

Taxonomic studies on some species of Genus *Pediastrum* Meyen from Anjani dam of Jalgaon District, Maharashtra.

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ABSTRACT

The present communication deals with the taxonomic enumeration of 18 taxa representing five species and 13 varieties of the Genus *Pediastrum* Meyen of order Chlorococcales from Anjani dam in the Erandol Tahsil of Jalgaon district, Maharashtra. Taxonomy and diversity of each taxon have been described with photomicrography. Among them *Pediastrum simplex*, *P. simplex* var. *duodenarium*, *P. tetras* were observed as dominant species.

Key words: Taxonomy, Chlorococcales, *Pediastrum*, Anjani dam, Erandol, Maharashtra.

INTRODUCTION

The genus *Pediastrum* is beautiful green algal member belonging to order chlorococcales of division Chlorophyta. It is free floating on the surface of water or attached on a substratum. It is widely distributed genus of green algae characteristically consisting coenobia with an elaborate star like pattern mostly found in fresh water environments, particularly in lentic water bodies. To study diversity of algae present investigation is undertaken. The Anjani dam is located near the Palasdal village (20° 54' North latitude and 75° 19' East longitudes) in the Erandol Tahsil of Jalgaon district, Maharashtra. The present communication deals with the systematic description of 18 taxa of genus *Pediastrum* Meyen.

In Maharashtra studies on this genus has been carried out by Dixit (1937), Gonzalves and Joshi (1943,1946), Kamat (1963, 1968, 1974, 1975), Kamat and Frietas (1976), Ashtekar and Kamat (1980), Barhate and Tarar (1983), Bodas (1991), Pingle (1992), Nandan (1993), Patil and Badgujar (1994), Tarar and Bodkhe (1998), Pingle (1992), Nandan and Mahajan (2002), Kumawat and Jawale (2004), Deshmukh and Gunale (2007), Andhale and Papdiwal (2008), Jawale and Patil (2009), Kumawat *et.al* (2010), Jawale *et.al* (2010), Kumawat and Patil (2012), More and Ramaiah (2014).

MATERIALS AND METHODS

During the present investigation algal samples were collected early in the morning between 7.00 am to 9.00 am in different sized wide mouth plastic bottles for two years during May-2013 to April-2015 from Anjani dam. Algal samples were examined fresh as far as possible immediately after they were brought to the laboratory under Labomed Trinocular Research Microscope (LX-400 Model). The line drawings of algal taxa were made with the help of mirror type of camera lucida under appropriate magnifications, microphotographs of algal taxa also taken with the help of Sony digital camera. Identification of the taxa is based on the monograph of Prescott (1951), Philipose (1967), Hortobagyi (1973) and relevant research papers.

SYSTEMATIC ENUMERATION

Genus *Pediastrum* Meyen.

Pediastrum boryanum (Turp.) Menegh.

Pl. -I, Fig. 1, Pl. -IV, Fig. 1

Philipose, M. T., 1967, pp. 118-119, Fig. 40 a.

Colonies circular to oval and 16-celled. Cells arranged in concentric rings without intercellular spaces. Inner cells polygonal with straight sides. Outer face of marginal cells slightly to deeply emarginate and with two short processes ending in stumpy spines. Cell wall usually granulate. Cells 11.1-18.5 µm in diameter. Processes 8.3-15.7 µm long. Sixteen-celled colonies up to 57.3-88.8 µm in diameter.

Habitat:- Coll. Nos. 187,293,299.

P. boryanum (Turpin) Menegh. var *longicorne* (Reinsch)

Pl. -I, Fig. 2, Pl. -IV, Fig. 2

Philipose, M. T. 1967, pp. 119-120, Fig. -40 b.

Colonies 16-32 celled, circular, intercellular spaces absent, cells sides are straight. Outer cells with two long processes ending bluntly. Cell wall smooth. 16 celled colony 37.5-43.1µm in diameter. Cells 6.3-6.7 µm in diameter and 3.3-4.1µm long; processes 7.1-7.5 µm long.

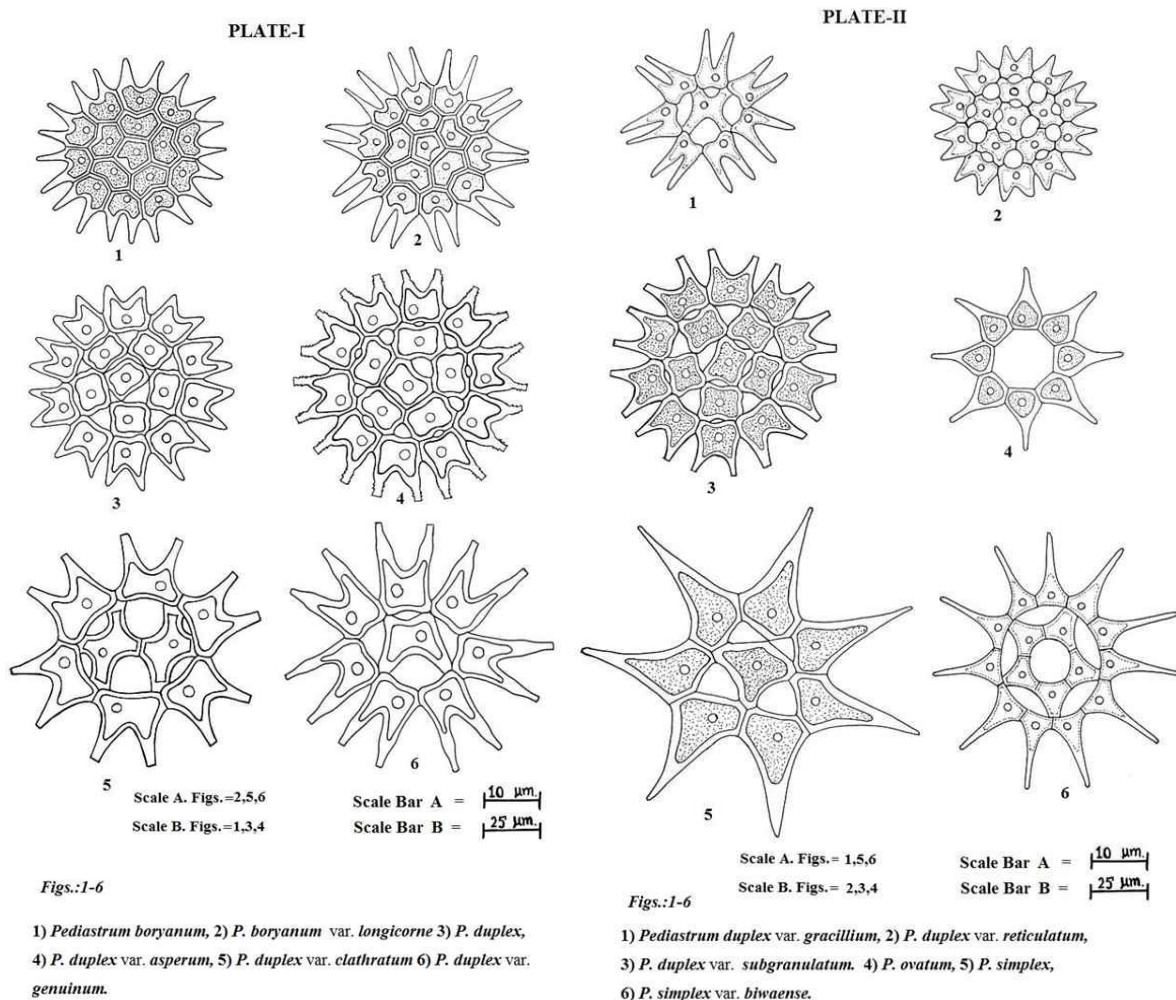
Habitat:- Coll.Nos. 293, 2105

P. duplex Meyen.

Pl. -I, Fig. 3, Pl. -IV, Fig. 3

Philipose, M. T. 1967, pp. 121, Fig. 43- a, b.

Colonies 16 celled cells with small lens shaped perforations between cells. Inner cells quadrate to angular and not in contact at the central portion of the side walls. Inner side of marginal cells concave, outer side produced into two short truncate processes. Cells 9.7-19.4 µm in diameter and 12.3-23.1µm long. Colonies up to 61.8-102 µm in diameter.



Habitat:- Coll.Nos. 187, 2106

P. duplex Meyen var. ***asperum*** (A. Braun) Hansgirg

Pl. -I, Fig. 4, Pl. -IV, Fig. 4.

Philipose M.T., 1967, pp. 121, fig. 43; Jena M. and Adhikary, S.P.2007, p 171 pl-1 fig.3

Colonies 8-16-32-64 celled, 16-celled colony upto 100 µm in diameter, small lens shaped perforation between cells. Inner cells quadrate to angular and in contact at the central portion of the side wall. Inner side of marginal cells concave, outer sides produced into two short truncate processes. Chloroplast single and parietal with a pyrenoid. Cell 21.1 µm in diameter.

Habitat: - Coll.No 295.

P. duplex Meyen var. ***clathratum*** (A. Braun) Lagerheim

Pl. -I, Fig. 5, Pl. -IV, Fig. 5

Philipose, M. T. 1967, pp. 122-123, Fig. 43-g.

Cells with more deeply emarginate sides and larger intercellular spaces. Outer cells with two long stout processes, inner cells without processes. Colonies 8-64 celled. 8-celled colony 44.5 µm in diameter. Cells 11.2 µm in diameter and 12.0 µm long.

Habitat: - Coll.No.481

P. duplex var. ***genuinum*** (A. Braun) Hansgirg

Pl. -I, Fig. 6, Pl. -IV, Fig. 6

Philipose, M. T. 1967, pp. 123, Fig. - 43-d.

Colonies 4-8-16-32 celled with fairly large intercellular space. Marginal cells with stout processes which are straight or slightly curved. Cell membrane smooth. Cells 7.8-13.1µm. in diameter .Colonies 46.5-52.5 µm in diameter.

Habitat: - Coll.Nos. 293,294.

P. duplex Meyen var. ***gracillium*** West et G.S. West.

Pl. -II, Fig. 1, Pl. -IV, Fig. 7

Philipose, M.T. 1967, pp. 124, Figs. 43 h-i.

Colonies with large intercellular spaces; cells narrow, as broad as or narrower than the processes. Marginal cells curved outwards and with two long processes with emarginated apex; inner cells also similar to marginal cells but with shorter processes. Colony 33.7µm in diameter; marginal cells 10.5 µm long, 7.1 µm broad; inner cells 8.6 µm long, 7.8 µm broad.

Habitat:- Coll.No. 299.

P. duplex Meyen var. ***reticulatum*** Lagerh.

Pl. -II, Fig. 2, Pl. -IV, Fig. 8

Philipose, M. T. 1967, pp. 124, Fig. 43-g.

Colonies 16-celled circular. Cell more or less H-shaped with sides of processes of marginal cells nearly parallel. Inter cellular spaces large and oval. 16 celled colonies 58.5-74.9 µm in diameter. Cells 11.2-15.7 µm diameter and 13.8-16.6 µm long.

Habitat: - Coll.Nos. 187,195,293.

P. duplex var. ***subgranulatum*** Raciborski

Pl. -II, Fig. 3, Pl. -IV, Fig. 9

Philipose, M. T. 1967, pp. 125, Fig 43 j

Colonies 8-16-32-celled. Cells and intercellular spaces more or less as in the type of the species, cell walls distinctly granulate. Cells 20.3 µm in diameter and 25.9 µm long.16-celled colony 105.4 µm in diameter.

Habitat:- Coll.No. 293.

P. ovatum (Ehr.) A Braun

Pl. -II, Fig. 4 , Pl. -V, Fig. 1

Philipose, M. T. 1967, pp. 115-116, Fig. 37.

Colonies 4-8-16 celled. Cells arranged in a ring round a central space or with one or more interior cells and a number of marginal cells, with or without perforations. Outer sides of the peripheral cells markedly convex, inner side convex or nearly straight, peripheral cells with single process. Chloroplast parietal with a pyrenoid. Cell wall smooth or granulated. Cells 23.2-30.5 µm long, 12.7-15.7 µm broad; 4 celled colony 53.2 µm in diameter and 8-celled colony 77.7-86.9 µm in diameter.

Habitat: - Coll. Nos. 187, 294, 1103

P. simplex Meyen

Pl. -II, Fig. 5, Pl. -V, Fig. 2

Philipose, M. T. 1967, pp. 112-114, Figs. 36 a-c.

Colonies circular or oval, 4 to 32-celled, small intercellular spaces present. Inner side of the marginal cells nearly straight. Outer side produced into gradually tapering process, lateral sides of the cells concave; inner cells polygonal; cell wall smooth or granulate. Cells 7.5-14.6 µm broad, 15.0-27.2 µm long; 8 celled colony 37.1-69.0 µm in diameter while 16-celled colony 63.7-91.5 µm in diameter.

Habitat:-Coll.Nos.186,187,194,198,215,1101,1103,1106,2105,2107,2113,2115.

P. simplex Meyen var. ***biwaense*** Fukushima.

Pl. -II, Fig. 6, Pl. -V, Fig. 3

Jena, M. and Adhikary, S.P. 2007, pp. 171 pl-1 Fig. 6-7

Colonies 16-32 or more celled, circular; large intercellular spaces or a single central space with the cells arranged in a ring at the periphery. Inner face of marginal cells concave, outer face prolonged into a single tapering processes; side of marginal cells concave on nearly straight; inner cells similar to marginal cells but short in processes. Cell wall smooth or slightly punctuate. Cells 5.6-9.3 µm broad and 13.5-19.8 µm long; 16-celled colony up to 46.5-70.1µm in diameter.

Habitat: - Coll. No. 293, 2125.

P. simplex Meyen var. ***echinulatum*** Wittrock

Pl. -III, Fig. 1, Pl. -V, Fig. 4

Jena, M. and Adhikary, S.P. 2007, pp 171 pl-1 Fig. 8-9

Colony mostly 4-8-celled; the cells are arranged in a plate, which is continuous or with interstices; outer cells have one elongated outward pointing process, inner cell polygonal, cell wall surface of each cell is ornamented with teeth like protuberance. Cells 11.2-13.1µm broad and 22.1-24.7 µm long.

Habitat: - Coll. No. 2107.

P. simplex var. ***duodenarium*** (Bailey) Rabenhorst.

Pl. -III, Fig. 2, Pl. -V, Fig. 5

Philipose, M. T. 1967, pp. 115, Figs. 36 d-h.

Colonies 4-8-16-32-celled having inter-cellular spaces or single central space with the cells arranged in a ring at the periphery. The inner side of the peripheral cells slightly concave, outer side produced into long tapering processes. Sides of the marginal cells also concave or nearly straight, interior cells similar to marginal cells, but with short processes. Cell wall smooth or finely punctate. Cells 9.0-13.8 µm broad, 15.0-30.5µm long. 4-celled colony 36.7-42.2 µm in diameter, 8 celled colony 67.5-79.7 µm in diameter, 16 celled colony 57.0-99.9 µm in diameter, 32-celled colony 107.3 µm in diameter.

Habitat: -Coll. Nos. 187, 294, 298, 2102, 2105,2106,2107,2113

P. sturmii Reinsch var. ***echinulatum*** (Wittr. et Nordst.) Lemm. **Pl. -III, Fig. 3, Pl. -V, Fig. 6**

Hortobagyi, T., 1973, pp. 78, Fig. 305.

Colony with 8-celled, outer cells 10.8 µm in diameter, 22.1 µm long, central cell 11.2 µm in diameter, cells arranged in the form of a ring around central cell without perforation, peripheral cells with single long process. 8-celled colony 54.7µm in diameter. Cells covered with spines, ends of spines smooth.

Habitat:- Coll. No. 2115.

P. tetras (Ehr.) Ralfs.

Pl. -III, Fig. 4, Pl. -V, Fig. 7

Philipose, M. T., 1967, p. 128-129, Figs. 45-a-c.

Colonies rectangular, oval or circular of 4-8 cells without intercellular spaces. Marginal cells divided into two lobes by a deep incision on the outer side, each lobe truncate or slightly emarginate. Inner cells 4-6 sided with a single linear incision. 4-celled colonies 15.7-25.5 µm in diameter, 8-celled colonies 22.0-33.0 µm in diameter. Cells 6.3-7.8 µm in diameter, 7.5-8.2 µm long.

Habitat: - Coll. Nos.187, 194, 293, 288, 1106

P. tetras (Ehr.) Ralfs var. ***excisum*** (Rabenh.) Hansgirg

Pl. -III, Fig. 5, Pl. -V, Fig. 8

Philipose, M. T., 1967, pp.129-130, Fig. 45-f.

Colony rectangular, 4 celled with a very small space in the centre. Cells divided into two lobes by a deep incision reaching slightly below the middle of the cell, lobes more or less deeply concave. Colonies 28.1-30.7 µm in diameter. Cells 9.3-12.0 µm in diameter, 12.3-13.1 µm long.

Habitat: - Coll. Nos.197, 293.

P. tetras (Ehr.) Ralfs var. ***tetraodon*** (Corda) Hansgirg

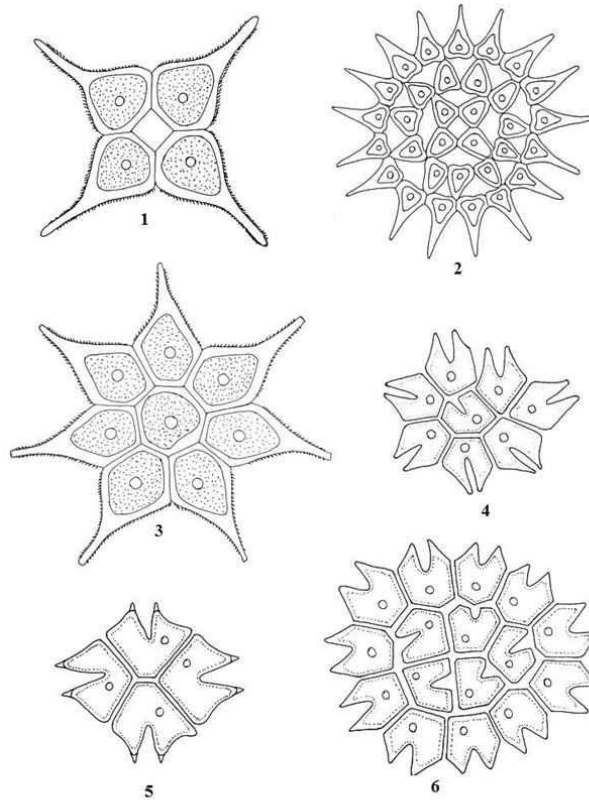
Pl. -III, Fig. 6, Pl. -V, Fig. 9

Philipose, M. T., 1967, pp. 129, Figs 45- e, g.

Colonies 8-16 celled. Incision of the cells deep with the lobes adjacent to the incision of the marginal cells prominent. Colonies upto 37.1-47.2 µm in diameter. Cells 10.1-11.2 µm in diameter, 9.7-13.1 µm long.

Habitat: - Coll. Nos.293, 294.

PLATE-III

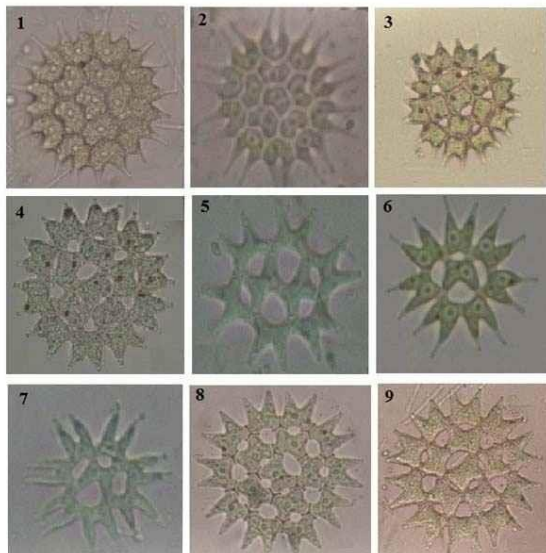


Scale A. Figs. = 1,3,4,5,6 Scale Bar A = 10 μm
Scale B. Figs. = 2 Scale Bar B = 25 μm

Figs. :-1-6

- 1) *Pediastrum simplex* var. *echinulatum*, 2) *P. simplex* var. *duodenarium*,
3) *P. sturmi* var. *echinulatum*, 4) *P. tetras* 5) *P. tetras* var. *excisum*,
6) *P. tetras* var. *tetraodon*

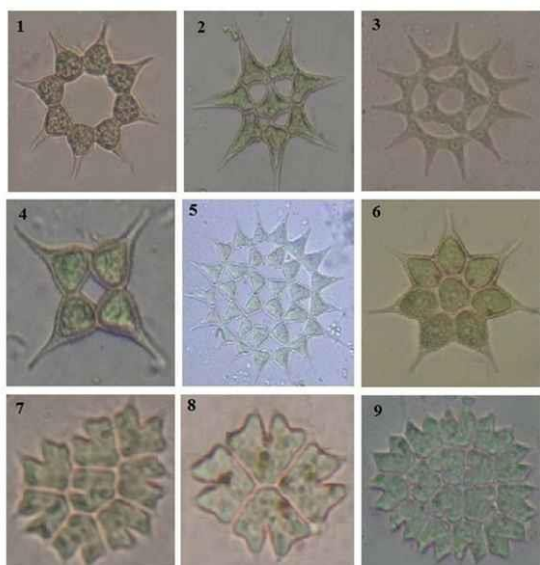
PLATE-IV



Figs:-1-9

- 1) *Pediastrum boryanum*, 2) *P. boryanum* var. *longicorne*
3) *P. duplex*, 4) *P. duplex* var. *asperum*, 5) *P. duplex* var. *clathratum*, 6) *P. duplex* var. *genuinum*, 7) *P. duplex* var. *gracillium*, 8) *P. duplex* var. *reticulatum*, 9) *P. duplex* var. *subgranulatum*.

PLATE-V



Figs:-1-9

- 1) *Pediastrum ovatum*, 2) *P. simplex*, 3) *P. simplex* var. *biwaense*, 4) *P. simplex* var. *echinulatum*, 5) *P. simplex* var. *duodenarium*, 6) *P. sturmi* var. *echinulatum*, 7) *P. tetras*, 8) *P. tetras* var. *excisum* 9) *P. tetras* var. *tetraodon*

CONCLUSION

During the present study a total 18 taxa of genus *Pediastrum* belonging to 05 species and 13 varieties are recorded. Among them *Pediastrum simplex*, *P. simplex* var. *duodenarium*, *P. tetras* were dominant species.

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