

**Role of macrophyte life forms in driving periphytic microalgal assemblages in a  
Brazilian reservoir**

**Ubirajara L. FERNANDES,\* Elaine C. C. de OLIVEIRA, Sírléis R. LACERDA**

Departamento de Ciências Biológicas, Laboratório de Botânica, Universidade Regional do  
Cariri, URCA, Rua Coronel Antônio Luis nº 1161, CEP 63.100-000, Bairro Pimenta, Crato,  
Ceará, Brazil

**\*Corresponding author:** [ubiralf@gmail.com](mailto:ubiralf@gmail.com)

**Supplementary Tab. 1.** Synopsis and frequency of occurrence (%) of periphytic assemblages on aquatic macrophytes in the Thomaz Osterne de Alencar reservoir.

Taxa	Aquatic macrophytes											
	<i>C. rusbyana</i>		<i>S. auriculata</i>		<i>A. granatensis</i>		<i>P. hispidum</i>		<i>N. pulchella</i>		FGO	GCat
	FO	Cat	FO	Cat	FO	Cat	FO	Cat	FO	Cat		
<b>CYANOBACTERIA</b>												
<i>Anabaena</i> sp.	62.5	F	53.85	F	38.10	F	63.16	F	21.43	LF	45.87	F
<i>Aphanocapsa</i> sp.	87.5	VF	46.15	F	54.76	F	52.63	F	64.29	F	55.96	F
<i>Aphanothece</i> sp.	25	LF	19.23	LF	16.67	LF	5.26	S	14.29	LF	15.60	LF
<i>Borzia</i> sp.	-	-	3.85	S	2.38	S	10.53	LF	-	-	3.67	S
<i>Calothrix</i> sp.	75	VF	34.62	F	40.48	F	47.37	F	21.43	LF	40.37	F
<i>Chroococcus</i> sp.	50	F	34.62	F	40.48	F	47.37	F	42.86	F	41.28	F
<i>Coelomoron</i> sp.	75	VF	46.15	F	59.52	F	52.63	F	64.29	F	56.88	F
<i>Cylindrospermum</i> sp.	-	-	3.85	S	-	-	-	-	-	-	0.92	S
<i>Dactylococcopsis</i> sp.	12.5	LF	11.54	LF	16.67	LF	10.53	LF	7.14	S	12.84	LF
<i>Gloeocapsa</i> sp.	87.5	VF	73.08	VF	61.90	F	73.68	F	92.86	VF	72.48	VF
<i>Gloeocystis</i> sp.	37.5	F	26.92	LF	19.05	LF	36.84	F	7.14	S	23.85	LF
<i>Lyngbya</i> sp.	12.5	LF	19.23	LF	14.29	LF	42.11	F	7.14	S	19.27	LF
<i>Merismopedia</i> sp.	37.5	F	34.62	F	23.81	LF	21.05	LF	21.43	LF	26.61	LF
<i>Microcystis aeruginosa</i> (Kützing) Kützing	37.5	F	50	F	28.57	LF	21.05	LF	21.43	LF	32.11	F
<i>Myxosarcina</i> sp.	-	-	7.69	S	2.38	S	5.26	S	7.14	S	4.59	S
<i>Oscillatoria</i> sp <sub>1</sub>	75	VF	57.69	F	66.67	F	68.42	F	78.57	VF	66.97	F
<i>Oscillatoria</i> sp <sub>2</sub>	37.5	F	61.54	F	50	F	57.89	F	35.71	F	51.38	F
<i>Oscillatoria</i> sp <sub>3</sub>	-	-	-	-	4.76	S	5.26	S	-	-	2.75	S
<i>Phormidium</i> sp.	87.5	VF	84.62	VF	85.71	VF	94.74	VF	78.57	VF	86.24	VF
<i>Planktolynngbya</i> sp.	37.5	F	30.77	F	16.67	LF	36.84	F	14.29	LF	24.77	LF
<i>Scytonema</i> sp.	25	LF	7.69	S	19.05	LF	26.32	LF	14.29	LF	17.43	LF
<i>Spirulina</i> sp <sub>1</sub>	-	-	3.85	S	-	-	-	-	-	-	0.92	S
<i>Spirulina</i> sp <sub>2</sub>	-	-	-	-	-	-	-	-	7.14	S	1.83	S
<i>Synechococcus</i> sp.	-	-	-	-	2.38	S	-	-	-	-	0.92	S
<b>EUGLENOPHYTA</b>												
<i>Astasia</i> sp.	-	-	7.69	S	-	-	-	-	-	-	1.83	S
<i>Euglena</i> sp.	25	LF	19.23	LF	14.29	LF	5.26	S	14.29	LF	14.68	LF
<i>Phacus</i> sp.	25	LF	7.69	S	4.76	S	-	-	-	-	5.5	S
<i>Trachelomonas</i> sp <sub>1</sub>	25	LF	26.92	LF	21.43	LF	21.05	LF	7.14	S	21.1	LF
<i>Trachelomonas</i> sp <sub>2</sub>	-	-	7.69	S	-	-	-	-	-	-	1.83	S

Taxa	Aquatic macrophytes											
	<i>C. rusbyana</i>		<i>S. auriculata</i>		<i>A. granatensis</i>		<i>P. hispidum</i>		<i>N. pulchella</i>		FGO	GCat
	FO	Cat	FO	Cat	FO	Cat	FO	Cat	FO	Cat		
<b>BACILLARIOPHYTA</b>												
<i>Achnantheidium minutissimum</i> (Kützing) Czarnecki	75	VF	69.23	F	59.52	F	84.21	VF	71.43	VF	68.81	F
<i>Amphora</i> sp <sub>1</sub>	87.5	VF	100	VF	88.10	VF	100	VF	50	F	88.07	VF
<i>Amphora</i> sp <sub>2</sub>	37.5	F	23.08	LF	21.43	LF	21.05	LF	-	-	20.18	LF
<i>Caloneis</i> sp.	-	-	7.69	S	11.9	LF	10.53	LF	7.14	S	9.17	S
<i>Campylodiscus</i> sp.	12.5	LF	-	-	2.38	S	10.53	LF	-	-	30.67	S
<i>Cocconeis</i> sp.	-	-	30.85	S	4.76	S	50.26	S	-	-	30.67	S
<i>Coscinodiscus</i> sp.	25	LF	38.46	F	45.24	F	26.32	LF	28.57	LF	36.7	F
<i>Cyclotella</i> sp.	-	-	-	-	-	-	10.53	LF	-	-	10.83	S
<i>Cymbella</i> sp <sub>1</sub>	12.5	LF	50	F	33.33	F	52.63	F	-	-	34.86	F
<i>Cymbella</i> sp <sub>2</sub>	12.5	LF	30.77	F	26.19	LF	63.16	F	7.14	S	30.28	F
diatom centraceae 1	37.5	F	76.92	VF	57.14	F	52.63	F	42.86	F	57.8	F
diatom centraceae 2	-	-	30.85	S	-	-	50.26	S	-	-	10.83	S
diatom pennateae	-	-	42.31	F	35.71	F	42.11	F	14.29	LF	33.03	F
<i>Epithemia</i> sp.	100	VF	88.46	VF	90.48	VF	94.74	VF	100	VF	92.66	VF
<i>Eunotia</i> sp <sub>1</sub>	87.5	VF	92.31	VF	92.86	VF	89.47	VF	78.57	VF	89.91	VF
<i>Eunotia</i> sp <sub>2</sub>	-	-	26.92	LF	9.52	S	-	-	-	-	10.09	LF
<i>Fragilaria</i> sp.	25	LF	23.08	LF	16.67	LF	21.05	LF	70.14	S	18.35	LF
<i>Gomphoneis</i> sp.	12.5	LF	70.69	S	9.52	S	15.79	LF	-	-	90.17	S
<i>Gomphonema olivaceum</i> (Hornemann) Brébisson	25	LF	70.69	S	26.19	LF	36.84	F	70.14	S	21.1	LF
<i>Gomphonema subtile</i> Ehrenberg	50	F	50	F	33.33	F	63.16	F	-	-	39.45	F
<i>Gomphonema</i> sp.	87.5	VF	92.31	VF	90.48	VF	100	VF	78.57	VF	90.83	VF
<i>Gyrosigma</i> sp.	-	-	30.85	LF	-	-	-	-	-	-	0.92	S
<i>Navicula radiosa</i> Kützing	100	VF	100	VF	90.48	VF	100	VF	71.43	VF	92.66	VF
<i>Navicula</i> sp <sub>1</sub>	50	F	69.23	F	64.29	F	68.42	F	64.29	F	65.14	F
<i>Navicula</i> sp <sub>2</sub>	37.5	F	30.77	F	35.71	F	47.37	F	28.57	LF	35.78	F
<i>Navicula</i> sp <sub>3</sub>	25	LF	19.23	LF	16.67	LF	10.53	LF	14.29	LF	16.51	LF
<i>Navicula</i> sp <sub>4</sub>	-	-	-	-	20.38	S	10.53	LF	-	-	20.75	S
<i>Neidium</i> sp.	-	-	19.23	LF	16.67	LF	21.05	LF	35.71	F	19.27	LF
<i>Nitzschia</i> sp <sub>1</sub>	12.5	LF	11.54	LF	90.52	S	50.26	S	70.14	S	90.17	S

Taxa	Aquatic macrophytes											
	<i>C. rusbyana</i>		<i>S. auriculata</i>		<i>A. granatensis</i>		<i>P. hispidum</i>		<i>N. pulchella</i>		FGO	GCat
	FO	Cat	FO	Cat	FO	Cat	FO	Cat	FO	Cat		
<i>Nitzschia</i> sp <sub>2</sub>	-	-	23.08	LF	20.38	S	-	-	-	-	60.42	S
<i>Pinnularia</i> sp.	12.5	LF	42.31	F	19.05	LF	26.32	LF	14.29	LF	24.77	LF
<i>Rhopalodia gibba</i> (Ehrenberg) O. Müller	100	VF	69.23	F	71.43	VF	94.74	VF	42.86	F	73.39	VF
<i>Surirella</i> sp.	-	-	-	-	-	-	50.26	S	-	-	00.92	S
<i>Synedra</i> sp.	37.5	F	34.62	F	57.14	F	47.37	F	28.57	LF	44.95	F
<i>Tabellaria</i> sp.	12.5	LF	26.92	LF	21.43	LF	15.79	LF	21.43	LF	21.1	LF
<i>Thalassionema nitzschioides</i> Grunow	100	VF	100	VF	90.48	VF	100	VF	85.71	VF	94.5	VF
<i>Thalassiothrix frauenfeldii</i> Grunow	100	VF	100	VF	85.71	VF	100	VF	71.43	VF	90.83	VF
<b>CHRYSOPHYTA</b>												
<i>Centrtractus</i> sp.	-	-	7.69	S	40.76	S	10.53	LF	-	-	5.5	S
<b>CHLOROPHYTA</b>												
<i>Ankistrodesmus</i> sp.	12.5	LF	19.23	LF	90.52	S	5.26	S	70.14	S	11.01	LF
<i>Asterococcus</i> sp.	62.5	F	34.62	F	50	F	73.68	VF	50	F	51.38	F
<i>Bulbochaete</i> sp <sub>1</sub>	50	F	57.69	F	40.48	F	57.89	F	70.14	S	44.04	F
<i>Bulbochaete</i> sp <sub>2</sub>	-	-	19.23	LF	90.52	S	-	-	70.14	S	90.17	S
<i>Chaetopeltis</i> sp.	12.5	LF	30.77	F	30.95	F	-	-	70.14	S	21.1	LF
<i>Characium</i> sp.	25	LF	26.92	LF	23.81	LF	50.26	S	70.14	S	19.27	LF
<i>Chlamydomonas</i> sp.	-	-	-	-	4.76	S	-	-	70.14	S	20.75	S
<i>Chlorococcum</i> sp.	12.5	LF	3.85	S	2.38	S	-	-	-	-	20.75	S
Indeterminate green alga	25	LF	23.08	LF	9.52	S	31.58	F	70.14	S	17.43	LF
<i>Closterium acerosum</i> Ehrenberg ex Rals	-	-	7.69	S	2.38	S	10.53	LF	-	-	40.59	S
<i>Closterium leibleinii</i> Kütz. ex Rals	87.5	VF	69.23	F	54.76	F	73.68	VF	14.29	I	58.72	F
<i>Closterium</i> sp <sub>1</sub>	100	VF	92.31	VF	71.43	VF	89.47	VF	71.43	VF	81.65	VF
<i>Closterium</i> sp <sub>2</sub>	-	-	23.08	LF	40.76	S	50.26	S	-	-	80.26	S
<i>Closterium</i> sp <sub>3</sub>	12.5	LF	15.38	LF	90.52	S	-	-	70.14	S	90.17	S
<i>Coelastrum</i> sp.	12.5	LF	11.54	LF	70.14	S	36.84	F	-	-	12.84	LF
<i>Coleochaete</i> sp.	-	-	3.85	S	11.9	LF	-	-	70.14	S	60.42	S
<i>Cosmarium quadrum</i> P. Lundell	62.5	F	76.92	VF	69.05	F	89.47	VF	57.14	F	72.48	VF

Taxa	Aquatic macrophytes											
	<i>C. rusbyana</i>		<i>S. auriculata</i>		<i>A. granatensis</i>		<i>P. hispidum</i>		<i>N. pulchella</i>		FGO	GCat
	FO	Cat	FO	Cat	FO	Cat	FO	Cat	FO	Cat		
<i>Cosmarium</i> sp <sub>1</sub>	87.5	VF	69.23	F	66.67	F	84.21	VF	35.71	F	67.89	F
<i>Cosmarium</i> sp <sub>2</sub>	50	F	26.92	LF	26.19	LF	42.11	F	70.14	S	28.44	LF
<i>Cosmarium</i> sp <sub>3</sub>	25	LF	19.23	LF	70.14	S	21.05	LF	-	-	12.84	LF
<i>Cosmarium</i> sp <sub>4</sub>	12.5	LF	15.38	LF	16.67	LF	15.79	LF	21.43	LF	16.51	LF
<i>Cosmarium</i> sp <sub>5</sub>	-	-	15.38	LF	4.76	S	-	-	-	-	50.5	S
<i>Cosmarium</i> sp <sub>6</sub>	-	-	-	-	-	-	50.26	S	-	-	00.92	S
<i>Crucigenia</i> sp.	-	-	11.54	LF	70.14	S	31.58	F	35.71	F	15.6	LF
<i>Crucigeniella</i> sp.	-	-	-	-	70.14	S	50.26	S	-	-	30.67	S
<i>Dictyosphaerium</i> sp.	-	-	30.85	S	-	-	-	-	-	-	00.92	S
<i>Elakatothrix</i> sp.	-	-	-	-	-	-	26.32	LF	-	-	40.59	S
<i>Euastrum</i> sp <sub>1</sub>	75	VF	53.85	F	47.62	F	84.21	VF	14.29	LF	53.21	F
<i>Euastrum</i> sp <sub>2</sub>	50	F	53.85	F	45.24	F	63.16	F	7.14	S	45.87	F
<i>Euastrum</i> sp <sub>3</sub>	12.5	LF	11.54	LF	11.9	LF	21.05	LF	-	-	11.93	LF
<i>Glaucocystis</i> sp.	12.5	LF	38.46	F	21.43	LF	42.11	F	-	-	25.69	LF
<i>Micrasterias</i> sp.	12.5	LF	19.23	LF	20.38	S	10.53	LF	14.29	LF	10.09	LF
<i>Micrasterias truncata</i> Brébisson ex Ralfs	25	LF	26.92	LF	40.76	S	-	-	-	-	10.09	LF
<i>Microspora</i> sp.	50	F	69.23	F	45.24	F	78.95	VF	42.86	F	56.88	F
<i>Nephrochlamys</i> sp.	-	-	30.85	S	-	-	-	-	-	-	00.92	S
<i>Oedogonium</i> sp <sub>1</sub>	75	VF	76.92	VF	85.71	VF	73.68	VF	57.14	F	77.06	VF
<i>Oedogonium</i> sp <sub>2</sub>	-	-	23.08	LF	70.14	S	5.26	S	-	-	90.17	S
<i>Oocystis</i> sp.	50	F	34.62	F	23.81	LF	57.89	F	42.86	F	36.7	F
<i>Pediastrum tetras</i> (Ehrenberg) Rals	-	-	-	-	-	-	50.26	S	-	-	00.92	S
<i>Penium</i> sp.	-	-	30.85	LF	-	-	-	-	-	-	00.92	S
<i>Pleurotaenium</i> sp.	-	-	70.69	S	70.14	S	10.53	LF	-	-	60.42	S
<i>Scenedesmus</i> sp.	87.5	VF	46.15	F	35.71	F	73.68	VF	21.43	LF	46.79	F
<i>Schroederia</i> sp.	-	-	30.85	S	40.76	S	10.53	LF	-	-	40.59	S
<i>Sphaerocystis</i> sp.	-	-	-	-	20.38	LF	-	-	-	-	00.92	S
<i>Spirogyra</i> sp <sub>1</sub>	50	F	53.85	F	64.29	F	31.58	F	21.43	LF	49.54	F
<i>Spirogyra</i> sp <sub>2</sub>	25	LF	11.54	LF	40.76	S	-	-	70.14	S	70.34	S
<i>Staurastrum dorsidentiferum</i> W. et West	75	VF	46.15	F	28.57	LF	78.95	VF	14.29	LF	43.12	F
<i>Staurastrum leptocladum</i> Nordstedt	25	LF	50	F	33.33	F	47.37	F	-	-	34.86	F

Taxa	Aquatic macrophytes											
	<i>C. rusbyana</i>		<i>S. auriculata</i>		<i>A. granatensis</i>		<i>P. hispidum</i>		<i>N. pulchella</i>			
	FO	Cat	FO	Cat	FO	Cat	FO	Cat	FO	Cat	FGO	GCat
<i>Staurastrum</i> sp <sub>1</sub>	50	F	34.62	F	35.71	F	52.63	F	14.29	LF	36.7	F
<i>Staurastrum</i> sp <sub>2</sub>	37.5	F	30.77	F	26.19	LF	73.68	VF	70.14	S	33.94	F
<i>Staurastrum</i> sp <sub>3</sub>	75	VF	42.31	F	50	F	42.11	F	35.71	F	46.79	F
<i>Staurastrum</i> sp <sub>4</sub>	-	-	70.69	S	40.76	S	-	-	-	-	30.67	S
<i>Tetraedron gracile</i> (Reinsch) Ransgirg	37.5	F	23.08	LF	14.29	LF	26.32	LF	14.29	LF	20.18	LF
<i>Tetraedron</i> sp <sub>1</sub>	50	F	34.62	F	23.81	LF	42.11	F	70.14	S	29.36	LF
<i>Tetraedron</i> sp <sub>2</sub>	-	-	-	-	-	-	5.26	S	-	-	00.92	S
<i>Xanthidium</i> sp.	-	-	3.85	S	-	-	5.26	S	-	-	10.83	S
<i>Zygnema</i> sp.	12.5	LF	-	-	-	-	-	-	70.14	S	10.83	S
<b>DINOPHYTA</b>												
<i>Peridinium gatunense</i> Nygaard	87.5	VF	65.38	F	54.76	F	73.68	VF	35.71	F	60.55	F
<b>RHODOPHYTA</b>												
<i>Compsopogon</i> sp.	-	-	-	-	90.52	S	31.58	F	70.14	S	10.09	LF

FO, Frequency of occurrence; Cat, category; FGO, frequency of general occurrence;; GCat, general category; S, sporadic; LF, low frequent; F, frequent; VF, very frequent; -, absent.