Algae in symbiotic association with fresh water *Spongellia* spp.

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ABSTRACT

While studying the symbiotic association of algae with fresh water *Spongellia* spp. author were identified 23 algal texa from the body of *Spongellia* which includes: *Aphanocapsa banaresensis* Bharadwaja, *Glenkiniopsis minutissima* Iyengar Balakrishnan, *Treubaira appendiculata* (Bernard) Shaji & Patel, *Pediastrum simplex* Meyen. var. *duodenarium* (Bailey) Rabenhorst, *Chodatella citriformis Snow, Chlorella parasitica* (Barndt) Beijerinck,*Oocystis solitaria* Wittock form *major* Wille, *Nephrocytium obesum* W. S. West, *Cosmarium boergesenii* Gronblad, *Cosmarium granatum* Breb. var. *delpontii* Gutw., *Cosmarium protuberans* Lund. var *minor* Schmidle, *Cosmarium subcostatum* Nordst.,*Staurastrum kalapanii* Prasad & Misra, *Fragilaria rempens* (Kuets.) Cari., *Fragilaria rumpens* (Kuetz.) Cari. var. *famillaris* (Kuetz.) A. Cl., *Mastogloia baltica* Grun., *Frustulia saxonica* Rabh. var. *linearis* A. Cl. form *capitata* Gandhi, *Diploneis subovalis* Cleve, *Stauroneis groenlandica* Ostrup. var. *subquadrata* A. Cl., *Navickula lucidula* Grun., *Cymbella ventricosa* Kuetz. var. *depressa* Krishnamurthy, *Nitzzchia maharashtrensis* Sarode et. Kamat. Out of these 23 taxa *Chlorella parastitica* (Barndt) Beijerinck, *Cosmarium boergesenii* Gronblad, *Cosmarium protuberans* Lund var. *minor* Schmidle and *Staurastrum kalapanii* Prasad and Misra, are the new additions to the algal flora of Maharashtra.

Key words: Symbiotic association, Fresh water Spongellia.

INTRODUCTION

While studing the algal flora of this region author collected fresh water spong from Latipada dam 22 Kms. away from Sakri, District Dhule, Maharashtra. (District Dhule lies between 20º 28' and 20º 3' North latitude and 20º 47' and 75º 11' East longitude). Since from few decades the literature regarding fresh water spong is available, noting its biological, systematic and pharmaceutical studies (Tonapil, 1966). However, limited authors have reported the sponge and its symbiotic relationship. Smith (1973) suggested symbioses in sponges, he further stated that vary few reports are available about the spong symbiosis.

MATERIALS AND METHODS

For systematic study of algal flora, blue-green algae and green algae were processed as per Kumar and Sing (1977). The diatoms were processed according to Bruns method by treating with hydrochloric acid for 24 hrs. Further it was treated with sulphuric acid to which few crystals of potassium dichromate were added (Sarode and Kamat, 1984). Permanent mounts were prepared in Canada balsam.

Camera lucida digrams of all taxa have been drawn. Indentifications were made according to Agarkar (1971), Compare (1984), Desikachary (1959), Kant and Gupta (1998), Kumar and Patel (1990), Patel et. al. (1980), Philipose (1967), Prasad and Misra (1984), Sarode and Kamat (1984).

SYSTEMATIC ENUMERATION

Cyanophyta
Cyanophyceae Sach.
Chroococcales Wettstein.
Chroococcaceae Nageli.
Aphanocapsa Nag.
***Aphanocapsa banaresensis* Bharadwaja** (fig.1)
Cell 6.2 µ in diameter.

Chlorophyta
Chlorococcales March & orth mut.
Micractiniaceae (Brunnth) G. M. Smith.
Glenkiniopsis Korshikov.

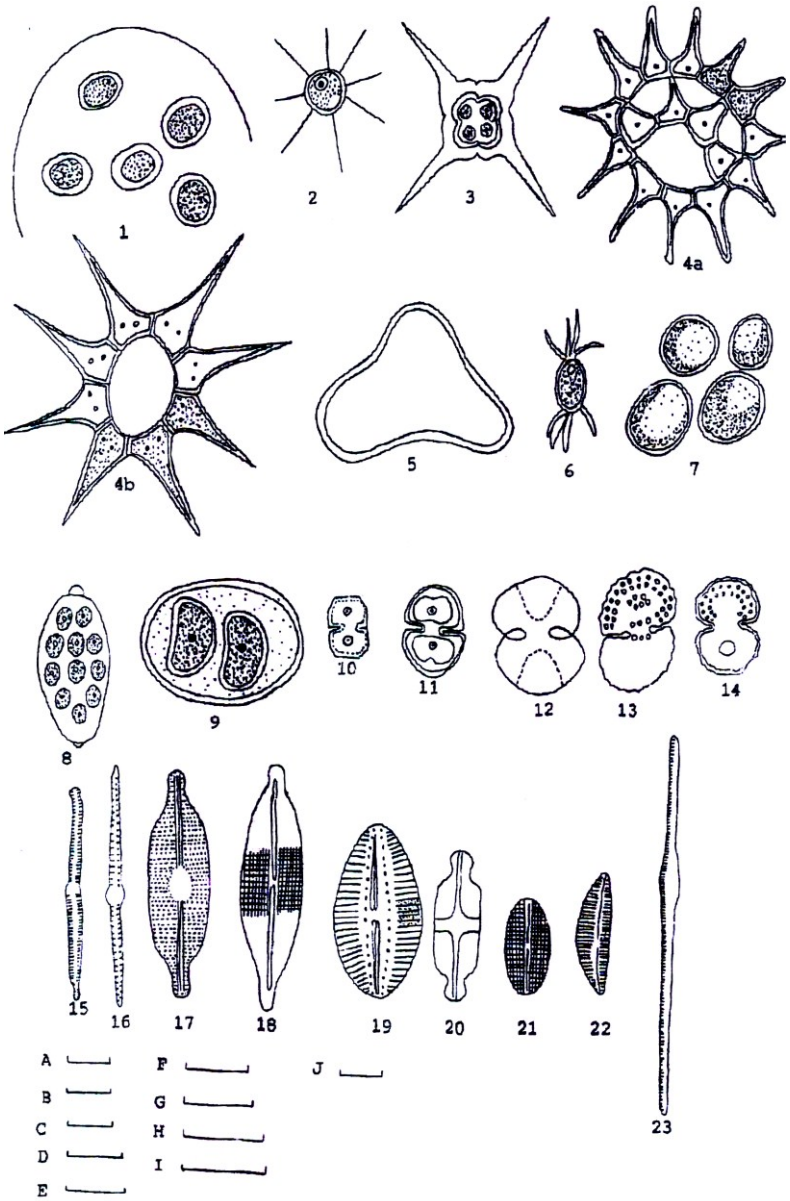
***Glenkiniopsis minutissima* Iyengar et. Balakrishnan**. (fig.2)
Cells 5 µ in diameter bristles 7.5 µ long.
Treubariaceae (Korsh.) Fott.
Treubaria Bernard.
Cells four angled, cells without spines 12 µ in diameter, spines 21 µ long and 3 µ broad at the base.
Hydrodictyaceae (S.F. Gray) Dumortier.
Hydrodictyoideae
Pediastrum Meyen.
***Pediastrum simplex* Meyen. var. *duodenarium* (Bailey) Rabenhorst**. (Fig.4)
Colony 16 celled 13.5-16.5 µ broad, 21.45 µ long., colony 102-112.5 µ in diameter.
Teraedronoideae
Tetraedron Kuetzing.
***Tetraedron trilobulatum* (Reinsch) Hansgirg**. (Fig.5)
Cells upto 25 µ in diameter.
Oocystaceae Bohlin
Lagerheimioideae
Chodatella Lemm.emend. Fott.
Chodatella citriformis Snow. (Fig.6)
Cals 8 x 12 µ setae 10 µ long.
Chlorelloideae
Chlorella Beijerinck,
***Chlorella parasitica* (Barndt) Beijerinck**. (Fig.7)
Cell 6-8 µ in diameter.
Oocystoideae
Oocystis Nagegeli. In A. Braun.
***Oocystis solitaria* Wittock form *major* Wille**. (Fig.8)
Cells 35 x 18 µ.
Nephrocytium Naegeli.
***Nephrocytium obesum* W.et. G.S. West**. (Fig.9)
Colony 54 x 78 µ.; cells 21 x 35 µ
Desmidiales
Desmidaceae Ralfs.
Cosmarium Corda ex. Rats.
Cosmarium boergesenii Gronblad. (Fig.10)
Lengh 14 µ; breadth 10 µ; isth. 2.5 µ.
Cosmarium granatum Breb. var. ***delpontii*** Gutw. (Fig 11).
Length 28 µ; breadth 19.5 µ; isth; 14 µ.
Cosmarium protuberans Lund. var ***minor*** Schmidle. (Fig.12)
Cells 25 µ long; 21 µ wide; isth 14µ.
Cosmarium subcostatum Nordst. (Fig.13)
Cells 25 µ long, 19 µ wide; isth 5.5 µ.
***Treubaira appendiculata* Shaji & Patel** (fig.3)
Staurastrum
Staurastrum kalapanii Prasad & Misra. (Fig.14)
Length 18 µ; breadth 19 µ; isth 6 µ.
Bacillariophyta
Diatomatae
Pennales
Arphidineae
Fragilariaceae
Frafilarioideae
Fragilaria Lyngbye
Fragilaria rempens (Kuets.) Cari. (Fig.15)
Valves 31.5 µ long, 3 µ broad, striae 16 in 10 µ.
Fragilaria rumpens (Kuetz.) Cari. var. ***famillaris*** (Kuetz.) A. Cl. (Fig. 16)
Length 52 µ.; breadth 3.6 µ.
Biraphidineae
Naviculaceae
Naviculoideae
Mastogloia Thwaites.
Mastogloia baltica Grun. (Fig. 17)
Valves 34 µ long, 10 µ broad; loculi 5 in 10 µ; striae 20 in 10 µ.
Frustulia saxonica Rabh. var. ***linearis*** A. Cl. form ***capitata*** Gandhi. (Fig. 18)
Valves 37.8 µ long; 10 µ broad; striae 32 in 10 µ,
Diploneis Ehrenberg.
Diploneis subovalis Cleve. (Fig. 19)
Valve 25.4 µ long, 14.8 µ broad; costae 8 in 10 µ; alveoli 16 in 10 µ.
Stauroneis Ehrenberg.
Stauroneis groenlandica Ostrup. var. ***subquadrata*** A. Cl. (Fig. 20)
Length 18.6 µ breadth 6.4 µ
Navicula Bory de. st. Vinent.
Navicula lucidula Grun. (Fig. 21)
Valves 15.3 µ long, 8 µ broad; striae 16in 10 µ
Gomphocymbelloideae
Cymbella Agardh.
Cymbella ventricosa Kuetz. var. ***depressa*** Krishnamurthy (Fig. 22)
Length 24.8 µ; breadth 7.9 µ.
Nitzschiaceae
Nitzschoideae
Nitzschia Hassall
Nitzchia maharashtrensis Sarode et. Kamat (Fig. 23)
Valves 55.6 µ long; 2.8 µ broad; striae 28 in 10 µ.

RESULTS AND DISCUSSION

Very few records were available on the fresh water sponges of Maharashtra, and their symbiotic relations are studied very rarely. Very few workers studied their biological, systematic and symbiotic relationship (Tonapil, 1966; Smith, 1973).

While studing the symbiotic relation of sponge author recorded 23 taxa of algae from the body of Spongellia spp. Out of these 23 taxa 09 belongs to cyanophyta, 05 from chlorophyta and rest of 09 from bacillariophyta. In distribution point of view four taxa of algae has been recorded first time from Maharashtra.

It is known that diatoms are rich source of calcium. The author came to conclusion that in the symbiotic relation diatoms provide calcium to sponges. This calcium may help sponges to strengthen their chanal system. The role of other algae in this symbiosis is yet to know. The study of biochemical symbiosis of sponge and algae is under way.



PLATE

1. *Aphanocapsa banaresensis* Bharadwaja
2. *Glenkiniopsis minutissima* Iyengar et. Balakrishnan.
3. *Treubaira appendiculata* (Bernard) Shaji & Patel
4. *Pediastrum simplex* Meyen. var. *duodenarium* (Bailey) Rabenhorst.
5. *Tetraedron trilobulatum* (Reinsch) Hansgirg.
6. *Chodatella citriformis Snow*.
7. *Chlorella parasitica* (Barndt) Beijerinck.
8. *Oocystis solitaria* Wittock form *major* Wille.
9. *Nephrocytium obesum* W.et. G.S. West.
10. *Cosmarium boergesenii* Gronblad.
11. *Cosmarium granatum* Breb. var. *delpontii* Gutw.
12. *Cosmarium protuberans* Lund. var *minor* Schmidle.
13. *Cosmarium subcostatum* Nordst.
14. *Staurastrum kalapanii* Prasad & Misra.
15. *Fragilaria rempens* (Kuets.) Cari.
16. *Fragilaria rumpens* (Kuetz.) Cari. var. *famillaris* (Kuetz.) A. Cl.
17. *Mastogloia baltica* Grun.
18. *Frustulia saxonica* Rabh. var. *linearis* A. Cl. form *capitata* Gandhi.
19. *Diploneis subovalis* Cleve.
20. *Stauroneis groenlandica* Ostrup. var. *subquadrata* A. Cl.
21. *Navicula lucidula* Grun.
22 *Cymbella ventricosa* Kuetz. var. *depressa* Krishnamurthy
23. *Nitzchia maharashtrensis* Sarode et. Kamat

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