs	Fabaceae (Faboideae)	India, Pakistan and Ethiopia
109	**Centrosema molle** Benth.	Kattu sanku pushpa m	Pubescent twiners	Fabaceae (Faboideae)	Native of America; introduced in India

110	**Derris trifoliata** Lour.	Kammatti valli	Stragglinglianas	Fabaceae (Faboideae)	Paleotropics
111	**Desmodium biarticulatum** (L.) F.V. Muell.	Sivanarvayampu	Diffuse under shrubs	Fabaceae (Faboideae)	Indo-Malesia to Australia
112	**Desmodium heterophyllum** (Willd.) DC.	Spanish Clover	Prostrate herbs	Fabaceae (Faboideae)	Indo-Malesia and China
113	**Desmodium triflorum** (L.) DC.	Nilamparanda	Prostrate herbs	Fabaceae (Faboideae)	Indo-Malesia and Australia
114	**Gliricidia sepium** (Jacq.) Kunth ex Walp.	Seemakonna	Small trees	Fabaceae (Faboideae)	Native of South America; introduced in India
115	**Lespedeza bicolor** Turcz.	Bicolored Lespedeza	Shrubs	Fabaceae (Faboideae)	Native of Japan
116	**Pycnospora lutescens** (Poir.) Schind.	Nir-pullari	Trailing herbs	Fabaceae (Faboideae)	Africa, Tropical Asia and Australia
117	**Vigna radiata** (L.) Wilczek	Cherupayar	Annual herbs	Fabaceae (Faboideae)	Paleotropics
118	**Vigna vexillata** (L.) A. Rich	Kattuzhunnu	Pubescent twiner	Fabaceae (Faboideae)	Paleotropics
119	**Albizia saman** (Jacq.) F.Muell.	Mazhamaram	Large trees	Fabaceae (Mimosoideae)	Native of Central and South America; widely planted in the tropics as avenue tree
120	**Mimosa diplotricha** C. Wight ex Sanvalle	Aanathottavadi	Rambling shrubs	Fabaceae (Mimosoideae)	Native of Tropical America; a weed in India
121	**Mimosa pudica** L.	Thottavadi	Stragglingsubshrubs	Fabaceae (Mimosoideae)	Native of South America; now Pantropical
122	**Salacia chinensis** L.	Cherukoranti	Climbing shrubs	Hippocrateaceae	Indo-Malesia
123	**Blyxa aubertii** L.C. Rich. **var. echinosperma** (Clarke) Cook & Lound	Round fruit Blyxa	Submerged aquatic herbs	Hydrocharitaceae	Cosmopolitan
124	**Hydrilla verticillata** (L.f.) Royle	Hydrilla	Aquatic herb	Hydrocharitaceae	Asia, Europe and Africa
125	**Vallisneria natans** (Lour.) Hara	Eel grass	Submerged herbs	Hydrocharitaceae	Pantropical
126	**Hyptis capitata** Jacq.	Knob weed	Shrubs	Lamiaceae	Native of Tropical America; naturalised in India and Malesia

127	**Leucas aspera** (Willd.) Link	Thumba	Erect herbs	Lamiaceae	Indo-Malesia
128	**Leucas lavandulifolia** J.E. Smith	Thumba	Annual herbs	Lamiaceae	Indo-Malesia and East Asia
129	**Plectranthus rotundifolius** (Poir.) Spreng.	Koorkka	Annual tuberoush erbs	Lamiaceae	Native of Tropical Africa, introduced & cultivated elsewhere
130	**Pogostemon purpurascens** Dalz.	Poothachida	Diffuse herbs	Lamiaceae	Endemic to South West India
131	***Scutellaria oblonga*** Benth.	Skullcap	Herbs	Lamiaceae	Endemic to South India and Sri Lanka
132	**Leea asiatica** (L.) Ridsd.	Nalugu	Shrubs	Leeaceae	Indo-Malesia and China
133	**Lemna perpusilla** Torrey	Payal	Floating aquatic herbs	Lemnaceae	Cosmopolitan
134	**Utricularia aurea** Lour.	Golden Bladder wort	Suspended aquatic herbs	Lentibulariaceae	Indo-Malesia to Australia and East Asia
135	**Ammannia baccifera** L. ssp. **aegyptiaca** (Willd.) Koehne	Kallurvanchi	Erect annual herbs	Lythraceae	Pantropical
136	**Rotala macrandra** Koehne	Giant Red Rotala	Amphibious annual herbs	Lythraceae	Endemic to Western Ghats
137	**Hibiscus hispidissimus** Griff.	Panichakam	Climbing shrubs	Malvaceae	Paleotropics
138	**Sida acuta** Burm. f.	Anakuruntthotti	Erect subshrubs	Malvaceae	Pantropical
139	**Sida cordata** (Burm.f.) Borss.	Vallikuruntthotti	Prostrate herbs	Malvaceae	Pantropical
140	**Sida rhomboidea** Roxb. ex Fleming	Kurumthotti	Subshrubs	Malvaceae	Endemic to Peninsular India
141	**Urena lobata** L.	Oorakam	Subshrubs	Malvaceae	Pantropical
142	**Maranta arundinacea** L.	Koovva	Rhizomatous herbs	Marantaceae	Endemic to India and Sri Lanka
143	**Naregamia alata** Wight & Arn.	Nilanaragam	Prostrate woody herbs	Meliaceae	Endemic to Peninsular India
144	**Cyclea peltata** (Lam.) Hook. f. & Thoms.	Padathali	Climbing shrubs	Menispermaceae	Endemic to India and Sri Lanka

145	**Tiliacora acuminata** (Poir.) Miers ex Hook.f. & Thoms.	Valli kanjiram	Climbing shrubs	Menispermaceae	Endemic to India and Sri Lanka
146	**Tinospora cordifolia** (Willd.) Miers.	Chittamruthu	Climbing shrubs	Menispermaceae	Sri Lanka, India, Bangladesh and Myanmar
147	**Mollugo pentaphylla** L.	Parpadaka pullu	Ascending herbs	Molluginaceae	Pantropical
148	**Ficus exasperata** Vahl	Parakam	Medium trees	Moraceae	East Africa, Arabia, India and Sri Lanka
149	**Ficus hispida** L. f.	Erumanakku	Small trees	Moraceae	Indo-Malesia to Australia
150	**Ficus racemosa** L.	Atthi	Deciduous trees	Moraceae	Indo-Malesia to Australia
151	**Ficus tsjahela** Burm. f.	Karaal	Deciduous trees	Moraceae	Endemic to Peninsular India and Sri Lanka
152	**Musa x paradisiaca** L.	Vazha	Herb	Musaceae	Cultivated throughout the tropics
153	**Psidium guajava** L.	Peramaram	Small trees	Myrtaceae	Originally from Tropical America; now naturalised in the tropics
154	**Syzygium caryophyllatum** (L.) Alston	Njara	Small trees	Myrtaceae	Endemic to Western Ghats and Sri Lanka
155	**Najas graminea** Del.	Ricefield Water nymph	Submerged herbs	Najadaceae	Pantropical
156	**Nymphaea nouchali** Burm.f.	Vellambal	Aquatic herbs	Nymphaeaceae	Indo-Malesia and Tropical Africa
157	**Ludwigia hyssopifolia** (G. Don) Exell	Neergrampu	Herbs	Onagraceae	Pantropical
158	**Biophytum reinwardtii** (Zucc.) Klotzsch.	Mukkutti	Annual herbs	Oxalidaceae	Indo-Malesia and China
159	**Pandanus odorifer** (Forssk.) Kuntze	Kaitha	Shrubs to small trees	Pandanaceae	Tropical and subtropical Asia
160	**Passiflora foetida** L.	Poochapazham	Herbaceous vines	Passifloraceae	Native of Tropical America; naturalised in India, China and Africa
161	**Peperomia pellucida** (L.) Kunth	Mashithandu	Delicate, annual herbs	Piperaceae	Native of Tropical America; now Pantropical
162	**Arundinella leptochloa** (Nees ex Steud.) Hook. f.	Reed grass	Perennial herb	Poaceae	Endemic to Peninsular India and Sri Lanka

163	**Chrysopogon aciculatus** (Retz.) Trin.	Asthra pullu	Perennial herb	Poaceae	Tropical Asia and Australia
164	**Coix lacryma-jobi** L.	Poocha kal	Robust annual herbs	Poaceae	Tropical Africa; introduced elsewhere
165	**Cyrtococcum trigonum** (Retz.) A. Camus	Short-leaf Cyr tococcu m	Annual herbs	Poaceae	South East Asia, Sri Lanka and Peninsular India
166	**Dactyloctenium aegyptium** (L.) P. Beauv.	Kavara pullu	Annual herbs	Poaceae	Native of South America, naturalised in Paleotropics
167	**Digitaria ciliaris** (Retz.) Koeler	Henry's Crab grass	Annual herbs	Poaceae	Paleotropics
168	**Echinochloa colona** (L.) Link	Kavada	Annual herbs	Poaceae	Tropical Asia and Africa
169	**Eleusine indica** (L.) Gaertn.	Kattu thina	Annual herb	Poaceae	Pantropical
170	**Eragrostis unioloides** (Retz.) Nees ex Steud.	Karaya m pullu	Annual herb	Poaceae	South East Asia, India and Africa
171	**Isachne miliacea** Roth.	Chovve rippull u	Annual herb	Poaceae	India, China and South East Asia
172	**Leersia hexandra** Sw.	Swamp Rice grass	Perennial herb	Poaceae	Pantropical
173	**Oryza rufipogon** Griff.	Vari nellu	Annual herbs	Poaceae	India, Sri Lanka and Tropical Australia
174	**Oryza sativa** L.	Nellu	Annual herbs	Poaceae	Native to the tropics and subtropics of Southeast Asia; now widely cultivated
175	**Paspalum conjugatum** Berg.	Hilo grass	Perennial herb	Poaceae	Pantropical
176	**Paspalum scrobiculatum** L.	Varagu, Kodo Millet	Perennial herbs	Poaceae	Endemic to India and Pakistan
177	**Pennisetum polystachion** (L.) Schult.	Mission grass	Annual herbs	Poaceae	Paleotropics
178	**Sacciolepis interrupta** (Willd.) Stapf	Polla kala	Annual herbs	Poaceae	Tropics of South East Asia and Africa
179	**Monochoria vaginalis** (Burm. f.) Presl	Karim koovala m	Semi-aquatic herbs	Pontederiaceae	India to China, Malesia and Japan

180	**Ziziphus oenoplia** (L.) Mill.	Cheru thudali	Thorny shrubs	Rhamnaceae	Tropical Asia and Australia, in the hotter parts of India
181	**Dentella repens** (L.) J. R. & G. Forst.	Cheru maneli	Prostrate herbs	Rubiaceae	Indo-Malesia
182	**Ixora coccinea** L.	Kattu chethi	Bushy shrub	Rubiaceae	Endemic to Peninsular India and Sri Lanka
183	**Mitracarpus hirtus** (L.) DC.	Thaval	Erect herbs	Rubiaceae	Tropical Africa and America; now common in S. India
184	**Mussaenda frondosa** L.	Vellila	Stragglin g shrubs	Rubiaceae	Endemic to Peninsular India
185	**Oldenlandia auricularia** (L.) K. Schum.	Erachi ketti	Diffuse to trailing herbs	Rubiaceae	Indo-Malesia
186	**Oldenlandia diffusa** (Willd.) Roxb.	Parpad aka pullu	Small diffuse herbs	Rubiaceae	Tropical and Subtropical Asia and America
187	**Cardiospermum halicacabum** L.	Uzhinja	Climbing or trailing herbs	Sapindaceae	Pantropical
188	**Chrysophyllum cainito** L.	Star apple	Medium trees	Sapotaceae	Native of West Indies
189	**Mimusops elengi** L.	Elanji	Medium trees	Sapotaceae	Indo-Malesia
190	**Bacopa monnieri** (L.) Pennell	Neer brahmi	Prostrate, semi-succulent herbs	Scrophulariacea e	Paleotropics
191	**Dopatrium lobelioides** (Retz.) Benth.	Lobelia-like Do patrium	Herbs	Scrophulariacea e	Endemic to South India and Sri Lanka
192	**Limnophila heterophylla** (Roxb.) Benth.	Manga nari	Emergent annual herbs	Scrophulariacea e	Indo-Malesia and China
193	**Limnophila repens** (Benth.) Benth.	Manga nari	Erect or procumbe nt herbs	Scrophulariacea e	Tropical Asia
194	**Lindernia anagallis** (Burm. f.) Pennell	Pimper nel Lin dernia	Diffuse herbs	Scrophulariacea e	Indo-Malesia
195	**Lindernia caespitosa** (Blume) Panigrahi	..	Prostrate or diffuse herbs	Scrophulariacea e	Africa and Tropical Asia
196	**Lindernia crustacea** (L.) F.V. Muell.	Malaysi an false Pimper nel	Prostrate herbs	Scrophulariacea e	Africa, America and Tropical and Subtropical Asia
197	**Lindernia hyssopioides** (L.) Haines	Hyssop Lindern ia	Erect herbs	Scrophulariacea e	South East Asia, Malesia and China

198	**Scoparia dulcis** L.	Kalluru kki	Annual or perennial herbs	Scrophulariaceae	Native of Tropical America; now Pantropical
199	**Solanum torvum** Sw.	Ana chunda	Prickly Shrubs	Solanaceae	Throughout the tropics
200	**Melochia corchorifolia** L.	Cheruv uram	Branched herbs	Sterculiaceae	Pantropical
201	**Grewia nervosa** (Lour.) Panigrahi	Kottakk a	Bushy shrubs	Tiliaceae	Tropical Asia
202	**Trema orientalis** (L.) Blume	Oma maram	Small trees	Ulmaceae	Tropical Africa, Asia and Australia
203	**Pilea microphylla** (L.) Liebm.	Rock weed	Slender succulent herbs	Urticaceae	South America; now introduced into other tropical regions
204	**Pouzolzia zeylanica** (L.) Bennett	Kanali	Procumbe nt herbs	Urticaceae	Tropical Asia
205	**Clerodendrum inerme** (L.) Gaertn.	Puzha mulla	Scandent shrub	Verbenaceae	Coastal India, Sri Lanka; now naturalised on the shores of Myanmar, Australia, China
206	**Clerodendrum viscosum** Vent.	Periyila m	Shrubs	Verbenaceae	Indo-Malesia
207	**Phyla nodiflora** (L.) Greene	Neer thippali	Prostrate herbs	Verbenaceae	Tropics and subtropics
208	**Cayratia pedata** (Lam.) A. Juss. ex Gagnep.	Chori valli	Tendril Climber	Vitaceae	Indo-Malesia
209	**Curcuma aeruginosa** Roxb.	Neela kua	Rhizomat ous herbs	Zingiberaceae	India and Myanmar
210	**Curcuma longa** L.	Manjal	Rhizomat ous herbs	Zingiberaceae	Cultivated throughout the tropics

2. PTERIDOPHYTES

No	Scientific name	Local Name	Habit	Family	World Distribution
1	**Stenochlaena palustris** (Burm. f.) Bedd.	Climbing fern	Climbing shrub	Blechnaceae	Indo-malesia, Australia to the Pacific Islands.
2	**Lygodium flexuosum** (L.) Sw.	Japanese climbing fern	Climbing shrub	Lygodiaceae	Native to eastern Asia and eastern Australia
3	**Marsilea minuta** L.	Four leaf clover	Aquatic fern	Marsiliaceae	Europe, Asia & US

4	**Acrostichum aureum** L.	Machin thol	Rhizomat ous shrubs	Pteridaceae	Tropics and sub tropics of the world
5	**Adiantum lunulatum** Burm.	Walking maiden hair fern	Terrestria l herb	Pteridaceae	Tropics - Africa, Asia, Australia, Central and northern S. America
6	**Ceratopteris thalictroides** (L.) Brongn.	Oriental water fern	Spongy erect herb	Pteridaceae	Pantropical
7	**Pityrogramma calomelanos** (L.) Link	Silver back fern	Terrestria l herb	Pteridaceae	Native to tropical & subtropical America; now in tropics, including South-East Asia
8	**Pteris confusa** T.G. Walker	Not known	Terrestria l herb	Pteridaceae	Tropics
9	**Pteris cretica** L.	Ribbon fern	Terrestria l herb	Pteridaceae	Native to Europe, Asia and Africa
10	**Pteris quadriaurita** Re tz.	Striped Brake	Herbs	Pteridaceae	Tropics and sub tropics of the world
11	**Selaginella delicatula (**Desv. ex Poir.) Alston	Not known	Herbs	Selaginellaceae	South east Asia, New Guinea and Sulawesi
12	**Christella dentata** (Forssk.) Brownsey & Jermy	Downy wood fern	Erect herb	Thelypteridacea e	Central and South America, Australia, Tropical Asia and Africa
13	**Cyclosorus interruptus** (Willd.) H.Itô	Swamp Shield Fern	Erect herb	Thelypteridacea e	Tropics and subtropics of all the continents

Regarding the world distribution of the species, it could be seen that majority of the plants studied were having Pantropical distribution (41 nos./19.5%). Sixteen species (7.6%) had Indo-malesian distribution and another 24 species had distribution extending further to Madagascar, Africa, China, East Asia or Australia. Fourteen species had their distribution in the whole Paleotropic areas; 7 were distributed in Tropical parts of Asia only. There were several exotic species. Twenty eight species (13.3%) were from various American countries. There was a single species each from Japan, Java, Myanmar etc. Out of the total 210 species, 20 were endemics. Two species were endemic to our country (*Dipteracanthus prostratus, Dioscorea alata*), while 3 species were endemic to Peninsular India. Another 11 species had an extended endemic distribution to Srilanka also. Three species were found endemic to Western Ghats. There are around 493 RET plants out of the 5094 flowering plant species reported from Kerala (Sasidharan, 2014). Fortunately, no species reported from the study area were found included in this list.

Table 2. Endemic species enumerated and their distribution

No	Name of the species	Family	Endemic Distribution*
1	**Dioscorea alata**	Dioscoreaceae	Endemic to India
2	**Dipteracanthus prostratus**	Acanthaceae	
3	**Crinum viviparum**	Amaryllidaceae	Endemic to India and Sri Lanka
4	**Cyclea peltata**	Menispermaceae	
5	**Maranta arundinacea**	Marantaceae	
6	**Tiliacora acuminata**	Menispermaceae	
7	**Mussaenda frondosa**	Rubiaceae	Endemic to Peninsular India
8	**Naregamia alata**	Meliaceae	
9	**Sida rhomboidea**	Malvaceae	
10	**Arundinella leptochloa**	Poaceae	Endemic to Peninsular India and Sri Lanka
11	**Coccinia grandis**	Cucurbitaceae	
12	**Ficus tsjahela**	Moraceae	
13	**Ixora coccinea**	Rubiaceae	
14	**Phyllanthus airy-shawii**	Euphorbiaceae	
15	**Dopatrium lobelioides**	Scrophulariaceae	
16	**Scutellaria oblonga**	Lamiaceae	
17	**Pogostemon purpurascens**	Lamiaceae	Endemic to South West India
18	**Glochidion ellipticum**	Euphorbiaceae	Endemic to Western Ghats
19	**Rotala macrandra**	Lythraceae	
20	**Syzygium caryophyllatum**	Myrtaceae	Endemic to Western Ghats and Sri Lanka

Ref: **Ahmedullah, M. and M. P. Nayar (1987).**

Regarding the phenology, it could be learned that one third of the species studied (65/210), started flowering with the onset of the south–west monsoon period (June – August) and continued to bear flowers during the entire monsoon period. About 26 species started flowering during the NE monsoon period. Another 21 species started flowering during winter, after the heavy raining months. A few species (34 nos.) during the post winter and summer months. About 35 species were found to bear flowers throughout the year. This shows that 57 percentages of the plants (120 nos.) out of the total 210 species start and often complete their reproductive cycles during the monsoon period, before the wetlands dries up.

When the list of the total 210 species collected was compared with the local and regional floras available such as *Flora of Calicut* (Manilal & Sivarajan, 1982), *Flora of Malappuram* (Babu, 1990) and *Aquatic and Wetland Flora of Kerala* (Ansari *et al*, 2016), it could be learnt that 47 species were

represented in all the three floras under mention. However, it became clear that, about 22 species were not reported in any of the three floras, some of which were cultivated species.

Among these, there were 4 endemic species, and other exotics such as 5 from America, 2 from Africa and 1 from Japan. Only 168 species were present in the *Flora of Calicut* and only 142 species were present in the *Flora of Malappuram.* It is assumed that either some of these species were later introductions or perhaps missed by the authors in their surveys.

However, it looked strange to note that only 75 species were represented in the *Aquatic and Wetland Flora of Kerala.* The main reason may be that this floristic expedition was conducted in a geographical region demarcated as wetlands, where majority of the region remained as intact wetlands, however in some regions various cultivation practices were also going on. This included paddy, vegetables (mainly cucurbits), fruit crops, tuberous crops (tapioca, colocasia, yams, arrow roots etc) and a few plantation crop trees such as *Cocos, Areca & Anacardium* etc. Some areas amidst these wetlands were also subjected to landfilling where mesophytic species have found their places. Hence, several species other than the true wetland species could be recorded during the study. Even then, more than two dozens of common wetland/ marshy/mangrove associate species reported from the area (eg. *Alocasia macrorrhiza, Arundinella leptochloa, Cleome burmannii, Clerodendrum inerme, Coix lacryma-jobi, Costus speciosus, Cyathula prostrata, Cyclea peltata, Cyperus tenuispica, Derris trifoliata, Desmodium biarticulatum, Eleusine indica, Eleutheranthera ruderalis, Ficus racemosa, Glochidion zeylanicum, Ipomoea obscura, Limnophila heterophylla, Peperomia pellucida, Pycreus polystachyos, Sida cordata, Sida rhomboidea* etc.) were found missing in the Wetland flora mentioned, which indicates the need of indepth floristic studies in the wetlands of our country, which are often neglected to a great extent.

5. Summary & Conclusion

The detailed floristic expedition conducted during 2019-2021 at '*Pariyapurath chali*', a large wetland of more than 30 acres situated in the Ramanattukara Municipality of Kozhikode district brought forth fantastic information regarding the biodiversity and conservational importance of the area. About 210 flowering plant species could be collected from the area, which belonged to 165 genera under 59 families. About 13 pteridophyte species coming under 11 genera and 6 families were also collected. On analysis of the data, it became clear that, about 22 species were not reported in any of the three regional floras viz., *Flora of Calicut*, *Flora of Malappuram* and *Aquatic and Wetland Flora of Kerala*, even though some of them where cultivated species. Moreover, nearly 135 species were not represented in the *Aquatic and Wetland Flora of Kerala,* which indicates the necessity of detailed exploration in the other such wetlands of the state, which remains neglected and unexplored.

It could also be learned that the study area, which is a valley surrounded on three sides by hills serves as a good reservoir of water which determines the water table of the area. From this place that a perennial stream (*Chethupalam thodu*) also originates, which later join other streams such as *Neeli thodu* and *Canoly Canal* to finally empty into the Chaliyar near Arabian sea (at Chaliyam). During monsoon, the area usually remains flooded, thereby preventing other populated areas less affected. However during the last three years, there were severe flood in the area, which destroyed many of the cultivated crops such as rice, tapioca, other tuberous crops, vegetables and even trees. The floods have destroyed several of the local flora, and also have brought some new recruits to the area

The area is the abode of dozens of indigenous and exotic wetland birds, which are a part of this wetland ecosystem. About 36 species were recorded during the period of research. many of them foraging from the area thereby helping in the biological control of pests. However, Swamp hens and Parakeets are considered as a menace in the paddy fields, since the former species destroy plants and the latter one take away the spikelets.

Only in a few acres paddy cultivation is done, by a renowned famer Thottooli Chinnan, who cultivates about 17 rice cultivars in about 9 acres of land, but has faced severe crop losses during the last 3 years dut to the flood. Most of the areas remain abandoned and uncultivated, where several Cyperaceae members, Water lilies, *Hydrilla, Utricularia* etc flourish. Some areas have turned out to be waste dumping areas.

It is a known fact that wetlands perform numerous valuable functions such as recycling of nutrients, storing of sediments, purifying of water, attenuating floods, maintaining the stream flow, recharging of ground water, serves in providing drinking water, fish, fodder, fuel, wildlife habitat, control urban runoff and recreation to the society. From this study, it became clear that such ecosystem services done by the wetlands usually remain neglected due to ignorance, which is true for *Pariyapurath chali* also. In majority of the regions paddy cultivation also is not done dueto salt water intrusion and also the lack of interest of people. So they are considered as mere 'waste lands' by the common people. Since majority of the regions are under private possession, land filling, alteration of the land for housing or other purposes, dumping of wastes etc are common. It is a sad truth that this wetland is getting converted or destroyed day by day which affects the water table of the area, posing great loss to the biodiversity also. It is the need of the time to protect this wetland, considering the remarkable ecosystem services it render to the society. More studies on the water table, runoff, soil features, microbial, lower plant diversity and animal diversity should also be conducted urgently.

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Coconut palms growing in the area

Abundant growth of Water lilies

Acrtostichum aureum

Abundant growth of *Schoenoplectiella*

Paddy cultivation in the area

Wastes discarded in the area

Chethupalam thodu

Severity of the flood in the area