

Survey of Macrophytic Diversity in different ponds of ongargarh city of Chhattisgarh

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Abstract: The present investigation concerns the diversity of aquatic macrophytes in different ponds of Dongargarh city of Chhattisgarh. Ponds are the natural habitat of macrophytic plants. Macrophytes are the common features of aquatic ecosystem. Aquatic macrophytes play a prominent role in water ecosystems. Aquatic macrophyte diversity and its role in understanding the wetland ecosystem dynamics have tremendous significance. Species composition of aquatic macrophytes, seasonal distribution in four Ponds in Dongargarh city of Chhattisgarh viz. Tapaswiee pond, Mahaveer pond, Fly over pond and Murmunda pond were studied during 2013-2014. Forty one different species of aquatic macrophytes were recorded from the studied ponds which include three free floating, six submerged, three rooted floating and twenty nine emergent species. *Eichornia crassipes* [free floating] occurs throughout the year. In the submerged species *Vallisneria spiralis*, *Ceratophyllum demersum*, *Hydrilla verticillata* occurs throughout the year. In the rooted floating *Ipomoea aquatica* occurs throughout the year. Species composition, seasonal distributions have been discussed in this paper.

Keywords: Aquatic macrophytes, Emergent, Free floating, Submerged.

I. Introduction

Life on earth depends on fresh water. Our planet earth has a definite hydrological cycle, which sustains life on earth. Continuously moving above and below the soil surface, water maintains and links the planet's ecosystem. Some is returned directly to the atmosphere, partly via plants. The rest flows into and over the ground, permeating soil, moving through organisms, recharging underground aquifers, replenishing rivers and lakes and finally entering the oceans. I have selected this topic because this area Dongargarh of Rajnandgaon district of Chhattisgarh state is the famous tourist and pilgrimage center surrounded by lush green forest and hillocks and according to its geographical situation is located at Latitude in $21^{\circ} 12'00''N$ and Longitude in $80^{\circ} 44'00''E$. This region have good number of fresh water ponds and dams with wetlands harboring a great variety of aquatic macrophytes. Wetlands are well known for high diversity in class in class, composition and four broad categories of function viz. physical/hydrological, chemical, biological and socioeconomic (Williams,1990). Wetland supports plant species intermediate between true aquatic and terrestrial habitats. Information on phytosociological data for aquatic macrophytes in any water body is of immense importance to understand the wetland ecosystem.

Several works have been done on the phytosociology of different macrophytic species in different freshwater bodies of India and abroad (Bhat , Mahdi and Yousuf, 2007, Billore and vyas, 1981, Biswas and Calder, 1984; Mishra 1974; Unni, 1971, Dhote, 2007, and Siraj, Yousuf and Parveen 2011). There is very little literature is available about the aquatic macrophytes of Dongargarh city Chhattisgarh. The present investigation was, therefore, undertaken to study the species composition and seasonal distribution of aquatic macrophytes in different ponds of Dongargarh city of Chhattisgarh.

II. Material And Method

Localize and identification of the different types of ponds which receive different mode of water collections. Much work has been done on the phytosociology of different macrophytic species in different freshwater bodies of India and abroad (Billore and vyas, 1981, Biswas and Calder, 1984). In the present study monthly survey was done by quadrat method for collecting submerged aquatic macrophytes from July 2013 to June 2014. Qualitative and quantitative analysis of aquatic macrophytes was done by following the methodology of Biswas and Calder (1984) and Mishra (1974).

Calculations were done using following formulae.

$$(i) \text{ Frequency} = \frac{\text{Total no. of quadrates in which a species occurred} \times 100}{\text{Total no. of quadrates studied}}$$

$$(ii) \text{ Density} = \frac{\text{Total no. of individuals of the species in all quadrates}}{\text{Total no. of quadrates studied}}$$

$$(iii) \text{ Abundance} = \frac{\text{Total no. of individuals of a species in all quadrates}}{\text{Total no. of quadrates in which the species occurred}}$$

$$(iv) \text{ Relative frequency} = \frac{\text{No. of occurrence of one species} \times 100}{\text{No. of occurrence of all species}}$$

$$(v) \text{ Relative density} = \frac{\text{Total no. of plants of a species} \times 100}{\text{No. of occurrence of all the species}}$$

$$(vi) \text{ Relative dominance} = \frac{\text{Total basal area of the species in all the quadrates} \times 100}{\text{Total no. of all the species in all the quadrates}}$$

$$(vii) \text{ Importance value index (IVI)} = \text{Relative frequency} + \text{Relative density} + \text{Relative dominance.}$$

Table1:List of some aquatic macrophytes in different ponds of Dongargarh city of Chhattisgarh

Sr. No	Name Of Species	Family	LifeformS	Sr. No	Name Of Species	Family	Lifeforms
1	<i>Pistia stratioides</i> L.	Araceae	Free floating	22	<i>Sphaeranthus indicus</i> L.	Asteraceae	Emergent
2	<i>Eichhornia crassipes</i> (Mart.) Solms.	Pontederiaceae	Free floating	23	<i>Bacopa monnieri</i> (L.) Wettstein	Scrophulariaceae	Emergent
3	<i>Lemna perpusilla</i> Torrey	Lemnaceae	Free floating	24	<i>Coix aquatica</i> Roxb.	Poaceae	Emergent
4	<i>Aponogeton natans</i> L.f	Aponogetonaceae	Submerged	25	<i>Commelina benghalensis</i> L.	Commelinaceae	Emergent
5	<i>Vallisneria spiralis</i> L.	Hydrocharitaceae	Submerged	26	<i>Commelina hasskarlii</i> C.Comm. Cyt.	Commelinaceae	Emergent
6	<i>Potamogeton pectinatus</i> L.	Potamogetonaceae	Submerged	27	<i>Cyperus rotundus</i> L.	Cyperaceae	Emergent
7	<i>Najas minor</i> L.	Hydrocharitaceae	Submerged	28	<i>Gomphrena celosioides</i> Mart.	Amaranthaceae	Emergent
8	<i>Ceratophyllum demersum</i> L.	Ceratophyllaceae	Submerged	29	<i>Cynodon dactylon</i> (L.) Pers.	Poaceae	Emergent
9	<i>Hydrilla verticillata</i> (L. f.) Royle	Hydrocharitaceae	Submerged	30	<i>Elaeocharis geniculata</i> (L.) R.&S.	Cyperaceae	Emergent
10	<i>Ottelia alismoides</i> (L.) Pers.	Hydrocharitaceae	Rooted floating	31	<i>Cyathocline purpurea</i> (Buch-Ham. ex D.Don) Oltze	Asteraceae	Emergent
11	<i>Ipomoea aquatica</i> Forsk	Convolvulaceae	Rooted floating	32	<i>Glinus lotoides</i> L.	Molluginaceae	Emergent
12	<i>Nelumbo nucifera</i> Gaertn.	Nelumbonaceae	Rooted floating	33	<i>Heliotropium supinum</i> L.	Boraginaceae	Emergent
13	<i>Limnophylla sessiflora</i> L.	Plantaginaceae	Emergent	34	<i>Crozophora rotlerii</i> (Geisel.) A. Juss. ex Spr.	Euphorbiaceae	Emergent
14	<i>Typha angustata</i> Bory and Chaub.	Typhaceae	Emergent	35	<i>Phyla nodiflora</i> (L.) Greene	Verbenaceae	Emergent
15	<i>Polygonum glabrum</i> Willd.	Polygonaceae	Emergent	36	<i>Alternanthera sessilis</i> (L.) R.Br. ex DC	Amaranthaceae	Emergent
16	<i>Ammania baccifera</i> L.	Lythraceae	Emergent	37	<i>Elaeocharis capitata</i> R. Br.	Cyperaceae	Emergent
17	<i>Echinochloa calomum</i> (L.) Link	Poaceae	Emergent	38	<i>Verbascum chinense</i> (L.) Sant	Scrophulariaceae	Emergent
18	<i>Aeschonemene indica</i> L.	Fabaceae	Emergent	39	<i>Eriocaulan cinereum</i> R. BR.	Eriocaulaceae	Emergent
19	<i>Sesbania bispinosa</i> (Jacq.) w.t. wight	Fabaceae	Emergent	40	<i>Gnaphalium pulvinatum</i> Del.	Asteraceae	Emergent
20	<i>Sopubia delphinifolia</i> (L.) G. Don	Scrophulariaceae	Emergent	41	<i>Rotala serpillifolia</i> (Roth.) Breneck	Lythraceae	Emergent
21	<i>Dopartium junecum</i> (Roxb.) Buch-Hum ex Benth.	Scrophulariaceae	Emergent				

III. Result And Discussion

Rio Earth summit held in 1992 emphasized the need to conserve the biodiversity of the earth, especially of the tropics. The meaning of conservation involves thorough understanding of the flora and fauna on regional basis including those of wetland as form the bulk of the wetland flora and has immense functional values (Cronk and Fuller, 1995). Thomaz et al. (1999) found 62 taxa belonging to 25 families and 42 genera. Among this total, 47 were identified at the species level and 33 species were common between both surveys. Similar to what we found in present study. Differences in the number of species and the identity of genera between these surveys indicate that macrophyte assemblages are still changing and are dynamic in different Ponds.

Aquatic macrophytes exhibited a heterogeneous assemblage of forty one species in the studied of Ponds. These species were distributed in thirty eight genera representing a variety of taxonomic group angiosperms. Of these *Eichornia crassipes*, *Vallisneria spiralis*, *Hydrilla verticillata* *Ipomoea aquatica*, *Cynodon dactylon* occurs throughout the year. During monsoon, floating species of aquatic macrophytes viz. *Eichornia crassipes*, *Vallisneria spiralis*, *Hydrilla verticillata* *Ipomoea aquatica*. Conversely, the monsoon varieties of aquatic macrophytes were succeeded by the winter emergent species viz. *Lemna perpusilla*, *Limnophylla sessiflora*, *Ottelia alismoides*, *Najas minor*. The species occurs during onset of summer are *Heliotropium supinum* *Crozophora rottleri*, *Gnaphalium pulvinatum*, *Glinus lotoides*. Significant phytosocial association had been recorded among the different aquatic macrophytes. *Hydrilla verticillata*, *Vallisneria spiralis*, *chara sp.*, *Nitella sp.* were found to be association with others. *Vallisneria spiralis*, *Najas minor* *Potamogeton pectinatus*, *Ceratophyllum demersum* were found to be associated with other. *Ottelia alismoides*, *Limnophylla sessiflora*, *Valisneria spiralis* found to be associated with each other. The study represents the flora of different Ponds of Dongargarh city of Chhattisgarh. Our aim is to study the especially focusing on the relationships between these resources and human health and wellbeing. Due to absence of river the "Bowl of rice state" irrigates the paddy field by ponds only in this region, which comes in the food chain of the human. An awareness of environment, its impact with religion orthodox promote quality environment for human survival of this area.

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