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GENUS *SCENEDESMUS* MEYEN FROM MANGRUL DAM DIST JALGAON, MAHARASHTRA

***Patil S. A.**

Department of Botany, Sardar Vallabhbhai Patel Arts and Science College, Ainpur-425507

*Author for Correspondence

ABSTRACT

The present paper deals with the description of 23 taxa of genus *Scenedesmus* (Chlorococcales) collected from Mangrul dam (21° 19' 45" N and 72° 2' 15" E) Jalgaon district Maharashtra. From these 6 taxa viz. *Scenedesmus arcuatus* f. *gracilis*, *S. armatus* var. *dispar*, *S. dispar* var. *costatus* f. *crassispinosus*, *S. javanensis*, *S. smithii* var. *Linearis* and *S. spinosus* are reported for the first time from Maharashtra and 3 taxa viz. *Scenedesmus balatonicus*, *S. danubialis* var. *Robustus* and *S. ecornis* are reported for the first time from India.

Key Words: Chlorococcales, *Scenedesmus*, Mangrul dam, Maharashtra.

INTRODUCTION

While studying the ecology and biodiversity of algae from Mangrul dam, dist. Jalgaon, Maharashtra the author's collected 23 taxa of genus *Scenedesmus*. 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) and Jawale *et al.* (2010).

MATERIALS AND METHODS

Materials for the present study were collected from two sites of Mangrul dam, Jalgaon district of Maharashtra during January, 2010 to December, 2010. The materials were collected between 8.30 to 9.30 am at fortnightly or monthly intervals. Camera lucida drawings were made from fresh as well as materials preserved in 4% formalin. The taxa are identified with the help of monograph by Philipose (1967) and relevant research publications.

Systematic Account

Scenedesmus abundans (Kirch.) Chodat var. *brevicauda* Smith

Plate1, Figure1

M. T. Philipose, 1967, P. 279, Figure 184e.

Colony 2-celled. Cells ovoid to oblong-ovoid. Cells with long spines only from the alternating poles and poles of the internal cells with short spines. Cells 3 x 5.7 µm. Long spines 6.1 µm long.

Occurrence: Summer season

Scenedesmus arcuatus (Lemm.) Lemm. var. *capitatus* G. M. Smith

M. T. Philipose, 1967, P. 257, Figures 66 d-l.

Plate1, Figure 2

Colonies curved, 4-8 celled. Four celled colonies in a linear or sub-linear series. Cells slightly curved with one side convex and other straight or slightly concave. Ends of the cells stumpy with nodular thickenings. Cells 3.4 – 8.4 x 18-23.8 µm.

Occurrence: Winter and Rainy seasons

Scenedesmus arcuatus (Lemm.) Lemm. f. *gracilis* Hortobagyi

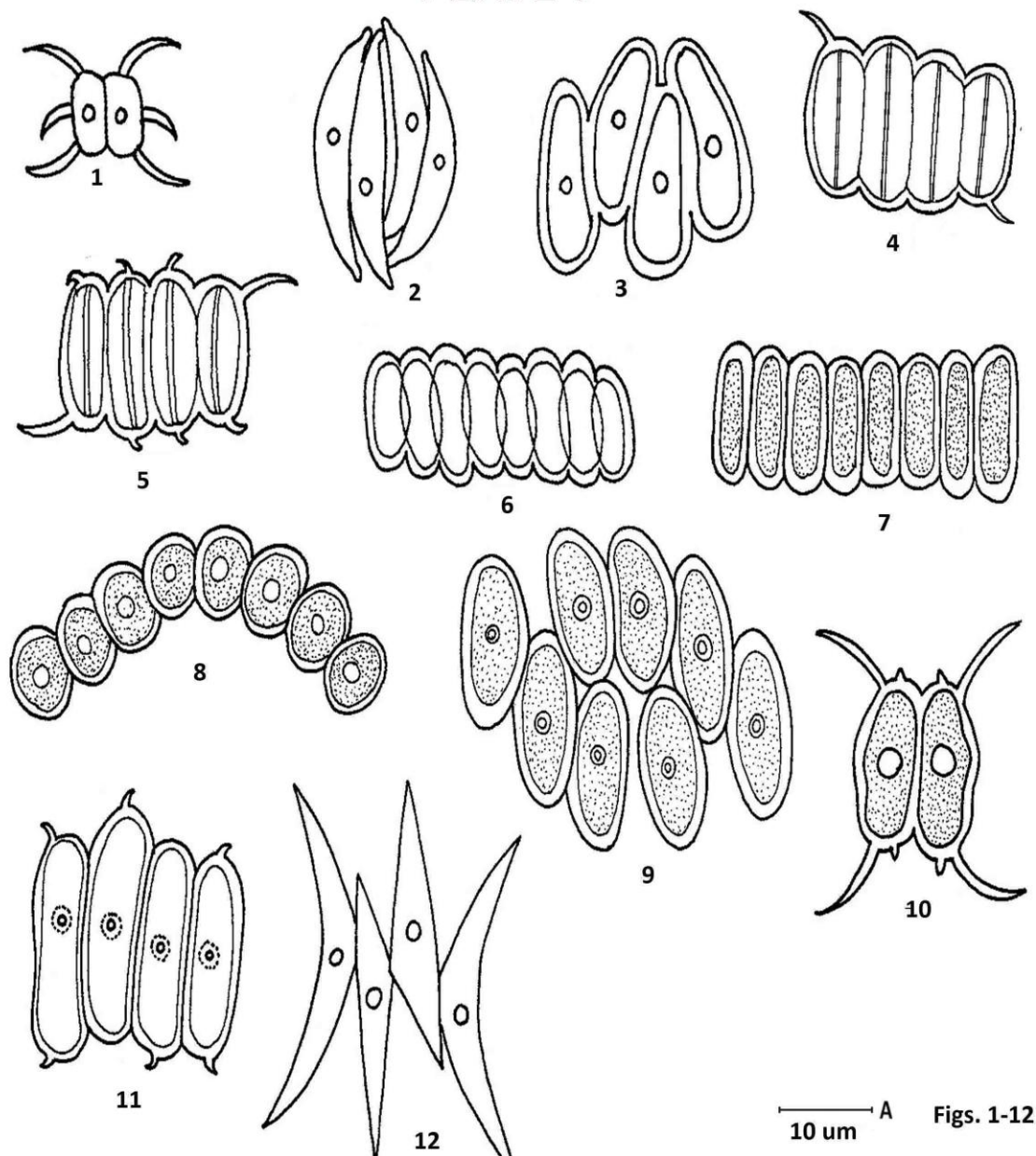
T. Hortobagyi, 1969, PP. 49-50, Pl. 21, Figure 295.

Plate1, Figure 3

Colonies 4-celled; cells alternately arranged with cavities between them. Cells oblong, outer faces slightly convex and inner face straight or slightly concave; one end usually broader than other. Cell wall smooth with rounded ends. Cells 4.9-6.1 x 15-17.2 µm.

Occurrence: Winter season

PLATE-I



Figures:1-12

1. *Scenedesmus abundans* var. *brevicauda* 2. *Scenedesmus arcuatus* var. *capitatus* 3. *Scenedesmus arcuatus* f. *gracilis* 4. *Scenedesmus armatus* var. *bicaudatus* 5. *Scenedesmus armatus* var. *dispar* 6. *Scenedesmus balatonicus* 7. *Scenedesmus bijugatus* 8. *Scenedesmus bijugatus* var. *flexuosus* 9. *Scenedesmus bijugatus* f. *irregularis* 10. *Scenedesmus danubialis* var. *robustus* 11. *Scenedesmus denticulatus* var. *linearis* f. *alternans* 12. *Scenedesmus dimorphus* f. *tortus*

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Scenedesmus armatus (Chodat) G. M. Smith var. *bicaudatus* (Gugli.) Chodat Plate1, Figure 4
M. T. Philipose, 1967, P. 262, Figures 171 d-f, m.

Colony 4-celled. The spines of the two terminal cells alternating with each other. Longitudinal ridges present in all the cells, extending from pole to pole. Cell 4.9 x 13 µm. Spines 2.3 µm long.

Occurrence: Summer season

Scenedesmus armatus (Chodat) G. M. Smith var. *Dispar* Phil. Plate1, Figure 5
M. T. Philipose, 1967, PP. 265-266, Figure 171.

Colonies 4-celled with the cells arranged in a single linear series. Cells oblong-ellipsoid with broadly rounded ends with longitudinal ridge extending from pole to pole. Terminal cells with a long outwardly oblique spine from one pole, a shorter slightly curved spine from the opposite pole. The long and short spines of the terminal cells alternating with each other. Inner cells with short spines from the alternating poles. Cells 4.2-4.9 x 9.9-11.1 µm. Long spines .1-4.6 µm long.

Occurrence: Winter season

Scenedesmus balatonicus Hortob. Plate1, Figure 6
T. Hortobagyi, 1973, P. 86, Figure 396.

Colonies 8-celled. Cells arranged in a single linear series. Cells oblong-ellipsoidal with broadly rounded ends. Adjacent cells are in contact except at the poles. Cells 2.7-3.4 x 8.4-10.3 µm.

Occurrence: Winter season

Scenedesmus bijugatus (Turp.) Kuetz. Plate1, Figure 7
M. T. Philipose, 1967, P. 252, Figures c, e, f.

Colony composed of 2-4-8 cells arranged in a single linear series. Cells 2.6 - 6.9 x 9.6-16.9 µm.

Occurrence: All season

Scenedesmus bijugatus (Turp.) Kuetz. var. *flexuosus* Lemm. Plate1, Figure 8
M. T. Philipose, 1967, P. 254, Figures 164 k-l.

Colonies 8-16 celled. Cells arranged in a single linear series only. Cells 4-5.4 x 6-7.2 µm.

Occurrence: Summer and Rainy season

Scenedesmus bijugatus (Turp.) Kuetz.f. *irregularis* Wille Plate1, Figure 9
B. N. Prasad, M.N. Srivastava and P. Khanna, 1986, P. 454, Figure 19.

Colonies 8-celled. Cells being arranged in an irregular sub-alternating or sometimes in an almost double series. Inner cells usually in lateral and basal contacts. Cells 6.5-7.7 x 13.4 - 15.7 µm.

Occurrence: Winter season

Scenedesmus danubialis Hortob. var. *robustus* Hortob. Plate1, Figure 10
T. Hortobagyi, 1973, PP. 90-91, Figures 528-529.

Colonies 2-4 celled. Long extremely thick spines developed only on the poles of the outermost cells; beside them a small papilla or obtuse spines of 1.1-1.5 µm in length are seen. Cells 5.7-6.1 x 12.2-13.8 µm. Spines 8-8.4 µm long.

Occurrence: Winter season

Scenedesmus denticulatus Lagerh. var. *linearis* Hansg. f. *alternans* Daniel Plate 1, Figure 11
T. Hortobagyi, 1967, P. 50, Figures 46-47.

Colony 4-celled. Cells ovoid-oblong to ellipsoidal with rounded ends. Terminal cells with a single short stout teeth from each pole and the internal cells with only one teeth each. The teeth of the internal cells alternating with each other. Cells 4.6-5.3 x 15.7-18.4 µm. Teeth 1.1-1.5 µm long.

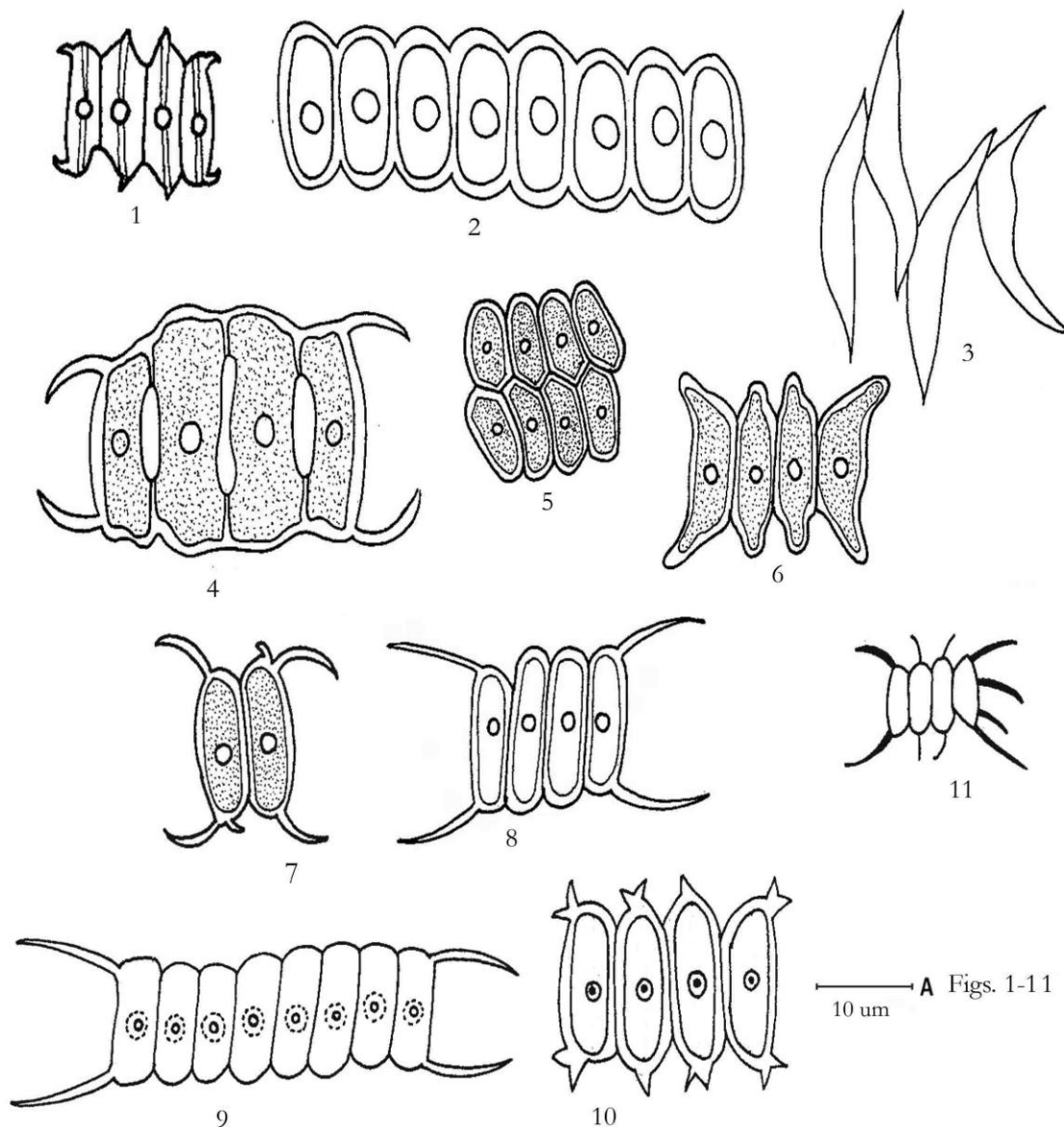
Occurrence : Summer season

Scenedesmus dimorphus (Turp.) Kuetz.f. *tortus* G. M. Smith Plate1, Figure 12
M.T. Philipose, 1967, P. 251 Figure 160d.

Colonies 4-celled. Differs from the type in the central cells of the colony arranged at an angle to the axes of the terminal cells instead of being parallel to them. Cells 3-4.6 x 18.2-29.1 µm.

Occurrence: Rainy season

PLATE-II



Figures 1-11:

1. *Scenedesmus dispar* var. *costatus* f. *crassispinosus* 2. *S. ecornis* 3. *S. javanensis* 4. *S. perforatus* 5. *Platydiscus* 6. *S. producto-capitatus* 7. *S. quadricauda* var. *bidigitatus* 8. *S. quadricauda* var. *longispina* 9. *S. quadricauda* var. *westii* 10. *S. smithii* var. *linearis* 11. *S. spinosus*

Scenedesmus dispar Breb. var. *costatus* Hortob. et Nemeth f. *crassispinosus* Hortob. Plate 2, Figure 1

T. Hortobagyi, 1969, P. 40, Figures 162-164.

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Colony 4-celled. Cells fusiform with acute ends having 1-2 rudimentary thick stumpy spines. All the cells with a median longitudinal ridge extending pole to pole. Cells $2.4 - 3.2 \times 7.6-9.6 \mu\text{m}$. Spines $1.3 - 2.2 \mu\text{m}$ long.

Occurrence: Winter season

Scenedesmus ecornis (Ralfs) Chodat

Plate 2, Figure 2

T. Hortobagyi, 1973, P. 93, Figures 427-428.

Colony composed of 4-8 cells arranged in a single linear series. Cells oblong-ellipsoid to ovoid with broadly rounded ends. Cells $5.7-6.9 \times 13.8-14.9 \mu\text{m}$.

Occurrence: Winter season

Scenedesmus javanensis Chodat

Plant 2, Figure 3

R. J. Patel and Isabella George, 1989, P.47, Figures 7 o, p.

Colonies 2-4 celled. Cells flat and rarely curved a little, terminal cells were lunate in shape and the median cells were sigmoid, terminal cells always longer than median cells. The cells were arranged in a unique zigzag series. Cells $1.5-4.9 \times 18.8-26.8 \mu\text{m}$.

Occurrence: Winter and Rainy season

Scenedesmus perforatus Lemm.

Plate 2, Figure 4

M. T. Philipose, 1967, P. 280, Figures 186 a,b,g.

Colonies 4-8 cells. Cells arranged in a single linear series. Outer face of terminal cells slightly convex, inner face concave; poles curved outwards and with a long curved spines. Inner cells with concave sides and with linear to lenticular perforations between the adjacent cells; cells with capitate ends. Cell wall smooth. Cells $5.4-8 \times 13.4-20.7 \mu\text{m}$. Spines $7.3 - 8.4 \mu\text{m}$ long. Perforations $1.5 \times 7.6 \mu\text{m}$.

Occurrence: Winter seasons

Scenedesmus platydiscus (G. M. Smith)

Plate 2, Figure 5

M. T. Philipose, 1967, P. 256, Figure 165.

Colonies flat eight celled with oblong-elliptic cells arranged in a double series. Interstices between the cells absent. Cells $3-7.6 \times 8-16.8 \mu\text{m}$.

Occurrence: All season

Scenedesmus producto-capitatus Schm.

Plate 2, Figure 6

Dhande, 2007, P. 70, Pl.11, Figure 5.

Colony 4-celled. Cells arranged in a single linear series, in contact with half or nearly third portion of the lateral walls. Cells ellipsoidal with two protuberances at both ends. Cell wall smooth without teeth or spines. Cell $4.6 \times 15.3 \mu\text{m}$.

Occurrence: Rainy season

Scenedesmus quadricauda (Turp.) Breb. var. *bidigitatus* Hansg.

Plate 2, Figure 7

R. J. Patel and Isabella George, 1989, P. 57, Figures 8 G, H, I, J, L.

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Colonies 2-4 celled. Cells oblong-cylindrical with rounded ends and arranged in a linear series. Poles of terminal cells with a long, more or less straight or curved spines. Cells with two short spines present diametrically opposed terminal poles. Cells 3.8 x 12.3 µm. Long spines 6.5-9.6 µm long.

Occurrence: Summer season

Scenedesmus quadricauda (Turp.) Breb.var.*longispina* (Chodat) G. M. Smith Plate 2, Figure 8

M. T. Philipose, 1967, P. 285, Figures 187 b,c.

Colonies 4-celled. Cells ovoid to cylindrical, narrower and the spines proportionately longer, compared to the length of the cells; internal cells without spines from their poles. Cells 3.8-4.6 x 11.9-13.8µm. Spines 12.7 -14.6 µm long.

Occurrence: Winter season

Scenedesmus quadricauda (Turp.) Breb.var.*westii* G. M. Smith Plate 2, Figure 9

LatikaSharan and R. N. Das, 2003, P. 100.

Colonies 4-8 celled. Cells ovoid with rounded apices, arranged in a single series. Spines relatively short and curved. Cells 3.4- 4.6 x 8-11.1 µm. Spines 2.3 – 11.9µm long.

Occurrence: Rainy and Winter season

Scenedesmus smithii (Teiling) var.*linearis* Phil. Plate 2, Figure 10

M. T. Philipose, 1967, P. 272, Figure 178a.

Colony 4-celled with the cells arranged in a linear series. Cells more or less naviculoid. Adjacent cells in contact except at the poles. Poles of the cells with 2-3 sharp spines. Cells 5.3-5.7 x 14.6-16.1 µm.

Occurrence: Winter season

Scenedesmus spinosus Chodat Plate 2, Figure 11

T. Hortobagyi, 1973, PP. 110-111, Figures 511-515.

Colonies usually 2-4 celled. Cells arranged in a linear series, 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 with 1-2 spines from their poles. Cells 1.9-2.7 x 5.3 - 5.7 µm. Spines 1.9–6.1 µm long.

Occurrence: Rainy season

CONCLUSION

During this study winter months are more favourable for the growth of genus *Scenedesmus*. Density of *Scenedesmus* was found maximum in winter and less in summer and rainy season. In this investigation out of these 23 taxa 6 taxa are recorded for the first time from Maharashtra, three taxa are addition to existing algal flora of India.

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