REDVET - Revistaelectrónica de Veterinaria- ISSN 1695-7504
Vol 25, No. 1 (2024)
http://www.veterinaria.org
Article Received - 10 Jan 2024Acceptance - 27 Jan 2024Publication - 15 Feb 2024

Preliminary Studies On Aquatic Macrophytes Of Siddipet District, Telangana State. India

M. Srinivas[1*] M. Madhan Mohan[2], M. Aruna[3*]

[1]Lecturer in Botany, Govt. Degree College (A), Siddipet, Telangana state. India
[2]Assitant Professor of Botany, Govt. Degree College (A), Siddipet, Telangana state. India
[2*]Professor, Department of Botany, Telangana University, Nizamabad, Telangana state. India.

Corresponding Author: M. Srinivas
[1]Lecturer in Botany, Govt. Degree College (A), Siddipet, Telangana state. India
Email: srinivasm655@gmail.com

ABSTRACT
The aim of the present study was to enumerate the aquatic macrophytes of different lakes located in Siddipet district, Telangana state. The present study on identification and characterization of aquatic plants was carried out during the period, February to October 2023. The aquatic macrophytes collected from selected lakes were preserved in laboratory of Botany, Government Degree College, Siddipet. The study reveals the occurrence of 40 species of 36 genera and 19 families of Angiosperms. Out of these 5 species belonging to cyperaceae family was found to be dominant followed by Hydrocharitacae, Poacaae and Araceae.

KEY WORDS: Aquatic Macrophytes, lakes , Siddipet District, Telangana state

INTRODUCTION:
Aquatic plants are natural and important components of the aquatic environment. Macrophytes play an important role in the structure and function of aquatic ecosystem. Studies related to aquatic and wetland flora were Globally carried earlier by Mirashi, Sen and Chaterjee, 1959; Subramanyan, 1962; Vyas, Singh and Tomar, 1982; Srivastava et al., 1987; Baruah and Barauh, 2000; Dhote and Dikshit, 2007; Deshkar, Chandra et al., 2008; Srinivas and Aruna, 2013. Macrophytes are an important component of lake because they provide food and habitat for all invertebrates, fish and wild life. The aquatic macrophytes comprise a diverse group of macrophytic organisms which include angiosperms, pteridophytes, bryophytes, and some other fresh macro that occur seasonally or permanently in the wet environment. (Lacoul and Freedman, 2006; Chambers *et al*,Macrophytes constitute a very prominent characteristic of an aquatic ecosystem (Sharma *et al.*, 2007) they oxygenate water and are important for different activities of aquatic animals. They also dynamically guide the cycling of minerals and other organic constituents, there by influencing overall biomass production of water bodies and can serve as indicators for monitoring the degree of damage in the ecosystem. Aquatic macrophytes respond to the changes in water quality and have been used as bio-indicator of pollution (Tripathi and Shukla, 1991).

The species of plants which are generally grown in water are called aquatic plants (Muenscher, 1994). Aquatic macrophytes are basically uninfluenced by environmental alterations in comparison to the terrestrial plants. Diversity of living organisms refers to variety of plants animals microbial in certain ecosystem. This refers to terrestrial, aquatic and manmade field areas. Aquatic ecosystems are suitable for diversity of biotic and abiotics. Aquatic macrophytes are most universal, they are varying in their habitat and habit, actively grow forever or periodically submerged, floating and emerged plants. Aquatic life always depends on water streams (Millman *et.al*,. 2005).

Srinivas,M. Bhargavi,R and Aruna.M (2014) investigated Nagaram lake of warangal district in Telangana state,India to enlist the aquatic macrophytes. In this study it was aimed to identify the aquatic macrophytes growing abundantly in Nagaram lake of Warangal district in Telangana year during 2014. They identified, 12 species of 10 genera and 6 families under the class monocotyledons,12 species of 24 genera and 2 families under the class algae were recorded. The aquatic macrophytes morphologically anchored, floating leaved anchored and emergent. Narasimha Ramulu K, Benarjee G (2015)have carried out studies on diversity and distribution of macrophytes in Nagaram tank of Warangal district, Telangana state. Unfortunately, some aquatic plants often become a problem by stopping uses of water and threaten the structure and function of diverse native aquatic ecosystems. Aquatic weeds are also responsible to reduce the available water resources by way of excess seepage or evapotranspiration process. When seasonal fluctuations occurred, the diversity of aquatic plants is drastically changed and also it blocked the drainage canals of the colonies and irrigations canals badly due to its profuse growth. In the present study, a total of 25 macrophytes were recorded from littoral and sub-littoral zones of the tank at four selected sampling stations. With the floating species like *Hydrilla* spp. and *Lemna* spp. were dominant at all sampling stations. Among the rooted floating species *Nymphea* spp. and *Nelumbo* spp. recorded from all sampling stations. In sub-merged macrophytes, *Ceratophyllumdemersum*and *Utricularia* spp. were recorded. An intensive survey of the infestation of the waterways by the aquatic weed populations in the study area documented. These studies provides new baseline information on the diversity, distribution and inter specific

associations of floating-leafed and submersed aquatic plants in Nagaram tank that will be useful for managing and or controlling the plant species.
Rajyalaxmi K, Aruna M, (2018) identified Aquatic Macrophytes of Singabhupalem Lake in Telangana State. The survey has been carried out to investigate the marshy and aquatic macrophytes of Singabhupalem lake, Telangana state. 61 species belonging to 52 different genera of four groups of aquatic plant life, Algae (3species), Bryophytes (2 species), Pteridophytes (4species) and Angiosperms (52 species) were recorded. The name of the species, family and habitat of the marshy and aquatic macrophytes has also been noted in this present work.

MATERIAL AND METHODS:
The lake is main source of drinking and also irrigation. Growth of aquatic vegetation mainly depends upon the availability of soil moisture, water, light, pH and other physico-chemical parameters. A thorough survey of Marshy and aquatic vegetation was made during the period of one year from February – October 2023
Study Sites:
In the present study Siddipet district was selected for conduct of further survey of water bodies situated in and around. It is one among the 31 districts of Telangana State. It lies between 18^0 6'.68544"N Northern latitude and 78^0 51'7.4664" E of Eastern longitude and it is located 100 kilometres from Hyderabad, 62 kilometres from Karimnager, 124 kilometres from Ramagundam, and 80 kilometres away from second largest city of Telangana, Warangal It occupies 3632 Sq. Kilometers, with a total annual rainfall ranging from 50-55 cm and temperature varying between 30-35^0C **(Fig-1 & 2).** Siddipet is a town in Siddipet district of the Indian state of Telangana. It is a municipality and the headquarters of Siddipet district.
We have chosen the aquatic habitats of siddipet district, Komati cheruvu and Erra cheruvu lakes of Siddipet, Pedda cheruvu, Ramasamudramcheruvu of Dubbak and Nalla cheruvu of Duddeda. Overview of both the lakes, Komati cheruvu and Erra cheruvucheruvu, Ramasamudramcheruvu of Dubbak and Nalla cheruvu of Duddeda is shown in figures.**(Fig-1)**

DATA COLLECTION:
Sample collections were made in the regular intervals during the study period from February – October 2023. During the period of investigation the field trips of monthly duration were planned taking into consideration the flowering and fruiting seasons of the plants inhabiting the area. The aquatic macrophytes were collected from different stations of selected lake and the marshy and aquatic macrophytes were collected by quadrate method and transferred into large polythene bottles and polythene covers. These specimens were treated with 2% mercury chloride for sterilization and were pressed on herbarium sheets for further study. The preserved material were initially identified with the help of regional and local district floras such as *Flora of the Presidency of Madras* (Gamble,2011) and Flora of Medak District (Swamy,2015). Recent monographs, revisionary works and relevant research floras were consulted for determining correct identity of plants and updating nomenclature. The present enumeration of Aquatic macrophytes belonging to four different categories Algae, Bryophytes, Pteridophytes and Angiosperms which are depending on their contact with soil, water and air and classified into following groups Floating hydrophytes, Submerged hydrophytes, Emergent hydrophytes and Wet land hydrophytes.

RESULT S AND DISCUSSION:
An extensive study was made to find out the occurrence and abundance of aquatic plants population in different study sites (Five-Lakes) of Siddipet District, Telangana, India. Totally 40 species of plants were recorded during the study period as shown in Table:-1.The name of the species, family and habitat of the marshy and aquatic macrophytes has also been noted in this present work. Present study documented a remarkable biodiversity in species composition. This qualitative floristic survey conducted in this location was first time. Maximum species were recorded in site I, and followed by site II, site III, sit-IV & site V. The families with maximum number of species include, Cyperaceae (5), Hydrocharitaceae (4), Poaceae (3), Araceae (3), Thypaceae (2), Characeae (2), Convolvulaceae (2), Nymphaceae (1), Acanthaceae (1), Lemnaceae (1), Potamogetanaceae (1), Apanogetanaceae (1), Ceratophyllaceae (1), Marsiliaceae (1), Polygoniaceae (1), Salviniaceae (1), Amaranthaceae (1), Pistiaceae (1) and Lentibulariaceae (1) (Table No. 1).
The maximum families were recorded in site followed by I, III, IV, IV. Among morphophysiological categories i.e Free floating Rooted and floating, Submerged anchored Emergent anchored weeds. Above these emergent weed species are predominant in all sites and followed by submerged anchored, rooted and floating, free floating.
In the present investigation a total of 40 species belonging to 20 families and 40 genera under 4 classes were identified. The aquatic macrophytes were morphologically classified as groups viz., classified under floating, submerged, submerged anchored, floating leaved anchored and emergent. The results are presented in Table 1. Thus aquatic macrophytes act as indicators of water quality, reduce pollution by acting as nutrient pumps and provide suitable breeding and shelter for varied aquatic fauna. It is presumed that macrophytes are the most productive means of aquatic ecosystem since they utilize the roots in sediments beneath water and their photosynthetic parts in air, Westlake; 1963.

REDVET - Revistaelectrónica de Veterinaria- ISSN 1695-7504
Vol 25, No. 1 (2024)
http://www.veterinaria.org
Article Received - 10 Jan 2024Acceptance - 27 Jan 2024Publication - 15 Feb 2024

Fig-1.Showing images of Lakes where from Macrophytes were collected

1. Komati cheruvu lake, Siddipet

2. Erra cheruvu, Siddipet

3. Pedda cheruvulake,Dubbak

4. Ramasamudramcheruvu lake, Dubbak

5. Nalla Cheruvu, Duddeda

Fig-2. Satellite view of different lakes of Siddipet, district.

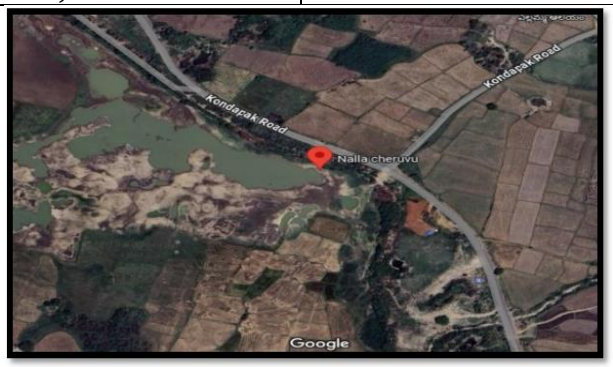
REDVET - Revistaelectrónica de Veterinaria- ISSN 1695-7504
Vol 25, No. 1 (2024)
http://www.veterinaria.org
Article Received - 10 Jan 2024Acceptance - 27 Jan 2024Publication - 15 Feb 2024

1. Komati cheruvu lake, Siddipet

2. Erra cheruvu, Siddipet

4. Pedda cheruvulake,Dubbak

5. Ramasamudramcheruvu lake, Dubbak



5. Nalla Cheruvu, Duddeda

Table-1: Showing abundance of aquatic macrophytes collected from different lakes.

S.No.	Name of the Plant	Family	Komati Cheruvu lake	Erra Cheruvu lake	Pedda Cheruvu lake	Rama samudram Cheruvu lake	Nalla Cheruvu lake
1.	*Najas marina*	Hydrochartiaceae	++	+	+	+	+
2.	*Nechamandra alternifolia*	Hydrocharitaceae	+	+	+	+	+
3.	*Hydrilla verticillata (*L.f.) Royle	Hydrochartiaceae	+	+	+	+	+
4.	*Ottelia alismoides*(L.) Pers	Hydrochartiaceae	+	+	+	+	+
5.	*Nymphoideshydrophylla*	Nymphaeceae	++	+	+	+	+
6.	*Nymphaea pubescens Willd.*	Nymphaeaceae	+	-	++	+	+
7.	*Fimbristylistetragena*	Cyperaceae	+	+	+	+	+

REDVET - Revistaelectrónica de Veterinaria- ISSN 1695-7504
Vol 25, No. 1 (2024)
http://www.veterinaria.org
Article Received - 10 Jan 2024Acceptance - 27 Jan 2024Publication - 15 Feb 2024

8.	*Cyperus dives*	Cyperaceae	+	+	+	+	+
9.	*Cyperus alopecuroides*Rottb.	Cyperaceae	+	+	+	+	+
10.	*Cyperus rotundus*L.	Cyperaceae	+	+	+	+	+
11.	*Ceratophyllumdenersum*L.	Ceratophyllaceae	+	+	+	+	+
12.	*Rhynchosporawightiana*(Nees) Steud.	Cyperaceae	+	+	+	+	+
13.	*Chara globularis*	Characeae	+	+	+	+	+
14.	*Nitellafurcata*	Characeae	++	+	+	+	+
15.	*Centella asiatica* (L.) Urb.	Apiaceae	+	+	+	+	+
16.	*Panicum repens* L.	Poaceae	+	+	+	+	+
17.	*Echinochloacolona* (L.) Link	Poaceae	+	+	+	+	+
18.	*Oryza rufipogon*Griff.	Poaceae	+	++	++	+	++
19.	*Typha capensis*	Typhaceae	+	+	+	+	+
20.	*Typha angustifolia*	Typhaceae	++	++	++	++	++
21.	*Ammonia baccifera*	Lythraceae	+	+	+	+	+
22.	*Rotaladensiflora*(Roth) Koehne	Lythraceae	+	++	+	-	+
23.	*Limnophytonobtusifolium*(L.)*Miq* .	Alismataceae	+	+	+	+	-
24.	*Utricularia stellaris*	Lentibulariaceae	+	+	+	+	+
25.	*Ipomoea cornia*Jaeq	Convolvulaceae	+	+	+	+	+
26.	*Ipomoea aquatica* Forssk.	Convolvulaceae	+	++	+	++	++
27.	*Potomogetonnodosus*Poir.	Potomogtonaceae	++	+	++	++	+
28.	*Pistiastratiodes*L.	Pistieaceae	+	+	+	+	+
29.	*Marsileaminuta*L.	Marsileaceae	+	+	+	+	+
30.	*Spirodelapolyrhiza*	Araceae	+	+	+	+	+
31.	*Wolffia globosa* (Roxb.) Hartog& Plas	Araceae	+	+	+	+	+
32.	*Lemna aequinoctialis*Welw.	Araceae	++	++	++	++	++
33.	*Eichornia crassipes*	Pontedriaceae	+	+	+	+	+
34.	*Azolla pinnata* R. Br.	Azollaceae	+	+	+	+	+
35.	*Nelumbo nucifera*	Neliumbonaceae	+	-	+	+	+
36.	*Hygrophylla auriculata*	Acantahceae	++	+	++	+	++
37.	*Mimosa pudica*	Fabaceae(Mimosoideae)	-	++	++	+	++
38.	*Ceratophyllumdemersum*	Ceratophyllaceae	+	+	++	++	+
39.	*Hygrophila auriculata (Schumach.) Heine*	Acanthaceae	+	++	+	++	+
40.	*Aponogeton natans (L.) Engl. & K. Krause*	Aponogetonaceae	+	+	++	+	++

++ =Dominant- =Absent + = Present

REDVET - Revistaelectrónica de Veterinaria- ISSN 1695-7504
Vol 25, No. 1 (2024)
http://www.veterinaria.org
Article Received - 10 Jan 2024Acceptance - 27 Jan 2024Publication - 15 Feb 2024

Fig:1-Showing few of the Macrophytes identified at different sites

	
Ammaniabaccifera	***Azolla pinnata* R. Br.**
	
***Aponogeton natans* (L.) Engl. & K. Krause**	***Cyperus alopecuroides* Rottb.**
	
***Cyperus difformis* L.**	***Cyperus rotundus* L.**
	
Chara sps	***Echinochloacolona***

REDVET - Revistaelectrónica de Veterinaria- ISSN 1695-7504
Vol 25, No. 1 (2024)
http://www.veterinaria.org
Article Received - 10 Jan 2024Acceptance - 27 Jan 2024Publication - 15 Feb 2024

	
***Eichornia crassipes* (Mart.) S.L.**	***Fimbristylis tetragena***
	
***Hydrilla verticillata*(L.f) Royle**	***Ipomoea aquatica* Forssk.**
	
***Ipomoea cornia*Jaeq**	***Marsilea minuta*L.**
	
Najas marina	***Nelumbo nucifera***

REDVET - Revistaelectrónica de Veterinaria- ISSN 1695-7504
Vol 25, No. 1 (2024)
http://www.veterinaria.org
Article Received - 10 Jan 2024Acceptance - 27 Jan 2024Publication - 15 Feb 2024

	
Nymphoideshydrophylla	***Ottelia alismoides* (L.) Pers.**
	
***Panicum repens* L.**	***Pistiastratiodes***
	
Rhynchosporacolona	***Spirodela polyrhiza***
	
***Typha domingensis* Pers.**	***Utricularia stellaris***

ACKNOWLEDGEMENT:
The authors express their sincere thanks to Principal and of the Head of the Department, Government Degree College (Autonomous) Siddipet for providing facilities
The authors are grateful to **Prof. Vidyavati,** Former Vice-Chancellor of Kakatitya University, Warangal, and Telangana State for her constant encouragement and valuable suggestions.

References

1. Barauh, P.P and Barauh, C.K.,(2000). Study of the Hydrophytic flora of KAziranga National Park, Assam, India. Annals of Forestry, 8 (2): 170-178.

2. C.A.N. Rao, J. Deepa, M. Hakeel, Journal of Threatened Taxa, 2011, 3(2), 1564-1566.
3. Carpenter, S. R., Lodge, D. M. (1986) Effects of submersed macrophytes on ecosystem processes. Aquatic Bot. 26: 341- 370.
4. Deepa,J., C.A.N. Rao, Zoos' Print Journal, (2007) 22 (12), 2937-2939.
5. Deshkar, S.L.,(2008). Avifaunal Diversity and Ecology of Wetlands in Semi-arid zone of Central Gujarat with refrence to the Consrvation and Categorization. Ph.D thesis, M.S University. Vadodora.
6. J. S. Gamble, Flora of Presidency of Madras, Adlard & Son, London, 1915-1936 (repr. ed., 2011), vols. I-III.
7. Mirashi, M.V., (1954). Studies on the Hydrophytes of Nagpur. *J. Indian BotSoc. 33:293-308.*
8. Mishra, K.L.,(1974). Manual of plant Ecology. Oxoford and IBH publishing Co. New Delhi, pp.491.
9. Odelu, G.,(2016) Phytoplankton and Macrophytic Floral studies in KamalapurReserviour of Karimnagar District of Telangana, India.. Int.J.Curr.Microbiol.App.Sci., 5(1): 78-94.
10. Pullaiah,T., Prabhakar,C., Ravi Prasad Rao,B., (1998). Flora of Medak District, Andhra Pradesh, India, Daya publishing house, New Delhi,
11. Rajyalaxmi K, Aruna M., (2018). Aquatic Macrophytes of Singabhupalem Lake in Telangana State. International Journal of Life Sciences Research. Vol. 6, Issue 2: 203-206.
12. Shailaja, A., Aruna.M., (2023). Diveristy of Aquatic macrophytes in Nagaram pond and Dubbak pond of Siddipet district Telangana. International journal of Novel research and development Vol:8 issiue 12: 492-498.
13. Sharma, S.C. Purohit, S.C &Kantiya Jeetendra, (2007). Aquatic macrophytes of Bikaner District (Rajastan). J. Indian Bot. Soc., 86 (3&4) 137-140.
14. Srinivas,M. and Aruna,M., (2013). Diversity of Aquatic macrophytes in Eraacheruvu of Medak District, Andras Pradesh. The Biosphere. An International Biannual Journal of Life Sciences. 5(2): 131-133.
15. Swamy,J (2016). An Inventory of Aquatic and Wetland Plants of Pocharam lake, Medak District, Telangana, India. Asian Journal of Plant Science and Research, 6(3): 87-91
16. Swamy,J.,(2015). Floristic Studies on Pocharam Wildlife Sanctuary, Telangana State, PhD Thesis, Osmania University (Hyderabad, Telangana, India.).
17. Tripathi, B.D & Shukla, S.C., (1991). Biologcaltreatement of wastewater by selected aquatic plants, Environ. Poll. 6: 69-78.
18. Vyas, L.N., (1964). A study of the Hydrophytes and Marsh plants pf Alwar. J. Indian.Bot Soc. 43:17-30.