A systematic account of Chlorococcales-II new to Marathwada, Maharashtra

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***Abstract*- While working on algal taxonomy of Latur district in the Marathwada region of Maharashtra during April 2018 to March 2019 the author came across some interesting members of Chlorococcales. A total of 125 taxa under 25 genera of Chlorococcales have been encountered for the first time from the Latur district by visiting various habitats like pools, ponds, streamlets, streams, polluted water passages (gutter) and puddles. As far as seasonal variation studies, they were recorded in all seasons; maximum numbers of species were found in winter season and followed by monsoon and summer. The present paper deals with the systemic enumeration of 37 taxa under 10 genera.**

***Index terms*- Chlorococcales, Seasonal variation,Latur, Marathwada, Maharashtra.**

INTRODUCTION

Review of literature reveals that, studies on Chlorococcales in abroad and in India have been done extensively by many research workers. India has a very rich and diversified algal flora. In India, Wallich,(1860) appears to have been the first to records some Chlorococcales (Tetraedron) from Bengal for first time in India. Carter,(1869) reported new genus Conococcus. Bruhl and Biswas, (1992, 1926) recorded 29 Chlorococcales from the filter beds of Bengal and Loktak lake of Manipur. Iyengar,(1925) described a new species of Hydridictyon from Madras. N.Carter,(1926) reported 15 chlorococcales from North-East India. During the years 1930, 1934, and 1936 Biswas recorded about 20 Chlorococcales from Bengal Assam.Skuja,(1949) reported 71 Chlorococcales from Burma. Philipose,(1940; 1959) finally reported a total of 1079 species of Chlrococcales under 173 genera. In Maharashtra tremendous work has been done on algal taxonomy by various workers (Iyengar and Balkrishnan (1959) described new species of Golenkinia from Poona city, Gonzalves (1959) recorded some chlorococcales from Bombay.) In Marathwada region of Maharashtra except few reports (Ashtekar 1979a, Andhale 2008,) very rare attention has been paid towards algal taxonomy, although the climatic conditions of Marathwada region are most suitable to grow Chlorococcales luxuriantly and in diverse form, therefore to fulfil this lacuna, it has been decided to work on algal taxonomy (Chlorococcales) of Latur district in Marathwada region of Maharashtra.

MATERIALS AND METHODS

The present investigation was carried out by visiting various selected habitats like pools, ponds, streamlets, streams, polluted water passages (gutter) and puddles. The algal samples were collected during April 2018 to March 2019. The algal collections were made regularly from selected sampling stations. Acid washed collection bottles were used for the collection of algal samples. On return to the laboratory from field, the collections were carefully observed under the microscope and important points were noted. All collections were preserved in 4% commercial formalin added with 5% glycerine. Identification of algal taxa was performed by referring to the standard literature on algae. Brunnthaler (1915), Collins (1928), Philipose (1967), Prescott (1951), Smith, (1920), (1951), Tiffany and Britton (1952), Scott and Prescott (1961).

SYSTEMIC ENUMERATION

OOCYSTIS Naegeli, 1855

Oocystis borgei Snow :

Colonies consisting of 8 cells; cells broadly ellipsoid, with rounded ends, poles not thickened; cells 7-9µ in diameter, 10-12.5µ long; chloroplast one, parietal,

with a pyrenoid; 8 celled colonies 25-38.5µ in diameter.

Oocystis crassa Wittrock :
Colonies consisting of 2-8 cells, ellipsoid poles broadly rounded, furnished with a nodular thickening; chloroplast 4-10, parietal, fairly large, each with a pyrenoid; cells 16.5-20µ in diameter, 25-27µ long.

Oocystis elliptica W. West:
Colonies consisting of 8 cells, with narrow envelope; cells elongate ellipsoid, with broadly rounded ends without polar thickenings; chloroplasts 10-13 in number, parietal, with pyrenoids; cells 10.8-12.5µ in diameter, 14.5-22µ long.

Oocystis pusilla Hansgirg:
Colonies consisting of 4 cells, enclosed by the enlarged mother cell-wall; cells cylindrical, poles rounded, without nodular thickenings; chloroplast 1-2, parietal with a pyrenoid; cells 4.8-6µ in diameter, 10-11.5µ long.

Oocystis pyriformis Prescott :
Colonies consisting of 4, broadly pyreform-ovoid cells, with a prominent apiculation at one pole, other end broadly rounded; chloroplast massive, parietal with a pyrenoid; cells 5-7µ in diameter, 5-9.5µ long; 4-celled colonies 17.5-26µ in diameter.

NEPHROCYTIUM Naegeli, 1849
Nephrocytium agardhianum Naegeli :
Colonies consisting of 4 cells, arranged irregularly, reniform with rounded ends; cells 7-9.5µ in diameter, 16.5-19.5µ long; chloroplast one, parietal, with a pyrenoid; 4 celled colonies upto 24µ diameter.

Nephrocytium limneticum G.M. Smith :
Colony subspherical, consisting of 4-8 curved or sausage-shaped cells, with broadly rounded ends; cells 2.5-3.5µ in diameter, 8-10µ long; chloroplast one, parietal with a pyrenoid; 4 celled colonies upto 20µ in diameter, 8 celled, colonies upto 28.5µ in diameter.

Nephrocytium lunatum W. West:
Colony ovate, consisting of 4, lunate, bluntly pointed cells; concave wall directed towards the centre of the colony; cells 4.5-5.5µ in diameter, 13-17.5µ long, chloroplast one, parietal, with a pyrenoid; 4 celled colonies upto 29µ in diameter.

Nephrocytium obesum West and West
Colony broadly ovate, consisting of 4, broadly ovate to hemispherical cells, in closed by a thick membranous integument, cells broadly rounded at the ends, with one margin strongly convex, other concave; chloroplast massive, reticulate, covering the entire wall; cells 6-7.5µ in diameter, 10-16µ long; 4 celled colonies 24-30µ in diameter.

DICTYOSPHAERIUM Naegeli, 1849
Dictyosphaerium ehrenbergianum Naegeli:
Colony ovoid, consisting of 8-30, ellipsoidal cells, attached in groups of 2 or 4 at the ends of fine, branched strands; cells 3-6µ in diameter, 6-7.5µ long; chloroplast parietal, cup shaped, with a pyrenoid.

Dictyospherium pulchellum Wood
Colony spherical, consisting of numerous cells (32), spherical, arranged in series of 4, on dichotomously branched threads; cells 7-10µ in diameter; chloroplast one, parietal, cup shaped, with a pyrenoid; colonies upto 30µ in diameter.

WESTELLA de Wildeman, 1897
Westella botryiodes (W. West) de Wildeman :
Colonies irregular, consisting of 18 cells; cells spherical to subspherical in groups of four; chloroplast one, parietal, cup shaped, with a pyrenoid; cells 9-10.5µ in diameter; colonies 40-50µ in diameter.

DACTYOLOCOCCUS Naegeli, 1849
Dactylococcus infusionum Naegeli :
Cells fusiform, solitary or attached pole to pole to form false branched filaments or chains; cells 2-3µ in diameter, 5-7.5µ long; chloroplast parietal, with indistinct pyrenoid.

ANKISTRODESMUS Corda, 1838
Ankistrodesmus falcatus (Corda) Ralfs :
Cells needle-like to somewhat spindle shaped, with the ends tapering to acute apices, usually in clusters of 2-4, not inclosed in a colonial sheath; chloroplast one, parietal, without pyrenoid; cells 1.5-2.5µ in diameter, 40-47.5µ long.

Ankistrodesmus fractus (West and West) Brunnthaler:
Cells arched-fusiform or arcuate, the outer wall convex in the median portion only, with almost straight walls extending to the sharply pointed apices, the inner margin concave in the median portion, straight towards the apices; apices cells 2-3µ in diameter, 20-28µ long; chloroplast divided into 4 portions by deep folds or incision.

Ankistrodesmus spiralis (Turner) Lemmermann:
Cells spindle-shaped, spirally twisted into bundles of 4 cells; cells 2-2.5µ in diameter, 28-32µ long; chloroplast parietal without a pyrenoid.

SELENASTRUM Reinsch, 1867
Selenastrum gracile Reinsch:
Colonies consisting of 8 cells; cells lunate to sickle shaped, with shaply pointed apices, convex surfaces are apposed towards the centre of the colony, apices of cells acute; chloroplast parietal, without pyrenoid; cells 3-4.5µ in diameter, 15-20µ long, distance between apices 12-15µ; colonies upto 30-38µ in diameter.

Selenastrum minutum (Naegeli) Collins :
Cells solitary or rarely united in colonies, cells crescent shaped, usually uniformly curved and plump with pointed ends; chloroplast single, parietal with a pyrenoid (indistinct); cells 2.5-3.8µ in diameter, 7-10µ long; distance between apices 5.5-7.5µ.

Selenastrum westii G.M. Smith :
Colonies consisting of 4, lunate or arcaute shaped cells, convex surfaces of cells in contact; chloroplast single, parietal, without pyrenoid; cells 2-2.5µ in diameter, 30-35µ long, distance between apices 15-20µ; colonies upto 30-35µ in diameter.

KIRCHNERIELLA Schmidle, 1893
Kirchneriella contorta (Schmidle) Bohlin :
Colonies consisting of 4 cells enclosed by a gelatinous envelope; cells curved with rounded ends, irregularly scattered within the envelope chloroplast covering entire wall of the cells; cells 1.5-2µ in diameter, 7-10µ long; colonies upto 10-15.5µ in diameter.

Kirchneriella lunaris (Kirchner) Moebius :
Colonies spherical to ellipsoid with an outer gelatinous envelope; cells irregularly arranged within the envelope in groups of four to eight, flattened and crescent shaped with pointed ends; cells 2-4µ in diameter, 3-7µ long; chloroplast nearly filling the cell, with a pyrenoids; colonies upto 15-21µ in diameter.

Kirchneriella obesa (W. West) Schmidle :
Colonies consisting of 4-8 cells, irregularly arranged, within a wide gelatinous envelope; cells strongly lunate with the ends almost near each other, outer side of cell markedly convex, inner side nearly parallel to it, ends of cells tapering slightly and with rounded or bluntly pointed apices; chloroplast covering entire convex surface of the cell wall; cells 2-4µ in diameter, 4-6µ long; colonies upto 25-27.5µ in diameter.

COELASTRUM Naegeli, 1849
Coelastrum cambricum Archer :
Colonies consisting of 32 cells; the outer face of the external cells being subsphaerical and gradually arched; the outstanding projections are also blunt and rounded and not truncate; interspaces between cells more or less triangular; cells 5.8-7.5µ in diameter; colonies 42-52µ in diameter.

Coelastrum microporum Naegeli :
Colonies more or less spherical, consisting of 8-16 cells, with small intercellular spaces; cells spherical to ovoid, enclosed by delicate gelatinous sheaths and interconnected by almost imperceptible gelatinous processes; cells 10.5-14.5µ in diameter including sheath.

Coelastrum proboscideum Bohlin:
Colonies more or less pyramidal, consisting of 8 cells; intercellular spaces usually large and polygonal; cells conical, truncate, 6 sided with the lateral sides slightly concave; poles of cells thickened; cells 5-7.5µ in diameter; colonies 20-26.5µ in diameter.

CRUCIGENIA Morren, 1830
Crucigenia fenestrata (Schmidle) Schmidle:
Colonies consisting of 4, trapezoidal cells, arranged about a square opening the outer free walls longest and convex, the free angles sharply rounded; the

inner walls short and straight; cells 3-4.8µ in diameter, 5-8.8µ long; chloroplast parietal; along outer convex wall, with a pyrenoid; 4-celled colonies 10-13.5µ in diameter.

Crucigenia irregularis Wille:
Colonies consisting of 4, ovate cells, arranged irregularly, no central space as in other species of the genus and not in quadrangular formation, with both lateral and apical walls in contact; chloroplast broad, parietal, with a pyrenoid; cells 2.8-4.5µ in diameter; 4-5.8µ long.

Crucigenia lauterbornii Schmidle, :
Colonies consisting of 4, subspherical cells, arranged in two opposite pairs about a large square space bounded by the flat, inner walls of the cells; the outer wall convex, inner wall straight; cells in contact at their inner corners; cells 4.5-6µ in diameter, 8.8-10µ long; chloroplast parietal along the outer convex wall, with a pyrenoid; colonies upto 10-16.5µ in diameter.

Crucigenia quadrata Morren:
Colonies consisting of a circular plate of 4, triangular cells, cruciately arranged about a small central space, the outer free walls broadly convex, the lateral walls straight, adjoined throughout their length with the neighbouring cells and converging towards the centre of the colony; chloroplast parietal, with a pyrenoid; cells 3-4.5µ in diameter, 4.5-5.5µ long.

Crucigenia rectangularis (A. Braun) Gay:
Colonies consisting of 4, ovate cells, with a small rectangular space at the centre, cells in contact with adjacent ones at the poles and sides; chloroplast 1-4, parietal discs, with a pyrenoid; cells, 2.8-4µ in diameter, 4-6µ long; four celled colonies up to 7µ in diameter, 11µ long.

Crucigenia tetrapedia (Kirch.) :
Colonies consisting of 4, triangular cells, cruciately arranged about a central space; the outer free walls and lateral walls straight, the angles acutely rounded; chloroplast a parietal plate, with a pyrenoid; cells 5-7.5µ in diameter; four celled colonies 14-16.5µ in diameter.

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