



Research Article

Diversity of genus *Scenedesmus* (Meyen) from Anjani dam of Erandol tahsil, district Jalgaon, Maharashtra, India.

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Abstract: The present communication deals with the taxonomic enumeration of 23 taxa representing 12 species, 09 varieties, 02 forms of the genus *Scenedesmus* Meyen of order Chlorococcales from Anjani dam in Erandol Tahsil of Jalgaon district, Maharashtra. Among all these taxa *Scenedesmus arcuatus*, *S. arcuatus* var. *capitatus*, *S. bijugatus* var. *alternans*, *S. dimorphus*, *S. platydiscus*, *S. quadricauda* are being recorded as the dominant species from the Anjani dam.

Key words: Algae, *Scenedesmus*, Chlorococcales, Anjani dam, Erandol, Maharashtra.

Introduction

Scenedesmus Meyen is most common and diversified genus of chlorococcalean colonial fresh water green alga; with 2, 4, 8 or 16 cells arranged in a row. The knowledge of chlorococcales (*Scenedesmus*) from Maharashtra is known through the work of Gonzalves and Joshi (1946), Kamat (1963, 1968, 1974), Kamat and Frietas (1976), Ashtekar and Kamat (1979, 1980), Barhate and Tarar (1983), Pingle (1992), Tarar and Bodkhe (1998), Kumawat and Jawale (2004), Jawale and Dhande (2005), Jawale *et.al* (2010), Beherepatil and Deore (2012), Patil (2013), Reddy and Chaturvedi (2015) and Jain (2016).

Materials and Methods

Algal samples for the present study were collected from different localities of Anjani dam (20° 54' North latitude and 75° 19' East longitude) in the Erandol Tahsil of Jalgaon district, Maharashtra for two years during May-2013 to April-2015. The samples were collected between 7.30 to 9.30 a.m. in different sized plastic vials and wide mouth bottles. Algal samples were examined fresh as far as possible and material was preserved in 4% formalin for further study. The line drawings of algal taxa were made with the help of camera lucida under appropriate magnifications with labomed trinocular research microscope (Model-LX-400) and photomicrograph were taken by Sony digital camera. Identification of the taxa is based on the monograph of Smith (1916), Philipose (1967) and relevant research publications.

Systematic account

Genus *Scenedesmus* Meyen.

Scenedesmus abundans (Kirch.) Chodat. **Pl.1, Fig.1**

M. T. Philipose, 1967, p. 278-279, Figs. 148 a-d. Colony 4-celled. 13.8 µm in diameter, rarely eight-celled and arranged in a linear series. Cells ovoid to oblong-ovoid. External cells with one or more median lateral spines from the outer face in addition to spines from the four corners of the colony. Internal cells are without spines. Cell 3.3 µm broad, 9.0 µm long; spines 6.3 µm long.

Habitat: Coll. No. 124.

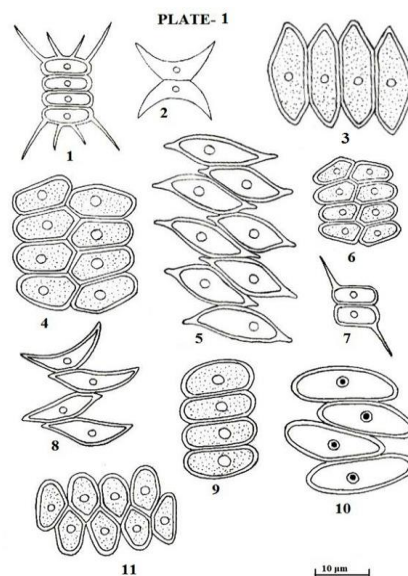


Plate: 1 fig. 1-11

1. *Scenedesmus abundans*, 2. *S. acuminatus*, 3. *S. acutiformis*, 4. *S. arcuatus*,5. *S. arcuatus* var. *capitatus*, 6. *S. arcuatus* var. *platydiscus*, 7. *S. armatus* var.*bicaudatus*, 8. *S. bernardii*, 9. *S. bijugatus*, 10. *S. bijugatus* var. *alternans*, 11.*S. bijugatus* var. *graevenitzii*

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PLATE-3

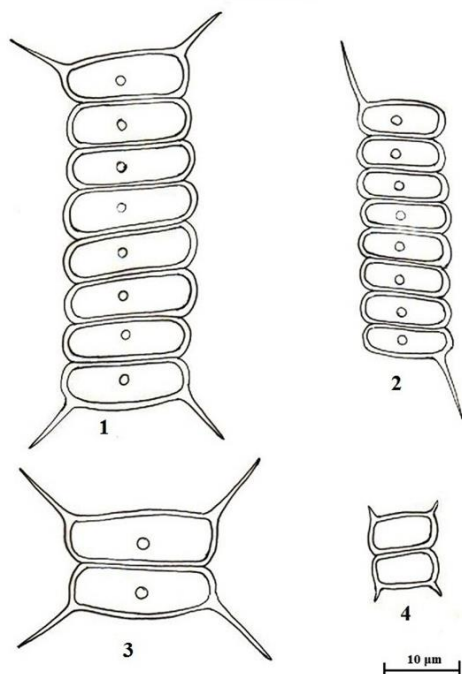
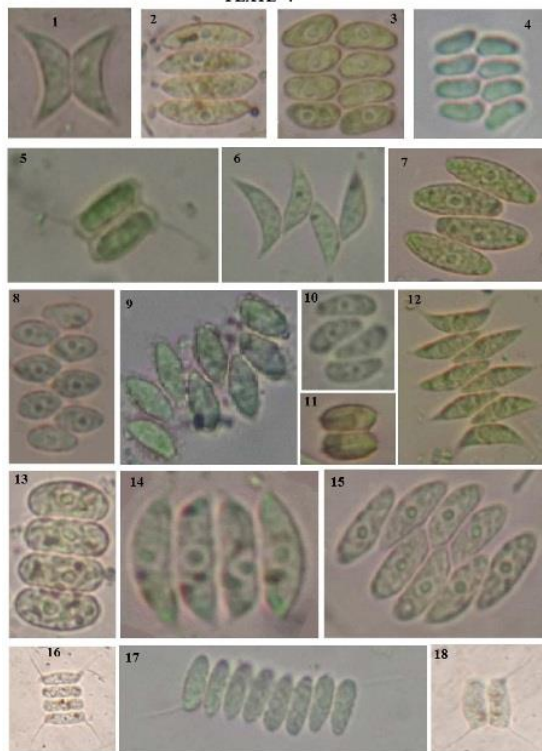


Plate:-3 fig. 1- 4

1. *S. quadricauda*, 2. *S. quadricauda* var. *bicaudatus*,
3. *S. quadricauda* var. *quadrispina* 4. *S. quadricauda* var. *microspina*.

PLATE- 4



Figures:-1-18

1. *S. acuminatus*, 2. *S. acutiformis*, 3. *S. arcuatus*, 4. *S. arcuatus* var. *platydiscus*, 5. *S. armatus* var. *bicaudatus*, 6. *S. bernardii*, 7. *S. bijugatus* var. *alternans*, 8. *S. bijugatus* var. *graevenitzi*, 9. *S. bijugatus* f. *irregularis*, 10. *S. bijugatus* var. *alternans* f. *Parvus*, 11. *S. denticulatus* var. *australis*, 12. *S. dimorphus*, 13. *S. ecoris*, 14. *S. incrassatus*, 15. *S. platydiscus*, 16. *S. quadricauda*, 17. *S. quadricauda* var. *bicaudatus*, 18. *S. quadricauda* var. *quadrispina*

***S. acuminatus* (Lagerheim) Chodat. Pl.1, Fig.2, Pl.4, Fig.1**

Philipose, M. T. 1967, p. 251, Fig. 161.

Colony curved and two celled. 7.5 µm in diameter. Cells fusiform, lunate with sharp pointed ends. External cells usually sharply lunate, internal cells sometimes flat, fusiform; rarely all cells in the same plane. Cell wall smooth, without teeth or spines. Cell 3.7 µm broad, 15.3 µm long.

Habitat: Coll. No. 293.

***S. acutiformis* Schroeder. Pl.1, Fig.3, Pl.4, Fig.2**

Philipose, M.T. 1967, p.260, Fig.169.

Colonies flat usually 4-celled. 19.2-25.8 µm in diameter. Cells arranged in a single linear series; each cell fusiform, cylindrical and cell wall smooth, median cells with a lateral longitudinal ridge extending from pole to pole on each side. Terminal cells with two to four ridges. Poles of cells acute and without teeth or spines, but sometimes with a minute papilla. Cells 5.2-6.7 µm broad, 15.3-21.3 µm long.

Habitat: Coll. Nos 282, 1108.

***S. arcuatus* (Lemm.) Lemm. Pl.1, Fig.4 Pl.4, Fig.3**

Philipose M. T., 1967, p. 256, Figs. 166 a-c.

Colonies usually 8-celled, rarely 4 or 16-celled, 18.7-30.0 µm in diameter, curved and with small intercellular spaces. Cells in eight-celled colonies in two series, oblong-ovoid, sometimes slightly angular at the base due to mutual pressure. Cell wall smooth, without teeth or spines. Cells 4.8-6.3 µm broad, 8.6-12.7 µm long.

Habitat: Coll. Nos. 293, 187, 2115, 212, 212, 236, 1106.

***S. arcuatus* (Lemm.) Lemm. var. *capitatus* G. M. Smith Pl.1., Fig.5**

Philipose M. T., 1967, p. 257, Figs. 66 d-l.

Colonies curved, 4-8-celled. Cells in eight-celled colonies in a linear or sublinear series, cells slightly curved with one side convex and the other straight or slightly concave, ends of cells stumpy and with nodular thickenings. 4-celled colonies 18.7-23.2 µm in diameter and 8-celled colony 41.2 µm in diameter. Cells 5.6-6.3 µm broad, 16.8-21.7 µm long.

Habitat: Coll. Nos. 1108, 187, 194, 399.

***S. arcuatus* Lemm. var. *platydiscus* G.M. Smith Pl.1, Fig.6, Pl.4, Fig.4**

Halder Nilu, 2016 p. 4 pl. 1, Fig. 4

Colonies flat, 8-celled. 19.2-19.5 µm in diameter, arranged in double rows; cells oblong-ellipsoidal with rounded ends, cells between two rows distinctly alternate; without teeth or spines; cell wall smooth. Cells 3.9-4.1 µm broad and 7.4-7.5 µm long.

Habitat: Coll. Nos 122, 123.

***S. armatus* (Chodat) G. M. Smith var. *bicaudatus* (Gugli.) Chodat Pl.1, Fig.7, Pl.4, Fig.5**

Philipose M. T., 1967, p. 262, Figs. 171 d-f, m.

Colonies 2- 4 celled; two celled colony 7.8 μm long, differ from the type in having a long spine from one of the poles of the terminal cell only; the spines of the two terminal cells alternating with each other. Cell 3.7 μm broad, 8.2 μm long and spines 6.7 μm long.

Habitat: Coll. No 212.

S. bernardii G.M. Smith **Pl.1, Fig.8, Pl.4, Fig.6**

Philipose M. T., 1967, p. 251, Figs. 162 a-b

Colonies 4-8 celled. 4-celled colony 20.2 μm in diameter; internal cells fusiform, lunate or sigmoid with acute apices and arranged alternately with their apices in contact with the apices or median portions of adjacent cells. Terminal cells fusiform or lunate, usually attached to the apices of the inner cell and frequently at an angle to the plane of the colony. Cell wall smooth and without spines or teeth. Cell 4.5 μm broad, 17.2 μm long.

Habitat: Coll. No 293.

S. bijugatus (Turp.) Kuetz. **Pl.1, Fig.9**

Philipose M. T., 1967, p. 252, Figs. c, e, f.

Colonies 2-4-8 celled. Cells arranged in a single linear series; flat or slightly curved. 25.8 μm in diameter. Cells oblong-ellipsoid to ovoid with the ends broadly rounded. Cell 6.7 μm broad, 13.8 μm long.

Habitat: Coll. No.263.

S. bijugatus (Turp.) Kuetz. var. ***alternans*** (Reinsch) Hansg. **Pl.1, Fig.10, Pl.4, Fig.7.**

Philipose M. T., 1967, p. 254-255, Fig. 264 g.

Patel R. J. and George Isabella, 1989, p. 49, Figs. 3.

Colonies flat or slightly curved, usually eight-celled, but sometimes four celled, with the cells arranged in a distinctly alternating series; adjacent cells jointed to each other along a short portion of their length only. 4-celled colony 19.5-32.2 μm in diameter. Cells 5.6-9.7 μm broad, 10.8-21.3 μm long, ellipsoid to ovoid-ellipsoid with rounded ends.

Habitat: Coll. No. 293, 2121,263,294,262,187.

S. bijugatus (Turp.) var. ***graevenitzii*** (Bernard)

Philipose **Pl.1, Fig.11, Pl.4, Fig.8**

Philipose, M. T. 1967, p. 254, Figs. 164 a-b.

Colonies 4-8 celled. 27.0 μm in diameter. Cells fusiform, ellipsoid to ovoid with obtuse poles and arranged in an alternating series with adjacent cells in contact only along a short portion of their length. Cells 4.5-4.8 μm broad and 9.3-10.8 μm long.

Habitat: Coll. No. 294

S. bijugatus (Turp.) Kuetz. f. ***irregularis*** Wille **Pl.2, Fig.1, Pl.4, Fig.9**

Philipose M. T. 1967, p. 253, Figs. 164 i, m.

Colonies 4-8 celled, upto 33.7 μm in diameter; cells arranged in double or in an irregularly sub alternating series. Cell 5.6 μm broad, 12.0 μm long.

Habitat: Coll. No. 222.

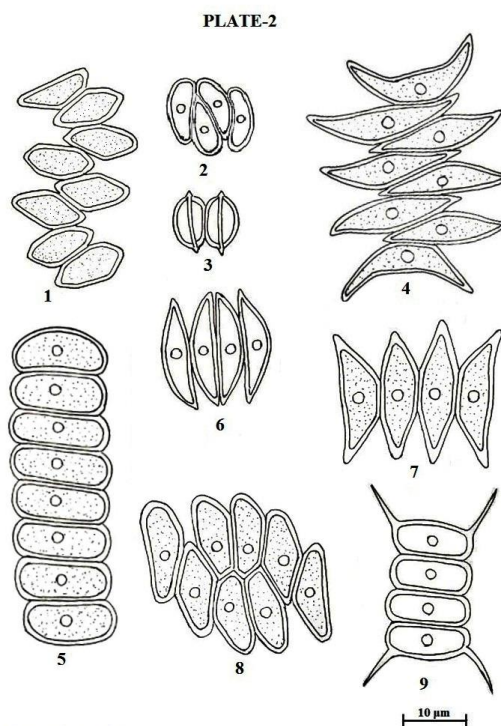


Plate:-2 fig. 1-9

1. *S. bijugatus* f. *irregularis*, 2. *S. bijugatus* var. *alternans* f. *parvus*, 3. *S. denticulatus* var. *australis*, 4. *S. dimorphus*, 5. *S. ecorinis*, 6. *S. incrassatulus*, 7. *S. obliquus*, 8. *S. platydiscus* 9. *S. quadricauda*.

S. bijugatus var. ***alternans*** (Reinsch) Hansg. f. ***parvus*** Philipose **Pl.2 Fig.2 Pl.4, Fig. 10**

Philipose, M.T., 1967, p.255-256. Fig. 164 h, j

Colonies 4-celled. 12.7-15.7 μm in diameter with the cells arranged in a regular sub alternating series. Cells much smaller and oblong-ovoid. Cell wall smooth. Cells 3.3-4.1 μm broad, 7.8-10.1 μm long.

Habitat: Coll. Nos. 2115, 293, 295, 2116,194.

S. denticulatus Lagerh. var. ***australis*** Playfair **Pl.2, Fig.3, Pl.4, Fig.11**

Philipose M. T., 1967, p.271 Figs. 176 f-h

Colonies 2-4-celled. 10.5 μm in diameter. Cells arranged in a single linear series, oblong cylindrical with more or less rounded ends and with one (very rarely two) short teeth from the poles of all cells. Cells 5.2 μm broad, 9.3 μm long; teeth 1.1 μm long.

Habitat: Coll. No. 293

S. dimorphus (Turp.) Kuetz. **Pl.2, Fig.4, Pl.4, Fig.12**

Philipose M. T., 1967, p. 249-250, Figs. 160 a-c.

Colonies 4-8 celled; 13.8-33.0 μm in diameter. Cells fusiforms, arranged in a single or alternating series, inner cells with straight, sharp apices; outer cells lunate, curved with sharp and acute apices. Cells 3.3-6.0 μm broad, 15.7-25.5 μm long.

Habitat: Coll. Nos. 146, 124, 113, 198, 224, 2115, 212.

S. ecornis (Ralfs) Chodat.

Pl.2, Fig.5, Pl.4, Fig.13

Hortobagyi T., 1973, p. 93, Figs. 427-428.

Colonies 4-8 celled. 28.1-52.7 μm in diameter, occasionally of sixteen cells; colonies of the last ones strongly arcuating. Cells 5.2-7.5 μm broad, 12.0-17.6 μm long.

Habitat: Coll. No. 197, 263, 1108.

S. incrassatulus Bohlin. **Pl.2, Fig.6, Pl.4, Fig.14**

Philipose M. T., 1967, p. 252, Fig. 163.

Single celled or in colonies of 2-4 cells, 18.3 μm in diameter. Cells in a linear or sub-alternating series, fusiform, curved with the outer side convex and the inner side more or less straight or slightly concave; ends of the cells stumpy and with apical nodules. Cells 4.1 μm broad, 18.3 μm long.

Habitat: Coll. No.1108.

S. obliquus (Turp.) Kuetz. **Pl.2, Fig.7**

Philipose M. T., 1967, p. 248, Fig. 159.

Colonies 4 celled. 25.8-27.0 μm in diameter, cells arranged in linear or sub linear series. Cells fusiform with subacute apices, outer side of the terminal cell concave or slightly convex, intermediate cells more or less straight with slightly convex sides; cell wall smooth, without teeth or spines. Cells 5.6-6.3 μm broad 18.0-21.3 μm long.

Habitat: Coll. Nos. 196,197.

S. platydiscus (G. M. Smith) Chodat.

Pl.2, Fig.8, Pl.4, Fig.15

Philipose M. T., 1967, p. 256, Fig. 165.

Colonies flat, 8-celled. 29.2-37.5 μm in diameter with oblong, elliptic cells arranged in a double series; interstices between cells minute or absent. Cells 5.6-7.5 μm broad, 12.7-19.8 μm long.

Habitat: Coll. Nos. 262, 1104,267,279.

S. quadricauda (Turpin) Brebisson. **Pl.2, Fig.9, Pl.3, Fig 1, Pl.4, Fig.16**

Philipose, M. T. 1967, p. 283-284, Fig. 187 a.

Colonies 2-4 celled, sometimes 8-celled. 22.8-49.8 μm in diameter. Cells oblong-cylindrical with rounded ends and arranged in a linear series. Poles of terminal cells with long, more or less straight curved spines. Cell wall smooth. Cells 4.2-6.7 μm broad, 12.7-17.6 μm long; spines 6.6-9.9 μm long.

Habitat: Coll. Nos. 187,265,194,164,122,274.

Scenedesmus quadricauda (Turp.) Breb. var. *bicaudatus* Hansg. **Pl.3, Fig.2, Pl.4, Fig.17**

Philipose M. T. 1967, P. 284, Fig. 187 k, l.

Colonies 4-8 celled; 36.6 μm in diameter, terminal cells with a long spine from one pole only, the spine of one terminal cell being at an angle of opposite to that of the other terminal cell. Internal cells without spines from their poles. Cell 4.5 μm broad, 12.0 μm long; spines 12.0 μm long.

Habitat: Coll. No. 241.

S. quadricauda (Turp.) Breb. var. *quadrispina* (Chodat) G. M. Smith **Pl.3, Fig.3, Pl.4, Fig.18**

Philipose M. T., 1967, p. 285, Figs. 187 d, j.

Colonies usually 2-4 celled. 13.0-15.0 μm in diameter. Cells broadly ovoid and about twice as long as broad. Cell wall smooth. Poles of terminal cells with a single short recurved spine. Cells 7.1-7.5 μm broad, 16.1-19.5 μm long; spines 7.5-9.7 μm long.

Habitat: Coll. No. 198,154.

S. quadricauda (Turp.) Breb. var. *microspina* (Chodat) Philipose **Pl.3, Fig.4**

Isabella P.K. and Patel R. J. 1975 p. 251 pl.24 Fig. 6, 7

Colony 2-4 celled. 2 celled colony 9.9 μm long; cells oblong to ellipsoid and arranged in a single linear series; poles of terminal cells with short spines. Inner cells without teeth or spines. Cell 5.3 μm broad, 8.9 μm long; spines 2.1 μm long.

Habitat: Coll. No. 122.

Conclusion

The present work described total 23 taxa of genus *Scenedesmus* (Chlorococcales) representing 12 species, 09 varieties and 02 forms. Among them *Scenedesmus arcuatus*, *S. arcuatus* var. *capitatus*, *S. bijugatus* var. *alternans*, *S. dimorphus*, *S. platydiscus*, *S. quadricauda* are recorded as the dominant species form study area.

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