

## GENUS *OSCILLATORIA* VAUCHER (CYANOBACTERIA) FROM ANJANI DAM OF JALGAON DISTRICT, MAHARASHTRA, INDIA

SANJAY BHAGWAT PATIL<sup>1</sup>, SATISH ADHAR PATIL<sup>1</sup> AND  
JIVAN SITARAM DHANDE<sup>2</sup>

<sup>1</sup>S.V.P. Arts and Science College, Ainpur, District Jalgaon, (M.S.) – 425507

<sup>2</sup>Smt.P.K.Kotecha Mahila Mahavidyalaya, Bhusawal, District Jalgaon, (M.S.) – 425201  
Email: sbp2068@rediffmail.com

Date of online publication: 31st December 2021

DOI: 10.5958/2455-7218.2021.00038.3

The present study deals with the taxonomic enumeration of genus *Oscillatoria* Vaucher from Anjani dam, Erandol Tahsil of Jalgaon district, Maharashtra. The species of *Oscillatoria* are delimited on the basis of nature of trichome, colour, sheath, diameter of the cell, granulation, constriction and nature of apex. A total of 20 taxa have been identified from the collected samples of different sites of Anjani dam. All the taxa are being recorded for the first time from the present study area.

**Key words:** *Oscillatoria*, *Cyanobacteria*, *taxa*, *Anjani dam*, *Maharashtra*

Cyanobacteria represent the diverse group of gram negative, prokaryotic oxygen generating phototrophs that are adapted in all possible aquatic habitats of the world. *Oscillatoria* Vaucher is a commonly occurring cyanophycean alga of family Oscillatoriaceae. The genus *Oscillatoria* is a filamentous form which does not differentiate heterocyst and akinetes. They may be terrestrial, free floating, epiphytic or growing on surface of rocks and are survive in extreme environmental conditions.

Cyanobacteria of Maharashtra have been studied by several workers like Kamat (1962, 1963), Thomas and Gonzalves (1965), Barhate and Tarar (1983), Bhoge and Ragothaman (1986), Mahajan (1986, 1989) Mahajan and Mahajan (1988), Deore and Patil (1989), Kumawat and Jawale (2006), Talekar *et.al* (2010), Patil (2013), Beherepatil and Deore (2014), Jain (2015), Jaiswal (2017), Shejul and Sawant (2019), Jasiwal and Gavit (2019). The present study is a step to explore and document the diversity of *Oscillatoria* from Anjani dam of Jalgaon district.

### MATERIALS AND METHODS

Anjani dam is located near the Palasdal village

(20° 4' North latitude and 75° 19' East longitude) situated on Anjani river in the Erandol Tahsil of Jalgaon district, Maharashtra. The algal samples collections were made monthly early in the morning between 7.00 to 09.00 am during May, 2017 to April, 2019 from different sites of Anjani dam and. All the collected samples were studied fresh as far as possible and later preserved in 4 % formalin for further studies. Camera lucida drawings were made with the help of mirror type of camera lucida. The identification of taxa was made by the following the monograph of Desikachary (1959), Prescott (1962), Santra (1993) and relevant research papers.

### Taxonomic enumeration

*Oscillatoria amoena* (Kutez.) Gomont  
**Pl.1, Fig.1**

Desikachary T.V.1959, P.230: Pl. 40, Fig. - 12.  
Thallus more or less blue green; trichomes straight, slightly constricted at the cross walls, ends gradually attenuated, 4.6 µm broad, dull blue green; cells nearly as long as broad, 6.4 µm long, septa granulated. Terminal cell capitate, broadly conical with calyptra.  
Coll. No. :-397

***Oscillatoria anguina* Bory ex Gomont Pl.1, Fig.2**

Das S.K. and Adhikary S.P.2014, P.67, Pl.3, Fig.10.

Trichomes bright blue green or blackish green, 8.2 µm broad, straight, constricted at finely granulated cross walls, gradually attenuated at the ends, cells are 2.1µm long, apical cells obtusely button like flattened with thickened outer cell wall.

Coll. No. :-122

***Oscillatoria annae* Van Goor Pl.1, Fig.3**

Desikachary T.V.1959, P.203; Pl. 38, Fig. 13

Filaments solitary, straight, yellowish blue green in colour; constricted at the cross-walls, cells 7.8 µm broad and 2.2 µm long, end cell rounded, calyptra absent.

Coll. No. :-2114

***Oscillatoria brevis* (Kuetz) Gomont Pl.1, Fig.4**

Kumawat D.A. and Jawale A.K., 2006, P.99, Fig.7.

Trichomes straight; not constricted at cross walls; ends briefly attenuated, apical cell rounded, conical in shape, calyptra absent. Cell 3.9 µm broad and 2.1 µm long.

Coll. No.:-122

***Oscillatoria chalybea* (Mertens) Gomont var. *insulris* Gardner Pl.1, Fig.5**

Desikachary, T.V. 1959, P.219, Pl. 38, Fig. 18.

Trichome straight as long as broad, end bends and sickle shaped, not constricted at the cross-walls; end cell obtuse, not capitate, without calyptra. Cell 14.8 µm broad, 4.6 µm long,

Coll. No. :-395

***Oscillatoria cortiana* Meneghini ex Gomont Pl.1, Fig.6**

Desikachary T.V, 1959, P.233, Pl. 38, Fig.14.

Thallus dull blue-green; trichome slightly constricted at the cross-walls, 4.1 µm broad, gradually tapering at the ends, bent, not capitate, blue -green ; cells 3.7 µm long, septa not granulated, end cell without calyptra .

Coll. No. :-251

***Oscillatoria irrigua* Kützing ex Gomont Pl.1, Fig.7**

Desikachary T.V., 1959, P.224, Pl. 42, Figs.7, 9.

Thallus blackish blue-green, trichome light blue green, straight, not torulose, 5.6 µm dia., slightly attenuated, sub-capitate and straight. Cell quadrate, 12.3 µm dia 5.6 µm long. Apical cell with thick wall.

Coll. No. :-279

***Oscillatoria jasorvensis* Vouk Pl.1, Fig.8**

Desikachary T.V., 1959, P.221-222.

Thallus pale to dark blue-green, free floating. Trichome long, straight, without constriction 4.2 µm broad, bent at the ends, not attenuated, not capitate. Terminal cell rounded or dome shape, apex slightly tapering without calyptra. Cells 4.2 µm broad, 2.1 µm long, cyanophycean granules distributed throughout cell.

Coll. No. :-135

***Oscillatoria margaritifera* (Kutz.) Gomont Pl.1, Fig.9**

Desikachary T.V., 1959. P. 202, Pl. 42, Fig. 8.

Trichome fragile, curved, constricted at cross walls, apices slightly bent and attenuated, cells 24.4 µm broad and 6.2 µm long, cross wall granulated end cell capitate with slightly convex calyptra.

Coll. No. :-122

***Oscillatoria okeni* Agardh ex Gomont Pl.1, Fig.10**

Desikachary, T.V. 1959, P.231, Pl. 38, Fig. 17.

Thallus dull blue-green; trichomes straight, fragile distinctly constricted at the cross-walls. Trichome 4.5 µm broad, 1.5 µm long; end cells obtuse or sub conical not capitate, without calyptra.

Coll. No. :-2114.

***Oscillatoria perornata* Skuja Pl.1, Fig.11**

Desikachary, T.V. 1959, P.205, Pl. 41, Fig.

8,9,14.

Trichome, pale blue- green, erect or flexuous, apices briefly attenuated or curved; cells 6.7  $\mu\text{m}$  broad and 1.8  $\mu\text{m}$  long, distinctly constricted and granulated at the cross wall; apical cell hemispherical without calyptra.

Coll. No. :-315.

***Oscillatoria princeps* Vaucher ex Gomont Pl.1, Fig.12**

Desikachary, T.V. 1959, P. 210, Pl. 37, Fig. 14, Trichome mostly straight, not constricted at cross walls, slightly attenuated at the apices, occasionally with thin sheaths; cells 35.1  $\mu\text{m}$  broad and 6.4  $\mu\text{m}$  long; apical cell flatly rounded, slightly capitate, truncate, fragmented part containing two horns like structure.

Coll. No. :-165.

***Oscillatoria princeps* Vaucher ex Gomont var. *pseudolimosa* Ghose Pl.1, Fig.13**

Desikachary T.V., 1959, P 210, Pl. 39, Fig.15  
Thallus blue green ; trichome straight, rigid and fragile ,unconstricted at the cross-walls, cross-walls not granulated; cell 27.7  $\mu\text{m}$  broad, 8.3  $\mu\text{m}$  long ,apical cells lightly convex, calyptra absent.

Coll. No. :-286.

***Oscillatoria proboscidea* Gomont Pl.1, Fig.14**

Prasad B.N. and Srivastava M.N. 1992, P. 69, Pl. 8 Fig.9

Trichomes single dark blue-green, flexuous or more or less erect, distinctly attenuated and slightly curved at the ends, not constricted at the cross walls, 22.2  $\mu\text{m}$  in diameter; cells 1/4 to 1/6 times as long as broad, 8.3  $\mu\text{m}$  long; end cells almost truncate, capitate with thick convex outer membrane.

Coll. No. :- 286.

***Oscillatoria rubescens* De Candolle ex Gomont Pl.1, Fig.15**

Desikachary T.V., 1959, P. 235, Pl. 42, Fig. 12. Trichome are nearly straight, at the ends gradually attenuated, 8.2  $\mu\text{m}$  broad, not

constricted at the cross-walls, cells 1/2 - 1/3 as long as broad, 2.2  $\mu\text{m}$  long, often granulated at the septa, with gas-vacuoles; end cell capitate, with convex calyptra.

Coll. No. :-2114.

***Oscillatoria sancta* Kuetzing ex Gomont Pl.1, Fig.16**

Desikachary T.V., 1959, P. 203, Pl. 42, Fig. 10. Thallus dark blue green, mucilaginous sheath present, trichome more or less straight, constricted at cross walls, cells 14.2-15.0  $\mu\text{m}$  broad and 2.2-4.1  $\mu\text{m}$  long ,end cell hemispherical and attenuated ,slightly capitate with a thickened membrane.

Coll. Nos. :-154, 267.

***Oscillatoria subbrevis* Schmidle Pl.1, Fig.17**

Desikachary T.V.,1959, P. 207, Pl. 37, Fig. 2 and Pl. 40, Fig. 1

Trichome single, 3.0  $\mu\text{m}$  broad nearly straight, not attenuated at the apices; cells 1.5  $\mu\text{m}$  long, not granulated at the cross walls; end cell rounded, normal calyptra absent.

Coll. No. :- 399

***Oscillatoria tenuis* Agardh ex Gomont Pl.1, Fig.18**

Desikachary T.V., 1959, P. 222, Pl. 42, Fig. 15. Thallus blue green or olive green, trichome straight, constriction not present at the cross-walls, cell 9.0  $\mu\text{m}$  broad and 4.1  $\mu\text{m}$  long, granule present uniformly.

Coll. No. :-395.

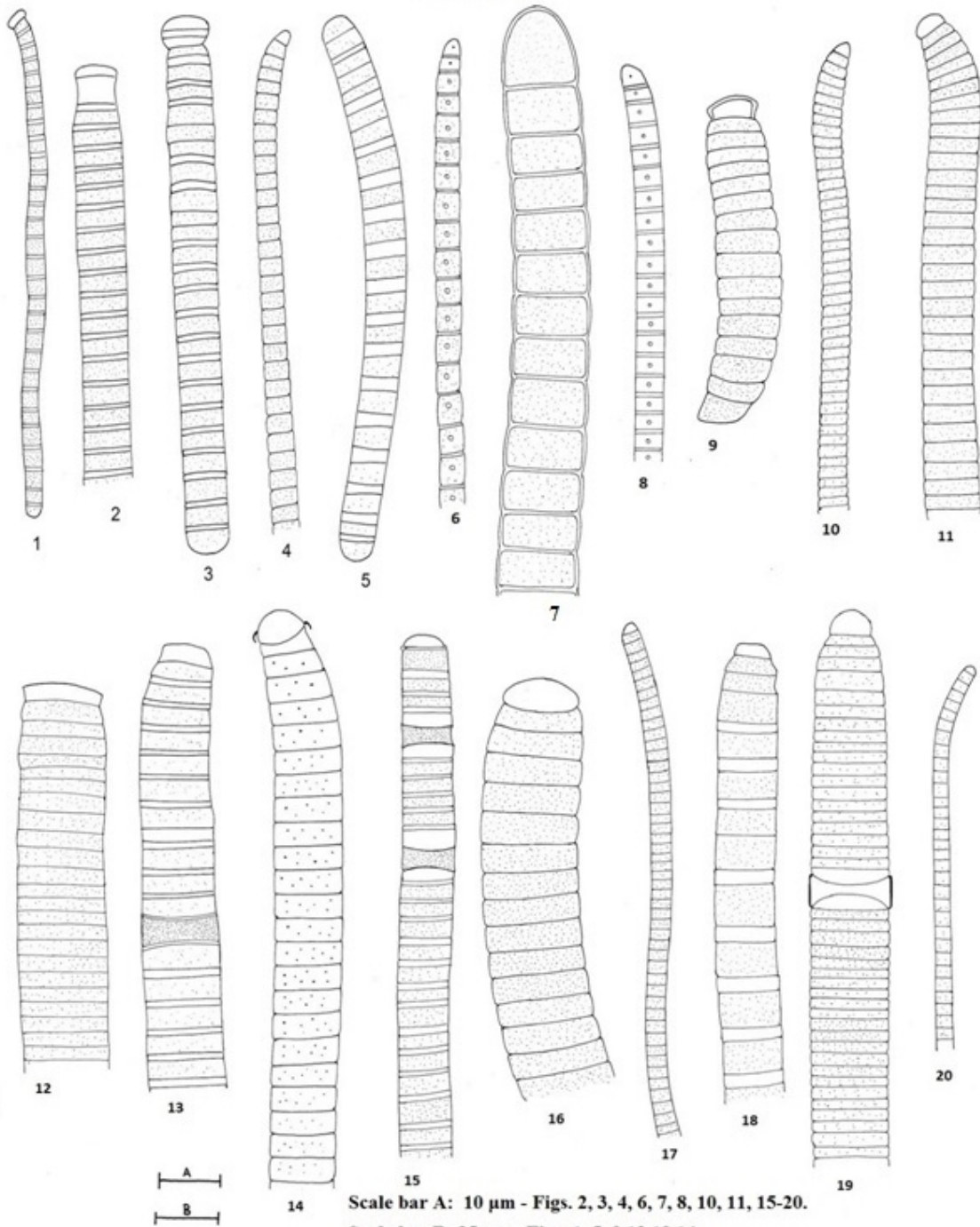
***Oscillatoria vizagapatensis* Rao Pl.1, Fig.19**

Prasad B.N. and Srivastava M.N. 1992, P. 16 Pl. 8, Fig.12

Trichome solitary pale blue-green uniformly broad, straight, not constricted at the cross walls. 11.2-18.5  $\mu\text{m}$  in diameter; cells much shorter than broad, 1.8-3.7  $\mu\text{m}$  long; end cells rounded, capitate forming a cap with thick outer membrane, cell wall thick, smooth.

Coll. Nos. :-262, 2114.

**PLATE-1**





***Oscillatoria willei* Gardner em Drouet  
Pl.1, Fig.20**

Desikachary T.V., 1959. P. 217, Pl. 38, figs. 4, 5. Trichome bent at the ends, 2.2 µm broad, not constricted at cross walls, ends not attenuated cell 1.8 µm long, cell rounded without a thickened membrane.

Coll. No. :-2125.

## CONCLUSION

There are 20 taxa of *Oscillatoria* representing 18 species and 02 varieties of Genus *Oscillatoria* and all these taxa were recorded for the first time from the study area.

We are thankful to the Principal and Head, Department of Botany and Research centre Arts, Science and P.O.Nahata Commerce College, Bhusawal, District Jalgaon for providing laboratory facilities.

## REFERENCES

Barhate V P and Tarar J L 1983 Algae of Maharashtra: I Additions to Cyanophyceae of Khandesh. *Phykos*, **22 (1&2)**67-72.

Beherepatil K P and Deore L T 2014 Non-Heterocyst genus *Oscillatoria* Vaucher from Nasik and its environs (M.S.) India. *Int. Jour. Bioassays* **3 (04)** 2005-2012

Bharat Bhushan and Kumar D 2018 Diversity of *Oscillatoria* from aquatic habitat of Billawar district Kathua Jammu and Kashmir, India. *Jour. of Emerging Techn. and Innova. Rese.* **5 (1)** 488-493.

Bhoge O N and Ragothaman G 1986 Studies on Cyanophyceae from Jalgaon region, Maharashtra. *Phykos*, **25 (1&2)** 129-131.

Das M and Keshri J P 2017 Algal diversity in foot hills of Eastern Himalayas-II (Cyanoprokaryota: Oscillatoriales) *Phykos* **47 (1)** 31-51.

Das S K and Adhikary S P 2014. *Freshwater algae of Eastern India*. Astral International Pvt. Ltd., New Delhi, pp. 1-453

Deka S J and Sarma G C 2011 Preliminary checklist of Oscillatoriaceae (Cyanophyta) Goalpara district Assam, India *Journal of Applied Biology and Pharmaceutical Technology* **2 (1)** 430-433.

Deore Leela T. and Patil, Neelima 1999. Addition to blue green algae of hot spring from Unapdeo (Maharashtra) *BRI'S JAST*, **II (II)** 53-55.

Desikachary T V 1959 *Cyanophyta*. I. C. A. R. New Delhi, pp: 1-686.

Devi T I and Tiwari O N 2011 exploration of oscillatoriacean cyanobacteria of Manipur, India falling under Indo-Burma biodiversity hotspots *J.Indian Bot. Soc.* **90 (1&2)** 33-44.

Halder, N. 2017 Taxonomy and biodiversity of the genus *Oscillatoria* Vauch. ex Gom. (Cyanoprokaryota: Oscillatoriales) with ecological notes from Hooghly in West Bengal, India *Brazilian Journal of Biological Sciences* **4 (7)**:89-101.

Jain D S 2015 A systematic account of *Oscillatoria* species from Sonvad Dam and Devbhane Dam of Dhule, Maharashtra. *J.Expt. Bio. and Agricultural Sci.* **3 (2)**:131-137

Jaiswal A G 2017 Genus *Arthrospira*, *Spirulina*, *Oscillatoria*, *Crinalium* and *Phormidium* of Nostocales from Sakri and Navapur, Maharashtra (India) *Jour.Engineering Techno. Sci. and Research* **4 (7)** 129-141

Jaiswal A G and Gavitt U G 2019. Taxonomical investigation of Cyanophyta from Nandurbar District MS, India, *Int. J. of. Life Sciences* **Special Issue, A13** 126-134

Kamat N D 1962 The cyanophyceae and

chlorophyceae of Panhala; *J. Univ. Bombay*, **30 (3&5)** 22-31.

Kamat N D 1963 The Oscillatoriaceae of Ahmedabad, India. *Ibid* **31(3&5)** 20-27.

Kamat N D 1963. The algae of Kolhapur, India; *Hydrobiologia*, **22 (3&4)** 209-305

Kamat N D 1972 Oscillatoriaceae of Mysore state. *Phykos*, **11 (1&2)** 59-63.

Kesarwani S., Tandon R and Tiwari G L 2015. The genus *Oscillatoria* Vaucher (Cyanoprokaryota) from India. *Phykos* **45 (1)** 18-29.

Kumar S and Suseela M R 2004 *Oscillatoria* species diversity in river Gomti, Lucknow. *Geobios*, **31 (2&3)** 167-168.

Kumawat D A and Jawale A K 2006 The genus *Oscillatoria* Vaucher (Cyanobacteria) from fish ponds of Jalgaon district, Maharashtra (India). *J. Indian Bot. Soc.*, **85 (1-4)** 97-102.

Mahajan A D 1989 Blue green algae from sugarcane field soils of Jalgaon district Maharashtra. *Int. J. Mendel.*, **6 (3&4)** 493-496.

Mahajan A D and Mahajan Neelima 1988 Additions to some Oscillatoriaceae Kirchner from banana fields of Jalgaon district (M.S.), India. *Vegetos*, **1 (I)** 54-55.

Mahajan A D 1986. Some *Oscillatoria* Vaucher and *Phormidium* Kuetz. from banana fields of Jalgaon District, Maharashtra *Indian botanical reporter* **5 (1)** 24-26

Misra P K, Mehrotra R K, Shukla M and Jai Prakash 2006. Genus-*Oscillatoria* Vaucher from District Gorakhpur, Uttar Pradesh. *Vegetos* **19 (1&2)** 85-88.

Patil Neelima 2013 Cyanophycean flora of Toranmal district Nandurbar, Maharashtra, *Indian Hydrobiology* **16 (1)** 32-41.

Prasad B N and Shrivastava M N 1992 *Fresh water algal flora of Andaman and Nicobar Islands I*. Bishen Singh Mahendra Pal Singh Publ., Dehradun. pp. 1-369.

Prescott G W 1962 *Algae on the Western Great Lakes Area*. Wm. C. Brown Company Publishers. Dubuque, Iowa. pp. 1-977.

Santra S C 1993 *Biology of rice fields blue green algae*. Daya publishing House: 1-175.

Sarmah P and Rout J 2017 Colonisation of *Oscillatoria* on submerged polythenes in domestic sewage water of Silchar town, Assam (India). *J. Algal Biomass Utln.* **8 (4)**: 135-144

Shejul Sampada K and Sawant R J 2019 Some Filamentous Blue Green Algae from Sukhana Dam, Aurangabad, Maharashtra., *J. Biol. Chem. Chron.* **5(1)**: 43-46

Sikdar J and Keshri J P 2014 The Genus *Oscillatoria* Vaucher (Oscillatoriales: Cyanoprokaryota) in West Bengal, India. *Int. Jou. Cur. Res. Rev.* **6 (21)**: 47-59.

Talekar S M, Jadhav M J and Jogdand S K 2010 Biodiversity studies on Oscillatoriaceae from Jalgaon Nala of Ashti Taluka in Beed district, India. *Jour. Expt. Sci.* **1(2)** 03-04.

Thomas J and Gonzalves E A 1965 Thermal algae of Western India - VI. Algae of the hot springs of Unai, Lasundra and Unapdeo. *Hydrobiologia* **26 (1&2)** 55-65.