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STUDY OF ALGAL DIVERSITY OF GUPTESHWAR LAKE IN DAUND TAHSIL FROM PUNE DISTRICT (M.S.)

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Abstract:
Algal sample were collected monthly interval from three site of Gupteshwar Lake. The genera and species of four groups of algae were recorded from three site of Gupteshwar Lake. The algal flora of fresh water bodies shows the dominance of blue green algae and diatoms like Oscillatoria, Lygbya, Anabena, Microcystis and Navicula. Throughout investigation many green algae like Pandorina, Scenedesmus, Chlymydomonas and Spirogyra also occur abundantly and frequently. Total 44 algal species belonging to 31 genera were identified.
Keywords: Algal diversity, Gupteshwar Lake.

Introduction

Fresh water algae occur abundantly in lakes ponds, river, stream, wetland etc. Algae plays important role in various habitats in fresh water ecosystems as primary producer and also support secondary productivity so it is necessary to study algal diversity & algal community in fresh water bodies to conserve the ecosystems. Rout &Dey (1999) discovered the algal flora of different habitat. Deb (2005) investigated algal diversity at DargakonaCachar district Assam. Devi (2006) worked on distribution of algal communities growing in pond ecosystem till now there is no work on detailed investigation of algal diversity in wetland of Gupteshwarlake in DaundTahsil (M.S.). Therefore present investigation is directed to the exploration of algal diversity in Gupteshwar Lake in DaundTahsil from Pune district (M.S.).

Materials and Methods

Four study site were selected randomly for present study. Algae were collected using 5 cm2 quadrate from number of spots triplicate from all sites. Algal sample was preserved in 4.5 % formalin for further microscopic observation algal identification was performed with the help of relevant taxonomic literature Desikachari (1969), Smith (1950), Prescott (1954), Sarode and Kamat(1979, 1985).

Results and Discussion:

Algae recorded in Gupteshwar lake belongs to 44 squares and 31 genera. Representing 4 classes of algae, Chlorophyleae(22), Cyanophyleae(17), Baccilanophyleae (04) and Euglenophyleae(01). Algal species was found highest in April followed by May and June. Diatoms showed maximum population in April while lowest in July.

Characters of Algal diversity in Wetlands of Gupteshwar Lake

Ankistrodesmus fakatus turner

Thallus green in colour. Cells are needle shaped, either found singly or in bundles in all kinds of fresh waters. The cells possess a single parietal chloroplast occupying the greater part of the length of the cell and with or without pyrenoid.

Ankistrodesmus spiralis Smith

Cells curved or sigmoid, attenuated from middle towards acute apices. Median portion twisted around one another in the colonies of 34 to 39 cells. Apical portion of the cell is free. The cells possess a single chloroplast with or without pyrenoid. Planktonic.70 to 125 um long.

Chlamydomonas globosa Smith and Desikachary

Thallus green in colour, unicellular, biflagellate and usually oval or rather oblong in form. The protoplast is covered by a thin transparent cell wall. Within the cell wall plasma membrane is present. Cup-shaped chloroplast is present at the peripheral part of the cytoplasm with a single central nucleus. Pyrenoid is present in the lower part of the chloroplast. Two photo-receptive organs called stigma are present. Whip-like flagella present help in locomotion. Found planktonic.

Chlorella sp.

Thallus unicellular small green in colour. Chlorella is non-motile, round or oval, usually found solitary. Cell protoplast is covered by a cell membrane which in turn is covered by a cell wall. It consists of a single cup-shaped or bell-shaped chloroplast. Within the chloroplast a single nucleus is present. Pyrenoid, stigma and

contractile vacuole absent. Sometimes colonies of 2 to 8 individuals enclosed by persistent, gelatinised, old mother cell wall are found. Planktonic.

Cladophora aegagrophila Rabenh

Thallus occurs in the form of brush like tufts of long, wavy, branched, threads attached to rocks by rhizoids. The individuals are associated in dense mass appearing either as compact cushions loose follow balls. The balls are formed where there is a gentle movement of the water leading to a constant rolling to and fro of detached masses of the alga. The individual cells are large multi- nucleate, cylindrical and placed end to end. The branching is lateral, dichotomous or trichotomous, towards upper portion acropetalous, the cylindrical cells are longer 85 to 100 um' broad and 250 to 300 um long. Each cell consists of cell wall enclosed in the protoplast. A big central vaccuole is present. Pyrenoid and several nuclei are present. Cross walls within the main axis are vertical. Rhizoids present at the lower end forming a holdfast. Found epileptic attached to stones of the bunds.

Cladophora glomerata Kuetz

Thallus dark yellowish-green in colour forming dense soft tufts. Branches of main axis in acropetalous fashion. Rhizoids adventitious, with a hold fast. Cells are cylindrical, multinucleate, with cell wall. Epilithic in flowing streams and ponds.

Clasterium acutum Lyngv

Cells elongate generally curved, unconstructed with or without median inflation.Each cell 19 um long with needle-like or gradually attenuated poles to acuteapex. Cell wall smooth single chloroplast with.6 to 8 paranoids in series.Planktonic.

Closterium decorum Breb.

Cells fairly large 16 to 18 times longer than broad, moderately curved, median portion somwhat straight. Cell wail finely striated. Chloroplast ridged with 10 to 14 pyrenoids.

Euglena sp.

It is a protozoa-like genus. The cells are mostly fusiform but a few are strap- shaped, sometimes twisted and many species have a pointed caudus. Few are colourless but most have disc-like or band-shaped chloroplast. The pyrenoids are free in the cytoplasm or attached to the chloroplast. The flagellum has a bifurcate base. It shows rhythmic movement which is affected based on the light intensity.

Hydrodiclyon reticulatum Smith

The waternet is a rare alga. The coenobium in this case is a free floating hollow, cylindrical network closed at either end and reaching a length of as much as 20 cms. The meshes of the net are pentagonal or hexagonal, the angles being formed by the union of three of the elongate, multinucleate cells. The later are cylindrical and have a large central vaccuole. The living layer of cytoplasm containing the nuclei and a complex reticulate chloroplast with numerous pyrenoids.

Oedogonium sp.

It consists of long, unbranched threads, generally free floating in mature conditions, but attached by a specially differentiated basal cell when young. The cells are elongated and cylindrical. The cells contain a single often large nucleus and an elaborate, reticulate, cylindrical chloroplast with numerous scattered pyrenoids. Thickening ring is found in the thallus. Cap cells are present.

Oocystis sp.

Cells are usually free floating, oval or ellipsoidal, with rounded ends and possess a firm membrane which is often provided with an internal thickening at each pole. Occurring solitarily or in colonies of 2 to 4 cells sometimes 2 to 16 cells. The cells have a parietal chloroplast and are devoid of pyrenoids. Found planktonic.

Pandorina sp. Smith

It is motile, coenobial form. It is an oblong or nearly spherical mass of extracellular mucilaginous matrix. Each cell is united in a common sheath forming a colony. All the cells of the colony are alike and resemble chlamydomonas. Each coenobial cell is biflagillate somewhat wedge shaped, with a pointed and directed inwards and broader outwards. The nucleus centrally located. The chloroplast is cup-shaped and has a pyrenoid near the posterior end. Two whiplash flagella are present. Two contractile vaccuoles are present at the base of the flagella. Eyespot s present.Colonies 30 to 35 .tm long.Free swimming.

Pediastrum boryanum Turpin

The disc-shaped coenobia are abundant in fresh water planktons. Colonies compact, circular, of 4 to 6 cells. If 6 celled then 5 cells are in outer ring and one in central.Marginal cells with 2 or 4 short divergent processes ending in spines. Cell walls smooth. Each cell 12 to 16 um broad.Planktonic.

Scenedesmus acutformis Schroeder. and Tiffany

Colonies 4 celled, cylindrical. Cells with lateral, longitudinal ridge.Poles acute. End cells with spine at poles. All cells arranged in a single linear series. Cell walls smooth. Cell 9.5 to 10.5

um long.Each cell with a parietal chloroplast.Planktonic.

Scenedesmus diformis Turp. and Smith

Colonies of 4 to 8 cells arranged in linear or alternating series. Cells fusiform, straight. Inner cells lunate, Outer cells curved. Cell apices sharp and acute.Cell 16 to 19 um long.Each cell with parietal chloroplast.Planktonic.

Scenedesmus bijugatus Turp.

Colonies of 4 cells arranged in linear series. Inner cells oblong-ovate, outer cells slightly curved. Cell apices rounded blunt. Each cell with parietal chloroplast. Cell 20 to 24 im long and 8 to 10 .im broad. Planktonic.

Scenedesmus quadricauda Turp. andBreb.

4 celled colonies arranged in a linear series. Cells cylindrical, oblong, with rounded ends. Terminal cells with a long slightly curved or more or less straight spine. Each cell with a parietal chloroplast with 1 pyrenoid. Cell walls smooth. Planktonic

Spirogyra parvispora Wood

The thallus is silky, hair-like, unbranched, unattached, and filamentous. The cells consist of cell wall surrounding the protoplast. The plasma membrane is also present surrounding the cytoplasm. The cytoplasm encloses a large central vacuole. Vegetative cell in this species is 71 to 74 um broad and 180 to 290 um long. End walls plane. Each cell with 4 large, conspicuous chloroplast making 2 turns. The cell has a single large nucleus. The chloroplast shows presence of small spherical paranoids. Free floating.

Spirogyra pratensis Tramseau

Thallus filamentous, bright green in colour, unattached and unbranched. Vegetative cell in this species is 14 to 16 um broad and 60 to 80 um long. End walls simple. Each cell with single chloroplast making 2 to 3 turns. The cell has a single large nucleus and small spherical pyrenoids. Planktonic.

Ulothrix sp.

Thallus is bright-green in colour. Filamentous, attached with the help of holdfast, unbranched. The cells are often shorter than broad. The cell shows presence of nucleus, parietal chloroplast with one or several pyrenoids. The species is common in all kinds of fresh water bodies.

Volvox sp.

It is green, flagellated, colonial alga. The Volvoxcoenobia are large in size, look like small, green balls of pin-head size. Coenobium is a hollow sphere with numerous cells embedded in the matrix. Each cell is biflagellate, with two contractile vaccuoles near the base of fue flagella. The green chloroplast is cup-shaped with one pyrenoid. Single nucleus is present. The reddish eyespot is located in the anterior region of the chloroplast. The cell resembles exactly that of Chlamydomonas. The colony moves through water rotating slowly about the axis with one end of the sphere always leading in progression.

Zygnema sp.

Thallus filamentous, green in colour, solitary, unbranched. Cells are cylindrical, cell wall without pores. Chloroplast stellate shaped, two in number. The cellsareuninucleate, with the nucleus embedded in a broad strand of cytoplasm connecting the two chloroplasts, sometimes rhioid-lilce outgrowth are observed.

Anabena azolleae

Thallus blue green, trichomes straight, embedded in a soft matrix forming gelatinous masses or substrates. Trichomes 5-6 um broad. Cells are barrel shaped, end cells rounded, heterocyst conspicuous, sub spherical, 6-7 um broad. Spores are present on both the sides of heterocyst. Each cell is 4-5 um broad.

Lyngbya sp.

Thallus with many curved filaments, 1-2 um broad, sheath thin, lamellate extends beyond the apex of trichomes. Trichomes 1-1.5 um broad, cells 2.5-7 um long, pale blue-green in colour. End cells of the trichomes are rounded. Found attached to submerged aquatic plants.

Microcoleus sp.

Thallus dark green, coiled, trichomes enclosed in a wide colourless gelatinous sheath. Trichomes are tapering at their apices, ending in a blunt point. Cells 3-6 um broad often granulated. Trichomes show sliding and gliding movement over one another through the sheath sometimes emerging from it.

***Microcystis marginata* Halsinger**

Thallus is irregular, colonial. Colonies consiing of hundreds of small marble like cells grouped in common mucilaginous colourless sheath. Colonies ate microscopic and free swimming. Cell divisions seen occurring in all directions.Planktonic in rice fields.

***Nostoc calcicola* Geitler**

Nostoc are filamentous forms which grow in large colonies of closely packed trichomes. The colony forms a mucilaginous lump which floats or is found attached. The colony may be olive-green or blue green in colour, 5 cm in diameter. The colony consists of innurmembIe chains of bead like cells, trichomes of varying length. Trichomes are 2.5

um broad, enclosed by its own mucilaginous colourless sheath. The trichome consists of numerous rounded or oval cells. At frequent intervals subspherical colourless heterocysts are found. Heterocyst shows the presence of two polar nodules. The resting spores, akinetes with stored food materials are present.

***Oscillatoria curviceps* Gomant**

Thallus light or dark blue-green in colour. Thallus consists of free living trichomes which often form a compact floating mass. Each trichome is long, moreor less straight,fine, bent at the end or spirally coiled unbranched, not constricted at the crass walls. All the cells are similar in structure, 10-16 um broad and 2-4 um long. Pseudo-vaccules are present and the cells are flat and rounded. Planktonic in rice fields.

***Oscillatoria Formosa* Gomant. and Fremy**

Thallus blue-green, trichomes straight 4-6 um broad bright blue-green, attenuated at the ends, bent cells 2.5-5 um long, end cells obtuse. Planktonic in rice fields.

***Oscillatoria limosa* Gomant**

Thallus dark blue-green to brown in colour. Trichomes blue-green in colour more or less straight without sheath, not constricted at the cross walls. Trichomes show rotation movement on longividinal axis. Cells 13-15 um broad, 2-4 um long. Granulated cross walls, end cells flatly rounded. Found in standing freshwater.

***Oscillatoria princeps* Gomant**

Thallus blue-green or reddish, filamentous, forming an entangled lump. Trichornes straight, without movement. Each cell of the trichome 16-18 um broad, end cells flatly rounded, without any membrane. Found in water-logged rice field

Rivularia sp.

Thallus spherical, olive green in colour. Filaments arranged compactly in firm, often hard mucilage. The colonies appear as sedentery, hard, black or greenish balls. Sheath is broad, soft, elastic, broad, at base, hyaline. Each cell is 4 um broad and 1 um long. Heterocyst basal. Found in rice fields.

***Scytonema minor* Parukutty**

Thallus fleshy blue-green or brown.Filaments straight, 20 um broad. Scytonema develops false branches in pairs, united at the base or running to some distance with the main filament. False branches are developed from some distance from the heterocyst. False branches are longer and narrower than the main filament. Branches are covered with a firm, thick, lamellate, coloured sheath. The sheath is totally colourless in young branches. Cells are shorter than broad, blue-green, barrel shaped and found in the older portions of the trichome. Heterocyst single, round. Found in rice fields.

***Spirulina laxissima* Gomant**

Thallus blue-green in colour. Trichomes single, spirally twisted, spirals very loose but regular, 4.2 um broad. The cells are cylindrical and show active back and forth cork screw motion. End cells are rounded, obtuse. Sheath absent.Fresh water algae found in rice fields, entangled with another algae Oscillatoria

Spirulina princeps

Thallus blue-green in colour. Trichomes single, regularly spirally coiled, 5 um broad. Spirals 11 m broad and at a distance of 9.5 um from each other. The species is found to be highly variable. Sheath absent. Found in rice fields.

Spirulina gigantean Gomant

Thallus deep blue-green in colour. Trichornes 4 um broad regularly spirally coiled. End cells attenuated. Found free floating.

Stigonema sp.

Thallus made up of free, variously bent filaments. Filaments showing true, irregular branching.Branches with one or more rows of cells. Heterocyst intercalary or lateral, usually showing clear pit connections between cells. Found in the rice fields.

Synechoccus elongates

Thallus blue-green, cells cylindrical, 1.5 um broad, 2 times as long as broad, slightly bent with rounded apices. Sometimes found single or in colonies of 2 to 4 cells together. Mucilage sheath absent. Found planktonic.

Fragillaria sp.

Valves united, laterally forming free floating or sessile mostly zig-zag or ribbon-shaped sometimes flat or stellate colonies. Septa and costa absent. Cells linear-lanceolate or elliptical, medianly inflated, rarely constricted. Pseudo-raphe is pesent. Chromatophores usually two, plate-like, pyrenoids small, discoid.

Navicula sp.

Valves small, elliptical-lanceolate with rounded ends, raphe thin, straight.Median axial area very narrow, linear. Central area somewhat elliptical. Striae fine, lineate, delicate, slightly radiate throught the valve.

Pinnularia sp.

Valves linear to lanceolate with parallel margins gradually attenuated towards the poles. Ends weakly or deeply constrted, wedge-shaped, raphe thin, straight. Central nodules unilaterally bent on one side of the valve.

Median area narrow, linear, gradually widening towards the centre. Central area large, somewhat rhomboid, reaching the sides. Striae fine, convergent towards apices.

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