



Study On Aquatic Macrophytes of Bhadravathi, Karnataka

Dr Dharmendra*

*Department of Botany, Sir M V Government Science College, Bommanakatte, Bhadravathi-577302

*Correspondence Author: Dr Dharmendra

*Email: dharambotany@gmail.com

<p>CC License CC-BY-NC-SA 4.0</p>	<p style="text-align: center;">Abstract</p> <p>In the present study the diversity of aquatic macrophyte plants of Bommanakatte pond, Jannapura pond and Hiriya ponds of Bhadravathi taluk has been reported. Total of 34 macrophytes genera representing 24 families of dicot, monocot and pteridophytes were recorded. Free floating, submerged floating, submerged rooted, rooted with floating leaves and amphibious plant communities were found in Bommanakatte and Jannapura ponds but in Hiriya pond only submerged and amphibious plant communities were recorded. Among the groups dicots plant community exhibit dominance on lower group plants. The study reveals that bommanakatte and Jannapura ponds are nutritive rich and shows rich vegetation.</p> <p>Key Words: <i>aquatic macrophytes, ponds, Bhadravathi, nutritive.</i></p>
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INTRODUCTION:

Aquatic weeds defined as macrophytes constitute an important component of aquatic ecosystem which includes diverse group of organisms like algae, pteridophytes and angiosperms. Macrophytes compete with phytoplankton for nutrient requirement and thus the presence of macrophytes may result in change in phytoplankton community. They are found mainly in the shallow regions of ponds, lakes, rivers, swamps and streams etc. Macrophytes show their importance by providing food and habitats for aquatic invertebrates, zooplankton, fishes and aquatic wild life (Lacoul and Freedman, 2006). According to Abubakar macrophytes when present in large abundance have the power of modifying the composition and distribution of other organisms in water body (Abubakar, 2012).

The objective of this study was to document the macrophytes in ponds located in different habitat places of Bhadravathi taluk.

MATERIALS AND METHODS:

Study area:

Bhadravathi taluk is one of the famous industrial taluk of Shimoga district. It lies in the south-east part of the district. Geographically, Bhadravathi taluk lies in the central parts of the Karnataka state, in the south-east corner of the Shimoga district. The latitude and longitude coordinates of Bhadravathi town are 13° 50' N and 75° 42' E.

For present study three ponds located in Bommanakatte, Jannapura and Hiriya of Bhadravathi taluk were selected.

Bommanakatte pond (Pond A):

It is situated in bommanakatte village, situated 6 Km west south outskirts of Bhadravathi on the side of SH 17. It has thick vegetation and it is connected with sewage inlet. The main source of water is rain water and left bank canal of Bhadra reservoir.

Jannapura pond (Pond B):

It is situated near of Bhadravathi town in between Jannapura and Siddapura. This pond is surrounded by urban areas and extensively receives sewage. The main source water is rain water and left bank canal of Bhadra reservoir. The pond connected with drainage inlets from Jannapura area and Coolie Block. This water is utilized for agricultural purposes and fishing.

Hiriyur pond (Pond C):

It is situated west north of Bhadravathi near Hiriyur village. The source of pond is rain water as a result of pooled rain water and dried up during summer. This pond water is utilized for agricultural purposes and other domestic purposes.

Collection and Identification of plants:

The selected ponds were visited and surveyed in the year 2019 and plant specimens were collected. The plant species were collected around the pond, inlet and outlet regions. All the species were identified with the help of literature and flora (Fassette, 2006 and Gupta, 2001).

RESULTS AND DISCUSSION:

The aquatic macrophytes of three water bodies studied during present investigation are listed in Table 1 along with their families. The studies reveal that Bommanakatte and Jannapura pond shows comparatively more species than Hiriyur pond. The results were tabulated in table 1.

Present study shows the presence of diversified group of aquatic plants belonging to higher algae (2 genera of 1 family), pteridophytes (3 genera of 3 families), and angiosperms i.e. monocots (14 genera of 7 families) and dicots (15 genera of 13 families). Dicots showed the dominant vegetation in three ponds.

Both Bommanakatte and Jannapura pond (Pond A and B) consists thick vegetation of aquatic macrophytes. This includes free floating, submerged floating, submerged rooted, rooted emergent and marginal emergent. Hiriyur pond (Pond C) consists only submerged and marginal emergent. Free floating species were not noticed during study period.

The listed species under free floating are *Salvinia spp*, *Azolla pinnata*, *Eichhornia spp*, *Pistia stratiotes*, *Wolffia spp*, *Lemna minor*, *Ludwigia adscendens* (Syn. *Jussiea repens*). The Submerged rooted species are *Chara spp* *Nitella spp* *Potamogeton spp* and free floating species of *Hydrilla*, *Ceratophyllum* and *Utricularia* were recorded.

In all three ponds species of *Nymphaea*, *Nelumbium* and *Ipomoea aquatica* forms dominant under rooted with floating leaves group and *Marsilea quadrifolia*, *Typha angustata*, *Cyperus spp.*, *Scirpus spp*, *Polygonum glabrum*, *Ipomea cornea*, *Asteracantha longifolia*, *Bacopa monneri* and *Oxalis corniculata* forms rooted emergent category which found around the ponds.

Some species like *Ceratophyllum* present only in Hiriyur pond like that *Spirodela polyrrhiza* and *Monocharia vaginalis* were noticed in Jannapura pond. *Nymphoides hydrophylla* and *Utricularia spp.* found only in Bommanakatte pond.

Kiran et al., (2007) reported aquatic macrophytes of Shivaji tank and Jannapura tank (Kiran, 2015) of Bhadravathi. In Shivaji tank a total of 14 species belonging to free floating, rooted floating, submerged and amphibious varieties were reported but in Jannapura tank 13 species of 11 families comes under four categories like free floating, emergent anchored, floating leaves anchored and marshy amphibious.

Many workers reported that presence of free floating species like *Pistia*, *Eichhornia*, *Salvinia*, *Lemma*, *Jussiea*, *Azolla*, *Utricularia* *Potamogeton*, indicates that the water body comes under eutrophic category (Varshney 1981., Oommachan *et al.* 1980., Kiran *et al.*, 2007, Kiran 2015., Manjunath *et al.*, 2015).

Rorslet (1991) and Murphy (20002) reported that mesotrophic to slightly eutrophic lakes shows the maximum diversity of aquatic macrophytes. Spread of the free floating plants in Bommanakatte and Jannapura ponds shows eutrophic status of pond this is due to direct entry of sewage from the village and runoff water during rain increases nutrients and allows the rapid spread of pollution indicator species. Hiriyur pond located outside the village and anthropogenic activities very less and it is devoid of sewage flow hence free floating macrophytes are absent during our study time.

In three ponds we recorded 34 genera of aquatic plants among which dicots (15 genera under 13 families) shows dominance on other two groups like monocots and pteridophytes. Dominance of such dicots over the monocots in aquatic habitats have been emphasized by a number of workers (Burlakoti and Karmacharya, 2004; Manhas *et al.*, 2009; Saini *et al.*, 2010; Niroula and Singh, 2010).

CONCLUSION

Bommanakatte and Jannapura ponds shows rich plant diversity status than Hiriyur pond. It shows that the direct entry of sewage and other effluents influence the nutrient condition of Bommanakatte pond and make the pond eutrophic condition. Because of eutrophication Bommanakatte and Jannapura ponds are covered by thick mat of free floating vegetation.

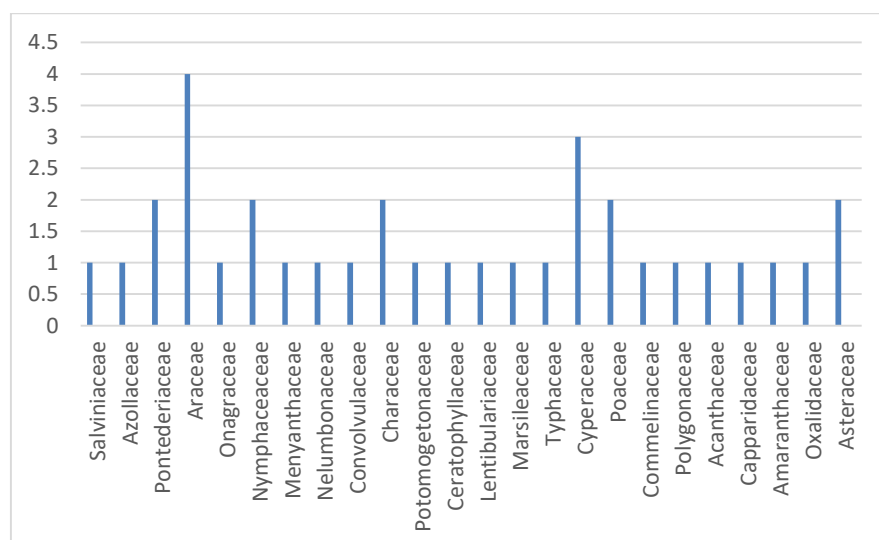


Fig 1: Number of Aquatic Macrophyte genera and their families

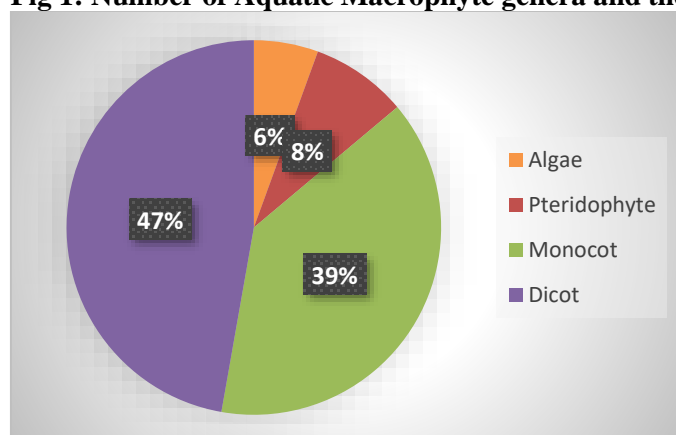


Fig 2: Percentage of Species Belongs to different groups

TABLE 1. Aquatic macrophytes of Bommanakatte (Pond A), Jannapura (Pond B) and Hiriur Ponds (Pond C)

- **Free floating:**

Name of the plant	Class	Family	Pond A	Pond B	Pond C
<i>Salvinia spp</i>	Pteridophyte	Salviniaceae	+	+	-
<i>Azolla pinnata</i>	Pteridophyte	Azollaceae	+	+	-
<i>Eichhornia spp.</i>	Monocot	Pontederiaceae	+	+	-
<i>Pistia stratiotes</i>	Monocot	Araceae	+	+	-
<i>Wolffia spp.</i>	Monocot	Araceae	+	+	-
<i>Lemna minor</i>	Monocot	Araceae	+	+	-
<i>Spirodela polyrrhiza</i>	Monocot	Araceae	-	+	-
<i>Ludwigia adscendens</i> Syn. <i>Jussiea repens</i>	Dicot	Onagraceae	+	+	-

- **Rooted with floating leaves**

Name of the plant	Class	Family	Pond A	Pond B	Pond C
<i>Nymphaea spp</i>	Dicot	Nymphaeaceae	+	+	-
<i>Nymphoides hydrophylla</i>	Dicot	Menyanthaceae	+	-	-
<i>Nelumbium spp</i>	Dicot	Nelumbonaceae	+	+	-
<i>Ipomea aquatica</i>	Dicot	Convolvulaceae	+	+	-

- **Submerged rooted plants**

Name of the plant	Class	Family	Pond A	Pond B	Pond C
<i>Chara spp</i>	Algae	Characeae	+	-	+
<i>Nitella spp</i>	Algae	Characeae	+	-	+
<i>Potamogeton spp</i>	Monocot	Potamogetonaceae	+	-	-

- **Submerged free floating plants**

Name of the plant	Class	Family	Pond A	Pond B	Pond C
<i>Hydrilla spp</i>	Dicot	Nymphaeaceae	+	-	+
<i>Ceratophyllum spp</i>	Dicot	Ceratophyllaceae	-	-	+
<i>Utricularia spp.</i>	Dicot	Lentibulariaceae	+	-	-

- **Rooted emergent plants**

Name of the plant	Class	Family	Pond A	Pond B	Pond C
<i>Marsilea quadrifolia</i>	Pteridophyte	Marsileaceae	+	-	+
<i>Typha angustata</i>	Monocot	Typhaceae	+	+	+
<i>Cyperus spp.</i>	Monocot	Cyperaceae	+	+	+
<i>Scirpus spp</i>	Monocot	Cyperaceae	+	+	+
<i>Actinoscirpus grossus</i>	Monocot	Cyperaceae			
<i>Phragmites maximus</i>	Monocot	Poaceae	+	+	+
<i>Cynodon dactylon</i>	Monocot	Poaceae	+	+	-
<i>Commelina spp.</i>	Monocot	Commelinaceae	+	+	-
<i>Monocharia vaginalis</i>	Monocot	Pontederiaceae	-	+	-
<i>Polygonum glabrum</i>	Dicot	Polygonaceae	+	+	+
<i>Ipomea cornea</i>	Dicot	Convolvulaceae	+	+	+
<i>Asteracantha longifolia</i>	Dicot	Acanthaceae	+	+	+
<i>Bacopa monneri</i>	Dicot	Capparidaceae	+	+	+
<i>Alternanthera sessilis</i>	Dicot	Amaranthaceae	+	+	+
<i>Oxalis corniculata</i>	Dicot	Oxalidaceae	+	+	-
<i>Eclipta prostrata</i>	Dicot	Asteraceae	+	+	-
<i>Acmella oleracea</i>	Dicot	Asteraceae	+	+	-
<i>Ludwigia perennis</i>	Dicot	Onagraceae	+	+	-

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