



ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 8.4
IJAR 2022; 8(7): 08-11
www.allresearchjournal.com
Received: 08-04-2022
Accepted: 12-05-2022

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Hydrophytic plant diversity of aquatic body of Govindgarh lake in Rewa district (M.P.) India

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Abstract

The Govindgarh lake is one of the unique water body in India and located in south of Rewa, district in Madhya Pradesh at a distance of 20 km. from Rewa, with a longitude 24°20'25" and latitude 81°15'20". The dam is connected with all weather Rewa-Shahdol and Satna-Sidhi road. The dam was formed by impounding of small nalla originating from Kaimore hill. With a view to storing rain water, the Maharaja of Rewa at that time built a bandh across the nalla to form a tank in the year 1958. The shows that the lake is functioning as a carbon and nitrate removal system. Major untreated sewage influx is removed by the bio diversity of the lake. The present work was carried out from October 2020 to September 2021, it showed 70 species of aquatic plants belonging to 34 families. The dominant families were Asteraceae with 8 species followed by Poaceae with 6 species and 4 species each of Alismataceae and Lamiaceae. Based on the existence of aquatic plants in lake, 41 species were peripheral, 14 species were shore, 11 species were floating and 4 species were categorized as submerged. As per the IUCN status, 54 species were not assessed by IUCN and 16 species were under the least concern status out of the 70 species observed during the study period. The present study mainly deals with the identification, documentation and conservation needs of aquatic plants species in Govindgarh lake.

Keywords: Aquatic plants, diversity, conservation, govindgarh lake

Introduction

Wetland biodiversity provides a variety of environmental services from its species that are essential at the global, regional and local level (Rao *et al.*, 2017) ^[1]. A wetland ecosystem is a complex independent system of plants, animals and microorganisms along with physical environment in which they live (Bhagyaleena *et al.*, 2012) ^[2]. Wetland are highly valuable, yet the most threatened ecosystems (Murphy *et al.*, 2003) ^[3]. The available freshwater is not evenly distributed throughout either at local or global level. It now rests on man to properly manage this ecosystem (Uka *et al.*, 2009) ^[4]. Biological science has attempted to classify living organism and categorized the variability in nature for over a century. This has led to an understanding of its organization into communication about the plants and animals. Planning for environmentally sound and biodiversity friendly development has in recent years emerged as an important concern. Minimizing the loss of biodiversity is one of the key objectives in planning for such sustainable development (Pramod *et al.*, 1997) ^[5]. Wetlands are capable of performing various functions as a result of physical, chemical and biological processes (Ramachandra *et al.*, 2002) ^[6]. Wetlands have been shown to improve water quality by filtering out fertilizers and pesticides. Aquatic plants maintain the habitat of various wetland dependent species, documentation of these wetland plant species is at the utmost importance. Therefore, the present study was undertaken to document the aquatic biodiversity of Govindgarh lake.

Material and Methods

The investigation on Hydrophytic plants of the Govindgarh lake was carried out in all three different seasons; winter (October to January), summer (February to May) and monsoon (June to September) from October 2020 to September 2021. Observed plants were photographed and plant specimens were identified as per Ugemuge (1986) ^[7], Kodarkar, (1992) ^[8], Cook (1996) ^[9] and Fasset (2000) ^[10]. The aquatic plants were categorized on the

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the basis of their existence in lake as submerged, floating, shore plants and peripheral plants. Conservation needs of the aquatic plants were assessed on the basis of IUCN red list status.

Result and Discussion

In the present investigation, 70 species of aquatic plants belonging to 34 families were observed from 5 stations of Govindgarh lake viz. S1, S2, S3, S4 and S5. Among the 34 families the Asteraceae were reported 8 species followed by Poaceae with 6 species and 4 species each of Amaranthaceae and Lamiaceae, 3 species each of Cyperaceae, Euphorbiaceae, Fabaceae, Hydrocharitaceae, Malvaceae, Convolvulaceae and Solanaceae, 2 species each of Acanthaceae, Alismataceae, Nymphaeaceae and Onagraceae and a single species was reported from family Apocynaceae, Aponogetonaceae, Araceae, Arecaceae, Boraginaceae, Capparaceae, Ceratophyllaceae, Characeae, Commelinaceae, Meliaceae, Menyanthaceae, Nelumbonaceae, Oxalidaceae, Papaveraceae, Polygonaceae, Phyllanthaceae, Trapaceae, Typhaceae and Verbenaceae. In the present study majority of the aquatic plants 77% were not assessed followed by 23% aquatic plants were under

least concern as per the IUCN red list status observed in NN corridor. Alien invasive plants pose a major threat to wetland species. In the present investigation aquatic invaders such as *Ipomoea carnea* (Beshram) was observed at the peripheral area at all 5 stations viz. S1, S2, S3, S4 and S5 of Govindgarh lake.

Aquatic plants with 16 number of species in Govindgarh lake has been classed as Least Concern (LC) and 54 number of species were data deficient per the IUCN red list status out of the 70 species observed in lake. The number of plant species assessed as data deficient reflects the low level of knowledge of many wetland plants as it has not been assessed by IUCN. The diversity and status of aquatic plants at 5 stations during the present study was done to generate quantitative information about wetland plants diversity, the result shows the position of wetlands in Govindgarh lake was not satisfactory as the aquatic plants are vanishes gradually and again invasive species invades the lake area. If present scenario of degradation of wetlands continue, the Govindgarh lake existence would be severely threatened it can affects the wetland biodiversity and movement of wild animal through this lake.

Table 1: Diversity and status of aquatic plants during study period

Sr. No.	Botanical name	Family	IUCN Status	Stations					Location of plants in lake
				S1	S2	S3	S4	S5	
1	<i>Hygrophila schulli</i>	Acanthaceae	NA		+	+	+	+	P
2	<i>Asteracantha longifolia</i>	Acanthaceae	NA			+	+	+	S
3	<i>Sagittaria trifolia</i>	Alismataceae	LC	+	+	+	+		S
4	<i>Sagittaria sagittifolia</i>	Alismataceae	LC		+		+	+	F
5	<i>Alternanthera sessilis</i>	Amaranthaceae	NA		+	+	+	+	S
6	<i>Amaranthus blitum</i>	Amaranthaceae	NA	+	+	+	+	+	P
7	<i>Achyranthes aspera</i>	Amaranthaceae	NA	+	+	+	+	+	P
8	<i>Celosia argentea</i>	Amaranthaceae	NA	+	+	+	+	+	P
9	<i>Calatropis gigantea</i>	Apocynaceae	NA		+	+	+	+	P
10	<i>Aponogeton natans</i>	Aponogetonaceae	LC		+	+	+		F
11	<i>Pistia stratiotes</i>	Araceae	LC	+	+		+		F
12	<i>Phoenix sylvestris</i>	Arecaceae	NA		+		+	+	P
13	<i>Grangea maderaspatana</i>	Asteraceae	NA		+	+	+	+	P
14	<i>Sphaeranthus indicus</i>	Asteraceae	LC	+	+	+	+		P
15	<i>Tridax procumbens</i>	Asteraceae	NA	+	+	+	+	+	P
16	<i>Xanthium strumarium</i>	Asteraceae	NA		+		+		P
17	<i>Vernonia cinerea</i>	Asteraceae	NA		+	+	+		P
18	<i>Blumea lacera</i>	Asteraceae	NA		+	+	+	+	P
19	<i>Acmella paniculata</i>	Asteraceae	LC	+	+	+	+	+	P
20	<i>Blumea eriantha</i>	Asteraceae	NA	+		+	+	+	P
21	<i>Heliotropium indicum</i>	Boraginaceae	NA	+		+	+	+	P
22	<i>Capparis zeylanica</i>	Capparaceae	NA		+		+		P
23	<i>Ceratophyllum submersum</i>	Ceratophyllaceae	LC				+		Sb
24	<i>Chara globularis</i>	Characeae	NA			+	+		Sb
25	<i>Merremia emarginata</i>	Convolvulaceae	LC	+		+	+	+	P
26	<i>Ipomoea aquatica</i>	Convolvulaceae	LC		+		+		F
27	<i>Ipomoea carnea</i>	Convolvulaceae	NA	+	+	+		+	P
28	<i>Cyanotis cristata</i>	Commelinaceae	LC	+	+	+	+	+	S
29	<i>Schoenoplectus articulatus</i>	Cyperaceae	NA		+		+	+	S
30	<i>Kyllinga triceps</i>	Cyperaceae	LC		+	+	+	+	S
31	<i>Cyperus rotundus</i>	Cyperaceae	LC	+	+	+	+	+	S
32	<i>Chrozophora rotleri</i>	Euphorbiaceae	NA	+	+	+	+	+	P
33	<i>Euphorbia hirta</i>	Euphorbiaceae	NA	+		+	+	+	P
34	<i>Ricinus communis</i>	Euphorbiaceae	NA	+	+		+	+	P
35	<i>Crotolaria ramosissima</i>	Fabaceae	NA	+	+	+	+		S
36	<i>Cassia tora</i>	Fabaceae	NA	+	+	+	+	+	P
37	<i>Butea monosperma</i>	Fabaceae	NA	+		+	+	+	P
38	<i>Vallisneria spiralis</i>	Hydrocharitaceae	NA	+	+	+	+		F
39	<i>Najas minor</i>	Hydrocharitaceae	NA		+		+	+	F

40	<i>Hydrilla verticillata</i>	Hydrocharitaceae	LC		+	+	+	+		Sb
41	<i>Ocimum americanum</i>	Lamiaceae	NA	+	+	+	+	+		P
42	<i>Ocimum tenuiflorum</i>	Lamiaceae	NA		+	+	+	+		P
43	<i>Leonotis nepetifolia</i>	Lamiaceae	NA	+		+	+	+		P
44	<i>Hyptis suaveolens</i>	Lamiaceae	NA	+		+	+	+		P
45	<i>Common sida</i>	Malvaceae	NA	+	+	+	+	+		P
46	<i>Urena lobata</i>	Malvaceae	NA	+	+	+	+	+		P
47	<i>Abelmoschus esculentus</i>	Malvaceae	NA	√		√	√	√		P
48	<i>Azadirachta indica</i>	Meliaceae	NA			+	+	+		P
49	<i>Nymphoides hydrophylla</i>	Menyanthaceae	LC		+	+	+			F
50	<i>Nelumbo nucifera</i>	Nelumbonaceae	NA			+				F
51	<i>Nymphae nouchali</i>	Nymphaeaceae	NA			+	+			F
52	<i>Nymphae pubescence</i>	Nymphaeaceae	NA		+		+			F
53	<i>Ludwigia octovalvis</i>	Onagraceae	NA		+	+	+			S
54	<i>Ludwigia adscendens</i>	Onagraceae	NA		+	+	+	+		S
55	<i>Oxalis corniculata</i>	Oxalidaceae	NA	+			+	+		F
56	<i>Argemone mexicana</i>	Papaveraceae	NA	+		+	+	+		P
57	<i>Oryza rufipogon</i>	Poaceae	NA		+	+	+			S
58	<i>Vetiveria zizanioides</i>	Poaceae	NA		+	+	+	+		S
59	<i>Cynodon dactylon</i>	Poaceae	NA	+	+	+	+			S
60	<i>Themeda triandra</i>	Poaceae	NA	+		+	+	+		P
61	<i>Aristida setacea</i>	Poaceae	NA	+	+	+	+	+		P
62	<i>Aristida adscensionis</i>	Poaceae	NA	+	+	+	+			P
63	<i>Polygonum glabrum</i>	Polygonaceae	LC		+	+	+	+		P
64	<i>Phyllanthus niruri</i>	Phyllanthaceae	NA			+	+	+		P
65	<i>Solanum surrattense</i>	Solanaceae	NA	+		+	+	+		P
66	<i>Physalis minima</i>	Solanaceae	NA		+	+	+	+		P
67	<i>Solanum xanthocarpum</i>	Solanaceae	NA	+	+	+	+	+		S
68	<i>Trapa natans</i>	Trapaceae	NA		+					Sb
69	<i>Typha provincialis</i>	Typhaceae	NA	+	+	+	+			P
70	<i>Lantana camara</i>	Verbenaceae	NA	+		+	+	+		P
				38	48	57	67	47		

IUCN status: LC- Least Concern, NA- Not Assessed,

Location status: P - Peripheral, S - Shore, F - Floating, Sb – Submerged and + = Present

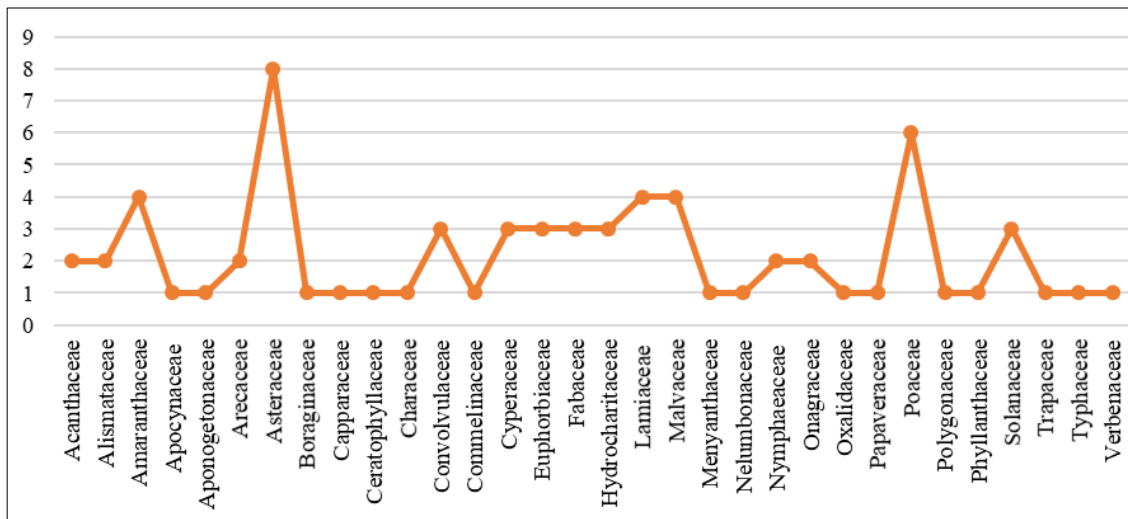


Fig 1: Familywise distribution of aquatic plant species in Govindgarh lake

Acknowledgement

Authors are thankful to the authority of Govt. Girls P.G. College, Rewa (M.P.) for kind cooperation and carry out to this work.

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