



## Research Article

# Diversity of desmids (Chlorophyceae) surviving on moist soils during monsoon season from Dhule district

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## ARTICLE INFO

## ABSTRACT

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Members of class Chlorophyceae commonly called green algae are observed to be surviving on moist soils during monsoon season. Desmids are unicellular green algae of order Conjugales. Present communication includes taxonomical description of 28 Desmid taxa belonging to 5 different genera growing on moist soils surfaces collected from Dhule District.

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## 1. Introduction

Desmids are unicellular Green algae made up of two semi cells with slight or deep constriction, cells are showing ornamentation. Monsoon season with regular showers keeps the soil moist and algal patches are formed on surface. Desmids diversity like *Closterium*, *Euastrum*, *Penium*, *Cosmarium* and *Staurastrum* are also observed to grow on such moist soil along with other algae. In Maharashtra, Desmids were studied by Agarkar and Kamat (1979), Kamat (1963, 1968, 1973) and Tararet *et al* (1998). To study soil diversity of Desmids, collections were made during the year 2017 -2019 from Dhule region. Generally, rain showers become regular during monsoon season particularly in months of August and September. Green patches of surface growing algae from moist soils were carefully collected. Samples of algae growing on moist soil were preserved in 4 % formalin. Some samples were readily observed under microscope as fresh as collected from field. Camera lucida drawings were made for taxonomical study and taxa were identified by relevant monograph and literature like West and West (1987, 1904, 1905, 1908, 1912) Prasad and Misra (1992). *Closterium lunula* (Muell) Nitzsch Cells large, more or less straight, outer margin more convex than inner and with arc, cells gradually and gently attenuated to slightly truncate apices, cell wall smooth. Cells are 54.4µ broad, 238µ long, at apex 10.2µ broad.

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**Systematic Enumeration:****2. *Closterium pritchardianum* Arch.**

Cells of medium size, faintly curved, longer than broad, outer margin showing an arc, inner margin slightly concave, cells gradually attenuated to narrow, sometimes with faintly recurved apices. Cell wall faintly striated, chloroplast with 5-7 ridges with pyrenoid arranged in a row. Cells 34µ-37.4µ broad, 285.6µ long, at apex 11.9µ broad.

**3. *Closterium sigmoideum* Lagerh et Nordst**

Cells of medium size, about 7 times longer than broad, faintly sigmoid, middle portion more or less straight and gradually attenuated towards moderately recurved and obtusely rounded apices, cell wall smooth; chloroplast with ridges with irregularly arranged pyrenoid. Cells 15µ broad, 91.5µ long, 4.5µ broad at apex.

**4. *Euastrum bombayense* (Gonzalv.Gangla) Brandham Var. *gokakense* Bongale et Kaulapur**

Semicells broadly pyramidal in surface view; highly asymmetrical and variable in outline, sinus closed, flat inside and broadly open outside, semicells obliquely bent towards one side. Cells 40.5µ broad, 67.5µ long, isthmus 11.2-15µ.

**5. *Euastrum orientale* Nob. Turner**

Cells are truncate to lanceolate, at base tumid, protuberance acute or rotund, cell surface punctate, cells 34.5µ broad, 64.5µ long.

**6. *Euastrum spinulosum* Delp.**

Cells rather small, slightly longer than broad, deeply constricted, sinus narrow and linear; semicells 5 lobed, lateral lobes rounded furnished with spines, polar lobe broadly truncate with shallow median notch, with spines, cell surface granulated. Cells 42µ broad, 49.5µ long, isthmus 9µ broad.

**7. *Penium cucurbitinum* Biss var. *subpolymorphum* Nordst.**

Cells of medium size, about twice as long as broad, moderately constricted, isthmus broad, semicells sub-elliptical with slightly narrowed and rounded apex; cell wall minutely punctate, cells 52.5µ broad, 103.5µ long, isthmus 46.5µ broad.

**8. *Cosmarium angulosum* Breb. Var. *concinnum* (Rab) West**

Cells are very small, little longer than broad, deeply constricted, sinus narrow and linear; semicells hexagonal with sharp angles and parallel sides, apex narrow; cell wall smooth. Cells 12.5µ broad, 19.5µ long, isthmus 3µ broad.

**9. *Cosmarium awadhense* Prasad et Mehrotra**

Cells small, slightly longer than broad, sinus slightly open outwards semicells sub-semicircular, sides 4-5 crenate, apex truncate with more or less straight margin, cell wall smooth, each semicell with one massive chloroplast, containing one pyrenoid. Cells 22.5µ broad, 28.5µ long, isthmus 9µ broad.

**10. *Cosmarium dispersum* Johnson**

Semicells truncate distinctly, with undulate margins, sinus straight. Cells 45µ broad, 54µ long, isthmus 15µ broad.

**11. *Cosmarium granatum* Breb.**

Cells small, slightly longer than broad, sub-rhomboid to elliptic, deeply constricted, sinus linear with a dilated extremity, semicells truncate, pyramidal, basal angles rounded, sides straight or slightly convex, apex narrowly truncate, cell wall finely punctate. Cells 13.5µ broad, 21µ long, isthmus 3.75-4.5µ broad.

**12. *Cosmarium hammeri* Reinsch**

Semicells pyramidate, deeply constricted, sinus straight dilated slightly, semicells at the base broad, tapers slightly towards apex with broad truncate ends, cell wall smooth, cells 24 $\mu$  broad, 36 $\mu$  long, at apex 13.5 $\mu$  broad, isthmus 6 $\mu$  broad.

13. *Cosmarium medioglabrum* Turner

Cells very small, slightly longer than broad, constricted with moderate broad sinus opening outwards; semicells sub-hexagonal, angles sub-rotundate, sides faintly converging, slightly narrowed, truncate at apex. Margins with undulations; cell wall finely punctate, each semicells with an axile chloroplast; containing one pyrenoid. Cells 15 $\mu$  broad, 19.5-21 $\mu$  long, isthmus 7.5 $\mu$  broad

14. *Cosmarium microspinctatum* Nordst.

The cells small, membrane is smooth and yellow-brown in colour. Semicells at the base rounded and truncate at apex, sinus straight, broadly opens at outside, cells 15 $\mu$  broad, 28.5 $\mu$  long isthmus 7.5 $\mu$  broad. Present desmid slightly longer with broader isthmus.

15. *Cosmarium pseudogranatum* Nordst. Var. *rotundatum* (Krieg.) Messik

Cells small, semicells broadly truncate exhibiting rather prominently convex sides and truncate-rounded apex, cell wall minutely punctate. Cells 13.5 $\mu$  broad, 19.5 $\mu$  long, isthmus 4.5 $\mu$  broad.

16. *Cosmarium proteiforme* Turner

Semicells elliptic, vertical view oval, surface with minute granules. Cells 10.5 $\mu$  broad, 21 $\mu$  long, isthmus 3.5 $\mu$  broad in vertical view.

17. *Cosmarium raneegungense* Turner

Semicells triangular with rotundated angles, sinus linear; punctate at margins only, cells 15 $\mu$ -16.5 $\mu$  broad, 21 $\mu$ -25.5 $\mu$  long, isthmus 7.5 $\mu$  broad.

18. *Cosmarium rectosporum* Turner

Semicells truncato-pyramidate-rotundated at base, with linear sinus broadly opening at outside, cells 25.5 $\mu$  broad, 33.7-37.5 $\mu$  long, isthmus 9 $\mu$  broad.

19. *Cosmarium reniforme* (Ralfs) Arch

Cells of medium size, slightly longer than broad, constriction deep, sinus narrow and linear with widely dilated extremity, semicells reniform, cell wall granulate, granules fairly regular, horizontal. Cells 40.5-45 $\mu$  broad, 51-54 $\mu$  long, isthmus 15 $\mu$  broad.

20. *Cosmarium regnellii* Wille

Cells very small a little longer than broad, deeply constricted, sinus narrow with slightly dilated extremity, semicells sub-hexagonal, basal angles more or less sub-rectangular, sides parallel, upper angles broad and oblique, apex truncate and straight, cell wall smooth, each semicells with an axile chloroplast and one pyrenoid. Cells 12 $\mu$  broad, 15.7 $\mu$  long, isthmus 3 $\mu$  broad.

21. *Cosmarium sexangulare* Lund. Var. *minus* Roy et Biss

Cells very small, a little longer than broad, deeply constricted, sinus narrow and linear, semicells transversely elliptic-hexagonal, angles rounded to subacute, apex straight, cell wall smooth, cells 9-12 $\mu$  broad, 15 $\mu$  long, isthmus 3.75-4.5 $\mu$  broad.

22. *Cosmarium speciosum* Lund

Cells of medium size, moderately constricted, sinus narrowly linear, semicells sub-pyramidate with rounded angles, side convex with crenate margin, truncate crenated apex. Cells 37.5-39 $\mu$  broad, 45-51 $\mu$  broad, isthmus 12 $\mu$  broad.

23. *Cosmarium subalatum* West

Cells small, slightly longer than broad, deeply constricted, sinus narrowly linear, semicells widely truncate to pyramidal, margins crenate, central tumour rounded with 7 granules arranged in circular fashion. Cells 18-19.5µ broad, 24µ long, isthmus 4.5µ broad.

24. *Cosmarium supergranatum* Turner

Cells longer than broad, pyramidal semicells rounded at base, truncate at apex, sinus linear fairly broad, with central rounded tumour, cells 25.5µ broad, 37.5µ long, isthmus 12µ broad.

25. *Staurostrum bieneanum* Rabenh. Var. *ellipticum* Wille

Cells small, slightly broader than long, very deeply constricted, sinus widely open with an acuminate apex, semicells narrowly elliptic with rounded angles. Cells 24-26.2µ broad, 22.5-24µ long, isthmus 4.5µ broad.

26. *Staurostrum pachyrhynchum* Nordst.

Cells rather small, almost as long as broad, deeply constricted, sinus open and acute angled, semicells sub-elliptic, dorsal margin strongly convex, angles thickened, obtusely rounded, top view triangular, cell wall smooth. Cells 24-30µ broad, 24-27µ long, isthmus 7.5µ broad.

27. *Staurostrum punctulatum* Breb.

Cells are triangular with more or less rounded-little acute apices, punctate, cells 19.5-20.25µ broad, 25.5µ long.

28. *Staurostrum truncatum* Turner

Cells fairly as long as broad, semicells elliptic triangular with rounded, apices, ornamented, margins verrucose to spinate, cells 20.2µ broad, 24-25.5µ long, isthmus 10.5-11.2µ broad.

**Result and Discussion:**

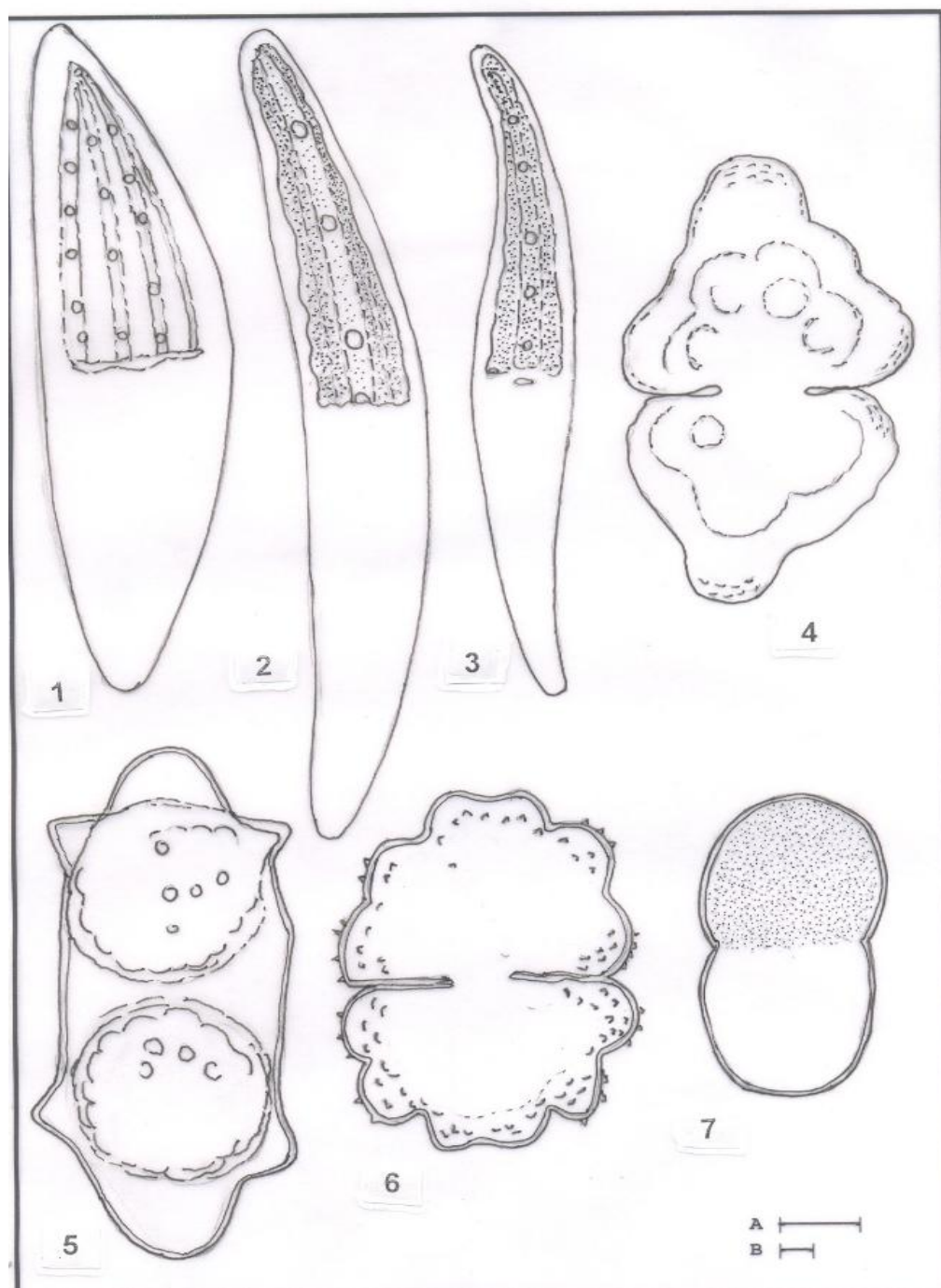
Desmid diversity on moist soils were studied first time in present report because desmids were mostly studied from water bodies. Regular monsoon showers promote algal growths on soil which forms green algal patches on surface of moist soils. At some places grass roots keep soil wet by holding moisture and avoid desiccation of soil this also favours algal growths on soils. In present study, 5 Desmid genera along with their species diversity were reported in which, 3 species of *Closterium*, 3 species of *Euastrum*, 1 *Penium*, 17 species of *Cosmarium* and 4 species of *Staurostrum* thus total 28 Desmid taxa from Dhule District were taxonomically studied from moist soil surfaces.

**Acknowledgements :**

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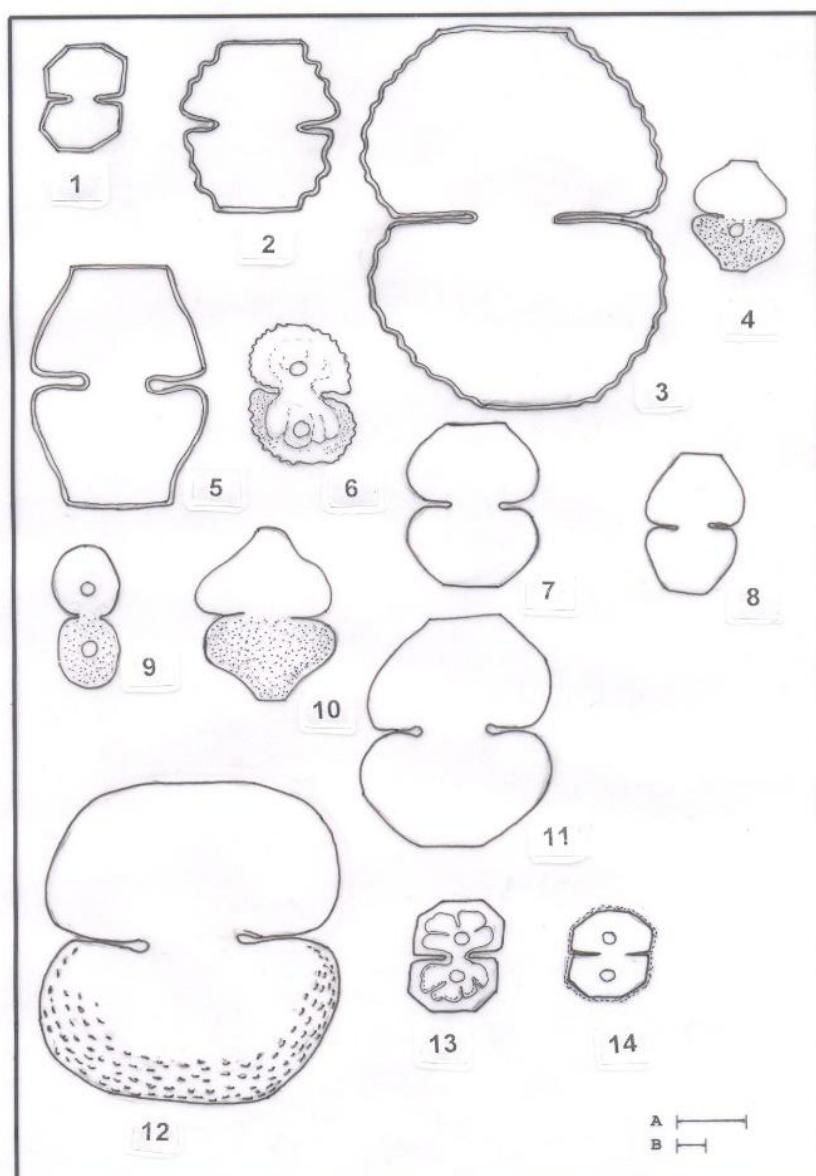
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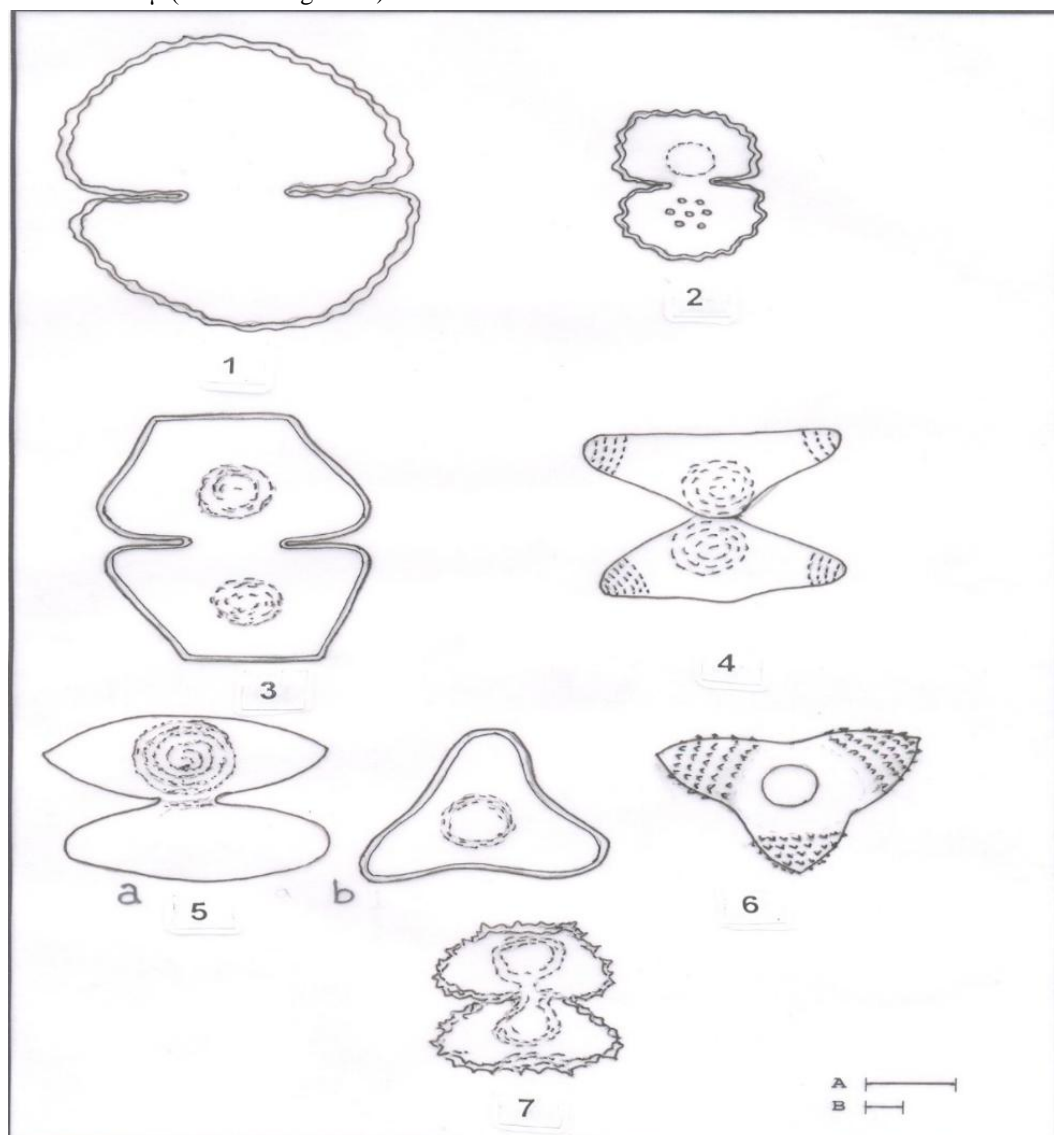
Scale Bar A, B-10  $\mu$  (Scale A- Fig. 3,4,5,6 Scale B- Fig 1,2,7)



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