

Studies on the diversity of some Myxophycean members (*Oscillatoria vaucher*) from Bhusawal city

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Abstract

Algae are natural inhabitants of water and serves as indicators of water quality in various ways. Sewage water contains 1-6 times more of organic matter which enhance the growth of algae. 48 members of Myxophytes collected from sewage water, moist soil near to sewage pools/puddles / nallies of Bhusawal city. Present communication includes 17 taxa of genera *Oscillatoria*.

Keywords: Algae, sewage, bhusawal, *Oscillatoria* and Myxophyceae

Introduction

Bhusawal city is located on a small tributary of river Tapi at latitude 21°00'20.56" north and longitudes 76°01'31.31" east. Bhusawal is a city as well as a municipal council in the Jalgaon district in the Indian state of Maharashtra and is the second biggest town in the district. Situated on river Tapi and National Highway 6 passes through it. The population of Bhusawal in 2011 is 1,87,421 While in end of 2018 would be 2,15,948. There is no proper drainage facility in certain specifically in new area. The temperature ranges 18 -46° sometimes it lowest up to 9.5°, humidity 52-82 %, while rain fall is ranges 10mm-310mm.

Cyanophytes diverse group of prokaryotic phototrophs that are to be found in all possible aquatic habitats of the world. From available literature it is seems that vast amount of work has been carried out on Cyanobacteria from Maharashtra. Kamat (1963) [11], Thomas and Gonzalves (1965) [22], Vasishta (1968) [24], Ashtekar and Kamat (1980) [2], Sardespande and Goyal (1981), Barhate and Tarar (1983) [3], Bhoge and Ragothaman (1986) [4] Mahajan and Mahajan (1988) [17], Kumawat and Jawale (2001,2006) [14, 15], Kumawat and Patil (2010) [16], Kumawat and Borse (2011) [13], Patil (2013) [19], Kamble and Karande (2014) [12], Jain (2015) [8], Jaiswal (2017) [9], Valvi and Gautam (2017) [23], Jaiswal and Gavit (2019) [10], Patil *et. al.* (2021) [18].

Materials and Methods

The collections were made early in the morning between 7.00 to 9.00 am during July 2017- June 2019 from Bhusawal city and neighbourhood community (M.S.). 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 is based on the monograph Desikachary (1959) [5] and relevant research paper publications. The material is deposited in the Department of Botany, Smt. P.K. Kotecha Mahila Mahavidyalaya, Bhusawal, district Jalgaon, (M.S.).

Observations and Results

Order – Nostocales

Family– Oscillatoriaceae

Genus *Oscillatoria* Vaucher, 1803

Oscillatoria amphigranulata van Goor

Fig. 1

T.V. Desikachary, *Cyanophyta*, p.226, Pl. 37, Fig. 4, 1959 [5].

Trichome straight, distinctly constricted at cross-walls, 1.2-4.4 µm broad, end cells rounded not capitate; cells 2.8-6.2 µm long, as long as broad or up to twice as long, two gas vacuoles at the septa, pale blue green. (Coll. Nos. JSD320, JSD 327).

Habitat: On moist soil, attached to submersed vegetation in pool.

Oscillatoria anandii Jawale and Dhande **Fig.17**

J.S. Dhande, *Ph.D. Thesis*, pp.227, Pl. 48, Figs. 11, 2007 [6].

Trichome straight, slightly tapering at both ends, cross-wall not constricted, 3.4-5.6 µm broad; cells rectangular, 1.6-4.6 µm long, slightly shorter than the broader, two granules on each side of septa, end cells rounded (Coll. No. JSD 320).

Habitat: On moist soil.

Oscillatoria anne van Goor f. *minor* Kam. **Fig. 2**

P.V. Ashtekar and N.D. Kamat, *Phykos* 19 (1): 89, 1980 [2].

Trichome straight, dirty blue green, 2.1-2.5 µm broad, 1.6-4.4 µm long, constricted at cross-walls; cells short, not granulated, end cells broadly rounded without calyptra. (Coll. No. JSD 298).

Habitat: In roadside ditches.

Oscillatoria bigranulata Jawale and Dhande **Fig. 3**

J.S. Dhande, *Ph.D. Thesis*, pp.228, Pl. 47, Figs. 11, 2007 [6].

Thallus blue green, trichome straight, constricted at cross walls, 2.1-2.5 µm broad; cells 1.6-4.4 µm long, two granules on one side of septa only, end cells obtuse rounded. (Coll. No. JSD 120).

Habitat: In gutter.

Oscillatoria brevis (Kuetz.) Gomont **Fig. 4**

K.P. Singh and U.K. Chaturvedi, *Phykos*, 9 (1): 37, 1970 [21].

Thallus expanded, trichome blue green, straight, not constricted at cross-walls, ends briefly attenuated, more or less bent, not capitate, 2.8-4.4 µm broad, cells longer than broad, not granulated at septa, end cells rounded, calyptra absent. (Coll. No. JSD 205).

Habitat: In gutter, on soil.

Oscillatoria cortiana* Menegh.ex Gomont var. *minor* Kam.*Fig.5**

P.V. Ashtekar and N.D. Kamat, *J. Bombay Nat. Hist. Soc.*, 76 (1): 215, 1977^[1].

Trichome blue green, straight, constricted at cross-walls, tapering at apex 3.4-4.4 μm . broad; cells 3.1-6.6 μm long, septa not granulated; end cells conical, without calyptra. (Coll. No. JSD 198).

Habitat: on moist bricks

Oscillatoria formosa* Bory ex Gom.*Fig.6**

T.V. Desikachary, *Cyanophyta*, p. 232, Pl.40, Fig. 15, 1959^[5].

Thallus blue green, trichome straight, constricted at crosswalls, 3.4-4.1 μm broad; cells nearly quadrate, 3.1-3.4 μm long, gas vacuoles are present, end cells nearly obtuse, calyptra absent, not capitate. (Coll. No. JSD 198).

Habitat: on moist bricks.

Oscillatoria limosa* Ag.ex Gomont*Fig.7**

T.V. Desikachary, *Cyanophyta*, pp.206-207, Pl.42, Fig.11, 1959^[5].

Thallus blue green, trichome free, straight, not constricted at cross-walls, cross wall frequently finely granulated, 11.5 μm broad; cells 1/3 – 1/4 as long as broad, 3.1-4.6 μm long, end cells flatly rounded with slightly thickened membrane. (Coll. No. JSD 138).

Habitat: Stagnant pool

Oscillatoria octagranulata* Jawale and Dhande*Fig.8**

J.S. Dhande, *Ph.D. Thesis*, pp.231, Pl. 47, Figs. 16, 2007^[6].

Trichome straight, blue green, 3.8-4.7 μm broad, slightly, constricted at cross-walls, cells 2.8-5.9 μm long, four-granules on eight sides of septa, end cell slightly curved flat or rounded. (Coll. No. JSD 321).

Habitat: In pond, moist soil

Oscillatoria okeni* Ag.ex Gomont*Fig.9**

T.V. Desikachary, *Cyanophyta*, p.231, Pl. 38, Fig. 17, 1959^[5].

Thallus blue green, trichome straight distinctly constricted at cross-walls, 2.2-4.4 μm broad; cells as long as broad, end cell slightly bent, subconical or obtuse without calyptra. (Coll. No. JSD 259).

Habitat: In pool, on moist soil.

Oscillatoria ornata* Kuetz.ex Gomont*Fig.10**

T.V. Desikachary, *Cyanophyta*, p.206, Pl. 37, Fig. 12, Pl. 40, Fig. 3, 1959^[5].

Thallus blue green, trichome slightly bent, constricted at cross-walls, 9.2-10.8 μm broad; cells 2.7-7.0 μm long, cross walls granulated, end cells tapering and rounded, apices slightly attenuated, without thickened membrane. (Coll. No. JSD 295).

Habitat: Along with Spirogyra, in road side canal

Oscillatoria princeps* Vaucher ex Gomont*Fig.11**

T.V. Desikachary, *Cyanophyta*, p.210, Pl. 37, Figs. 1, 10,11,13,14, 1959^[5].

Trichome blue green, straight or slightly bent at the apices, shortly attenuated, not constricted at cross-walls, 24.6-33.1 μm broad; cells 1/6-1/4 as long as broad, 3.8-6.9 μm long, end cells flatly rounded, slightly capitate. (Coll. No. JSD 138).

Habitat: On moist soil.

Oscillatoria profunda* Kirchner f. *Conica* Kam.*Fig.12**

N.D. Kamat, *Hydrobiologia*, p.287, Pl.16, Fig.92, 1963^[11].

Thallus light blue green, trichome straight, long, not constricted at cross-walls, 2.8-3.4 μm broad; cells quadratic, 1.6-3.7 μm long, end cells conical, bent, calyptra absent. (Coll. No. JSD 198).

Habitat: on moist soil.

Oscillatoria tenuis* Ag.ex Gomont*Fig.13**

T.V. Desikachary, *Cyanophyta*, p.222, Pl. 42, Fig. 15, 1959^[5].

Thallus olive-green, trichome straight or slightly bent, slightly constricted at cross-walls, 3.1-8.1 μm broad; cells up to 1/2 as long as broad, 2.5-4.4 μm long, some times bent at ends, septa mostly granulated, end cells more or less hemispherical. (Coll. Nos. JSD 180, JSD 234, JSD 331).

Habitat: In pool, on moist soil, along with other algae.

Oscillatoria tenuis* Ag.ex Gomont var. *tergestina* Rabenh.*Fig.14**

L. Hajdu, *Studia Bot. Hung.*, 11: 19, Fig. 30, 1976^[7].

Thallus blue-green, trichome straight or slightly bent, slightly constricted at cross-walls, 4.1-5.3 μm broad, bent at ends, not attenuated; cells 1.9-4.7 μm long, granulated at septa, end cells rounded or more or less hemispherical, not capitate. (Coll. Nos. JSD 286, JSD 331).

Habitat: In pool, on muddy soil.

Oscillatoria subbrevis* Schmidle f. *Minor* Desikachary*Fig.15**

T.V. Desikachary, *Cyanophyta*, p.209, 1959^[5].

Trichome single, straight, not constricted at the cross-walls, 3.7-4.1 μm broad; cells 2.3-3.7 μm long, end cells rounded, calyptra absent. (Coll. No. JSD 138).

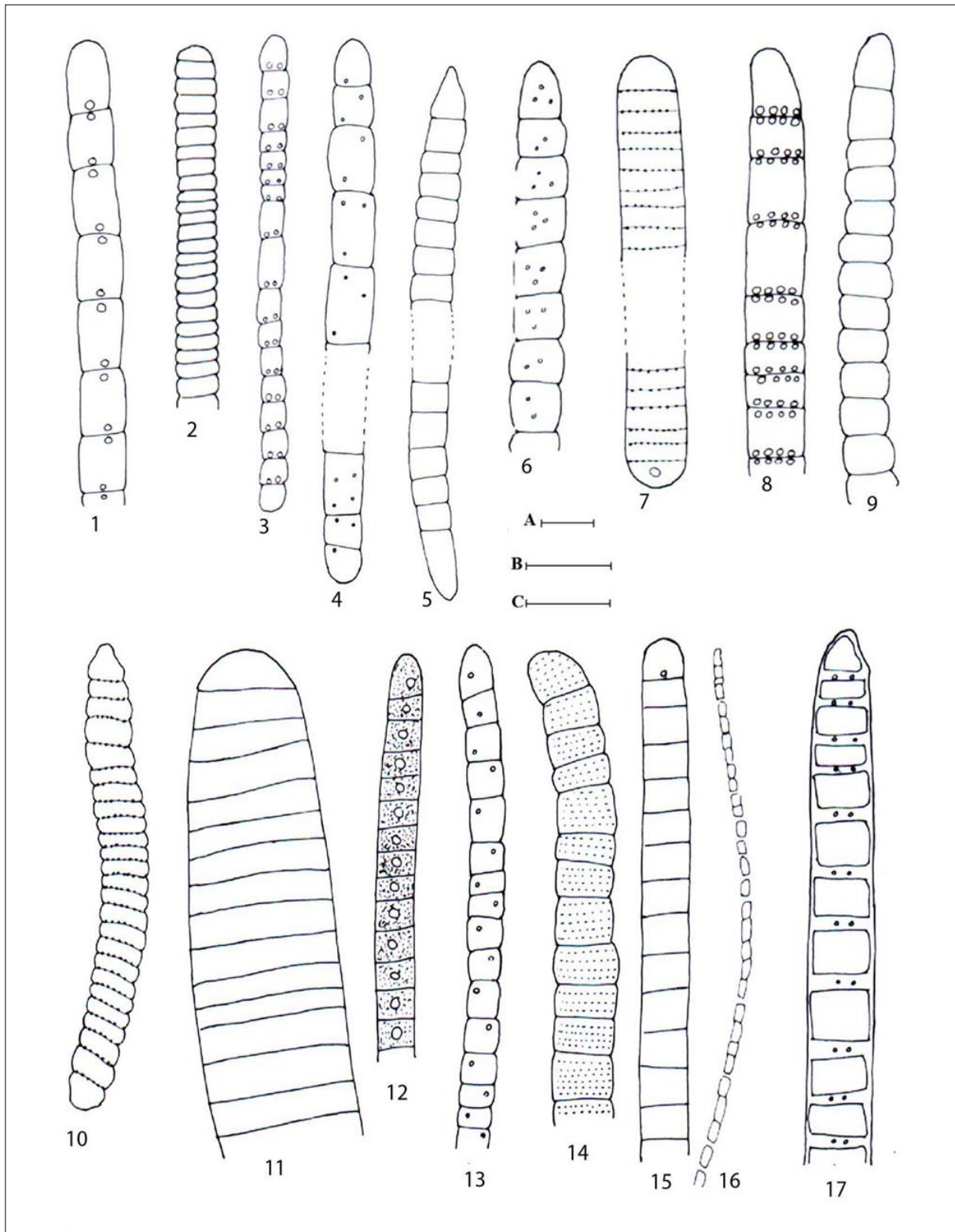
Habitat: On moist soil.

Oscillatoria subtilissima* Kuetz.*Fig.16**

T.V. Desikachary, *Cyanophyta*, p.215, 1959^[5].

Trichome single, straight or curved free floating, yellowish green, slightly constricted, 2.3 μm broad; cells 1.5-4.6 μm long, end cells rounded. (Coll. No. JSD 286).

Habitat: On moist soil.



Fig

Conclusion

In the present study a total of 17 taxa of genera *Oscillatoria* belonging to class Cyanophyceae have been described. They were recorded from mainly from domestic polluted water in all seasons (summer, winter and rainy). All species are new records from this region.

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25. *Oscillatoria amphigranulata* van Goor
26. *Oscillatoria annae* van Goor f. *minor* Kam.
27. *Oscillatoria bigranulata* Jawale and Dhande
28. *Oscillatoria brevis* (Kuetz.) Gomont
29. *Oscillatoria cortiana* Menegh.ex Gomont var. *minor* Kam.
30. *Oscillatoria formosa* Bory ex Gomont
31. *Oscillatoria limosa* Ag.ex Gomont
32. *Oscillatoria octagranulata* Jawale and Dhande
33. *Oscillatoria okenii* Ag. ex Gomont
34. *Oscillatoria ornata* Kuetz.ex Gomont
35. *Oscillatoria princeps* Vaucher ex Gomont
36. *Oscillatoria profunda* Kirchner f. *conica* Kam.
37. *Oscillatoria tenuis* Ag.ex Gomont
38. *Oscillatoria tenuis* Ag. ex Gomont var. *tergestina* Rabenh.
39. *Oscillatoria subbrevis* Schmidle f. *minor* Desikachary
40. *Oscillatoria subtilissima* Kuetz.
41. *Oscillatoria anandii* Jawale and Dhande
42. Scale bar A: 25 μ m
43. Scale bar B : 25 μ m
44. Scale bar C : 10 μ m
45. Scale A: Fig. 11
46. Scale B: Fig. 10,12 to 17
47. Scale C: Fig. 1 to 9