Information bulletin – 3

JALA NIDHI

A Garden for Aquatic Plants

(Our first collections)

Aswani V.J., Sabik S., Shaibu V.T.,
Midhun M.,
K. Haridasan

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Ahalia International foundation,
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Preface

Green Ahalia has been engaged in establishing a bioresource center at Ahalia campus. We aim that this park should be representative of the prevailing flora and showcase the rich diversity and richness so characteristic of Palakkad district. The district is one of the largest districts in the state and is endowed with unmatched biodiversity, vegetation and ecosystems. Thus, the community that has lived in association with these plants and fauna has known to understand them. When we speak about vegetation and ecosystem, there are forest ecosystem, grass land ecosystem, aquatic ecosystem, dry land ecosystem and more. Among these, aquatic system seem to be comparatively less known than the others largely due to accessibility issues. Further, our wetlands are the most threatened habitats in the country. As the wetlands get depleted, the plants depended on them too get exposed to threats and force them to peril. In that case, we may need to take up conservation efforts. This will warrant proper understanding of the species forming the flora and vegetation. At this point, we may also need to look at the background of several new species are added to the world from the Aquatic habitats to mention a few are *Rotala malampuzhensis* R.V.Nair, *Heliotropium keralense* Sivar. & Manilal etc. The best way to understand the biology of aquatic flora is to have a dedicated garden. This will also help in conservation of threatened aquatic plants.

To familiarize and promote aquatic flora to the community Green Ahalia has established an aquatic garden named **Jala Nidhi** during 2021. For this, we got much inspiration from the Malabar Botanic Garden and Institute of plant sciences which itself is a lead garden for Aquatic plants. Since the inauguration by Dr. Manju C Nair, Department of Botany, University of Calicut (2021), we have endeavored to add more species to the garden. As of now we have 62 species. They are grown in tubs and trays. The garden has ferns and angiosperms which are representative and holds as many types, like submerged, free floating, rooted and marsh plants, amphibian plants etc. A look into our collection will also reveal the resource potential of such plants as food, medicine, ornamental etc. Our garden has some unique plants like *Victoria amazonica* (Poepp.) J.C. Sowerby, *Euryale ferox* Salisb., *Trapa natans* L. and so on. Each of the species in the, garden is provided with self-explanatory labels giving required information to the visitor. The pooling of the species is usually the most herculean task, as most nurseries do not have seedlings of the choice. Thankfully, we had support from several quarters which include reputed institutes like MBGIPS, KFRI RC Nilambur, JNTBGRI, Mekattil nursery etc. They had liberally shared propagation material and cultivation technology that helped us establish our garden and reached thus far. This has also helped us realize that our garden could form part of a network that will stretch across the state and the country.

This publication provides information on the making of aquatic garden based on our experience. Every aspect of aquatic garden development and the enumeration of list is provided. We do hope this will help the prospective garden developers with useful tips and terms of gardening. Needless to mention, our plants are those that can be grown in the tropical climate we are experiencing.

Authors

Foreword

India's wetlands are among the most vibrant and diverse ecosystems, supporting an astonishing array of plant and animal life that play a crucial role in biological evolution. These ecosystems range from microscopic unicellular organisms to massive seaweeds and mammals of impressive proportions. Within freshwater habitats, plant diversity is reflected in a variety of life forms—some anchored to substrates, others free-floating—and a wide spectrum of morphological adaptations.

Unfortunately, this rich biodiversity remains under-documented, as evidenced by the frequent discovery of new aquatic species and the limited literature available. In addition, wetlands face mounting threats from developmental activities, leading to the inclusion of several aquatic species in conservation-dependent categories. The aesthetic appeal and commercial demand for many aquatic plants further drive overexploitation, exacerbating their vulnerability.

One of the most effective approaches to conserving these unique species lies in the establishment of ex situ conservation centers, such as the Malabar Botanic Garden, which has taken a pioneering role in safeguarding aquatic flora. These gardens not only ensure species survival but

also serve as repositories of valuable germplasm and as educational and research hubs.

From a utilitarian perspective, aquatic angiosperms serve multiple roles—as sources of food, medicine, ornamentals, and agents of water and soil conservation. Their sustainable use and propagation thus call for scientific cultivation practices and coordinated efforts in conservation. Encouragingly, universities and botanical gardens across the country are responding to this need, with several success stories of domestication and sustainable utilization to inspire further action.

Aquatic gardens are emerging as critical centers for germplasm conservation and public education, capable of supporting community-based initiatives and regional economies. A network of such gardens can also function as biological corridors for the migration and exchange of aquatic plant species.

It is indeed heartening to note that Green Ahalia is actively engaged in developing thematic gardens, among which Jala Nidhi—the garden of aquatic plants—is a commendable initiative. If thoughtfully developed and maintained, Jala Nidhi has the potential to evolve into a major centre for education, research, outreach, and economic development. Its accessible and replicable model offers excellent opportunities for skill development, entrepreneurship, and livelihood generation in gardening and landscaping.

The present publication offers valuable insights into the creation, significance, and maintenance of aquatic gardens. It provides botanical descriptions and photographs of the species curated in the garden, serving as an important

reference for students, researchers, nursery professionals, and landscaping experts. The inclusion of selected references for further reading enhances its value for the serious reader.

I wholeheartedly commend Green Ahalia for this important publication and congratulate the authors for their dedicated work. I look forward to more such informative publications focusing on other plant groups in the future.

Prof. M Sabu,

Former Prof and Head, Department of Botany, Calicut University and Emeritus Professor at MBGIPS, Calicut.

Message

It is heartening to note that Green Ahalia after its inception, has been making steady progress in their endeavour to establish thematic gardens in a broader perspective of greening the otherwise arid landscape. Based on our experience in developing and maintaining specialized gardens, for the benefit of different stake holders, Green Ahalia is bringing out information bulletins, since last two years. It gives me much pleasure to see the third one in the series focusing on the Aquatic Garden about which our understanding seems to be limited in general. In this publication, every aspect of Aquatic Garden establishment is dealt with and a detailed enumeration of plants found in such habitat is provided.

Our team has put in hard work to compile the information gathered and presented in such a way that inspires others to take up growing aquatic plants at least in their homes. The bulletin also highlights the utility of the species be it for food, medicine, conservation, or for ornamental purposes. To my mind, it opens up opportunities to our young community in growing aquatic plants like lotus, water lily, *Ludwigia*, etc. as an attraction for their homes or *Hydrilla* and *Ottelia,* like species for their aquaria. Thus, aquatic plants touches our lives in one or the other aspect

and stay inseparable. This adds value to the publication.

I also find that there are few species which are potentially invasive in nature but are beautiful with their flowers. This book also highlights such issues so that the reader can take informed decisions to opt or not for such perilous plants.

The book's appearance and content certainly is an improvement over the previous ones. This will be useful for those interested in gardening and visitors to our campus gardens.

I extend my best wishes to the team for bringing out such useful publications.

Dr. V. S. Gopal

Introduction

India, being one of the mega diverse countries of the world is rich in varied types of vegetation including tropical evergreen forest, semi evergreen, tropical dry deciduous, semi-desert forest, shola forests, riparian and aquatic vegetation etc. Among these vegetation, aquatic vegetation is the least studied one with only few literature available (Subramanyam, 1962; Ansari et al., 2016)

Green Ahalia has created several thematic gardens which are basically meant for conservation and protection of medicinal, traditional, rare and threatened plants etc. One such garden is "Jalanidhi – A garden of aquatic plants". The garden is established during 2021.

This garden represents the common aquatic plants seen around in ponds, lakes, rivers and in marshes. There are over 62 species in this unique garden which, we have mostly collected from wild and made it survive in the potted condition. In these represented aquatic plants, a few of them are seasonal plants namely *Rotala malampuzhensis* R.V.Nair, *Sphenoclea zeylanica* Gaertn., *Utricularia* sp. etc will dry at the end of the season. The rest of the plants are surviving well in our garden. In addition, certain plants are found to be rare in occurrence in the Palghat Gap region. We have collected such rare plants and grown in our garden. Some of the common members in our garden include unique plants like *Victoria amazonica* (Poepp.) J.C. Sowerby., *Euryale ferox* Salisb., 6 *Nymphaea* varieties, 4 *Ludwigia* sp., 3 *Ipomoea* sp. etc

The plants such as *Victoria amazonica* (Poepp.) J.C. Sowerby. and *Euryale ferox* Salisb. are very rare water lily plants (Largest waterlily in world and in India respectively) are grown in special aquatic ponds and is given special care and protection. Most of the plants in this aquatic section are herbs and few shrubs.

The journey of establishing Jala Nidhi

The idea of establishing an aquatic garden arose since there is no authenticate aquatic plant garden in the district. One of the biggest aquatic plant collection is present in Malabar Botanic Garden, Olavanna, Kerala. With vast tracts of wetland, it is one of the leading botanical gardens in India with such a large collection of aquatic plants. An aquatic plant conservatory, a protected area for lower-group plants are the main attractions in this garden.

Ahalia campus being located in Palghat Gap region has diverse range of aquatic habitats which include ponds and streams, rocky hillocks with small to medium sized water filled depressions, quarry pools etc. These habitats are home to diverse range of plants which can be generally called as wetland plants. The collection of such wetland plants can make a good aquatic garden which can be used as a resource centre for researchers, students and other stakeholders.

Establishing a mini collection of aquatic plants came to our mind then, and we started a theme garden for water plants in our garden next to shade houses where ferns, foliage and cactus and other succulents are placed and protected. An open shed was set up and water pots were arranged according to the nature of plants.

Field trips were conducted to various parts of the district and outside in search of aquatic plants suitable for our garden. We chose ponds, riverbeds, lakes, outskirts of dam and other wetlands like paddy fields and canals. In this way, several species were collected and

brought to campus. The important task is to get the plants potted and get established in an artificial aquatic potted system. Some of the represented members of this kind include *Nelumbo nucifera* Gaertn., *Pontederia crassipes* Mart., *Ottelia alismoides* (L.) Pers.es, *Rotala malampuzhensis* R.V.Nair, *Salvinia molesta* D.Mitch., *Sphenoclea zeylanica* Gaertn., *Typha angustifolia* L., etc.

In addition, several plants of ornamental value were purchased from several nurseries which include *Nymphaea mexicana* Zucc., *Nymphaea odorata* var. *rosacea* Lat.-Marl. ex M.Vilm., *Aquarius cordifolius* (L.) Christenh. & Byng, *Limnocharis flava* (L.) Buch. etc.

Things to be taken care of while setting Aquatic Garden

1. Location:

- Sunlight: Most aquatic plants need sunlight for good growth, so choose a location with at least 5 hours of daily sunlight.
- Avoid low lying (flooded) spots where water level may increase during rainy season
- Shade: Some of the aquatic plants are shade loving. Such plants need shade for their its growth; but excess shade can hinder the progressive growth.

2. Plant Selection:

- Plant type: Choose plants that thrive in the specific conditions of your pond or container (submerged, marginal, or floating).
- Growth Habits: Be aware of how quickly plants grow and multiply, especially floating plants like water hyacinths or water lettuce, and be prepared to prune or share them to prevent overcrowding.

- Eco-balance: Overabundance of plants can strain the ecosystem, so maintain a balance with a combination of floating and submerged plants.

3. Water Quality and Circulation:

- Clean Water: Use clean, moderately soft water.
- Circulation: Ensure proper circulation to prevent algae growth and debris accumulation.
- Water Testing: Regularly test water pH, hardness, and alkalinity to maintain optimal conditions for plants and fish, if present.
- Water Changes: Periodically change a portion of the water (e.g., 10% weekly or 25% bi-weekly) to remove accumulated pollutants and maintain water quality.

4. Substrate and Planting:

- Substrate: Choose a suitable substrate (e.g., gravel, sand, mud) for rooted plants.
- Manuring: The plants should be regularly manured once in a month or two. Organic manures like vermicompost, cattle manure, poultry manure and fertilizers like Urea, DAP and NPK may be used in different concentrations. In addition, use fish-safe, plant-safe fertilizers sparingly

5. Maintenance:

- Water Changes: Regularly change a portion of the water to remove pollutants and maintain water quality atleast once in a month.
- Cleanliness: Remove dead leaves, flowers, and debris to prevent algae growth and keep the water clear.

- Pest Control: Monitor for pests (snails, bugs and worms), algae, and take appropriate measures to control them.

Uses of Aquatic Plants

There are many kind of aquatic plants that could be, utilized for as feeds, fuel, building materials, soil improvement compost, mulch, medicinal and bioremediation. These plants are the chief primary producers in aquatic world providing food for aquatic life. In addition, submerged plants like *Hydrilla verticillata* (L.f.) Royle, *Ceratophyllum demersum* L., *Ottelia alismoides* (L.) Pers. release oxygen into the water through photosynthesis, supporting aquatic life.

Plants like *Pontederia crassipes* Mart. (Kulavazha), *Pistia stratiotes* L. (Duck Weed), *Typha angustifolia* L. (Aanapullu) etc play an important role in bioremediation and water purification. The plants are proven to absorb heavy metals and pollutants, helping to clean water bodies. Emergent anchored plants like *Pandanus* sp., *Homonoia riparia* Lour., *Saccharum spontaneum* L., etc stabilize shorelines and prevent soil erosion in wetlands and along riverbanks. In addition, Ludwigia sp., *Hygrophila auriculata* (Schumach.) Heine, *Ipomoea aquatica* Forssk., *Ipomoea carnea* subsp. *fistulosa* (Mart. ex Choisy) D.F.Austin, *Ipomoea pes-caprae* (L.) R.Br. etc supports in soil stabilization.

Along with this, they are the important food sources. *Nelumbo nucifera* Gaertn., *Trapa natans* L. *Ipomoea aquatica* Forssk., *Euryale ferox* Salisb., *Colocasia esculenta* (L.) Schott, *Centella asiatica* (L.) Urb. etc are some of the important food sources used by the common people. Plants that were used as traditional local food materials are getting popularized because of its nutritive value (Makhana seeds (*Euryale ferox* Salisb.) are eaten raw, roasted or boiled. Similar is the case of other plants. Plants like *Azolla pinnata* R.Br., *Hydrocharis dubia* (Blume) Backer etc are used as green manure which are the main

Nitrogen fixers enriching soil and improving crop yields in rice fields.

Centella asiatica (L.) Urb., *Bacopa monnieri* (L.) Pennell, and *Eclipta prostrata* (L.) L. are some of the important medicinal plants used in Ayurvedic systems. To add, many of the aquatic plants are used as animal feeds (*Azolla pinnata* R.Br.). Finally, most of the aquatic plants are known for its beautiful attractive flowers. They form an important place in beautifying the gardens. Some of the common plants included in the list include *Nelumbo nucifera* Gaertn., *Nymphaea sp., Nymphoides* sp., *Limnocharis flava* (L.) Buch. which are prized for its attractive colours. These plants have now taken position in landscaping and decorating homesteads and commercial spaces.

Even though, some of the plants like *Salvinia molesta* D.Mitch., *Ipomoea carnea* subsp. *fistulosa* (Mart. ex Choisy) D.F.Austin, *Pontederia crassipes* Mart. and *Pistia stratiotes* L. As can also be a nuisance to fisheries, water transportation, or water supply systems, it is desirable to find ways of controlling such vegetation by harvesting and using it. The water hyacinth, *Pontederia crassipes* Mart., is a well-known example of a nuisance plant which could be used in many ways. Usually, these invasive plants will badly affect the natural vegetation and gradually replace the natural native vegetation. Once these plants under control take over special place in the aquatic garden because of its attractive flowers, leaf patterns etc. These plants can be grown as central attraction in controlled conditions.

Many new applications and uses of aquatic plants are coming up including paper production, biogas generation, compost making etc. More and more research is occurring to find out new innovative ideas of utilizing these potential green warriors.

Invasive potential of aquatic plants

Biological invasion caused by invasive species have become the primary reasons for biological loss. Invasive alien species are now a major focus of global conservation concern. A catalogue of invasive alien flora of India by Reddy (2008) highlights about 176 alien taxa that pose threat to the ecosystems. Some such represented members include *Pontederia crassipes* Mart., *Pistia stratiotes* L., *Salvinia molesta* D.Mitch., *Typha angustifolia* L., *Acrostichum aureum* L., *Ipomoea carnea* subsp. *fistulosa* (Mart. ex Choisy) D.F.Austin etc.

An alien plant that has escaped from its original ecosystem and is reproducing on its own in the regional flora is considered a naturalized species. Those naturalized aliens that become so successful as to spread in the flora and displace native biota or threatens valued environmental, agricultural or personal resources by the damage it causes are considered invasive.

Jala Nidhi garden maintains a section of aquatic alien invasive plants which are taken care utmost care. Such plants need to be kept away from native water bodies so that they never get into contact with the native species. The plant debris are regularly removed and properly disposed.

Threats to the aquatic vegetation

1. **Habitat destruction:** Conversion of natural aquatic ecosystems like ponds, lakes, rivers and other wetlands for urbanization, infrastructure development and agriculture may lead to habitat loss and fragmentation
2. **Introduction of Alien invasive taxa:** When non-native species are introduced to a new environment, they can outcompete the native species for resources, alter ecosystems, and even drive

native species to be slowly replaced and make their existence under threat. For example, the introduction of invasive species like the Water hyacinth (*Pontederia crassipes* Mart.) and kariba weed (*Salvinia molesta* D.Mitch.) in India had a detrimental impact on native aquatic ecosystems.

3. **Aquatic vegetation as waste dumping grounds:** Often aquatic habitats become the dumping ground of waste that will slowly deteriorate the health of aquatic biodiversity. The water and soil will get polluted and will negatively affect the biotic life in it.

4. **Unscientific filling of water sources and infrastructure development:** The unscientific filling of water sources and construction of new buildings may make the disappearance of very rare, threatened or endemic taxa from its natural habitat. These plants may have only a small niche to which they are adapted. They may not be able to thrive in an altered environment and may perish forever.

5. **Over exploitation:** Over – exploitation of plants for its medicinal value creates a lot of negative effects. Population of such medicinal plants which were once abundant become reduced and later become rare due to uncontrolled harvesting, pruning and uprooting of plants for various medicine preparation. Such overexploitation of resources creates instability in ecosystem and negatively affect the total biodiversity.

Aquatic vegetation and its classes

The water systems that hold pure aquatic vegetation can broadly be divided into two major types: (1). Stagnant water (Pond, Canals, Water tanks, lakes, Water bodies in quarries etc.) and (2). Running water like rivers, streams, ditches, estuaries and sea etc. The plants

growing in these aquatic systems can be brought under the following groups based on their growth form with relation to substratum and water (Hutchinson, 1975; Sunil and Sivadasan, 2009).

1. **Free floating hydrophytes:** These are the plants that live on the surface of water in contact with the air. They mainly occur in stagnant water. Some of the represented members include *Pontederia crassipes* Mart., *Spirodela polyrhiza* (L.) Schleid., *Azolla pinnata* R.Br., *Pistia stratiotes* L. etc

2. **Suspended hydrophytes:** These plants are anchored and submerged in young stage, but later get detached from their roots and live below the surface of water. *Hydrilla verticillata* (L.f.) Royle., *Utricularia aurea* Lour., *Ceratophyllum demersum* L. are some of the represented members. As these plants cannot survive in fast flowing water they are found to be restricted in stagnant waters like ponds, lakes and tanks.

3. **Anchored hydrophyte with floating leaves:** These plants are found in shallow stagnant waters such as ponds, pools, tanks and seasonally flooded lowlands. They tide over their unfavorable periods by perennial organs like rhizomes, tubers, stolons etc. they are represented by *Aponogeton natans* (L.) Engl. & Krause., *Nelumbo nucifera* Gaertn., *Nymphaea sp.*, etc. Most of the plants are characterized by dimorphic leaves: the juvenile leaves and mature floating leaves.

4. **Anchored hydrophytes with floating shoots:** The members in these group are attached to the substratum, but the branches trail or creep along the water surface, often rooted at nodes. They are mostly found in ponds, lakes, tanks, rock pools in hillocks etc. some of the represented members includes *Nymphoides indica* (L.) Kuntze, *Ipomoea aquatica* Forssk., *Ludwigia adscendens* (L.) H.Hara etc.

5. **Submerged anchored hydrophytes:** These plants are anchored well in the substratum and live below the surface of water. The plant may be either caulescent or acaulescent and are found in stagnant or running water. *Ottelia alismoides* (L.) Pers. es is one of the common member in this group.

6. **Emergent anchored hydrophytes:** These plants are characterized by anchorage to substratum under water, but produce aerial shoot projecting well above the water. *Acorus calamus* L., *Ipomoea carnea* subsp. *fistulosa* (Mart. ex Choisy) D.F.Austin, *Pontederia vaginalis* Burm.f., *Limnocharis flava* (L.) Buch. etc. are some of the represented members.

Table 1. Aquatic plant diversity in Ahalia Garden (Till January 2025)

Sl. No	Binomial Name	Family	Category
1	*Acorus calamus* L.	Acoraceae	EAH
2	*Acrostichum aureum* L.	Pteridaceae	EAH
3	*Ammannia baccifera* L.	Lythraceae	EAH
4	*Aponogeton natans* (L.) Engl. & Krause natans	Aponogetonaceae	SAH
5	*Aquarius cordifolius* (L.) Christenh. & Byng	Alismataceae	EAH
6	*Azolla pinnata* R.Br.	Salviniaceae	FFH
7	*Bacopa caroliniana* (Walter) B.L.Rob.	Plantaginaceae	SH
8	*Bacopa monnieri* (L.) Pennell	Plantaginaceae	SH

Sl. No	Binomial Name	Family	Category
9	*Centella asiatica* (L.) Urb.	Apiaceae	SH
10	*Ceratophyllum demersum* L.	Ceratophyllaceae	SH
11	*Ceratopteris thalictroides* (L.) Brongn.	Pteridaceae	EAH
12	*Colocasia esculenta* (L.) Schott	Araceae	EAH
13	*Cyanotis axillaris* (L.) D. Don	Commelinaceae	EAH
14	*Cyperus difformis* L.	Cyperaceae	EAH
15	*Cyperus iria* L.	Cyperaceae	EAH
16	*Dopatrium junceum* (Roxb.) Buch.-Ham. ex Benth.	Plantaginaceae	AHFS
17	*Eclipta prostrata* (L.) L.	Asteraceae	EAH
18	*Equisetum ramosissimum* Desf.	Equisetaceae	EAH
19	*Euryale ferox* Salisb.	Nymphaceae	AHFL
20	*Hydrilla verticillata* (L.f.) Royle	Hydrocharitaceae	SH
21	*Hydrocharis dubia* (Blume) Backer	Alismataceae	AHFL
22	*Hydrocleys nymphoides* (Humb. & Bonpl. ex Willd.) Buchenau	Alismataceae	AHFL
23	*Hygrophila auriculata* (Schumach.) Heine	Acanthaceae	EAH
24	*Ipomoea aquatica* Forssk.	Convolvulaceae	AHFS
25	*Ipomoea carnea* subsp. *fistulosa* (Mart. ex Choisy) D.F.Austin	Convolvulaceae	EAH

Sl. No	Binomial Name	Family	Category
26	*Ipomoea pes-caprae* (L.) R.Br.	Convolvulaceae	EAH
27	*Limnocharis flava* (L.) Buch.	Alismataceae	EAH
28	*Limnophila aromatica* (Lam.) Merr.	Plantaginaceae	EAH
29	*Limnophila chinensis* (Osbeck) Merr.	Plantaginaceae	EAH
30	*Limnophyton obtusifolium* (L.) Miq.	Alismataceae	EAH
31	*Ludwigia adscendens* (L.) H.Hara	Onagraceae	AHFS
32	*Ludwigia hyssopifolia* (G.Don) Exell	Onagraceae	EAH
33	*Ludwigia peruviana* (L.) H. Hara	Onagraceae	EAH
34	*Ludwigia sedioides* (Humb. & Bonpl.) H.Hara	Onagraceae	AHFS
35	*Marsilea minuta* L.	Marsileaceae	AHFL
36	*Nelumbo nucifera* Gaertn.	Nelumbonaceae	AHFL
37	*Nymphaea mexicana* Zucc.	Nymphaceae	AHFL
38	*Nymphaea micrantha* Guill. & Perr.	Nymphaceae	AHFL
39	*Nymphaea nouchali* Burm.f.	Nymphaceae	AHFL
40	*Nymphaea nouchali* var. *caerulea* (Savigny) Verdc.	Nymphaceae	AHFL

Sl. No	Binomial Name	Family	Category
41	*Nymphaea nouchali* var. *versicolor* (Sims) Guruge & Yakand.	Nymphaceae	AHFL
42	*Nymphaea odorata* var. *rosacea* Lat.-Marl. ex M.Vilm.	Nymphaceae	AHFL
43	*Nymphoides aquatica* (J.F.Gmel.) Kuntze	Menyanthaceae	AHFS
44	*Nymphoides hydrophyllum* (Lour.) Kuntze	Menyanthaceae	AHFS
45	*Nymphoides indica* (L.) Kuntze	Menyanthaceae	AHFS
46	*Ottelia alismoides* (L.) Pers.es	Hydrocharitaceae	SAH
47	*Pandanus* sp.	Pandanaceae	EAH
48	*Persicaria barbata* (L.) H.Hara.	Polygonaceae	EAH
49	*Pistia stratiotes* L.	Araceae	FFH
50	*Pontederia crassipes* Mart.	Pontederiaceae	FFH
51	*Pontederia vaginalis* Burm.f.	Pontederiaceae	EAH
52	*Rotala malampuzhensis* R.V.Nair	Lythraceae	SAH
53	*Rotula aquatica* Lour.	Boraginaceae	EAH
54	*Salvinia molesta* D.Mitch.	Salviniaceae	FFH
55	*Schoenoplectiella articulata* (L.) Lye	Cyperaceae	EAH
56	*Schoenoplectiella juncoides* (Roxb.) Lye	Cyperaceae	EAH
57	*Sphenoclea zeylanica* Gaertn.	Sphenocleaceae	EAH
58	*Spirodela polyrhiza* (L.) Schleid.	Lemnaceae	FFH

Sl. No	Binomial Name	Family	Category
59	*Trapa natans* L.	Lythraceae	AHFS
60	*Typha angustifolia* L.	Typhaceae	EAH
61	*Utricularia aurea* Lour.	Lentibulariaceae	SH
62	*Victoria amazonica* (Poepp.) J.C. Sowerby	Nymphaceae	AHFL

*** FFH- Free floating hydrophytes; SH - Suspended hydrophytes; AHFL - Anchored hydrophyte with floating leaves; AHFS - Anchored hydrophytes with floating shoots; SAH - Submerged anchored hydrophytes; EAH -Emergent anchored hydrophytes*

Enumeration of Taxa

Pteridophytes

Acrostichum aureum L.

Family: Pteridaceae

Local Name: Golden leather fern

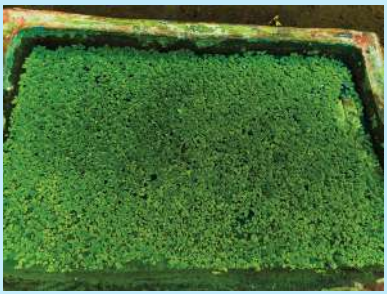
Habit: Gregarious Herb

Habitat: Swamps and mangroves, salt marshes and on river banks

Description: Gregariously growing rhizomatous erect terrestrial herbs densely covered with scales. Leaves simple, pinnate with oblong pinnae, stipe thick, dark brown, glabrous above,. Juvenile leaves red tinged or brown at tips, mature dark green. Sori at back of leaves orange turning dark brown to blackish.

Use: Young leaves are edible

Azolla pinnata R.Br.



Family: Salviniaceae
Local Name: E- Feathered mosquito fern, Water velvet
Habit: Herb
Habitat: Free floating in ponds, rivers, lakes, paddy fields etc

Description: Floating herbs, triangular in outline. Rhizome slender, branched; young roots in fusiform calyptra. Leaves 2-lobed, aerial, dorsal lobe, elliptic or rectangular, fleshy, containing mucilaginous cavities filled with blue-green algae; submerged lobes rounded, translucent, entire.

Use: Used as green manure.

Ceratopteris thalictroides (L.) Brongn.

Family: Pteridaceae

Local Name: M – vellankulachira; E - Rigid hornwort, Coontail

Habit: Herb

Habitat: Found in marshes

Description: Rhizomes short, erect, with brown fibrous roots. Fronds dimorphic; sterile fronds broad, bright green, thin and finely dissected; Fertile fronds erect and narrower with lesser divisions bearing sporangia on the undersides. Sporangia clustered in sori without indusia

Use: Widely used as an aquarium plant.

Equisetum ramosissimum Desf.

Family: Equisetaceae

Local Name: E - branched horsetail

Habit: Herb

Habitat: Grown as an ornamental plant in aquatic gardens Naturally found in wet moist habitats and damp soils

Description: Perennial herbs with hollow and jointed stems. Stem green, ridges and rough to touch. Fronds reduced to small, scale like structures fused into sheaths at the nodes. Reproductive structures are cones (Strobili) at the tip of stem.

Use: Diuretic, traditional medicine; helps stabilize soil and prevent erosion

Ornamental purposes: used in gardens and landscaping for its unique appearance

Note: This species is adapted to living in areas with high water tables or periodic flooding.

Marsilea minuta L.

Family: Marsileaceae

Local Name: E - Pepperwort

Habit: Herb

Habitat: Grows as aquatic or semi - aquatic in ponds, paddy fields and marshy places

Description: Terrestrial or aquatic herbs with long creeping rhizome, 1-1.5 mm thick. Fronds 8-10 x 1-2 cm, simple; stipe 6-8 cm long, slender, glabrous or softly pubescent; lamina 4-fid; each lobe 0.8-1 x 0.6-1 cm, obovate or obtriangular, lobed to serrate along the outer margins. Sporocarps 3 x 2.5 mm, oblongoid, hispid when young, less hairy at maturity, with 4-5 mm long stalk, produced in clusters.

Use: Vegetable and medicine.

Salvinia molesta D.Mitch.

Family: Salviniaceae

Local Name: M - African Payal; E- Giant Salvinia

Habit: Herb

Habitat: Seen free floating in ponds, rivers, lakes etc

Description: Free floating aquatic fern. Stem horizontal rhizome, internodes short. Floating leaves, oblong, vary in colour from green to greenish brown to brown, arranged in opposite pair. Submerged leaves modified into root like structure, highly dissected.

Use: Fodder. Note: this is a serious problem in lakes

Angiosperms

Acorus calamus L.

Family: Acoraceae

Local Name: M- Vayambu, T- Vasambu, H- Gorbach, E-Sweet Flag

Habit: Herb

Habitat: Marshy localities and often cultivated.

Flowering & Fruiting: April to July

Description: An aromatic rhizomatous herb. Leaves simple, ensiform, glossy bright green, apex acute, base amplexicaul, sheathing at base.

Use: Medicinal, colic pain, throat clearing etc

Ammannia baccifera L.

Family: Lythraceae

Local Name: M-Kalloravanchi, E-Blistering ammania

Habit: Herbs

Habitat: Paddy fields, other wet marshy lands.

Flowering & Fruiting: September- December.

Description: Annual herbs. Stem 4-angled or more or less winged, much branched. Leaves simple, decussate, sessile, linear-lanceolate, becoming smaller towards the apex. Cymes axillary, few flowered and sessile. Sepals 4 triangular. Petals absent. Stamens 4. Ovary globose 4 -5 locular. Ovules many. Seed brownish.

Use: Traditional medicine

Aponogeton natans (L.) Engl. & Krause

Family: Aponogetonaceae

Habit: Herb

Local Name: M - Paruakizhangu , E - Drifting sword plant, T - Kotti kizhangu

Habitat: Ponds and paddy fields

Flowering & Fruiting: August - December

Description: Tuberous rooted herbs with floating petioled leaves usually floating, rarely submerged; Floating leaves oblong, cordate at base; Inflorescence a single spike, with small white, pink or purple flowers. Fruits smooth and beaked.

Use: Tubers are edible.

Aquarius cordifolius (L.) Christenh. & Byng.

Family: Alismataceae

Local Name: E - Spade-leaf sword, Creeping Burhead

Habit: Herb

Habitat: Often cultivated in pots as ornamental plants

Flowering & Fruiting: October - December

Description: Stout perennial rhizomatous herbs. Leaves large, cordate to ovate, dark glossy green, 3-5 prominent veins and lines of translucent spots. Inflorescence in racemes, 3 – 15 flowered. Peduncles terete; rachis triangular. Flowers white peduncled appearing as clusters in nodes, petals not clawed; stamens 22; anthers versatile; pistils 200–250. Fruits oblanceolate, plump, 3 – 4 ribbed.

Use: The plants are found to be ornamental with attractive flowers. Sold in nurseries.

Bacopa caroliniana (Walter) B.L.Rob.

Habit: Herb

Habitat: Wet and moist soils, often grown in aquariums and aquatic gardens

Flowering & Fruiting: Throughout the Year

Description: Aquatic emergent herbs. Stem creeping or ascending, rooting at nodes. Leaves simple opposite, ovate to rounded, succulent and bright green. Flowers small, blue, axillary solitary. Sepals 4, petals 4.

Use: Ornamental

Bacopa monnieri (L.) Pennell

Family: Plantaginaceae

Local Name: M- Bhrammi, E – Bacopa, T- Neerpirami, S & H - Brahmi

Habit: Herb

Habitat: In the plains and often cultivated

Flowering & Fruiting: Throughout the Year

Description: Annual or perennial amphibious herbs. Stem creeping with ascending branches. Leaves opposite, decussate, sessile, succulent, ovate-oblong, gland dotted. Flowers solitary, axillary, pedicelled, Calyx-lobes 5; Corolla bluish-white, broadly campanulate, 2 – lipped. Stamens 4, didynamous. Fruits a capsule, oblong globose, seeds oblong, reticulate.

Use: Used as brain tonic. Also as vegetable.

Centella asiatica (L.) Urb.

Family: Apiaceae
Local Name: M- Kudangal, T- Vallaeai, H-Brahma manduki, E-Indian pennywort

Habit: Herb

Habitat: Marshy and wet waste lands, paddy fields.

Flowering & Fruiting: Throughout the year.

Description: Prostrate herbs, rooting at nodes. Leaves in rosettes arising from the nodes, sheathed at the base, simple, orbicular-reniform, margins dentate. Flowers in umbels, pink or white. Peduncles shorter than the leaves. Calyx adnate to ovary, 4 lobed. Petals 4. Fruits ovoid-ellipsoid capsule, 7-9 ribbed.

Use: Medicinal, Also as vegetable.

Ceratophyllum demersum L.

Family: Ceratophyllaceae

Local Name: M – Kaimbayal; E – Hornwort, Coontail

Habit: Herb

Habitat: Free floating plant in ponds usually submerged

Flowering & Fruiting: October - January

Description: Submerged rootless herbs. Leaves 7 -12 in close verticels. Flowers solitary, sessile. Male flowers with 10 – 15 subequal perianth segments, female flowers with 10 – 15 perianth segments, sessile. Fruit a nutlet, ovoid, compressed with 3 spines

Use: Common Aquarium plant

Colocasia esculenta (L.) Schott

Family: Araceae

Local Name: M – Chembu; E – Taro; S – Alukam; T - Sempu

Habit: Herb

Habitat: Waterlogged ditches, streamside and other marshes

Flowering & Fruiting: May - October

Description: Stoloniferous rhizomatous herbs. Stem short. Leaves peltate, ovate, cordate to sagitate at base; Inflorescence spadix; spathe ovate – lanceolate, constricted below the middle, green coloured below and orangish – yellow coloured above. Spadix cylindrical, appendages terete, obtuse. Female flowers at the base of spadix; sterile and male flowers at the tip; stamens united to a synandrium. Fruits aggregate of berries, globose.

Use: Widely cultivated for starchy tubers.

Cyanotis axillaris (L.) D. Don

Family: Commelinaceae

Local Name: M – Nirpullu; E - Creeping Cradle Plant; T - Vazhukai Pul;

Habit: Herb

Habitat: Seen abundant in swamps, marshes, ditches and rice fields

Flowering & Fruiting: August - December

Description: Fleshy decumbent herbs; rooting at nodes, often purple coloured. Leaves linear – lanceolate, margins with short stiff hairs, both surface glabrous, green. Flowers in axillary fascicles enclosed within the leaf sheath. Sepals 3, pale green; Petals 3, pink or blue; stamens 6, free, bearded with blue or pink hairs. Capsules beaked, glabrous; seeds deeply pitted.

Use: Used locally as medicine for ear pain

Cyperus difformis L.

Family: Cyperaceae

Habit: Herb

Habitat: Marshy areas, paddy fields and seasonally flooded areas

Flowering & Fruiting: Throughout the Year

Description: Tufted non – rhizomatous annual herbs. Leaves few, basal, linear – acute, flat; sheaths yellowish – brown. Inflorescence in terminal clusters of spikelets. Spikelets linear, obtuse. Glumes broadly ovate – elliptic; margins broadly white – hyaline, keel yellowish. Stamens 1 or 2. Stigmas 3. Nuts ellipsoid, obtuse and apiculate, trigonous and pale brown.

Use: Used as fodder.

Cyperus iria L.

Family: Cyperaceae

Local Name: E- Iria flatsedge

Habit: Herb

Habitat: In marshy areas and edges of Paddy fields

Flowering & Fruiting: September - December

Description: Erect non tufted, non-rhizomatous annual herbs. Culms triquetrous. Leaves few, basal; sheaths purplish – brown. Involucral bracts 3 – 7, foliaceous. Inflorescence compound, rays 3 – 8, unequal. Spikes ovoid – cylindrical. Spikelets linear – oblong, golden yellow. Stamens 2 – 3. Style 3 – cleft. Nuts obovate, triquetrous, shining dark brown to black.

Use: Fresh roots aromatic and used in medicines

Dopatrium junceum (Roxb.) Buch.-Ham. ex Benth.

Family: Plantaginaceae

Local Name: E - Horsefly's Eye

Habit: Herb

Habitat: Abundant in pools, paddy fields and marshy areas in waterlogged ponds, quarries

Flowering & Fruiting: August - October

Description: Annual slender glabrous marshy herbs. Stem

slender, semi – succulent. Leaves decussate, sessile, elliptic – oblong, the lower pairs small, the upper ones minute. Flowers small, axillary, solitary, bisexual, violet; lower ones sessile and upper ones pedicelled. Calyx small, 5 – partite; corolla 2 – lipped; stamens 2, filaments light yellow, filiform; Capsule globose, seeds cuneately ovoid, longitudinally ribbed.

Use: Used to treat **inflammatory Diseases**

Eclipta prostrata (L.) L.

Family: Asteraceae

Local Name: Kayyonni

Habit: Herb

Habitat: Paddy fields and other Marshy wetlands

Flowering & Fruiting: Throughout the Year

Description: Slender herbs. Stem terete. Leaves simple, opposite, oblong – lanceolate, sessile or subsessile. Flowers in heads. Involucral bracts in 2 rows. Outer bracts 5, ovate-elliptic; inner bracts 5, elliptic-obovate. Ray florets 2-3- seriate, female. Disk florets numerous, Corolla campanulate, 4 – lobed. Stamens 4 or 5. Ovary hairy at apex, style branches 2, pubescent. Achenes yellowish brown to brown, dorsiventrally compressed and sharply angled.

Use: Medicinal Plant, used in Ayurvedic hair oil preparation

Euryale ferox Salisb.

Family: Nymphaeaceae

Local Name: E - Prickly waterlily Gorgon plant, fox nut; A - Makhana,

Habit: Herb

Habitat: Pools and ponds

Flowering & Fruiting: May-December

Description: tuberous and rooted, densely prickly aquatic herb. Leaves simple; petioles long and prickly. Leaf blade thick, leathery, covered with prickles on both surfaces and along the veins. Broadly orbicular with a deep cleft at the base, centrally peltate, margins entire or slightly undulate. Flowers purplish – violet. Sepals 4, fleshy, triangular – ovate, violet or pinkish-violet inside, green and armed with scattered recurved prickles outside. Petals many, spirally arranged in many whorls. Fruits much prickly with accrescent sepals. Seeds sub-globose, wrinkled, dark brown, enclosed in pulpy white aril marked with scattered reddish streaks.

Use: The seeds are eaten raw, roasted or boiled.

Hydrilla verticillata (L.f.) Royle

Family: Hydrocharitaceae

Local Name: E –Water thyme

Habit: Herb

Habitat: Stagnant ponds and other waterbodies

Flowering & Fruiting: Throughout the Year

Description: Submerged perennial monoecious herbs. Roots unbranched. Leaves cauline in whorls, 3 – 12, sessile, linear – lanceolate. Male flowers minute, pedicelled, sepals 3, ovate to sub-orbicular, green; petals 3, spathulate, white, stamens 3. Female flowers sub-sessile, sepals 3, white. Petals 3, styles 3, very small. Fruits cylindrical indehiscent capsule. Seeds ellipsoid, smooth.

Use: Commonly used plant in aquariums

Hydrocharis dubia (Blume) Backer

Family: Alismataceae

Local Name: M – Thavalachedi

Habit: Herb

Habitat: Ponds and slow-running water courses

Flowering & Fruiting: August - November

Description: Aquatic perennial herbs with emergent and

floating leaves. Leaf blade cordate to orbicular, 5 – 7 veined. Male flowers arising 1–4 together on short pedicels from a peduncled spathe. Female flowers arising singly on a pedicel from a sessile spathe. Male flowers with sepals green; petals yellow; stamens 12, inner 3 stamens staminodal. Female flowers larger than male flowers, sepals green; petals white, yellow at base, staminodes 6; glands 3; styles with dense glandular hairs. Fruit berrylike, spherical to obovoid.

Use: Green manure and Ornamental.

Hydrocleys nymphoides (Humb. & Bonpl. ex Willd.) Buchenau.

Family: Alismataceae

Local Name: Water poppy

Habit: Herb

Habitat: Ponds and slow-running water courses

Flowering & Fruiting: September - December

Description: Free-floating or rooted aquatic herbs. Leaves broadly ovate to cordate (heart-shaped), glossy green, and floating; long, spongy petioles attach them to creeping stems. Stems rooting at nodes. Flowers: Solitary, cup-shaped, bright yellow with three rounded petals and a dark maroon center; borne above water on erect peduncles.

Use: Ornamental plant in gardens

Hygrophila auriculata (Schumach.) Heine

Family: Acanthaceae

Local Name: M – Vayalchulli

Habit: Herb

Habitat: Fallow Paddy fields and other moist localities

Flowering & Fruiting: September - April

Description: Thorny gregarious sub shrubs with sharp axillary thorns. Stem unbranched, hispid, thickened at nodes. Leaves sessile, simple in whorls of thorns and leaves, lanceolate, margins dentate. Flowers in axillary whorls, surrounded by axillary spines. Calyx tube unequally 4 lobed. Petals blue to purple coloured, midlobe of the lip with an yellow spot. Stamens 4, didynamous. Capsules linear oblong. Seeds orbicular.

Use: Medicinal.

Ipomoea aquatica Forssk.

Family: Convolvulaceae

Local Name: M - Neermuthakku; E - Water Morning Glory; H – Kalmi; T - Nalikam

Habit: Trailing prostrate wines.

Habitat: Marshy or aquatic-floating herbs

Flowering & Fruiting: November - March

Description: Perennial aquatic herbs. Stem hollow, rooting at the nodes. Leaves simple, alternate, lanceolate – sagittate or hastate. Flowers purplish – white, solitary or few in cymes. Calyx lobes sub-equal, bearing nectaries on the outside. Corolla funnel shaped, pink, throat purplish or white. Stamens included; filaments unequal, hairy at base. Capsules sub – globose, dark brown, minutely pubescent. Seeds 2 or 4.

Use: Used as vegetable.

Ipomoea carnea subsp. *fistulosa* (Mart. ex Choisy) D.F.Austin

Family: Convolvulaceae

Local Name:
M - Neyveli katta, Neyvelipoo; E - Bush Morning Glory

Habit: Gregarious Shrub

Habitat: In marshy areas along the banks of streams and paddy fields and wet slopes

Flowering & Fruiting: Throughout the Year

Description: Perennial erect or sub - scandent shrubs. Stem woody. Leaves simple, broadly ovate to deltate, cordate at base. Flowers in axillary cymes or panicles; peduncles upto 10cm long. Calyx lobes 5, sub-equal with nectaries outside; Corolla pale – pink. Stamen filaments villous at base. Capsules globose with persistant sepals. Seeds covered with brownish wooly hairs.

Use: Used as anti-inflammatory drug. The dried stems used as fuel.

Ipomoea pes-caprae (L.) R.Br.

Family: Convolvulaceae

Local Name: Adambuvalli

Habit: Herb

Habitat: Sandy sea coasts and mangrove forests, beaches,

Flowering & Fruiting: November - March

Description: Stout creepers. Leaves shallowly 2-lobed, broadly orbicular, base truncate, coriaceous. Flowers solitary or few in axillary cymes. Calyx lobes 5, unequal, ovate, acuminate, outer surface wrinkled. Corolla pink, funnel-shaped. Stamens 5. Style long, pilose. Capsule sub - globose, glabrous. Seeds brownish - tomentose.

Use: Sand stabilization cover crop.

Limnocharis flava (L.) Buch.

Family: Alismataceae

Local Name: M - Nagapola

Habit: Herb

Habitat: Marshy areas, shallow ponds and paddy fields

Flowering & Fruiting: Throughout the Year

Description: Perennial herbs with stout rhizome. Leaves radical, ovate to broadly elliptic or sub- orbicular. Petiole triangular,

spongy. Inflorescence terminal, 2 – 15 flowered umbels; peduncles triangular. Sepals broadly ovate, green persistent. Petals pale yellow with darker base. Stamens numerous surrounded by whorl of staminodes. Carpels numerous. Fruits sub-globose. Seeds numerous, ovate, dark brown.

Use: Used as vegetable

Limnophila aromatica (Lam.) Merr.

Family: Plantaginaceae

Local Name: M- Manganari

Habit: Herb

Habitat: Waterlogged areas

Flowering & Fruiting: August - December

Description: Glabrous herbs. Leaves opposite or in whorls, oblong – lanceolate, rounded and semi-amplexicaul at base, margin serrulate. Flowers in many-flowered, terminal or axillary racemes. Calyx campanulate, glandular, lobes 5, sub-equal, lanceolate, acuminate. Corolla purple, sparsely glandular without, densely villous within. Stamens 4. Ovary ellipsoid; stigma white. Fruit a sub – globose capsule. Seeds many, minute, blackish – brown.

Use: Folk medicine, potential ornamental aquatic plant

Limnophila chinensis (Osbeck) Merr.

Family: Plantaginaceae

Local Name: M- Manganari

Habit: Herb

Habitat: Waterlogged areas.

Flowering & Fruiting: February- April

Description: Erect herbs with quadrangular stem, pubescent. Leaves sessile, ovate-lanceolate, decussate or whorled, upper surface glabrous, lower surface hairy. Flowers pale blue in axillary, solitary or in terminal racemes, calyx lanceolate. Corolla pale blue or pink, tube yellowish green with purple lines, villous inside, pubescent outside. Stamens 4.

Use: Folk medicine.

Limnophyton obtusifolium (L.) Miq.

Family: Alismataceae

Local Name: M – Chullithamara; E - English- Arrow Head; T - Nirchempu

Habit: Herb

Habitat: Marshy areas

Flowering & Fruiting: December - March

Description: Annual marshy herb with milky latex. Leaves basal, emergent, ovate triangular or sagittate, broadly cordate at base. Inflorescence in panicle. Flowers in whorls of 10-14 on branches. Sepals white, obovate. Stamens 6. Ovaries 12-20, free. Achenes in globose clusters, reticulately ribbed and shortly beaked.

Use: Epilepsy and Ulcers.

Ludwigia adscendens (L.) H.Hara.

Family: Onagraceae

Local Name: M- Neerkaramba, E- Water Primrose, H- Kessara

Habit: Herb

Habitat: Ponds and ditches

Flowering & Fruiting: Throughout the year

Description: Semi aquatic herb. Stem prostrate and ascending, if floating then with spongy spindle- shaped pneumatophores at the junctions of branches. Leaves oblong-elliptic, entire, glossy green. Flowers solitary in leaf axils. Calyx tube with five lobes, narrow-lanceolate. Petals 5, obovate to broadly elliptic, cream coloured or white with an yellowish blotch inside. Stamens 10. Fruit a terete capsule, 10 ribbed.

Use: Folk medicine.

Ludwigia hyssopifolia (G.Don) Exell

Family: Onagraceae

Local Name: M - Neergrampu

Habit: Herb

Habitat: Marshy places

Flowering & Fruiting: August - December

Description: Annual herbs. Stem erect, quadrangular and narrowly winged. Leaves simple, lanceolate-elliptic. Sub-glabrous and membranous. Flowers axillary solitary in leaf axis. Pedicel upto 2 mm long. Sepals 4, calyx lobes 4, tube narrow, lanceolate,

persistent. Petals 4, yellow to orangish yellow colour. Stames 8, filaments white, unequal. Ovary 4 celled, numerous ovules. Fruit a terete, 8-ribbed capsule. Seeds dimorphic-uniseriate and pluriseriate.

Use: Used in folk medicine.

Ludwigia peruviana (L.) H.Hara

Family: Onagraceae

Local Name:

Habit: Shrub

Habitat: Found in marshy areas, along paddy field, river banks.

Description: Perennial shrubs, villous throughout, leaves simple alternate, elliptic-lanceolate. Flowers solitary in upper leaf axils, yellow. Pedicels quadrangular, villous. Sepals 4(5), lanceolate, acuminate, serrulate, villous. Petals 4(5), sub-orbicular, shallowly imarginate. Stamens twice as many as sepals, sub-equal. Ovary quadrangular, ovules pluri-seriate. Fruit a quadrangular capsule with prominent ribs. Seeds ellipsoid, pale brown.

Ludwigia sedioides (Humb. & Bonpl.) H.Hara

Family: Onagraceae

Local Name: M – Manjakadali; E – Mosaic plant

Habit: Herb

Habitat: Aquatic garden plant

Flowering & Fruiting: October - January

Description: Aquatic perennial herbs. Stem profusely branched below with branches bearing floating rosettes of densely packed leaves at the end. Leaves rhomboid-ovate, serrate in the upper half, forming beautiful symmetrically arranged colonies on the water surface, bright pinkish below and along the margins; the inner younger leaves bright green above. The older ones become purple. Flowers axillary, solitary, bright yellow, emerging out from water. Petals 4, yellow. Stamens 8. Fruit a capsule.

Use: Ornamental.

Nelumbo nucifera Gaertn.

Family: Nelumbonaceae

Local Name: M - Chenthamara

Habit: Herb

Habitat: Fresh water ponds and lakes, also grown as an ornamental plant

Flowering & Fruiting: August - January

Description: Perennial rhizomatus herbs. Leaves orbicular, peltate entire or variate margin, dark green above, flat when floating, concave or bowl shaped when emersed. Petioles 60-180 cm long, weak, minutely prickly. Flowers emergent, rose- pink, white, white with pink at the tips or rarely creamy yellow. Pedicels exceeds the petiole. Sepals ovate or elliptic, concave, green when petals rose pink. Petals numerous, obovate or elliptic oblong, concave. Stamens numerous. Receptacle obconical, spongy. Carpels many, oblong - cylindric, sunk in the cavity of spongy receptacle. Fruiting carpels ellipsoid. Seeds ovoid-oblong, black.

Use: Edible, Medicine and spiritual. Rhizomes edible.

Nymphaea mexicana Zucc.

Family: Nymphaeaceae

Local Name: M - Manja ambel

Habit: Herb

Habitat: Grown as aquatic plant in gardens

Flowering & Fruiting: Throughout the Year

Description: Perennial rhizomatous hers. Leaves orbicular to broadly ovate, green above, often purplish or reddish underneath with possible blotches. Flowers floating or slightly emergent, bright yellow. Sepals 4, green with purple mottling. Petals numerous (20-40), narrowly pointed, spirally arranged. Stamens numerous, bright yellow with flattened filaments. Carpels numerous, united into a syncarpous gynoecium.

Use: Ornamental.

Nymphaea micrantha Guill. & Perr.

Family: Nymphaceae

Local Name: M - Violet Ambel

Habit: Herb

Habitat: Grown as aquatic plant in gardens

Flowering & Fruiting: Throughout the Year

Description: Rhizomes erect, hispid, white inside. Leaves ovate-orbicular, entire or sinuate-dentate and undulate along margin, dark shiny green above, pale green or purplish green with dark brown spot beneath. Flowers purplish colour, slightly fragrant or even white. Sepals spreading, ovate, acute and cucullate at apex, green with brownish red streaks outside. Petals purplish, cucullate at apex. Stamens numerous, forming a wide ring around the stigma, filaments yellow, sterile appendages blue. Carpels 18-21. stigmatic surface appendages oblong, yellow, incurved after pollination.

Use: Ornamental.

Nymphaea nouchali Burm.f.

Family: Nymphaeaceae

Local Name: M - Neelambel

Habit: Herb

Habitat: Fresh water ponds and lakes, also grown as an ornamental plant

Flowering & Fruiting: Throughout the Year

Description: Rhizomes erect, black woolly. Leaves elliptic orbicular, obtusely acute, entire and undulate along margin, green above, purple beneath atleast towards the margin. Flowers creamy white, slightly fragrant. Sepals oblong-lanceolate, green with pinkish margins outside. Petals 12-20 no's, elliptic-lanceolate, mauve coloured. Stamens numerous, filaments light yellow; sterile appendages white or pale bluish pinch, innermost stamens without appendages. Stigmatic surface concave with minute central core, bright yellow colour; stigmatic appendages bright yellow and triangular. Fruits spherical.

Use: Ornamental.

Nymphaea nouchali var. *caerulea* (Savigny) Verdc.

Family: Nymphaeaceae

Local Name: M - Neela-ambel

Habit: Herb

Habitat: Grown as water plant

Flowering & Fruiting: Throughout the Year

Description: Rhizomes erect. Leaves suborbicular, margins entire or sinuate-dentate towards base, pale green with dark brown patches above. Petioles brownish green. Flowers dark sky blue fragrant. Sepals oblong, lanceolate, obtusely cuculate at apex, brownish green with purple streaks outside. Petals sky blue, elliptic lanceolate. Stamens numerous, reflexed at the base of filament, filaments yellow, anthers blue, sterile appendages reflexed. Carpels numerous, stigma surface flat, yellow, stigmatic appendages oblong, yellow, incurved after pollination.

Use: Ornamental, Edible and Medicinal.

Nymphaea nouchali var. *versicolor* (Sims) Guruge & Yakand.

Family: Nymphaeaceae

Local Name: M - Vella - ambel

Habit: Herb

Habitat: Grown as garden plant

Flowering & Fruiting: Throughout the Year

Description: Rhizomes black, wooly. Leaves ovate-orbicular, entire or irregularly toothed and undulate along margins. Petioles pinkish green. Flowers white or white with pale pinkish, fragrant. Sepals ovate lanceolate cuculate at apex, green outside, greenish white or pinkish tinge inside. Petals elliptic, white or pale pinkish tinge. Stamens numerous, filaments yellow, anthers yellow or grey; sterile appendages white, innermost one without appendages. Stigmatic appendages, triangular-oblong, incurved in aged flowers. Seeds ellipsoid, longitudinally ridged.

Use: Ornamental

Nymphaea odorata var. *rosacea* Lat.-Marl. ex M.Vilm.

Family: Nymphaeaceae

Local Name: M - Ambel

Habit: Herb

Habitat: Fresh water ponds and lakes, also grown as an ornamental plant

Flowering & Fruiting: Throughout the Year

Description: Rhizomatus perennial herbs. Leaves broadly ovate-orbicular, dark green above, pubescent beneath, receptacles brownish green. Sepals oblong-elliptic, green, pubescent outside with prominent veins, pinkish green towards the tip. Petals numerous with prominent vein; outer petals oblanceolate, inner once elliptic. Stamens numerous, forming a tube around the stigma. Filament pink.

Use: Ornamental.

Nymphoides aquatica (J.F.Gmel.) Kuntze

Family: Menyanthaceae

Local Name: E- Crested Floating heart

Habit: Herb

Habitat: Ponds

Flowering & Fruiting: Throughout the year.

Description: Rhizomatous perennial herbs. Leaves all fertile, floating, orbicular-rounded, base deeply cordate, margins subentire, green above, purplish and gland-dotted below. Flowers small, bisexual, white or yellow, with fringed petals. Calyx deeply 5- lobed. Corrow yellow or white, obovate -oblong, margin with fimbriately toothed wings. Stamens 5, inserted at the sinuses of the corolla, alternating with tufts of yellow, glandular hairs. Ovary bottle-shaped; style short; stigma 5-lobed. Capsule ovoid.

Use: Ornamental

Nymphoides hydrophyllum (Lour.) Kuntze

Family: Menyanthaceae

Local Name: M- Cheruthettambel, E- Crested Floatingheart

Habit: Herb

Habitat: Ponds and ditches

Flowering & Fruiting: Throughout the year.

Description: Rhizomatous perennial herbs. Primary fertile shoots many, uniphyllous. Secondary shoots zig – zag, sympodial, many – jointed. Each joint bearing a single floating leaf. Leaves ovate to orbicular, gland dotted below. Flowers bisexual in umbellate clusters. Calyx deeply 5-partite, narrowly lanceolate. Corolla white with a yellow throat and a ring of glandular hairs at the throat. Stamens 5, highly reduced in female flowers. Ovary bottle-shaped, stigmas 2-lobed. Fruit a capsule.

Use: Ornamental and traditional medicine.

Nymphoides indica (L.) Kuntze

Family: Menyanthaceae

Local Name: M- Thakaram, T- Chinnambal, E- Floating hearts

Habit: Herb

Habitat: Ponds and ditches

Flowering & Fruiting: Throughout the year.

Description: Rhizomatous herbs with prominent branch scar. Primary fertile branches many, petiole like, highly variable in length depending on the depth of water, secondary branches sympodial, zig-zag, many jointed, trailing on water surface, each joined unifillous. Leaves all cauline, floating, ovate, orbicular, glossy green, gland dotted beneath. Flowers bisexual in umbel like clusters. Calyx 5-6 partite. Corolla white with yellow throat, elliptic or oblong, densely covered with long white hairs within. Stamens as many corolla lobes.

Use: Ornamental and traditional medicine.

Ottelia alismoides (L.) Pers.es

Family: Hydrocharitaceae

Local Name: M – Ottalambal; E - Duck Lettuce; T - Nirkkuliri

Habit: Herb

Habitat: Ponds and streams

Flowering & Fruiting: July - January

Description: Submerged or partly emergent annual herbs. Leaves ovate-suborbicular, acute, notched at apex, cordate at base, prominently veined. Petioles triangular. Flowers solitary, axillary, bisexual, white, sessile inside a stalked spathe. Spathe elliptic-ovate, glabrous, 5-10 winged or ribbed. Peduncles 4-5 angled. Sepals linear, persistent. Petals suborbicular, white with yellow spot at the base. Stamens 3-12, anthers yellow. Fruit ovoid, cylindrical, concealed in the spathe. Seeds numerous.

Use: Medicinal and ornamental.

Pandanus sp.

Family: Pandanaceae

Local Name: M – Kaitha

Habit: Large Shrub

Habitat: Growing along the margins of paddy fields and on the banks of streams

Flowering & Fruiting: July -

Description: Large shrubs, distally branching. Leaves spirally arranged, linear-attenuate, lamina coriaceous, margins and midrib (beneath) armed with sharp prickles, ventral pleats smooth unarmed.

Use: Traditional medicine. The split and dried leaves are used to for making mats, baskets and caps.

Note: Stabilises soil and prevent soil erosion. Used in matmaking, fodder and biofence along stream sides

Persicaria barbata (L.) H.Hara.

Family: Polygonaceae
Local Name: M – Velluthamuthalamookku; E - Bearded Knotweed
Habit: Herb
Habitat: Along stream sides
Flowering & Fruiting: August - March

Description: Perennial herbs. Stems erect, pubescent below. Leaves simple, opposite, subsessile, lanceolate, apex acute or acuminate, glabrous except the margins and midrib. Flowers in terminal and axillary spike like racemes. Bracts closely overlapping. Perianth white, 5 – lobed, unequal. Stamens 5 – 8. Style with 3 arms. Nutlets trigonous, black.

Use: Traditional medicine

Note: A common weed in marshy lowlands and along the banks of streams and rivers

Pistia stratiotes L.

Family: Araceae
Local Name: M - Kudappayal, Muttapayal,; E - Tropical duck weed, Water Cabbage
Habit: Herb
Habitat: Ponds, lakes and rivers

Flowering & Fruiting: October - March

Description: Free floating stoloniferous plants with numerous whitish elongated roots. Leaves sub sessile in rosettes, densely pubescent, parallel veined. Inflorescence axillary, subsessile. Spathe small, basal portion convoluted, upper portion expanded, pale yellow. Spadix with pistillate portion udnate to the spathe. Male and female flowers separated by disc like structure. Male flowers with 4-6 anthers forming synandrium.

Use: Ornamental. If escaped it can spread fast and create problem as weed.

Note: An important weed in rivers and ponds

Pontederia crassipes Mart.

Family: Pontederiaceae

Local Name: M – Kulavazha; E - Water hyacinth

Habit: Gregarious Herb

Habitat: Ponds, lakes and rivers

Flowering & Fruiting: November - February

Description: Floating herbs sometimes growing marshy places. Leaves radical, rosulate, broadly ovate-orbicular, cuneate-rounded at base. Petioles spongy, swollen near the base. Inflorescence a spike very beautiful with profuse bright flowers. Spathe dissimilar, lower leaf like, upper scale like. Perianth tubular below, 6-lobed, lilac, unequal, tinged with blue. Adaxial lobe with yellow blotch. Stamens 6.

Use: Often cultivated as ornamental for its beautiful flowers. Recently tried as manure and mulching.

Note: Invasive plant in ponds and other water sources. If escaped can be obnoxious

Pontederia vaginalis Burm.f.

Family: Pontederiaceae

Local Name: Kaka pola, Karimkovalum

Habit: Herb

Habitat: Ponds, rivers and other wet lowlands

Flowering & Fruiting: November - February

Description: Semi - aquatic herbs. Leaves radical, linear lanceolate or ovate, truncate or cordate at base. Petioles sheathing at base. Inflorescence in racemes, 2-7 flowered. Spathe dissimilar, lower spathe leaf like and sheathing. Flowers blue. Perianth companulate, deeply 6 lobed (3+3). Stamens 6; filaments sub equal. Stigma 3 lobed.

Use: Vegetable and Medicinal

Rotala malampuzhensis R.V.Nair

Family: Lythraceae

Habit: Herb

Habitat: Water filled rocky hillocks, banks of streams

Distribution: Endemic to Southern Western Ghats

Flowering & Fruiting: July - September

Description: Amphibious herbs. Stem creeping and rooting

below. Leaves simple, decussate, sessile, submerged leaves, scale like, upper leaves linear lanceolate. Bracts leaf like, bracteoles equal in calyx tube. Flowers axillary, sessile, solitary. Sepals 3, ovate-acute, bright red. Petals 3, elliptic, acute, bright red. Stamens 3, inserted above the base of calyx tube. Stigma capitate; ovary globose, bright red. Fruits a 3 valved globose capsule. Seeds semi ovoid, bright red.

Note: A new find from the district and endemic.

Rotula aquatica Lour.

Family: Boraginaceae

Local Name: M – Kallurvanchi; T - Kallurvanchi

Habit: Herb

Habitat: Rocky riverbeds

Flowering & Fruiting: November - March

Description: Stout branching under shrubs, branches usually villous, rooting at lower nodes. Leaves simple, alternate or in clusters, glabrous above, tomentose beneath. Flowers solitary or in few flowered axillary cymes. Calyx five lobed. Corolla pink, 5 lobed, companulate. Stamens 5, exerted. Ovary 4 celled, stigma capitate, style filiform. Fruit a globose drupe.

Use: Medicinal to treat Kidney stone and urinary infection.

Schoenoplectiella articulata (L.) Lye

Family: Cyperaceae

Local Name: Chelli

Habit: Herb

Habitat: Marshy places, paddy field and shallow water.

Flowering & Fruiting: August- December

Description: Erect tufted non rhizomatous perennial herbs, culms terete, hollow, smooth, glabrous, green. Leaves reduced to 1-3 bladeless sheaths. Inflorescence a pseudolateral cluster of few to many spikelets born on the middle of the culm, spikelets sessile, greenish or reddish brown. Glooms spiral.

Use : Medicinal

Schoenoplectiella juncoides (Roxb.) Lye

Family: Cyperaceae

Local Name: M-Mattipullu.

Habit: Herb

Habitat: Marshy areas

Flowering & Fruiting: January- March

Description: Non rhizomatous herbs, culms terete, smooth, glabrous. Leaves reduced to 2-3 membranous sheaths. Inflorescence pseudo lateral head with 2-7 spikelets. Spikelets sessile. Glooms spiral.

Use: Food and craft.

Sphenoclea zeylanica Gaertn

Family: Sphenocleaceae

Local Name: M - Pongati, Pongolan; E - Goose Weed

Habit: Herb

Habitat: Along water courses

Flowering & Fruiting: November - January

Description: Annual herbs. Stem thickened and pithy towards the base. Leaves alternate, acute, entire, glabrous above, glaucous beneath. Flowers in terminal spikes, bisexual. Sepals 5, greenish white, imbricate, ovate, united with the ovary. Corolla tube bell shaped, lobes 5, greenish white. Stamens 5, adnate and alternate to the petals. Ovary 2 locular, stigma shortly forked. Fruit depressed-globose capsule.

Use: Traditional medicine.

Spirodela polyrhiza (L.) Schleid.

Family: Araceae

Local Name: Piriyan Payal (M); Common duck weed (E)

Habit: Herb

Habitat: Stagnant waters; paddy fields

Flowering & Fruiting: August - December

Description: Small floating herbs; fronds 2 – 5, pale green, flattened ovate – obovate or oblong, base obtuse or emarginated at base. Upper surface flat or convex with or without hook

shaped apical papilla. Lower side flat; root solitary on each frond; budding pouches 2; male flowers 2; female flowers 1. Fruits ellipsoid; 1 – seeded. Seeds minute, yellowish with longitudinal ribs.

Use: Bio remediation

Trapa natans L.

Family: Lythraceae

Local Name: M – Kakkamullu, Vankottakkaya; E - Water chestnut

Habit: Herb

Habitat: Ponds and tanks

Flowering & Fruiting: September - May

Description: Floating herbs. Stem elongate, rooted at the bottom. Leaves dimorphic; submerged leaves sessile, linear and entire; floating leaves with bulged petiole in terminal rosettes, rhomboid, toothed along margins. Flowers white solitary, bisexual. Sepals 4, triangular, united to the ovary, developing into horns in fruits. Petals 4, white. Stamens 4. Ovary half inferior, 2 locular. Fruits a large, woody spinose nut.

Use: Ornamental, Fruits edible and sold in market.

Typha angustifolia L.

Family: Typhaceae

Local Name:
M – Aanapullu;
E - Elephant grass

Habit: Herb

Habitat: Marshy wetlands

Flowering & Fruiting: December - February

Description: Gregarious, robust perennial herbs. Rhizome creaping, stem terete, basally submerged. Leaves distichous, linear, sub terete, flattened toward apex, sheathing below. Flowers unisexual in cylindrical spikes, male spikes above the female ones. Male flowers: perianth hairs simple or forked. Stamens 2 or 3. Female flowers: bracteates; bracts exceeding the perianth hairs. Ovary linear.

Use: Water purification, mat making, rhizome astringent and diuretic.

Utricularia aurea Lour.

Family: Lentibulariaceae

Habit: Herb

Habitat: Stagnant or slow running waters, paddy fields, ponds.

Flowering & Fruiting: September - December

Description: Submerged floating herbs. Stolones up to 1 m long, branched. Foliar organs repeatedly dichotomously branched, ultimate segments capillary. Traps numerous on foliar segments, ovoid or obovoid. Flowers racemes arising at intervals on stolons. Flowers yellow up to 1.2 mm long, pedicellate. Calyx lobe subequal, papillose at base. Corolla bright yellow, hairy at throat bigibbous at base, spur more or less equal to the lower lip. Capsules globose with long beak.

Use: Water quality improvement. Academic curio.

***Victoria amazonica* (Poepp.) J.C. Sowerby**

Family: Nymphaeaceae **Local Name**: E - The giant waterlily

Habit: large floating Herb

Habitat: Found planted in artificial ponds introduced in India

Flowering & Fruiting: Throughout the Year

Description: Large rhizomatous herb. Leaves large, circular, upto 3m; margins of leaves raised forming a continuous rim, upper surface yellowish green, waxy, the lower surface purplish red and covered with sharp spines. Leaf petiole up to 8m, spiny. Flowers large, white when open and turn pinkish to rose purple on second and third day, fragrant.

Use: Ornamental

Note: A potential invasive if escaped.

Further reading...

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