



TAXONOMIC DIVERSITY OF PLANKTONIC ALGAE FROM JUNNAR TALUKA OF PUNE DISTRICT (INDIA)

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Abstract:

The Junnar tehsil in Pune District is situated between 19°11'59" Northern 73°52'47" Eastern latitude on the northern part of Deccan Plateau & composed of undulating hills. Junnar tehsil is famous for its wells and Dams. The famous and historical fort of Shivneri where Shivaji Maharaj was born is in this region. There is also a Satellite Center in Arvi. Survey was done of the following impoundments - Manikdoha Dam, Yedgaon Dam, Pimpalgaon joge Dam, and Wadaj Dam. Sub-aerial algae growing attached to tree barks, on damp walls or other such substrata were collected by scraping with a scalpel and then picked up with the help of a forceps. All algal plants were identified up to genus, species, variety as well as forms level. The 344 species, 99 varieties, 10 forms, 2 Variety and forms belonging to 112 genera of 39 families from 12 orders of 06 classes from 5 divisions. Family Desmidiaceae includes 10 genera, 38 species and 9 varieties while family Hyellaceae, Ceratiaceae, Chaetoceraeae, Chlorochytriaceae, Treubariaceae, Haematococcaceae and Chlorococcaceae include only 1 genus and 1 species; Cosmarium is more densely occur in Ambegaon tehsil.

Keywords: Pune, Junnar, Planktons, Cosmarium.

Introduction:

Filamentous algae were collected from mass growths by hand. Sub-aerial algae growing attached to tree barks, on damp walls or other such substrata were collected by scraping with a scalpel and then picked up with the help of a forceps. Hand collected samples were investigated from April 2014 to October 2015. The present investigation is undertaken with keep in mind that to study the algal population from selected stations of study area.

Attempts have been undertaken to bring out the Algal flora of this region. 37 Nostocales are described in the present paper. In which family Oscillatoriaceae consists genus *Lyngbya* & *Oscillatoria* in which genus *Lyngbya* consists 10 species, *Oscillatoria* consists 21 species; while family Scytonemataceae consists genus *Scytonema* that consists 6 species.

Materials and Methods:

The samples were preserved in a mixture of 50 ml of 95% ethyl alcohol, 5 ml of glacial acetic acid, 10 ml of 40% commercial formalin and 35 ml of water. The specimens are observed under microscope for 10X, 40X, 100X and Photographs were taken with the help of digital camera under appropriate magnifications. Identification of specimens was mostly based on the keys given in standard monographs & literatures. The Voucher specimens have been deposited at Dept. of Botany, Hon. Baladaheb Jadhav College, Ale, Tal. Junnar, Dist. Pune.

Periodical collections of algae from the study area were done from the Dams as well as Rivers, Lake's, Puddles, Pulls etc. from Junnar

Tehsil. Sampling stations were carried away. The samples were bringing to laboratory for identification; Identification were done with the help of Indian monographs and other standard literature like Desikachari (1959), Randhawa (1959), Venkatraman (1961), Prescott (1951), Ramnathan (1964), Bourrily (1970), Philipose (1967), Gonzalves (1981), Iyengar and Desikachari (1981), Desikachari *et al* (1990), Anand (1998) and Sarode and Kamat (1984). The collected algal forms had been preserved in 4% formalin.

List of Planktonic Algal specimens collected from Study Area:

Division: Chlorophyta > Class: Chlorophyceae > Order: Volvocales > Family: Volvocaceae.

1. *Volvox aureus* Ehrenberg
2. *Volvox globator* Linnem. Ehrb.
3. *Gonium pectorale* Muller
4. *Gonium sociale* (Duj.) Warming in Bot.
5. *Pandorina morum* (Muller) Bory
6. *Eudorina elegans* Ehrenberg.

Family: Chlamydomonadaceae

1. *Chlamydomonas globosa* Snow
2. *Chlamydomonas polyphyrenoides* Prescott
3. *Chlamydomonas sphagnicola* Fritsch and Takeda
4. *Sphaerellopsis iyengarü* Balakrishnan

Family: Haematococcaceae

1. *Haematococcus lacustris* (Girod) Rostafinski

Order: Tetrasporales > Family: Palmellaceae

1. *Gloeocystis ampla* (Kuetz) Lagerheim
2. *Sphaerocystis schroeteri* Chodat.

Order: Clorococcales>**Family:**
Clorococcaceae

1. *Chlorococcum humicola* (Naeg.) Rabenhorst

Family: Chlorochytriaceae

1. *Kentrosphaera bristolae* G. M. Smith

Family: Micractiniaceae

1. *Golenkinia radiata* (Chod.) Wille
2. *Micractinum pusillum* Fresenius
3. *Micractinum quadrisetum* (Lemm.) G.M. Smith
4. *Errerella bornhemensis* Conrad.
5. *Trochiscia aciculifera* (Lagerh.) Hansgirg

Family – Dictyosphaeriaceae

1. *Dictyospherium pulchellum* Wood
2. *Westella linearis* G. M. Smith
3. *Schroederia indica* sp. nov.
4. *Schroederia judayi* G. M. Smith

Family: Hydrodictyaceae

1. *Pediastrum boryanum* (Turpin) Meneghini
2. *Pediastrum duplex* Meyen v. *clathratum* (A. Braun) Lagerheim
3. *Pediastrum duplex* Meyen v. *gracillimum* West and West
4. *Pediastrum duplex* Meyen v. *reticulatum* Lagerh.
5. *Pediastrum integrum* Naegeli
6. *Pediastrum integrum* Naegeli v. *perphoratum* Raciborski
7. *Pediastrum ovatum* (Ehr.) A. Braun
8. *Pediastrum simplex* (Meyen) Lemmermann
9. *Pediastrum simplex* (Meyen) Lemmermann v. *duodenarium* (Bailey) Rabenhorst
10. *Pediastrum tetras* (Ehrenb.) Ralfs
11. *Pediastrum tetras* (Ehrenb.) Ralfs. v. *apiculatum* Fritsch
12. *Sorastrum spinulosum* Naegeli
13. *Tetraedron caudatum* (Corda) Hansgirg
14. *Tetraedron gracile* (Reinsch) Hansgirg
15. *Tetraedron minimum* (A. Braun) Hansgirg
16. *Tetraedron regulare* Kuetzing v. *bifarcatum* Wille
17. *Tetraedron regulare* Kuetzing v. *incus* Telling f. *major* Prescott
18. *Tetraedron trigonum* (Naegali) Hansg.
19. *Tetraedron trigonum* (Naegali) Hansg. v. *longispinum* var. nov.

Family: Coelastraceae

1. *Coelastrum cambricum* Archer
2. *Coelastrum cambricum* Archer v. *intermedium* Bohlin G.S. West
3. *Coelastrum microporum* Naegeli
4. *Coelastrum proboscideum* Bohlin
5. *Coelastrum sphaericum* Naegeli

Family: Selenastraceae

1. *Selenastrum bibraianum* Reinsch
2. *Selenastrum gracile* Reinsch
3. *Selenastrum minutum* (Naegeli) Collins.
4. *Selenastrum westii* G. M. Smith
5. *Kirchneriella lunaris* (Kirch) Moebius
6. *Kirchneriella lunaris* (Kirchner) Moebius v. *dianae* Bohlin
7. *Kirchneriella lunaris* (Kirchner) Moebius v. *irregularis* G.M. Smith
8. *Kirchneriella obesa* (W. West) Schmidle v. *aperta* (Teil.) Brunnthaler
9. *Ankistrodesmus convolutus* Corda
10. *Ankistrodesmus falcatulus* (Corda.) Ralfs. v. *mirabilis* (West and West)
11. *Ankistrodesmus falcatulus* (Corda.) Ralfs. v. *radiatus* (Chodat) Lemme.
12. *Ankistrodesmus falcatulus* (Corda.) Ralfs. v. *spirilliformis* (W. et West) G. S. West
13. *Ankistrodesmus fractus* (West and West) Brunnthaler
14. *Ankistrodesmus spiralis* (Turner) Lemmermann
15. *Ankistrodesmus spiralis* (Turner) Lemm. v. *faciculatus* G.M. Smith
16. *Quadrigula lacustris* (Chod.) G.M. Smith
17. *Actinastrum gracilimum* G.M. Smith
18. *Actinastrum hantzschii* Lagerheim
19. *Actinastrum hantzschii* Lagerheim v. *fluviatile* Schroeder.

Family: Scenedesmaceae

1. *Scenedesmus abundans* (Kirch.) Chodat
2. *Scenedesmus acuminatus* (Lagerheim) Chodat f. *globosus* Hortob. et Neme th
3. *Scenedesmus acuminatus* (Lagerh.) Chod. v. *bernardii* (G. M. Smith) De duss
4. *Scenedesmus acutus* Meyen
5. *Scenedesmus armatus* v. *bicaudatus* (Guglielmetti) Ghodat
6. *Scenedesmus bernardii* G. M. Smith
7. *Scenedesmus bijugatus* (Turp.) Lagerheim
8. *Scenedesmus bijugatus* (Turpin) Kuetzing f. *irregularis* (Wille)
9. *Scenedesmus bijugatus* (Turpin) Kuetzing. v. *graevenitzii* (Bernard) comb. Nov
10. *Scenedesmus carinatus* (Lemm.) Chod.
11. *Scenedesmus denticulatus* Lagerheim
12. *Scenedesmus incrassatulus* Bohlin
13. *Scenedesmus intermedius* Chod. v. *bicaudatus* Hortob.
14. *Scenedesmus longispina* Chod.
15. *Scenedesmus longispina* Chod. v. *capricornus* Skuja Hortob n.f.
16. *Scenedesmus obliquus* (Turpin) Kuetzing
17. *Scenedesmus opoliensis* P. Richter
18. *Scenedesmus perforatus* Lemmermann
19. *Scenedesmus quadricauda* (Turp.) Breb.
20. *Tetralantos lagerheimii* Telling

21. *Scenedesmus carinatus* (Le mm.) Chod.
22. *Scenedesmus denticulatus* Lagerheim
23. *Scenedesmus incrassatulus* Bohlin
24. *Scenedesmus intermedius* Chod. v.
bicaudatus Hortob.
25. *Scenedesmus longispina* Chod.
26. *Scenedesmus longispina* Chod. v.
capricornus Skuja Hortob n.f .
27. *Scenedesmus obliquus* (Turpin)
Kuetzing
28. *Scenedesmus opoliensis* P. Richter
29. *Scenedesmus perforatus* Lemmermann
30. *Scenedesmus quadricauda* (Turp.)
Breb.
31. *Crucigenia apiculata* (Lemm.) Schmidle
32. *Crucigenia irregularis* Wille.
33. *Crucigenia lauterbornii* Schmidle
34. *Crucigenia quadrata* Morren
35. *Crucigenia rectangularis* (A. Braun)
Gay
36. *Crucigenia truncata* G. M. Smith
37. *Tetrastrum staurogeniaeforme*
(Schroeder) Lemmermann

Family: Treubariaceae*Treubaria triappendiculata* Bernard**Family: Oocystaceae**

1. *Chlorella conglomera* (Artari)
Oltmanns
2. *Chlorella vulgaris* Beyerinck
3. *Oocystis elliptica* W. West
4. *Oocystis gloeocystiformis* Borge
5. *Oocystis kumaonensis* K. P. Singh
6. *Oocystis lacustris* Chodat
7. *Oocystis macrospora* (Turner)
Brunnthal
8. *Oocystis nodulosa* West and West
9. *Oocystis novaeseemilae* Wille
10. *Oocystis pusilla* Hansgirg
11. *Oocystis solitaria* Wittrock
12. *Oocystis submarina* Lagerheim
13. *Lagerheimia subsalsa* Lemmermann
14. *Nephrocytium obesum* W. et G. S.
West.

Family: Botryococcaceae

1. *Botryococcus braunii* Kuetzing
2. *Geminella ordinata* (W. et G. S. West)
Heering.

Order: Cladophorales > Family:**Cladophoraceae**

1. *Cladophora fracta* (Dillw.) Kuetzing v.
lacustris (Kuetz.) Brand ex Heering
2. *Pithophora varia* Wille
3. *Rhizoclonium crassipellitum* West and
West
4. *Rhizoclonium hookeri* Kuetzing.

Order: Zygnematales > Family: Zygnemataceae

1. *Mougotia americana* Transeau
2. *Mougotia caimani* Transeau
3. *Mougotia floridana* Transeau
4. *Mougotia gotlandica* (Cleve) Wittrock

5. *Mougotia regellii* Skuja
6. *Mougotia sphaerocarpa* Wolle
7. *Mougotia tenuissima* (de Bary) Czurda
8. *Debarya smithii* Transeau
9. *Zygnema czurdae* Randhawa
10. *Zygnemopsis decussata* Transeau
11. *Zygnemopsis lamellata* Randhawa
12. *Sirogonium tenuis* (Nordstedt) Transeau
13. *Temnogametum indicum* Iyengar
14. *Temnogametum uleanum* (Möbius)
Wille

Family: Mesotaeniaceae

1. *Mesotaenium giganteum* Turner
2. *Netrium digitus* (Ehr.) Itzigs. et Rothe
3. *Cylindrocystis brebissonii* Menegh.

Family: Desmidiaceae

1. *Staurodesmus pterosporum* (Lundell)
comb. nov.
2. *Staurastrum gracile* v. *elegantulum*
West et West
3. *Staurastrum leptocladum* v. *cornutum*
Wille
4. *Staurastrum margaritaceum* (Ehrenb.)
Meneghini
5. *Staurastrum panamanum* sp. Nov.
6. *Staurastrum punctulatum* Breb.
7. *Staurastrum sebaldi* Reinsch. v.
gracile Messik
8. *Staurastrum sebaldi* Reinsch. v.
ornatum Nordst.
9. *Staurastrum sparsidentatum* Nygaard
10. *Staurastrum tetracerum* Ralfs
11. *Closterium acerosum* (Schrank)
Ehrenberg
12. *Closterium diana* Ehrenberg
13. *Closterium intermedium* Ralfs.
14. *Closterium lanceolatum* Kuetzing
15. *Closterium leibleinii* Kuetz.
16. *Closterium moniliferum* (Bory)
Ehrenberg
17. *Closterium venus* Kuetz.
18. *Pleurotaenium ehernbergii* (Brebisson)
DeBary
19. *Euastrum ansatum* Ehrenberg
20. *Euastrum irregular* Gonzalves and
Gangle v. *gwalliorensis* v. nov.
21. *Euastrum oblongum* (Greville.) Ralfs
22. *Micrasterias americana* (Ehrenberg)
Ralfs.
23. *Micrasterias apiculata* (Ehrenberg)
Meneghini
24. *Cosmarium awadhense* Prasad and
Mehrotra
25. *Cosmarium biretum* Brebisson v.
trigiberrum Nordstedt.
26. *Cosmarium botrytis* Meneghini
27. *Cosmarium contractum* Kirchn.
28. *Cosmarium contractum* v.
ellipsoidium (Elfv.) West et West
29. *Cosmerium cucumis* (Corda) Ralfs
30. *Cosmarium depressum* (Naegeli)
Lundell
31. *Cosmarium holmiense* Lundell. v.
integrum Lundell

32. *Cosmarium meneghinii* Brebisson
33. *Cosmarium miscellum* Skuja
34. *Cosmarium moniliforme* (Turp.) Ralfs
35. *Cosmarium nitidulum* De Notaris
36. *Cosmarium pachdermum* Lundell v. *aethiopicum* W. and G.S. West
37. *Cosmarium portianum* Archer
38. *Cosmarium quadrum* Lundell
39. *Cosmarium quinarium* Lundell
40. *Cosmarium retusifforme*(Wille) Gutw
41. *Cosmarium sexnotatum* Gutw.
42. *Cosmarium subcrenatum* Hantzsch.
43. *Cosmerium subimpressulum* Borge.
44. *Arthrodesmus convergens* Ehrenberg
45. *Arthrodesmus phimus* Turner
46. *Spondylosum planum* (Wolle) W. and G.S. West.
47. *Hyalothca dissiliens* (Smith) Brebisson

Division: Euglenophyta>Class: Euglenophyceae>Order: Euglenales>Family: Euglenaceae

1. *Euglena acus* Ehrenberg
2. *Euglena acus* Ehrenberg v. *rigida* Huebner
3. *Euglena geniculata* Dujardin
4. *Euglena gracilis* Klebs.
5. *Euglena limnophila* Lemm.
6. *Euglena minuta* Prescott
7. *Euglena oblonga* Schmitz
8. *Euglena oxyuris* Schmarla
9. *Euglena polymorpha* Dangeard.
10. *Euglena proxima* Dangeard
11. *Euglena rostrifera* L.P. Josnson
12. *Euglena sanguinea* Ehrenberg
13. *Euglena satelles* Brast. Spect
14. *Euglena spiroides* Lemmermann
15. *Euglena tuba* H. J. Carter
16. *Lepocinclis fusiformis* (Carter) Lemmermann
17. *Lepocenalis texta* (Duj.) Lemm
18. *Phacus curvicauda* Swirenko
19. *Phacus helicoides* Pochmann
20. *Phacus lismorensis* Playfair
21. *Phacus longicauda* (Ehrenb.) Dujardin
22. *Phacus longicauda* (Ehr.)Dur.v. *insecta* Hub Pestaio.
23. *Phacus pulcher* Roll.
24. *Phacus ranula* Pochm
25. *Phacus swirenkoi* Skvortzow
26. *Phacus tortus* (Lemm) Skvortzow
27. *Trachelomonas dubia* (Swir.)Deflandre
28. *Trachelomonas intermedia* Dangeard
29. *Trachelomonas rotunda*Swirenko
30. *Trachelomonas volvocina* Ehr.v. *punctate* Playfair

Division:Chrysophyta>Class:Chrysophyceae> Order:Chrysomonadales> Family:Mallomonadaceae.

1. *Mallomonas acaroarides* v. *maskovensis* (Wermel) Krieger
2. *Mallomonas tonsurata* Teiling

Class: Bascillariophyceae> Order: Centrales> Suborder: Coscinodiscineae> Family: Coscinodiaceae> Subfamily: Melosiroideae

1. *Melosira granulata* (Ehr.) Ralfs v. *angustissima* O. Muell.
2. *Melosira islandica* O. Muell
3. *Melosira juergensii* Agardh

Subfamily: Coscinodiscoideae

1. *Cyclotella meneghiniana* Kuetz.
2. *Cyclotella striata* (Kuetz.) Grun.

Suborder: Biddulphineae>

Family: Chaetoceraceae

1. *Attheya zachariasii* J. Brun

Order: Pinnales>Suborder:

Fragilarineae>Family: Fragilariaceae

1. *Fragilaria brevistriata* Grun. v. *vidarbhensis* v. nov.
2. *Fragilaria intermerdia* Grun.
3. *Fragilaria rumpens* (Kuetz) Carl. v. *meneghiniana* (Grun) Gandhi
4. *Fragilaria ungeriana* Grun.
5. *Synedra capitata* Ehrenberg
6. *Synedra ulna* (Nitz.) Ehr.
7. *Synedra ulna* (Nitz.) Ehr. f. *stauroidestituta* Pant.
8. *Synedra ulna* (Nitz.) Ehr. v. *amphirhynchus* (Ehr.) Grun
9. *Synedra ulna* (Nitz.) Ehr. v. *subaequalis* Grun

Family: Eunotiaceae

1. *Eunotia formica* A. Berg.
2. *Eunotia gracilis* (Ehrenb.) Rabh.
3. *Eunotia lunaris* (Ehr.) Grun.
4. *Eunotia rostellata* Hustedt

Suborder: Achninthineae>Family:

Achnanthaceae

1. *Achnanthes elata* (Leud-Fort) Gandhi
2. *Achnanthes inflata* (Kuetz.) Grun.
3. *Achnanthes inflata* (Kuetz.) Grun. f. *elatoides* Cholnoky
4. *Achnanthes lanceolate* (Breb.) Grun.
5. *Achnanthes trigibba* Hustedt.

Family: Naviculaceae

1. *Diploneis subovalis* Cleve
2. *Caloneis bacillum* (Grun.) Meresch. v. *fontinalis* (Grun.) Mayer
3. *Caloneis beccariana* Grun.
4. *Caloneis beccariana* Grun. v. *hustedtii* Gandhi
5. *Caloneis silicula* (Ehr.) Cleve v. *genuina* Mayer
6. *Caloneis silicula* (Ehr.) Cleve v. *minuta* (Grun.)
7. *Caloneis silicula* (Ehr.) Cleve v. *truncatula* (Grun.) Mayer
8. *Caloneis ventricosa* (Ehr.) Meist. v. *alpina* (Cleve) Patr.
9. *Gyrosigma attenuatum* Motum (Kuetz.) Rabh.
10. *Gyrosigma bhusavalensis* sp. nov.
11. *Pinnularia arraniensis* Hustedt f. *indica* f. nov.

12. *Pinnularia borealis* Ehr.
13. *Pinnularia borealis* Ehr. v. *lonavensis* Gandhi
14. *Pinnularia braunii* (Grun.) Cleve v. *amphicephala* (Mayer) Hustedt.
15. *Pinnularia episcopalis* Cleve
16. *Pinnularia major* (Kuetz.) Cleve v. *linearis* Cleve
17. *Pinnularia major* (Kuetz.) Cleve v. *sendaiensis* Hustedt
18. *Pinnularia mesolepta* Ehr. v. *stauroneiformis* Grun.
19. *Pinnularia neglecta* (Mayer) A. Berg v. *undulata* Gandhi
20. *Pinnularia platycephala* (Ehr.) Cleve
21. *Pinnularia pseudoluculenta* Gandhi
22. *Pinnularia stauoptera* (Rabh.) Cleve v. *parva* Grun.
23. *Pinnularia stomatophorides* Mayer v. *ornata* A. Cl. f. *erlangensis* Mayer
24. *Pinnularia subcapitata* Greg. v. *hilseana* (Jan.) O. Muell.
25. *Pinnularia subcapitata* Greg. v. *lapponica* A. Cl.
26. *Navicula cari* Ehr. v. *angusta* Grun.
27. *Navicula cincta* (Ehr.) Kuetz. v. *heufleri* (Grun.) Cleve
28. *Navicula cryptocephala* Kuetz. v. *veneta* (Kuetz) Grun.
29. *Navicula cuspidata* Kuetz. v. *ambigua* (Ehr.) Cleve
30. *Navicula dicephala* (Ehr.) W. Smith v. *sphaerophora* A. Cl.
31. *Navicula feuerborni* (Feuerb.) Hustedt
32. *Navicula gracilis* Ehr.
33. *Navicula grimi* Krasske
34. *Navicula mutica* Kuetz. f. *intermedia* Hustedt.
35. *Navicula pupula* Kuetz v. *rostrate* Hustedt.
36. *Navicula radiosa* Kuetz. v. *minutissima* (Grun.) Cleve
37. *Navicula similis* Krasske
38. *Navicula subhamulata* Grun.
39. *Navicula viridula* Kuetz. v. *capitata* Mayer.

Family: Gomphonemataceae

1. *Gomphonema aequatoriale* Hustedt
2. *Gomphonema clavetoides* Gandhi v. *valida* Gandhi
3. *Gomphonema constrictum* Ehr. v. *capitata* (Ehr.) Cleve
4. *Gomphonema constrictum* Ehr. v. *indica* Gandhi
5. *Gomphonema gracile* Ehr.
6. *Gomphonema gracile* Ehr. f. *turris* Hustedt
7. *Gomphonema gracile* Ehr. v. *auritum* A. Br.
8. *Gomphonema gracile* Ehr. v. *intricatiforme* Mayer
9. *Gomphonema gracile* Ehr. v. *lanceolata* (Kuetz.) Cleve
10. *Gomphonema herbidense* (Greg.) Ehr.
11. *Gomphonema intricatum* Kuetz v.

fossile Pant

12. *Gomphonema lacus-rankala* Gandhi v. *robusta* Gandhi
13. *Gomphonema lancoelatum* Ehr.
14. *Gomphonema monantum* Schum. v. *acuminatum* Mayer
15. *Gomphonema moniliforme* Gandhi
16. *Gomphonema olivaceum* (Lyng.) Kuetz.
17. *Gomphonema olivaceoides* Hustedt
18. *Gomphonema parvulum* (Kuetz.) Grun.
19. *Gomphonema parvulum* (Kuetz.) Grun. v. *micropus* (Kuetz) Cleve
20. *Gomphonema sphaerophorum* Ehr.
21. *Gomphonema subapicatum* Fritsch et Rich
22. *Gomphonema subapicatum* Fritsch et Rich v. *okamurae* (Sk'v.) Gandhi

Family: Cymbellaeeae

1. *Cymbella aspera* (Ehr.) Cleve
2. *Cymbella bengalensis* Grun.
3. *Cymbella cistula* (Hemp.) Grun. v. *woosungensis* Voigt
4. *Cymbella gracilis* (Rabh.) Cleve
5. *Cymbella lanceolata* (Ehr.) V. H.
6. *Cymbella perpusilla* A. Cl.
7. *Cymbella tumida* (Breb.) V. H.
8. *Cymbella tumida* (Breb.) V. H. f. *ventricosa* Gandhi
9. *Cymbella tumidula* Grun.
10. *Cymbella turgida* (Greg.) Cleve
11. *Amphora acutiusscula* Kuetz
12. *Epithemia sorex* Kuetz.
13. *Epithemia zebra* (Ehr.) Kuetz v. *frickei* A. Cl.
14. *Epithemia zebra* (Ehr.) Kuetz v. *proboscidea* (Kuetz.) Grun.
15. *Rhopalodia gibba* (Ehr.) Muell.

Family: Nitzschiaeeae

1. *Hantzschia amphioxys* (Ehrenb.) Grunow. v. *capitata* O. Mull
2. *Hantzschia amphioxys* (Ehr.) Grun. v. *densestriata* (Font.) A. Cl.
3. *Hantzschia amphioxys* (Ehr.) Grun. v. *mugadensis* Gandhi
4. *Nitzschia apiculata* (Gorg.) Grun.
5. *Nitzschia closterium* W. Smith
6. *Nitzschia heufleriana* Grun.
7. *Nitzschia heufleriana* Grun. v. *elongata* Pant.
8. *Nitzschia hungarica* Grun.
9. *Nitzschia jugata* Gandhi
10. *Nitzschia obtusa* W. Smith v. *scapelliformis* Grun.
11. *Nitzschia palea* (Kuetz.) W. Smith
12. *Nitzschia theramalis* kuetz. v. *minor* Hilse
13. *Nitzschia tryblionella* Hantzsch v. *levidensis* (W. Smith) Grun

Family: Surirellaceae

1. *Surirella apiculata* W. Smith
2. *Surirella biseriata* Breb.
3. *Surirella carponii* Breg
4. *Surirella ovata* Kuetz

5. *Surirella ovata* Kuetz.v. *pinnata* (W. Smith) Hustedt
6. *Surirella obusta* Ehr.
7. *Surirella spiralis* Kuetzing
8. *Surirella tenera* Græg. v. *nervosa* A. S.
9. *Cymatopleura solea* (Breb)

Division: Pyrrophyta>Class: Dinophyceae>Order: Peridinales>Family: Glenodiniaceae

1. *Glenodinium borgei* (Lemm.) Schiller
2. *Glenodinium pulvispiculus* (Ehrenb) Stein
3. *Glenodinium quadridens* (Stein) Schiller
4. *Peridinium cinctum* (Mue ll.) Ehrenberg Slein
5. *Peridinium pusillum* (Penard) Lemmermann

Family: Ceratiaceae

1. *Ceratium hirundinella* (O.F. Muell.) Dujardin

Division: Cyanophyta>Class: Cyanophyceae>Order: Chroococcales>Family: Chroococcaceae

1. *Microcystis aeruginosa* Kuetz v. *major* (Wittr.) G. M. Smith
2. *Microcystis elabens* (Breb.) Kuetz.
3. *Microcystis flos-aquae* (Wittr.) Kirchner
4. *Microcystis orrisica* W. West.
5. *Microcystis robusta* (Clark) Nygaard
6. *Microcystis viridis* (A. Br.) Lemm.
7. *Chroococcus cohaerens* (Breb.) Nageli
8. *Chroococcus limneticus* Lemm.
9. *Chroococcus limneticus* Lemmermann v. *elegans* G. M. Smith
10. *Chroococcus minor* (Kuetz.) Naegeli
11. *Chroococcus minutus* (Kuetz.) Nageli.
12. *Chroococcus prescottii* Drouet and Daily in Drouet
13. *Chroococcus tenax* (Kirchn.) Hieron.
14. *Chroococcus turgidus* (Kutz) Naeg.
15. *Chroococcus turgidus* (Kuetz.) Naeg. v. *maximus* Nygaard
16. *Chroococcus varius* A. Br.
17. *Gloeocapsa coracina* Kuetz.
18. *Gloeocapsa crepidinum* Thuret
19. *Gloeocapsa fuscolutea* Nageli
20. *Gloeocapsa granosa* (Berk.) Kuetz.
21. *Gloeocapsa punctata* Nageli
22. *Gleothoece linearis* Nageli
23. *Gleothoece linearis* Naegeli v. *composita* G. M. Smith
24. *Gleothoece rupestris* (Lyngb.) Bomet
25. *Aphanocapsa delicatissima* W. et G. S. West
26. *Aphanocapsa koordersi* Strom
27. *Aphanocapsa pulchra* (Kuetz.) Rabenh
28. *Aphanocapsa rivularis* (Carm.) Rabenhorst
29. *Aphanothece caldaorum* Richter, P.
30. *Aphanothece castagnei* (Breb.) Rabenhorst
31. *Aphanothece clathrata* W. et G. S.

West

32. *Aphanothece gelatinosa* (Henn.) Lemm.
33. *Aphanothece nidulans* Richter, P.
34. *Aphanothece saxicola* Naegeli
35. *Aphanothece stagnina* (Spreng.) A. Br.
36. *Coelosphaerium dubium* Grunow
37. *Coelosphaerium kuetingianum* Naegeli
38. *Synechococcus elongatus* Nageli
39. *Synechocystis pevalekii* Ercegovic
40. *Dactylococcopsis fascicularis* Lemm. f. *indica* f. nov.
41. *Merismopedia convoluta* Breb.
42. *Merismopedia elegans* A. Braun
43. *Merismopedia elegans* A. Braun v. *major* G. M. Smith
44. *Merismopedia glauca* (Ehrenb.) Naeg.
45. *Merismopedia minima* Beck
46. *Merismopedia punctata* Meyen
47. *Merismopadia tenuissima* Lemm.

Family: Hyellaceae

1. *Xenococcus kernerii* Hansg.

Order: Nostocales>Family: Oscillatoriaceae

1. *Arthrospira gomontiana* Setchell
2. *Spirulina gigantea* Schmidle
3. *Spirulina labyrinthiformis* (Menegh.) Gomont
4. *Spirulina major* Kuetz.ex. Gomont
5. *Spirulina meneghiniana* Zanard. ex Gomont
6. *Spirulina princeps* W. et G. S. West
7. *Spirulina subtilissima* Kuetz ex Gomont
8. *Oscillatoria agardhii* Gomont
9. *Oscillatoria amphigranulata* Van Goor
10. *Oscillatoria chalybea* (Mertens) Gomont
11. *Oscillatoria chalybea* (Mertens) Gomont v. *insularis* Gardner
12. *Oscillatoria curviceps* Ag. ex Gomont
13. *Oscillatoria irrigua* Kuitz. Gomont
14. *Oscillatoria limosa* Ag. ex Gomont
15. *Oscillatoria margaritifera* (Kuetz) Gomont
16. *Oscillatoria minnesotensis* Tilden
17. *Oscillatoria nigra* Vaucher
18. *Oscillatoria obscura* Bruhl et Biswas
19. *Oscillatoria princeps* Vaucher ex Gomont
20. *Oscillatoria princeps* Vaucher ex Gomont v. *pseudolimosa* Ghose
21. *Oscillatoria raciborskii* Wolosz.
22. *Oscillatoria rubescens* DC ex Gomont
23. *Oscillatoria salina* Biswas f. *major* f. nov.
24. *Oscillatoria sancta* (Kutz.) Gomont
25. *Oscillatoria simplicissima* Gomont
26. *Oscillatoria vizgapatensis* Rao C.B.
27. *Phormidium ambiguum* Gom.
28. *Phormidium anomala* Rao, C. B.
29. *Phormidium usterii* Schmidle

30. *Lyngbya baculum* Gomont
31. *Lyngbya digueti* Gomont
32. *Lyngbya hitronymusii* Lemm.
33. *Lyngbya magnifica* Gardner
34. *Lyngbya majuscula* Harvey ex Gomont
35. *Lyngbya subconfervoides* Borge
36. *Lyngbya versicolor* (Wartmann) Gomont
37. *Microcoleus lacustris* (Rabenh.) Farlow.

Family: Nostocaceae

1. *Anabaenopsis arnoldii* Aptekar
2. *Cylindrospermum muscicola* Kutzing
ex Born. et Flah. v. *kashmiriensis*
Bharadwaja
3. *Anabaena ambigua* Rao C. B.
4. *Anabaena ballyganglii* Banerji
5. *Anabaena khannae* Skuja
6. *Anabaena laxa* (Rabehn.)
7. *Anabaena naviculoides* Fritsch
8. *Anabaena oscillarioides* Bory ex Bron.
et Flah.
9. *Anabaena variabilis* Kuetz. ex. Born. et
Flah.
10. *Nostoc carnaeum* Ag. ex. Born. et Flah.
11. *Nodularia spumigena* Mertens ex
Born. et Flah.

Family: Scytonemataceae

1. *Plectonema tomasinianum* (Kutz.)
Born. ex. Gomont
2. *Scytonema chiastum* Geitler
3. *Scytonema crustaceum* Ag. ex Born. et
Flah.
4. *Scytonema geitleri* Bharadwaja
5. *Scytonema mirabile* (Dillw.) Born
6. *Scytonema pseudopunctatum* Skuja

Family: Rivulariaceae

1. *Gloeotrichia kurziana* Zeller orth. Mut.
2. *Gloeotrichia raciborskii* Woloszynska
v. *conica* Dixit.
3. *Homoeothrix hansgirgi* (Schmidle)
Lemmermann.

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