Diversity of Hydrophytes of BandalaEllamma Temple Pond, Kodangal, Telangana state

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The present paper deals with occurrence and biodiversity of hydrophytes in the pond of Bandala Ellamma Temple, Kodangal, Vikarabad district, Telangana state. This study was carried out in the year 2025 from June to September months.The present study reported 36 hydrophytes dwelled in pond belonging to 34 genera and 30 families. Among these eleven members reported to be monocots, seven dicots, fifteen algae (belonging to Chlorophyceae, Bacillariophyceae, Cyanophyceae, Trebouxiphyceae and Zygnematophyceae) and three zoo planktons. The monocots and Algae were found to be the dominant vegetation in the pond. Five diverse forms were reported among hydrophytes such as free-floating, rooted with floating leaves, submerged, amphibious and emergent types. The present work aimed to study the diversity of hydrophytes and document the systemic position ofhydrophyteswithcommon name, scientific name, family, class and growth form.

Keywords: Hydrophytes, species diversity, Bandala Ellamma Temple.

Introduction:

The plant species which usually stand in water and must dwell at least a part of their life cycle in water either completely submerged or immersed are called Hydrophytes (Muenschar,1994).The hydrophytes are called as Aquatic plants that includes Microphytes (small) and Macrophytes (large). These were found in aquatic habitat including ponds, puddles, ditches, lakes, streams, rivers and oceans (Mishra,2015)Based on their life form,the hydrophytes are classified into free floating, rooted submerged, submerged, rooted with floating, amphibious and emergent(Wetzel,1975).These acts as a major sources to aquatic living forms and they can contribute oxygen through photosynthesis,food and shelter to all kind of aquatic forms including insects, fishes and others. Hydrophytes have poorly developed roots that may be fibrous or adventitious, reduced in their length, branched or unbranched. The stems are delicate, long, slender or thick, short, spongy, flexible, branched and turn as rhizome or runners. The leaves varies from larger to smaller,long, thin,flexible and may be modified into ribbon shaped orlinear shaped, petiole may be long or short,swollen or spongy and covered with mucilage.The hydrophytes play a significant role in maintaining structure and function of Ecosystemand also can be balancing the ecosystem of water bodies. The hydrophytes are divided into macro and microphytes. The macrophytes are dicot and monocot plants. The microphytes includes algae, phytoplankton's and zooplanktons. These showed large diversity in their morphology and anatomical structure, due to geographical conditions, depth of water bodies, properties of soil and sediments.

Methodology:

The present work is carried out at Bandala Ellamma temple pond, Kodangal located besides Government Degree College Kodangal. This pond was frequently visited to study hydrophytes in rainy season of the year 2025 specifically from June to September months. The Macrophytic plants were collected from the site directly using tools. The plants and their twigs are collected in plastic cover bags and brought into lab. The plant species were identified based on their external morphological features through regional floras, standard taxonomic manuals, digital identification techniques and previous articles.The specimens were vouchered number wise and noted their taxonomic description, identification characters in field notes and made them into herbarium.(Ugemuge (1986), Kodarkar,(1992), Cook (1996) and Fasset (2000) These are made as specimens by

using 4% formaldehyde liquid. In the same way, algal sample are picked up into plastic containers. This was done either directly by hands or tools. The algal members have been examined under microscope and identification was carried out based on morphological characteristic features such as colour, shape, filaments structure and cell structure by using standard texts, keys and monographs. Algal members were made into slides and specimens by using standard mounting Techniques for preservation.The microscopic photos are shot at the time of observation.

Results and Discussion:

The present study reported 36 hydrophytes with 34 genera belonging to 30 different families from the selected pond. Among them,10 genera are identified as monocots which are dominant in habitat,7genera aredicots,15genera are algae, one is Pteridophyte and three are zooplanktons.(Table-1) These Plants have been adopted to live in water andthis diversity is crucial for health and stability of pond habitat. This study reported various growth forms among hydrophytes dwellingin pond. They are categorised into five forms such as

1.Free Floating Forms:

These plants throughout their life existed on surface of water. Rootslie freely in water.Lemma minor is only one free floating form occurring in the pond understudy.

2.Submerged Forms.

These forms live entirely under the water. *Utricularia, Hydrilla* and *Najas flexilis* species found in this pond.

3.Rooted with floating leaves:

These are anchored in mud through roots and leaves float on the surface of water with their long petiole. *Nymphea alba* and *N.ampla* species are reported in this pond.

4.Emergent forms:

These are rooted in pond but their stems, leaves and flowers rise above the water surface. Many *Cyperus, Eclipta, Aeschynomene* and others were reported in pond.

5.Amphibious and Rooted:

These plants grow near the water reservoirs in shallow and muddy places.The present pond accommodate to *Marsilea* species.

From algae side,15 members were reported in pond. These belongs to Chlorophyceae, Cyanophyceae, Bacillariphyceae, Trebouxiphyceae and Zygnematophyceae. There are three categorised algae forms found such as filamentous algae, Planktonic algae and Macro algae.The recognized filamentous algae members are *Spirogyra, Oedogonium, Anabaena, Zygnema, Oscillatoria* and the Plankton members are *Chlorella, Cosmarium, Diatom, Closterium, Chlamydomonas, Euglena, Paramecium* and Rotifers were reported and the macro algae *Chara* was reported in pond.(Table-1)
This studied project reported that the emergent forms existed largely that is 11 numbered with 30.55%,8 green algal members with 22.22%,5 cyanobacteria(Blue green algae with 13.88%,3 submerged and planktonic members with 8.33%,2 Bacillariophyceae and Rooted with floating leaves with 5.55% and Pteridophytes, free floating forms were very poor with 2%.(figure 1 and Graph 1)
These 36 reported hydrophytes existed in numbers such as monocots 10 members with 27.77 %,dicots are 8members with 19.44%,15 various algal members with 41.66%,3 Planktons with 8.33%one member of Pteridophyte with low percentage 2.77.(figure2 & Graph2)
The Macro and Micro hydrophytes identification was carried out with using local floras, digital Identification apps, previous articles, standard Taxonomic keys and preserved eitherin the form of herbarium. or slides or specimens. The details of each hydrophytes like common name, scientific name,family,type of growth form and type of plant have been recorded systematically in table forms and graphs.

Conclusion:

The current study revealed that a wide range of hydrophytic diversity found in selected pond. There have been found36 hydrophytes belonging to 34 genus inhabited in this pond.These were related to 30 families which included Monocotyledons, Dicotyledons, Algae, Planktons and Pteridophytes. Among these, the Pteridophytes were found poor in number and algae with 15 members discovered as microphytic dominant vegetation. The monocots with 11 members are one more dominant macrophyte vegetation. This hydrophytic flora recognized

as key plants for creating a complex structure and function of pond habitat.These provides shelter, oxygen to other aquatic forms. This study assessed hydrophytic species diversity and species richness in the present pond. Finally this project concludes that this diverse hydrophytic flora documented and preserved eitherin the form of herbarium, specimens and slides.

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Table 1: list of Hydophytes Identified in Bandal Ellammma Temple Pond, Kodngal

S No	Common Name	Scientific Name	Family	Class	Life form
1	White lilly	*Nymphea alba*	Nymphaceae	Dicot	Rooted with floating
2	Bladderwort	*Utricularia foliosa*	lentibulariaceae	Dicot	Submerged & Rooted
3	Toothcup	*Ammannia latifolia*	Lythraceae	Dicot	Emergent
4	Guntagalijera	*Eclipta prostrate*	Asteraceae	Dicot	Emergent
5	White lilly	*Nymphea ampla*	Nympheace ae	Dicot	Rooted with floating
6		*Gratiola officinalis*	Plantaginaceae	Dicot	Emergent
7	Sola pith plant	*Aeschynomene indica*	Mimosaceae	Dicot	Emergent
8		*Leersia hexandra*	Poaceae	Monocot	Emergent
9	Fimbry grass	*Fimbristylis maliacea*	Cyperaceae	Monocot	Emergent
10	Duck weed	*Lemna lunar*	Araceae	Monocot	Free floating
11	Nodding water nymph	*Najas flexilis*	Hydrocharitaceae	Monocot	Submerged but not Rooted
12	Nut grass	*Cyperusrotandus*	Cyperaceae	Monocot	Emergent
13	Shingleflat sedge	*Cyperu s imbrecatus*	Cyperaceae	Monocot	Emergent
14	Jungle rice	*Echinochloa coloruim*	Poacaeae	Monocot	Emergent
15	Hydrilla	*Hydrilla verticillata*	Hydrocaritaceae	Monocot	Submerge & Rooted
16		*Pontederia vaginalis*	Pontederiaceae	Monocot	Emergent
17		*Cyanotis lanata*	Commelinaceae	Monocot	Emergent
18	Rotifer	*Philodina species*	Philodinidae	Bdelloidea	Planktons
19	Euglena	*Euglena viridis*	Euglenceae	Euglenoidea	Planktons
20	Slipper animalcule	*Paramaecium*	Paramecidae	oligohymenophorea	Planktons
21	Marsilea	*Marsilea minuta*	Marsileaceae	Pteridophyte	Amphibious

22	Chlorella	*Chlorella*	Chlorellaceae	trebouxiphyceae	Green Algae
23	Desmid	*Closterium species*	Desmidiaceae	Zygnemataceae	Green Algae
24	Desmid	*Chlamydomonas*	Chamydomonadeae	Chlorophyceae	Green Algae
25	Anabaena	*Anabaena variabilis*	Nostocaceae	Cyanophyceae	Blue Green Algae
26	Oscillatoria	*Oscillatoria species*	Oscillatoriaceae	Cyanophyceae	Blue Green Algae
27	Oedogonium	*Oedogonium species*	Oedogoniaceae	Chlorophyceae	Green Algae
28	Cosmarium	*Cosmarium species*	Desmidiaceae	Zygnematophyceae	Green algae
29	chara	*Chara*	Characeae	Chlorophyceae	Green Algae
30	*Spirogyra*	*Spirogyra*	Spirogyraceae	Chlorophyceae	Green Algae
31	Diatoms	*Gamphonema species*	Gamphonemataceae	Bacillariophyceae	Algae
32	Algae	*Zygnema circumcarinatum*	Zygnemataceae	Chlorophyceae	Algae
33	Blue green algae	*Chlorococcum pamirum*	Chlorococcaceae	Cyanophyceae	Algae
34	Blue green algae	*Gleocapsa atrata*	Chlorococcaceae	Cyanophyceae	Algae
35	Diatom	*Navecula*	Naviculaceae	Bacillariophyceae	Algae
36	Blue green algae	*Chroococcus turgidus*	Chlorpcoccaceae	Cyanophyceae	Algae

Table 2: list of hydrophytic plants of selected Pond

S. No.	Hydrophyte Type	Number of plants	Percentage
1	Free floating	01	2.77
2	Rooted with floating leaves	02	5.55
3	Submerged	03	8.33
4	Emergent	11	30.55
5	Amphibious	01	2.77
6	Green Algae	08	22.22
7	Cyanobacteria Members	05	13.88
8	Planktons	03	8.33
9	Bacillariophyceae algae	02	5.55

Figure 1: Graphical Representation of hydrophytes of selected pond

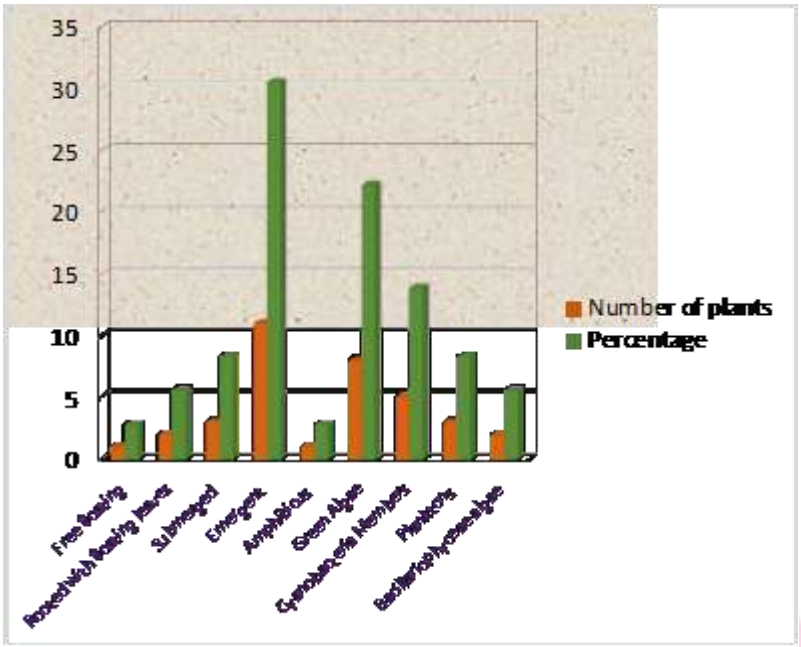
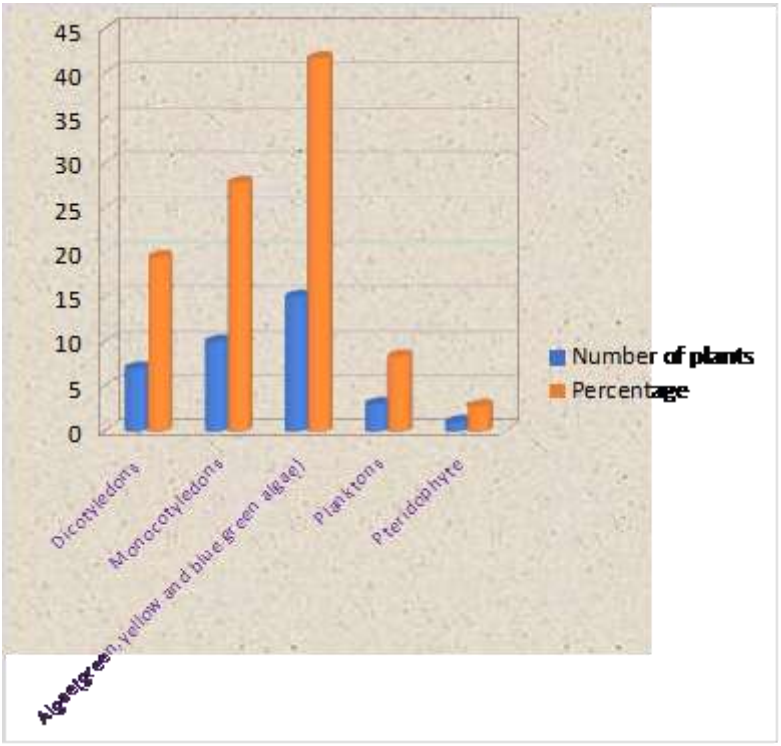


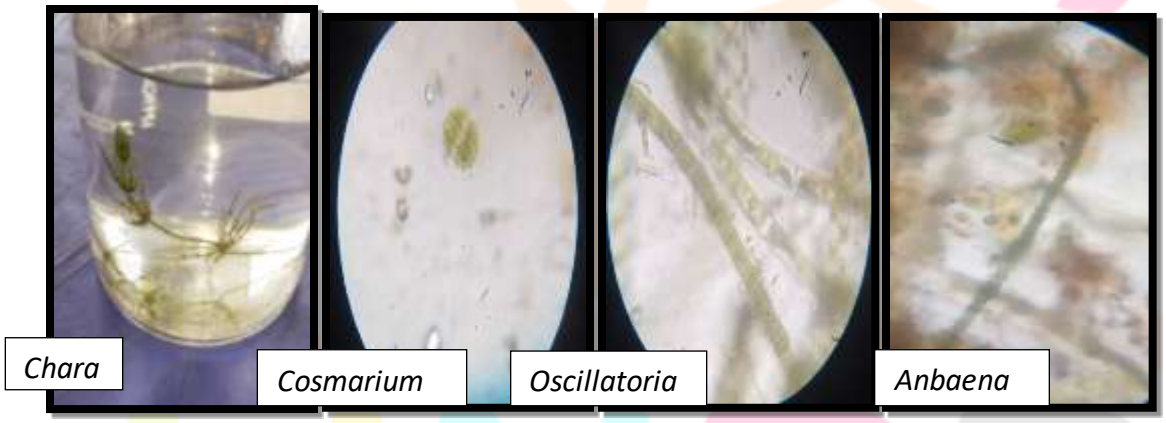
Table 3: Type of hydrophyte details in selected pond

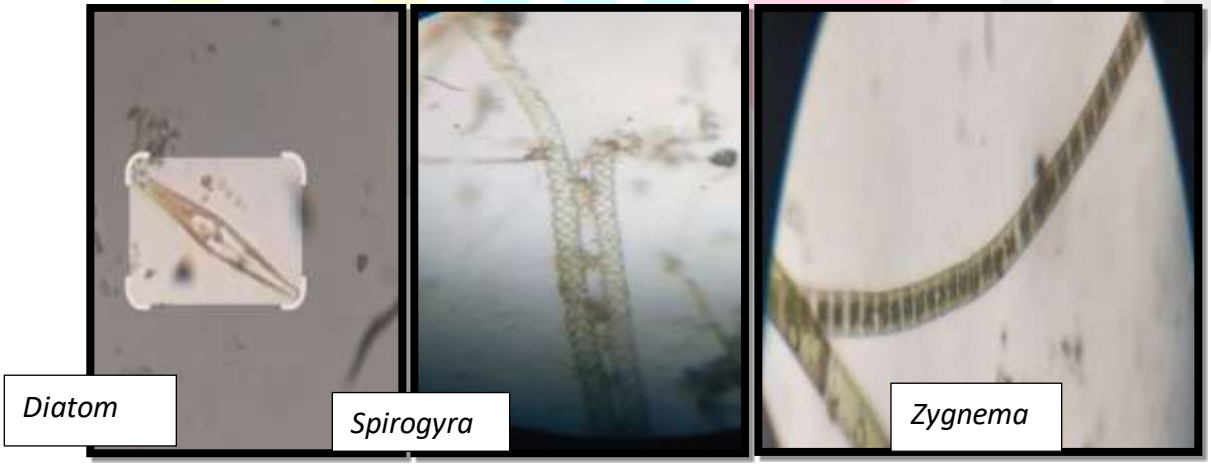
S.No.	Type of plant	Number of plants	Percentage
1	Dicotyledons	7	19.44
2	Monocotyledons	10	27.77
3	Algae(green,yellow and blue green algae)	15	41.66
4	Planktons	3	8.33
5	Pteridophyte	1	2.77

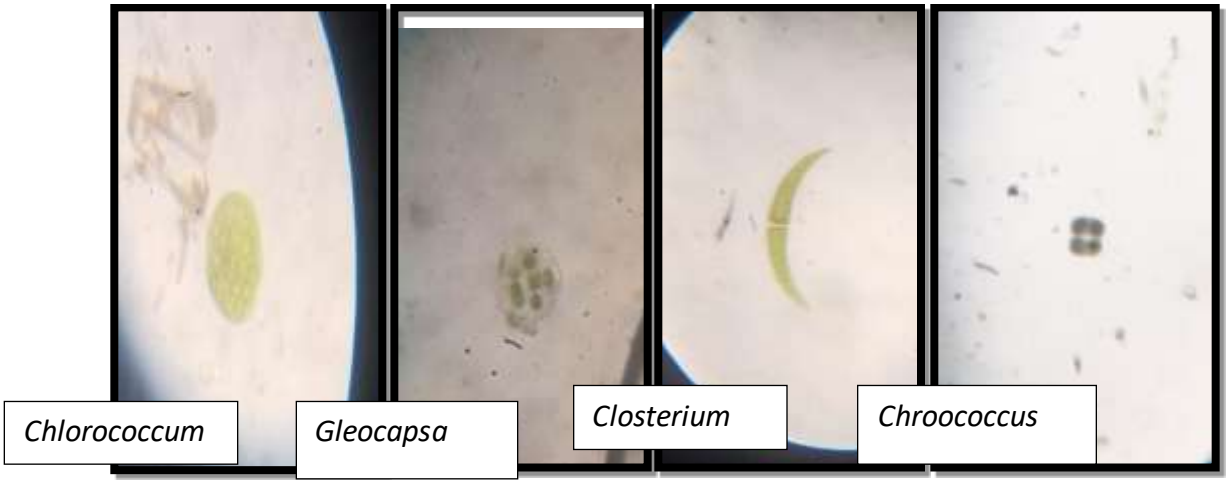
Figure 2: Graphical representation of hydrophytic plant type

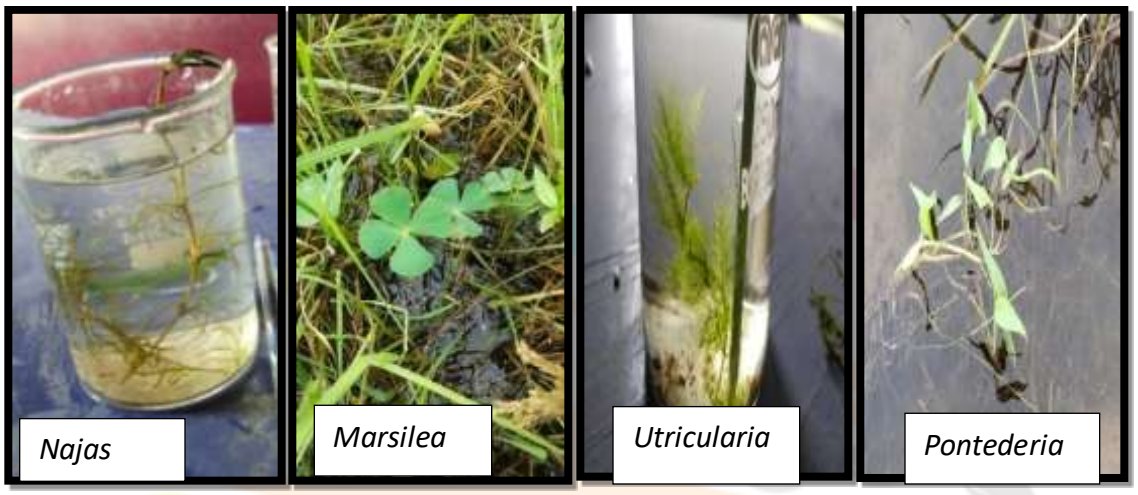


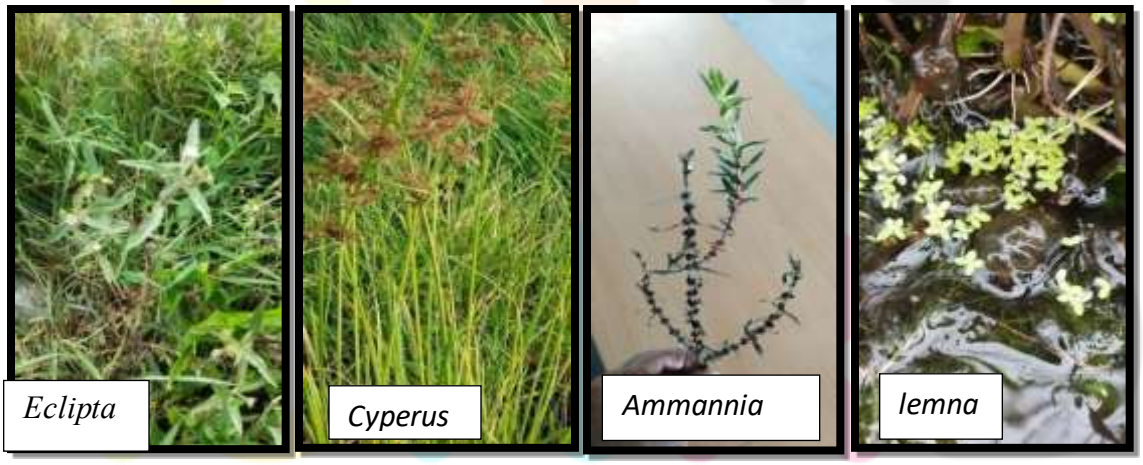
Glimpses of Hydrophytes found in studied Pond






Chlorococcum
Gleocapsa
Closterium
Chroococcus


Najas
Marsilea
Utricularia
Pontederia


Eclipta
Cyperus
Ammannia
lemna


N.ampla
Gratiola