

## STUDIES ON THE MACROPHYTIC VEGETATION OF LAKE MANSAR (JAMMU)

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A survey of marshy and aquatic plants of the lake Mansar was conducted and in all 46 species, belonging to 32 genera and 20 families were collected which revealed the composition and phenological data for the plants growing in lake Mansar. Of these Plants 11 species have been recorded for the first time from Jammu Province.

**Keywords :** Association; Habit; Phenology; Macrophytic Vegetation.

### Introduction

Lake Mansar, represents an interesting permanent lentic habitat for intensive limnological studies to provide data for the exploitation of aquaculture and tourism development in Jammu (J&K) region. Anand (1975, 1977, 1978) and Anand and Kant (1976) studied the limnology of the lake and correlated the phytoplanktonic population with that of physical factors. Anand and Langer (1988) studied the charophytes occurring in the lake and the aquatic macrophytes were studied by Anand and Sharma (1988) and Sharma (1990). A survey of marshy and aquatic plants of the lake Mansar was conducted for one and a half year i.e. February 1988 to

June 1989. The studies incorporated in the present communication pertain only to taxonomic enumerations, distribution, habit, association and phenology.

*The Lake :* Mansar lake a big basin, about 4.3 km around is situated about 54 km east of the Jammu City at 32° 8' N latitude and 72° 2' E longitude at an altitude of 665 mts above mean sea level. The average rainfall in the area ranged from 0.6 to 135.5 mm; the air temperature fluctuated between 15.3 to 32.5°C (Fig. 1). The soil along the shores of the lake is sandy or sanday loam (10 YR 6/3) or silty loam (5YR 5/3) referred to the Mun-Shell soil colour charts (1954).

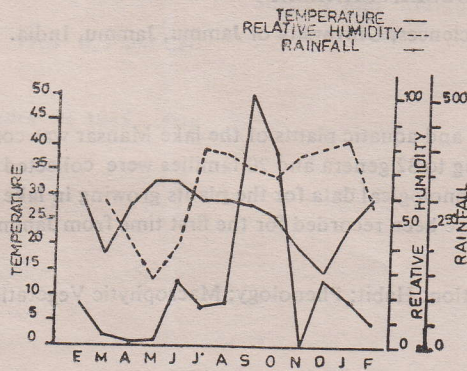


FIG - 1

Fig. 1 Meteorological data of the region.

Following are the physicochemical characteristics of lake water :—

- pH 6.9–8.3, Conductivity (in ho/cm) 0.09–0.1
- Water Temperature (C°) 11C°–31C°
- Corborates (mg/l) -187.5, Bicorborates (mg/l) 744–935.3
- Free Carbon dioxide (mg/l) -7.8
- Dissolved O<sub>2</sub> (mg/l) 9.9–17.4, Chloride (mg/l) 21.7–25.31
- Ca (mg/l) 37.69–40.1, Magnesium (mg/l) 7.2–14.3

Table 1 : Plants occurring in and around the lake Mansar

Name of Plants/habits	Occurrence	Flowering	Remarks
1	2	3	4
<b>A. Submerged</b>			
<i>Ceratophyllum demersum</i> Linn	R	Not seen	
<i>Hydrilla verticillata</i> Rich.	C	Dec-Jan.	
<i>Vallisneria spiralis</i> Linn.	C	March-Dec.	
<i>Najas indica (mild)</i> Cham.	C	Sept.	N.R. (J&K)
<i>Potamogeton lucens</i> Linn.	A	August-Dec.	N.R. (J)
<i>P. sps</i>	A	Feb-August	N.R. (J&K)
<i>P. crispus</i> Linn	R	Not seen	
<i>Chara corollina</i> Milldenaw	A	—	
<i>C. vulgaris</i> Linn	C	—	
<i>C. benthami</i> Braun	A	—	
<i>C. fragalis</i> Desraux	C	—	
<i>C. Zeylanica</i> Milldenow	C	--	
<i>C. Contraria</i> Kutzing	C	—	
<i>Lychnothamnus barbatus</i> (Meyon)			
Leon hardu vern	C	—	
<i>N. hyalina</i> (De cond) Agarth	R	—	
<b>B. Free Floating</b>			
<i>Nymphoides idicum</i> (L) D. Kuntze	C	March-Dec.	N.R. (J&K)
<i>N. cristatum</i> (Ronb) O. Kuntze	C	March-Dec.	
<i>Hygroshiza aristata</i> (Retz)	R	Not seen	
nees ex wt. & Arn.			
<b>C. Rooted with floating leaves</b>			
<i>Nelumbo pentapetala</i> (Walt) Fernald.	A	Aug.-Oct.	N.R. (J&K)
<i>Caldesia parnassifolia</i> (Barl & xl) Parl	R	May	N.R. (J&K)
<i>Potamogeton nodosus</i> Poir	A	March-August	
<i>P. natans</i> Linn.	R	March-August	
<b>D. Emergent</b>			
<i>Ranunculus scleratus</i> L.	R	Feb.-May	
<i>Aeschynomene indica</i> L.	R	July-October	

1	2	3	4
<i>Ipomea carnea</i> auct. non Jacq.	C	Throughout the year	
<i>Bramia monneri</i>	C	-do-	
<i>Veronica anagalis</i> aquatica L.	R	Feb.-May	
<i>Limnophila</i> sps. L.	R	August-Dec.	N.R. (J&K)
<i>Centella asiatica</i> L.	R	Not seen	
<i>Phyla nodiflora</i> (L) green	R	Throughout the year	
<i>Alternanthera sessilis</i> Forssk	R	August-Feb.	
<i>Typha angustata</i> Bory chaub	C	August-Feb.	
<i>Juncus articulatus</i> Linn.	R	August-Feb.	
<i>Cyperus pumillus</i> L.	R	August-Feb.	
<i>C. distans</i> L.	C	August-Dec.	
<i>Fimbristylis bisumbellata</i> Bup.	R	August-Dec.	
<i>Eleocharis plantaginea</i> R.B	A	August-December	N.R. (J&K)
<i>Scirpus validus</i> vahl.	C	August-Nov.	N.R. (J&K)
<i>S. mucronatus</i> L.	C	July-Nov.	
<i>S. articulatus</i> L.	C	July-Nov.	
<i>S. acutus</i>	C	August-Dec.	N.R. (J&K)
<i>Arundo donax</i> Linn.	C	July-Dec.	
<i>Polypogon monsplicies</i> Linn.	C	July-Dec.	
<i>Polygonum glabrum</i> Linn.	R	August-Nov.	
<i>Polygonum barbatum</i> Linn.	R	May-August	
<i>Equisetum diffusum</i> Don.	R	—	N.R. (J&K)

A = Abundant    C — Common    R = Rare    N.R. = New Records

— indicates the algae bearing oogonia & antheridia.

## Materials and Methods

The collections were made by using dredgers specified for the deep and shallow waters (Sharma, 1990). The plants were collected, sorted out, cleaned and finally pressed for herbarium records and also fixed in 70% alcohol for further studies. Some of the plants were studied afresh and identified.

## Results and Discussions

In all 46 species, belonging to 32 genera and 20 families were collected (Table 1) revealed the composition, association and phenological data for the plants growing in lake Mansar. Of these plants, 11 species (Table 1, N.R.) have been recorded for the first time from Jammu Province. Except for the species *Najas indica*, *Potamogeton natans*, *P. nodosus*, rest of the species constituted the new records for J&K State.

Seasonal changes in the water level brought interesting changes in the habitat type and the plants growing there. These plants exhibited remarkable morphological and anatomical variations due to the creation of new but temporary habitat conditions (Arber, 1920). Some of the plants got eliminated with the shift of the habit at nature i.e. aquatic to terrestrial or vice-versa.

Further it was observed that increase in the water depth led to

the increase in the size of the plant parts like leaf size, petiole and internodal length but root length showed a decrease. The reverse was observed with decrease in the water level. *Nelumbo pentapetala*, *Nymphoides indicum*, *N. cristatum*, *P. nodosus*, *Ceratophyllum demersum* showed such type of behaviour. The leaves of *Vallisnaria spiralis*, growing in deep water, were about 1-1½ mts. long and such plants have never been observed to flower throughout the year. On the other hand *Vallisnaria spiralis* grew near the lake shore (shallow regions) had short leaves but flowered throughout the year.

Zonation of macrophytes : Macrophytes growing in the lake also constituted an interesting zonation depending upon the water depth.

(a) *Deep waters* : In deep waters, pure belts of *Potamogeton species* i.e. *P. nodosus*, *P. natans*, *P. lucens* were formed during March-October. These species grew luxuriantly even up to the depth of 6-8 mts from the shore towards the centre. In the following months, *P. nodosus* decomposed but *P. lucens* continued to grow along with other species of *Potamogeton*.

(b) *Shallow Waters* : *Nymphoides indicum*, *N. Cristatum* formed pure or mixed stands in the shallow waters along the periphery of the lakes. At certain spots it formed mixed associations with *Nelumbo pentapetala*,

*Arundo donax*, *Eleocharis plantaginea*. Emergent vegetation was quite rich in the shallow waters along the shore of the lake (Table-1).

The species like *Ceratophyllum demersum* and *Najas indica* grew under the shade of the leaves of *Nelumbo* or *Nymphaoides indicum*, preferably in deep waters. On the contrary, *Hydrilla verticillata* and *Valisnaria spiralis* grew luxuriantly both in deep as well as in shallow waters. Charophytes i.e. *Chara corollina*, *C. brauni*, *C. benthami*, *C. Zeylanica*, *C. brachypus*, *C. fragalis*, *Nitella mucronata*, *N. hyalina*, *Lychnothamnus barbatum* formed pure or mixed meadows with submerged plants. Additionally, *Equisetum diffusum* belonging to pteridophyta was also found to form an important emergent vegetation of the lake. At certain spots, poor growth of these plants was observed which was either due to intensive biotic interference or excessive water currents.

It was observed that the lake Mansar is undergoing eutrophication though at slow rate. Proper reme-

dial measures should be taken to conserve the natural water resources and the biota which could otherwise be exploited for the future aquaculture developments in the area.

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