


Macrophyte Ecology of Laisoipat lake


Stevens, H. H., Jr., J. F. Fick and G. F. Smoot, (1975). Water temperature, influential factors, field measurement and data presentation. Techniques of water-
resources investigations of the *US Geological Survey*. Book 1, collection of water data by direct measurement. chapter D1. 65 pp.


LIFE-FORM ANALYSIS AND BIOLOGICAL SPECTRUM OF THE MACROPHYTES OF THE LAISOIPAT LAKE, MANIPUR

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Ecology Research Laboratory, Department of Life Sciences, Manipur University, Canchipur - 795 003, Manipur, India.

ABSTRACT

The present study focussing on the life-form and biological spectrum of the macrophyte community in the Laisoipat lake, Manipur have been carried out with details of the floristic study. Laisoipat lake is a freshwater eutrophic lake situated at Keinou village in Bishnupur district. The lake covers an area of about 0.3640 SQ. KM and lies at an intersection of 93°48'54" to 93°48'15" E longitude and 24°38'24" to 24°38'44.24" N latitude and at an altitude of 770 m above the mean sea level. The study has been carried out for a period of two years at monthly intervals and includes details of the floristic study i.e. habitats, heights and natures of perennating buds together with seasonal changes in the diversity of the plant species. Altogether 43 macrophytic plant species were recorded showing six (6) different life forms. Out of the species, 15 species were Therophyte (34.88 %), 11 species were EVC (25.58 %), 9 species were Geophytes (20.93 %), 6 species were Hemicycrophytes (13.95 %), 1 species each were chamaephytes (2.33 %) and lianas (2.33 %). The biological spectrum of the Laisoipat lake revealed the occurrence of Thero-Errant Vascular Hydrophytic phytoclimatic.

Keywords: Laisoipat lake, Macrophytes, Life forms, Biological spectrum, Phytoclimatic.

INTRODUCTION

The life-form reveals the characteristics of the adaptation of the plants to the climate. The life form of the vegetation reflects the major feature of the climate providing a sound basis for a natural ecological classification (Clements and Shelford, 1939). Conversely the major vegetation formation is also delimited by climatic data (Holdridge, 1947). Macrophytic vegetation not only represents the sum total of plants but also reflects other characteristics such as life forms, density, coverage etc. (Weaver and Clements, 1938).

Macrophytic communities play a significant role in regulating the structure of a lake ecosystem. The structure and dynamics of the vegetation provide an indication of the nature of the whole environment, biological and physical. The structural attributes through which a plant community is studied are conveniently viewed as analytic and synthetic characters. The analytic characters may be qualitative and quantitative. The qualitative analysis comprises the floristic composition, life-form analysis and growth form classification. The plant species can be grouped into life-forms and growth form classes on the basis of structure and function.
The percentage distribution of species among the various life-forms of a flora is called the biological spectrum of that place. Thus, through calculation of percentage value of each life-form, biological spectrum of the area is obtained. The dominant life forms on the basis of percentage contribution of the species is termed as phytoclimat.

The bio-resources of north-eastern region in the Eastern Himalayas of India including Manipur, being one of the 34 “Biodiversity hotspots” of the world (Conservation International, 2005 Myers et al., 2000) are much degraded which in turn affect the phytoclimate of the area.

MATERIALS AND METHODS

The study site is located in the Keinou village, Bishnupur district, Manipur. It extends between 93°48'54" N to 93°48'78" E longitude and 24°38'24" to 24°38'54.24" N latitude and at an altitude of 770 m above Mean Sea Level (MSL). The area covered by lake is 0.3640 sq. km.

Vegetational analysis were carried out by regular periodical survey and sampling of vegetation at monthly intervals during January, 2004 to December, 2005 in 4 different sites by using Quadrat method described by Curtis (1959) and Misra (1968).

Life forms of the macrophytes were determined after detailed floristic studies. The habit, form, height and nature of perennating buds of each species were studied in the field. The life form classification of Macrophytes on physiognomic basis has been done as per Raunkiaer’s system modified by Ellenberg and Mueller-Dombois (1967) and Mueller-Dombois and Ellenberg (1974). Raunkiaer’s classification (1934) of five life-forms have been expanded into 23 major life-forms. The biological spectrum for the study area has been compared with the Raunkiaer’s normal spectrum as well as with the spectra available for other localities.

RESULTS AND DISCUSSION

Out of the 43 macrophytic plant species recorded from the freshwater lake of Laisipat lake, the dominant macrophyte species like Alternanthera philoxeroides, Atylosia scarabaeoides, Azolla pinnata, Brachiaria mutica, Chara zeylanica, Eichhornia crassipes, Kyllinga triceps, Mikania micrantha etc are found to be present in all the study sites.

The macrophytic plant species were found belonging to 6 different life forms viz. Therophytes, Errant Vascular Hydrophytes, Geophytes, Hemicyrtophytes, Chamaephytes and Lianas. The Therophytes included 15 species constituting the maximum species percentage of 34.88 %, Errant Vascular hydrophytes had 11 species (25.58 %) which was successively followed by Geophytes with 9 species (20.93 %), Hemicyrtophytes with 6
species (13.95%), Chamaephytes and Lianas with 1 species (2.33%) each. The distribution of different life forms in the different sites of the study area has been shown in Table 1 and the life-form classification of the Laisiopat lake has been shown in Table 2.

Table 1. Distribution of different life-forms in the study area (+) and (-) signs indicate the presence and absence of a particular species in the study sites.

<table>
<thead>
<tr>
<th>Name of species</th>
<th>Life-form</th>
<th>Site I</th>
<th>Site II</th>
<th>Site III</th>
<th>Site IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ageratum conyzoides Linn.</td>
<td>Th</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Alternanthera philoxeroides (Mart.) Griseb.</td>
<td>Th</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Astelia scarabaeoides (Linn.) Benth.</td>
<td>Th</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Acollina pinata R. br.</td>
<td>EVH</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Brachiaria mutica (Forsk.) Stapf.</td>
<td>Th</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Cana gracilis Wahlb.</td>
<td>T</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Ceratothium demersum Linn.</td>
<td>EVH</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Chara zeylanica Wild.</td>
<td>EVH</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Colocasia esculenta (Linn.) G. Don.</td>
<td>G</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Commelina bengalensis Linn.</td>
<td>H</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Crossocephalum crepidoides (Benth.) Moore</td>
<td>Th</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Diplocladium porrectum Wall.</td>
<td>Ch</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Echinocloa stagnina (Retz.) P. Beauv.</td>
<td>Th</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Eichhornia crassipes (Mart.) Solms.</td>
<td>EVH</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Enhydra fluctuans Lour.</td>
<td>H</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Euryale ferox Salisb.</td>
<td>G</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Fagopyrum diatryx (D. Don.) Hara</td>
<td>Th</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Hydrilla verticillata (Linn. f.) Royce</td>
<td>H</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Hygropyca arisata (Retz.) Nees ex. Wight and Arn.</td>
<td>H</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Ipomea aquatica Forsk.</td>
<td>H</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Kyllinga triceps Roth.</td>
<td>Th</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Ludwigia adscendens (Linn.) Hara</td>
<td>Th</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Mikania micrantha Kunth</td>
<td>L</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Nymphaea pubescens Willd.</td>
<td>G</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Nymphaoides cristata (Roxb.) O. Kuntze</td>
<td>Th</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Oenanthe javanica (Bl.) DC.</td>
<td>Th</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Pennisetum glaucum (Linn.) R. br.</td>
<td>Th</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Pinae sativa Linn.</td>
<td>EVH</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Polygonum orientale Linn.</td>
<td>Th</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Poa meagon (Roxb.) Crispus Linn.</td>
<td>G</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Poa meagon (Roxb.) Crispus (R. br.) Vickery</td>
<td>Th</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Riccia natis Gorda</td>
<td>EVH</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Saccharum pseudo Roxb.</td>
<td>G</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Salvinia cucullata Roxb.</td>
<td>EVH</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Salvinia natans Hoffm.</td>
<td>EVH</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Schoenoplectus supinius Linn.</td>
<td>G</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Senecio saucalis Wall.</td>
<td>Th</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Trapa natans Linn.</td>
<td>Th</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Utricularia aqaua Lour.</td>
<td>EVH</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Utricularia exotica R. br.</td>
<td>EVH</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Vallisneria spiralis Linn.</td>
<td>EVH</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Zizania latifolia (Griseb.) Stapf.</td>
<td>G</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>35</th>
<th>38</th>
<th>39</th>
<th>39</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>155</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2. Life form classification of the Macrophytes in Laisipat lake (after Ellenberg and Meuli-Dombois, 1967 and Mueller-Dombois and Ellenberg, 1974).

<table>
<thead>
<tr>
<th>Life-form</th>
<th>Name of species</th>
<th>No. of species</th>
<th>Percentage composition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Therophytes (Th)</td>
<td>Ageratum conyzoides Linn.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alternanthera philosoroides (Mart.) Griebr.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aythyla scarabaeoidea (Linn.) Bentham.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bracharia mutica (Forsk.) Stapf.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Corex cruciata Wahlenb.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Crassocephalum crepidoides (Benth.) Moore</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Echinoclao stagna (Retz.) P. Beauv.</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Fagopyrum diboryys (D. Don.) Hara</td>
<td></td>
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<tr>
<td></td>
<td>Kyllinga tricaps Rothb.</td>
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<td></td>
<td>Ludwigia adscendens (Linn.) Hara</td>
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<td></td>
<td>Oenanthe javanica (Bl.) DC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pennisetum gajum (Linn.) R. Br.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Polygonum orientale Linn.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Senecio saxatilis Wall.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trapa natans Linn.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geophytes (G)</td>
<td>Colocasia esculenta (Linn.) G. Don.</td>
<td>09</td>
<td>20.93 %</td>
</tr>
<tr>
<td></td>
<td>Euryale ferox Salisb.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nymphaea pubescence Wild.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nymphaoides cristatum (Roxb.) O. Kuntze</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Potamogonon crispus Linn.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pontamogonon natans Linn.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Saccharum procerum Roxb.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Schoenoplectus supinus Linn.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Zizania latifolia (Griseb.) Stapf.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hemicryptophytes (H)</td>
<td>Commelina bengalensis Linn.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Enhydra fluctuans Lour.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hydrilla vericililata (Linn.) Roye</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hygrocyba aristata (Retz.) Nees ex. Wight and Arn.</td>
<td>06</td>
<td>13.95 %</td>
</tr>
<tr>
<td></td>
<td>Ipomoea aquatica Forsk.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pseudoraphis spinacea (R. Br.) Vickery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chamaephytes (Ch.)</td>
<td>Diplazium porrectum Wall.</td>
<td>01</td>
<td>2.33 %</td>
</tr>
<tr>
<td></td>
<td>Azolla pinnata R. Br.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ceratophyllum demersum Linn.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chara zeylonica Wild.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Errant vascular</td>
<td>Eichhornia crassipes (Mart.) Solms.</td>
<td>11</td>
<td>25.58 %</td>
</tr>
<tr>
<td>hydrophytes (E VH)</td>
<td>Pistia stratiotes Linn.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ricca natans Gorda.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Salvinia cucullata Roxb.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Salvinia natans Hofm.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Utricularia aures Lour.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Utricularia exoteta R. Br.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vallisneria spiralis Linn.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lianas (L)</td>
<td>Mikania micrantha Kunth.</td>
<td>01</td>
<td>2.33 %</td>
</tr>
</tbody>
</table>

The present findings are in conformity with the findings of Devi and Sharma (1998) in Utrapat lake who reported 30.80% species in Therophytes, 23.00% species in Geophytes, 15.40% in Hemicryptophytes and 30.80% in Errant Vascular Hydrophytes; Bebika and
Sharma (2002) from Sanapat lake who reported 29.41% of Therophytes, 23.53% of Geophytes, 17.65% of Hemicyrptophytes and 29.41% of Errant Vascular Hydrophytes and Devi (2002) from Poiroupat who reported 36.7% of Therophytes, 20.00% of Geophytes, 13.3% of Hemicyrptophytes and 30% of Errant Vascular Hydrophytes.

A comparative account of percentage composition of study area and Normal Biological Spectrum has been shown in Table 3. When the life-form spectra of a particular plant community is compared to the normal life-form spectrum (Raunkiaer, 1934), the adaptational capabilities of the plants to the adverse climate conditions are revealed.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Life - form</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Th</td>
</tr>
<tr>
<td>Total number of species</td>
<td>15</td>
</tr>
<tr>
<td>Life - form percentage</td>
<td>34.88</td>
</tr>
<tr>
<td>Raunkiaer's Normal Spectrum and composition (%)</td>
<td>13.00</td>
</tr>
</tbody>
</table>

(Abbreviation: Th - Therophytes; G - Geophytes; H - Hemicyrptophytes; Ch - Chamaephytes; Ph - Phanerophytes; EVH - Errant Vascular Hydrophytes; L - Lianas)

The highest percentage to the biological spectrum of the study area was contributed by Therophytes (34.88%) which was almost two or three times the percentage value of Therophytes (13%) in the ‘Normal Spectrum’ of Raunkiaer. It was followed by Errant Vascular Hydrophytes (25.58%).

The predominance of Therophytes in the present study is indicative of warm climate in conformity with the Bioclimatic diagram of Dansereau (1957). This is due to the fact that the Therophytic climate is favourable for the growth of Therophytes which are best adapted to tide over the unfavourable period in the form of seeds.

The co-predominance of Errant Vascular Hydrophytes is the indication of setting of eutrophication in the present study area since the Errant Vascular plants are mostly found in eutrophic water bodies.

The phytoclimatic of a region reflects the dominant life-form which comprises the largest number of plant species occurring in the community. Therefore, based on the various life-form classes of the Laisoapat lake, this region may be assigned to the “Thero-Errant Vascular Hydrophytic” type of phytoclimatic as the Therophytes and Errant Vascular Hydrophytes represent the dominant life forms comprising the higher number of plant species.
Similar types of phytoclimates have also been reported earlier by Rao (1968) from Karamnas watershed, Devi and Sharma (1998) from Utrapat lake, Manipur and Devi, 2002 from Poiroupat lake, Manipur.

A comparison of life-form spectra and phytoclimates of some wetlands of Manipur are incorporated in Table 4.

<table>
<thead>
<tr>
<th>Wetlands</th>
<th>Life-form (%)</th>
<th>Phyto-climate</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phumdi</td>
<td>H 46.57, 10.96, G 20.55, Ch 09.59, Ph 1.37, EVH 10.96</td>
<td>Thero Errant Vascular Hydrophytes</td>
<td>Devi, 1998, Devi &amp; Sharma, 1999</td>
</tr>
<tr>
<td>Utrapat</td>
<td>Th 30.80, H 23.00, G 15.40, Ch --, Ph --, EVH 30.80</td>
<td>Geo-Therophytes</td>
<td>Okram et al., 1996</td>
</tr>
<tr>
<td>Sanapat</td>
<td>Th 38.00, H 22.00, G 18.00, Ch 2.00, Ph --, EVH 20.00</td>
<td>Thero-Erant Vascular Hydrophytes</td>
<td>Bebika &amp; Sharma, 2002</td>
</tr>
<tr>
<td>Ikop</td>
<td>Th 29.41, H 23.53, G 17.65, Ch --, Ph --, EVH 29.41</td>
<td>Geo-Erant Vascular Hydrophytes</td>
<td>Devi, 2003</td>
</tr>
<tr>
<td>Poiroupat</td>
<td>Th 34.88, H 20.93, G 13.95, Ch 2.33, Ph --, EVH 25.58, L 2.33</td>
<td>Thero-Erant Vascular Hydrophytes</td>
<td>Devi, 2002, Present study</td>
</tr>
<tr>
<td>Laisoipat</td>
<td>Th 34.88, H 20.93, G 13.95, Ch 2.33, Ph --, EVH 25.58, L 2.33</td>
<td>Thero-Erant Vascular Hydrophytes</td>
<td>Present study</td>
</tr>
</tbody>
</table>

In the Waithou lake, Manipur, Okram et al. (1996) observed Geo-Therophytic phytoclimates while Devi (2000) reported Thero-Geophytic type of phytoclimates in the freshwater bodies (4 ponds and a stream) in Canchipur, Manipur. Errant Vascular Hydrophytic type of phytoclimates was reported by Devi and Sharma (2002) from non-Phumdi region of Loktak lake.

The rich growth of macrophytic species belonging to the Therophytic and Errant Vascular Hydrophytic plant species indicate the eutrophic nature of the lake. The eutrophic nature of the present study area is due to human activities and agricultural works in and around the study area. It is necessary to take up remedial measures in time to check further eutrophication in the present study area.
REFERENCES


Dr. C. Ulrichs, Professor of Humboldt University, Berlin (Germany) has been awarded Prof. E. P. Odum Gold Medal by Prof. Victor Tigga, Hon'ble Vice Chancellor, SKMU, Dumka on the eve of International Symposium on 29.9.2007 for his outstanding contribution to Nanotechnology.

Dr. Ahmed H. Al-Harbi, Professor of Natural Resource & Env. Research Institute, Riyadh (Saudi Arabia) has been awarded Prof. E. P. Odum Gold Medal by Prof. Arvind Kumar, Hon'ble Pro-Vice Chancellor, SKMU, Dumka on the eve of International Symposium on 29.9.2007 for his outstanding contribution to Bioresource Management Technology.