Freshwater algal diversity of Similipal Biosphere Reserve, Orissa

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ABSTRACT

The Similipal Biosphere Reserve, an unique ecosystem in the eastern part of India, occupy the central part of Mayurbhanj, a northern district of Orissa covering a vast area of 5578 sq. km. It is the richest watershed in the state of Orissa giving rise to many perennial rivers. An attempt was made by us to survey freshwater algal diversity of different water bodies of this undisturbed habitat. Our study revealed remarkable species diversity. A total of fifty-three taxa belonging to twenty-five species of Cyanophyceae, twenty species of Chlorophyceae, six species of Bacillariophyceae, one species each of Charophyceae and Rhodophyceae were recorded from ten different collection sites.

Introduction

A survey of literature on Indian algae reveals that very few (Bhakta et al., 2006; Jena et al., 2006; Adhikary and Sahu, 1987; Swain et al., 1994), attempts have been undertaken on taxonomic study of freshwater algal flora of this state and most of the work centered on blue-green algae of rice fields (Puriya et al., 1969; Mohanty and Padhii, 1982 and 1984; Sahu et al., 1996; Adhikary, 1998; Sahu, 2000). The Similipal Biosphere Reserve (SBR) is situated in the heart of the Mayurbhanj district of Orissa covering a vast area of 5578 sq. km. and lies between 21°28’N and 86°04’E. The climate of the biosphere is tropical with humid, warm summer and severe winter. The maximum temperature during summer is 40°C and in winter it falls to 4°C. Located in the Mahanadian biogeographic region and within the biotic province, Chhotanagpur plateau, is the richest watershed in the state, giving rise to cascades of perennial streams and drainage systems radiating all around like Budhabalanga, Subarnarekha and Baitarani system. Though scattered human settlements are present on the buffer zone, the freshwater algal diversity found in rivers and streams remain undisturbed. As no detailed information is available on freshwater algal diversity of this unexplored habitat, an attempt has been made by us to explore the freshwater algal diversity of different water bodies of the biosphere.

Materials and Methods

Several visits were made to Similipal Biosphere Reserve (SBR) during the months of January to May 2007 for collection of algal samples (Fig.1). The collections were made randomly from different sites and different habitats including stagnant, flowing and shallow water. The samples were collected in clean, sterile specimen bottles and polythene bags. A field number and collection site was assigned to each sample and field notes were maintained. The pH of the water in the collection sites was measured at the time of sampling using universal pH paper. The samples were brought to the laboratory and
Fig. 1. Similipal Biosphere Reserve, Orissa
were preserved in 4% formalin. Identification was done with the help of standard monographs (Desikachary, 1959; Randhawa, 1959; Philipose, 1967; Iyenger and Desikachary, 1981; Sarode and Kamat, 1984 and Anand, 1998). All the specimens have been deposited in the algal collection of P.G. Department of Botany, North Orissa University, Baripada, Mayurbhanj, Orissa.

Results and Discussion

In the present survey a total of fifty three algal taxa were recorded from different study sites (Table-1) of which twenty-five belong to Cyanophyceae, twenty to Chlorophyceae, six to Bacillariophyceae and one species each to Charophyceae and Rhodophyceae.

The predominant genera of Cyanophyceae were Anabaena, Aulosira, Calothrix, Oscillatoria, Raphidiopsis, Hapalosiphon, Nostochopsis, Nostoc, Mastigocoleus, Mastigocladospis, Gloeocapsa, Microcystis, Cylindrospermum, Microchaeta and Westiellopsis etc. Both heterocystous and non-heterocystous forms were reported during our survey. Among Cyanophyceae Calothrix and Oscillatoria were most abundant forms. Chlorophyceae were dominated by Spirogyra, Zygnema, Penium, Cladophora, Cosmarium, Pediasira, Oedogonium, Microspora, Strocladium and Microstria. Majority of species recorded in the streams were members of Chlorophyceae and Spirogyra was reported to be the most dominant species. The common Bacillariophyceae identified were Cymbella, Mastogloia, Synedra, Rhopalodia and Fragillaria etc. Chara was the single Charophyceae and Batrachospermum being the single Rhodophyceae found during study. The pH of various water bodies also were recorded and range of pH observed was 5.8 to 7.0.

Table 1. List of freshwater algae occurring at different sites of Similipal Biosphere Reserve

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the</th>
<th>Site(s) of Collection</th>
<th>Habitats of water</th>
<th>Stagnant Streams</th>
<th>Rivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Anabaena sp.</td>
<td>Sanjila, Khairi river and Barehipani</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Aulosira bombayensis Goncalves</td>
<td>Hathimundi</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Aulosira fertilissima Ghose</td>
<td>Hathimundi</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Calothrix clathroides Ghose</td>
<td>Hathimundi</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Calothrix gardneri J. De Toni</td>
<td>Barehipani</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>Calothrix braunii (A.Br.) Borenet et Flahault</td>
<td>Khairi river</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>Calothrix marchica Lemmermann</td>
<td>Khairi river</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>Oscillatoria sp. Vaucher</td>
<td>Madanmohanpur, Sanjila, Khairi river and Uski</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td>Oscillatoria subbrevis Schmidle</td>
<td>Khairi river</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>Oscillatoria virgapatensis, C.B. Rao</td>
<td>Sanjila</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11</td>
<td>Oscillatoria princeps Vaucher ex Comont</td>
<td>Sanjila</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>12</td>
<td>Oscillatoria marginifera (Kutz.) Comont</td>
<td>Hathimundi</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>13</td>
<td>Raphidiopsis sp. Fritsch et Rich</td>
<td>Hathimundi</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
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</table>
Table 1. Continued...

<table>
<thead>
<tr>
<th>No.</th>
<th>Species</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td><em>Hapalosiphon luteolus</em> W. &amp; G.S. West</td>
<td>Sanjila</td>
</tr>
<tr>
<td>15</td>
<td><em>Nostochopsis lobata</em> Wood em. Geitler</td>
<td>Khairi river and Barchipani</td>
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<tr>
<td>16</td>
<td><em>Nostochopsis radiata</em> Bharadwaja</td>
<td>Sanjila</td>
</tr>
<tr>
<td>17</td>
<td><em>Nostoc sp.</em> Vaucher</td>
<td>Madanmohanpur, Sanjila and Khairi river</td>
</tr>
<tr>
<td>18</td>
<td><em>Mastigocoleus testarum</em> Lagerh.</td>
<td>Sanjila</td>
</tr>
<tr>
<td>19</td>
<td><em>Mastigocladopsis jyengi</em> Iyengar et Desikachary</td>
<td>Khairi river</td>
</tr>
<tr>
<td>20</td>
<td><em>Gloeocapsa magna</em> (Breb.) Kuetzing</td>
<td>Hathimundi</td>
</tr>
<tr>
<td>21</td>
<td><em>Microcystis sp.</em> Kuetzing</td>
<td>Sanjila</td>
</tr>
<tr>
<td>22</td>
<td><em>Cylindrotheca sp.</em> Kuetzing</td>
<td>Sanjila</td>
</tr>
<tr>
<td>23</td>
<td><em>Microcolea aequalis</em> (Froux) Desikachary</td>
<td>Hathimundi</td>
</tr>
<tr>
<td>24</td>
<td><em>Microcolea tenera</em> Thuret ex Born. et Flah.</td>
<td>Hathimundi</td>
</tr>
<tr>
<td>25</td>
<td><em>Westiellopsis prolifica</em> Innes</td>
<td>Khairi river</td>
</tr>
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**CHLOROPHYCEAE**

<table>
<thead>
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<th>No.</th>
<th>Species</th>
<th>Location</th>
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<tbody>
<tr>
<td>26</td>
<td><em>Spirogyra sp.</em></td>
<td>Madanmohanpur, Sanjila, Hathimundi, Khairi river, Kohla, Uski, Barchipani</td>
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<tr>
<td></td>
<td></td>
<td>Joranda bypass, Barchipani and Nawan</td>
</tr>
<tr>
<td>27</td>
<td><em>Spirogyra occidentalis</em> (Transeau) Czarda</td>
<td>Khairi river, Kohla and Uski</td>
</tr>
<tr>
<td>28</td>
<td><em>Spirogyra acuminata</em> G.S West</td>
<td>Kohla</td>
</tr>
<tr>
<td>29</td>
<td><em>Spirogyra marvillosa</em> Transseau</td>
<td>Uski</td>
</tr>
<tr>
<td>30</td>
<td><em>Spirogyra rectangularis</em> Transseau</td>
<td>Uski</td>
</tr>
<tr>
<td>31</td>
<td><em>Spirogyra reinhardti</em> Chimleevski</td>
<td>Uski</td>
</tr>
<tr>
<td>32</td>
<td><em>Spirogyra gibberosa</em> iso</td>
<td>Hathimundi</td>
</tr>
<tr>
<td>33</td>
<td><em>Spirogyra sporeata</em> Rabenhotst</td>
<td>Barchipani Joranda bypass</td>
</tr>
<tr>
<td>34</td>
<td><em>Spirogyra schmidtii</em> W. and G.S. West</td>
<td>Barchipani Joranda bypass</td>
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<td>35</td>
<td><em>Spirogyra jacoensae</em> Randhawa</td>
<td>Barchipani Joranda bypass</td>
</tr>
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<td>36</td>
<td><em>Zygmena sp.</em> Agardh</td>
<td>Sanjila, Chahala</td>
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<td>37</td>
<td><em>Penium margaritaceum</em> (Ehr.) Breb.</td>
<td>Barchipani</td>
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<tr>
<td>38</td>
<td><em>Cladophora sp.</em></td>
<td>Madanmohanpur, and Uski</td>
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<tr>
<td>39</td>
<td><em>Cosmarium sp.</em></td>
<td>Madanmohanpur</td>
</tr>
<tr>
<td>40</td>
<td><em>Pediasastrum sp.</em></td>
<td>Madanmohanpur</td>
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<td>41</td>
<td><em>Pediasastrum tetras</em> (Ehr.) Raf.</td>
<td>Madanmohanpur</td>
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<td>42</td>
<td><em>Oedogonium sp.</em></td>
<td>Barchipani</td>
</tr>
<tr>
<td>43</td>
<td><em>Microspora sp.</em></td>
<td>Barchipani</td>
</tr>
<tr>
<td>44</td>
<td><em>Sirocladium vandalismense</em> Randhawa</td>
<td>Barchipani Joranda bypass</td>
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Table 1. Continued...

<table>
<thead>
<tr>
<th>No.</th>
<th>Taxon</th>
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<th>Present</th>
<th>Absent</th>
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<td>45</td>
<td>Microstegias sp.</td>
<td>Khairi river</td>
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<td>+</td>
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<td>Chara sp.</td>
<td>Khairi river</td>
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<td>47</td>
<td>Batschkaerasinum sp.</td>
<td>Chahala</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
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<tr>
<td>48</td>
<td>Cymbella cymbiformis Kuetzing</td>
<td>Chahala</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>49</td>
<td>Mastogloia sp.</td>
<td>Barehipani Joranda bypass</td>
<td>+</td>
<td>+</td>
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<td>-</td>
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<tr>
<td>50</td>
<td>Mastogloia smithii Thw.</td>
<td>Nawana</td>
<td>-</td>
<td>-</td>
<td>+</td>
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<tr>
<td>51</td>
<td>Synedra ulna (Nitzsch) Her.</td>
<td>Khairi river</td>
<td>-</td>
<td>-</td>
<td>+</td>
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<tr>
<td>52</td>
<td>Rhopalodia gibba (Ehr.) O. Muell.</td>
<td>Khairi river</td>
<td>-</td>
<td>-</td>
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<tr>
<td>53</td>
<td>Fragilaria sp.</td>
<td>Nawana</td>
<td>+</td>
<td>+</td>
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</tbody>
</table>

+ Present; - Absent

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References


