

## Algal biodiversity in Shivna river, Mandsaur (MP) India

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### ABSTRACT

In the present study a wide spectrum of algae has been collected from the three Sites identified in the river Shivna. Algae that were identified belong to Cyanophyceae, Chlorophyceae, Euglenineae and Bacillariophyceae. Highest representation was seen by the green algae Chlorophyceae. Out of the 254 genera encountered, 53.35% belong to Chlorophyceae, the Cyanophyceae and Bacillariophyceae were represented by 26.66% and 16.9% genera respectively, Euglenineae were the smallest group, 4 genera contributing 3.8% to the algae spectrum.

### INTRODUCTION

Studies on algal ecology branch out from the taxonomic identification of the algae which inhabit the different aquatic habitats. Thus taxonomy becomes the backbone of all hydro biological, ecological and environmental studies. Iyengar (1920-1958) carried out extensive work on many algal groups in Indian context. Bharadwaj (1928, 1935, 1938 and 1940) and his students worked on the Oedogoniales of United Provinces. Randhawa (1959) worked in detail on species of Zygnemaceae which were compiled into a monograph on Zygnemaceae published by Indian Council of Agriculture Research (I.C.A.R). This publication was followed by exhaustive taxonomic description of various groups of algae published as monographs by eminent phycologists such as Desikachary (1959) on Cyanophyta, Vaucheriaceae by Venkataraman (1961), Charophytes by Pal *et al.* (1962), Ulotrionales by Ramanathan, (1964), Chlorococcales by Philipose (1967) Oedogoniales by Gonzalves (1981) and Volvocales by Iyengar and Desikachary (1981). Algal flora of a variety of habitats were investigated by several scientists in the past and the present attempt is to understand the algae of the river Shivna.

### MATERIAL AND METHODS

The present study was spread over a period of two years commencing from July 2011 to June 2013. Algal samples were collected from each station every month on the same day of collection for physico-chemical analysis. All algal samples were examined under the microscope under 10x, 40x, and oil immersion. Measurements were taken with the help of a standardized ocular micrometer. Identification of the forms has been made with the help of monographs and literature available at hand.

### RESULTS AND DISCUSSION

A total of 254 algal taxa of 105 genera occurring in different seasons have been collected and identified (Fig. 1 & 2). Out of them 53 genera and 129 taxa belongs to Chlorophyceae. 19 genera and 35 taxa belongs to Bacillariophyceae. 4 genera and 11 taxa belongs to Euglenineae. 29 genera and 53 taxa belong to Cyanophyceae.

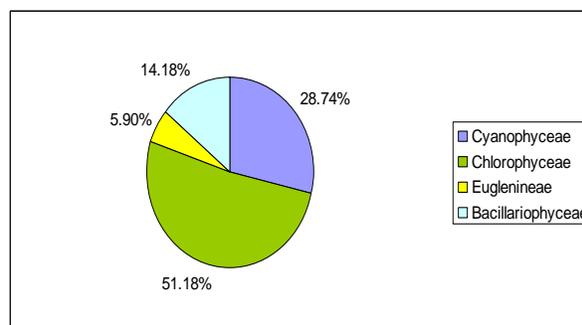
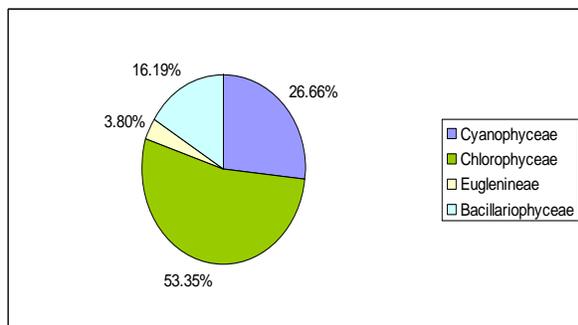


Fig. 1: - Percentage composition of total algal genera Fig. 2: - Percentage composition of total algal taxa

The dynamics of the abundance and frequency of the four classes of algae studied in the river Shivna showed the following variations: The river provided a varied collection of algae belonging to Cyanophyceae, Chlorophyceae, Euglenineae, and Bacillariophyceae. There were a large number of macrophytes along the river bank, visible from December to mid June. They provide an environment for the growth of periphytons, epiphytes and phytoplanktonic algae.

Member of chlorophyceae was recorded not only in April and May but also During winter, species of *Spirogyra elliptica*, *Zygnema gangeticum*, *Rhizoclonium hieroglyphicum*, *Mougeotia miamiana*, *Ulothrix tenuissima* and *Cladophora glomerata* impart bulk of biomass in riverine algal flora. In summer abundance of *Hydrodictyon reticulatum*, *Ankistrodesmus convolutus*, *A. falcatius*, *Scenedesmus armatus* and *S. dimorphus* was seen. The Chlorococccals were observed from November to June. *Spirulina* sp. was found at Site-I and III. Site-I is pollution free and Site-III receives starch factory effluent, *Spirulina* was found both in clean and polluted water. *Microcystis aeruginosa*, *Chroococcus micrococcus*, *Merismopedia minima*, *Oscillatoria chalybea*, *Cylindrospermum indicum*, *Anabaena circinailis* were dominant at Site-II and III.

The most abundant diatoms in the river Shivna were *Fragillaria capuciana*, *Synedra ulna*, *Gomphonema laceolatum*, *Cymbella affinis* and *Navicula pupula*. Species diversity was greater at Site-I but species density was higher at Site-II. Greater biodiversity was observed in Site-I due to least pollution. In contrast, Site II has less biodiversity due to domestic pollution. Site-III was also polluted due to effluent of starch factory and agriculture runoff. Therefore, Site-II and III has less biodiversity. The seasonal periodicity and species richness is designated oligotrophic nature of Shivna River.

Chlorophyceae was dominant in river water. The dominance of Chlorophyceae has also been reported by Malhotra *et al.* (2014) from Yamuna river. Chlorophyceae showed an upward trend in abundance during winter or late winter. This trend was also seen by Sarwade and Kamble (2014) in Krishna River, and gained abundance from December onwards till May in agreement with the finding of Tiwari *et al.* (2002) The river loses its velocity during summer simultaneously observed an increase of blue green algae from December to April-May, reaching a peak in summer. The four genera of Euglenophyceae, *Euglena*, *Phacus*, *Trachelomonas* and *Lepocinclis* are present Singh and Singh (2002) reported the presence of these except *Lepocinclis* in river water. Low representation of euglenoids has also been reported by Deshmukh (2004) and Sharma *et al.* (2013). Growth of Bacillariophyceae was luxuriant during the winter season as reported by Tiwari *et al.* (2001) and Raghuvanshi *et al.* (2011). Minimum diatoms in monsoon and maximum in the post monsoon season were also observed by Baral *et al.* (2013).

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