# Electronic Supplementary Materials (ESM)

# High nutrient loading and climatic parameters influence the dominance and dissimilarity of toxigenic cyanobacteria in northern bays of Lake Victoria

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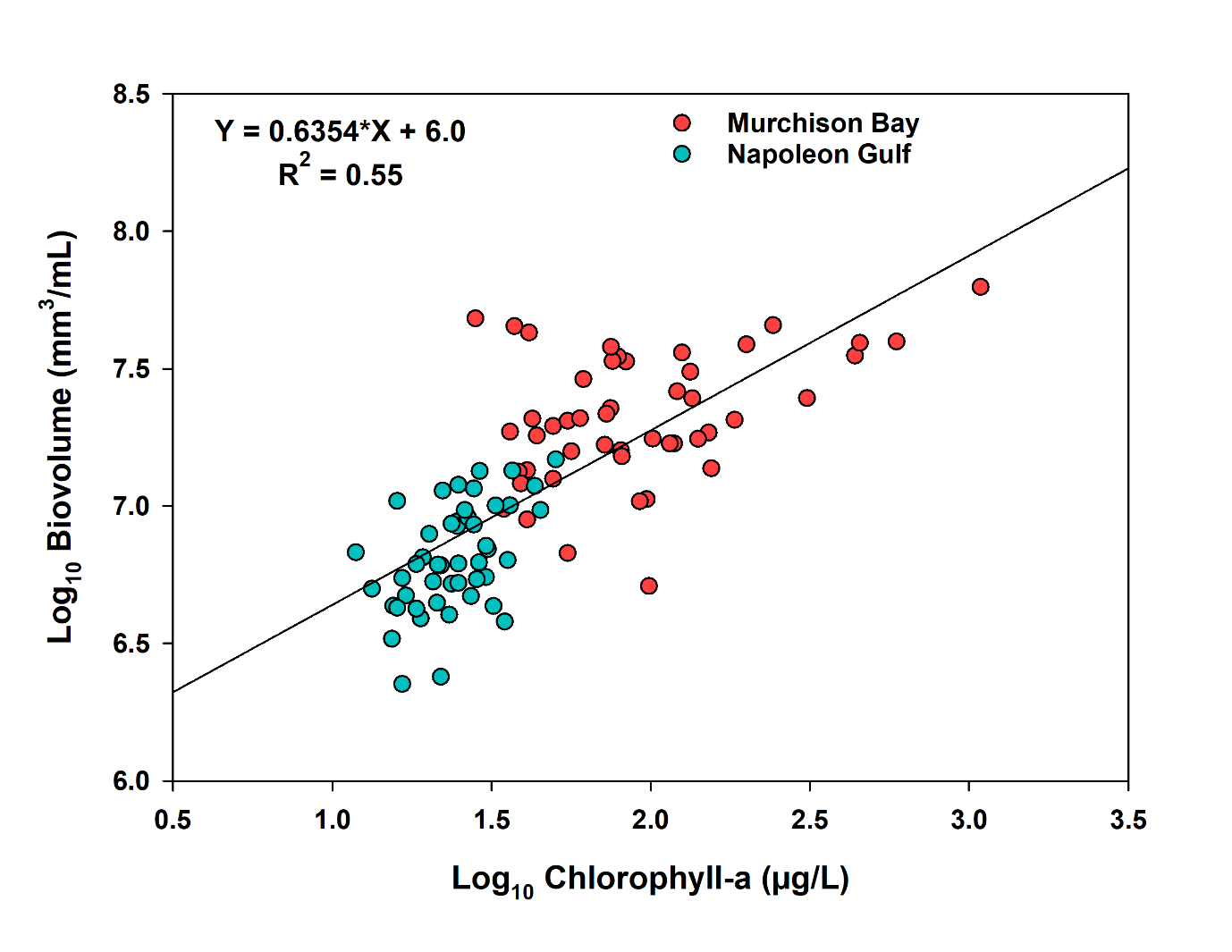
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Diagram

Description automatically generated

**Supp Figure 1:** Environmental gradients in Napoleon Gulf (NG) and Murchison Bay (MB). PCA on Euclidean distance based on limnological variables. A circle of correlation representing the contribution of environmental variables to the first two dimensions. The distance gradient from the shore is represented by an ellipse of different colours. Each data point corresponds to sampling stations of given months (November 2017 to October 2018) for NG (top, NG1-4) and MB (bottom, MB1-4).



**Supp Figure 2:** The correlation between total phytoplankton biovolume, phytoplankton abundance and chlorophyll-a biomass in Napoleon Gulf and Murchison Bay northern Lake Victoria

Shape

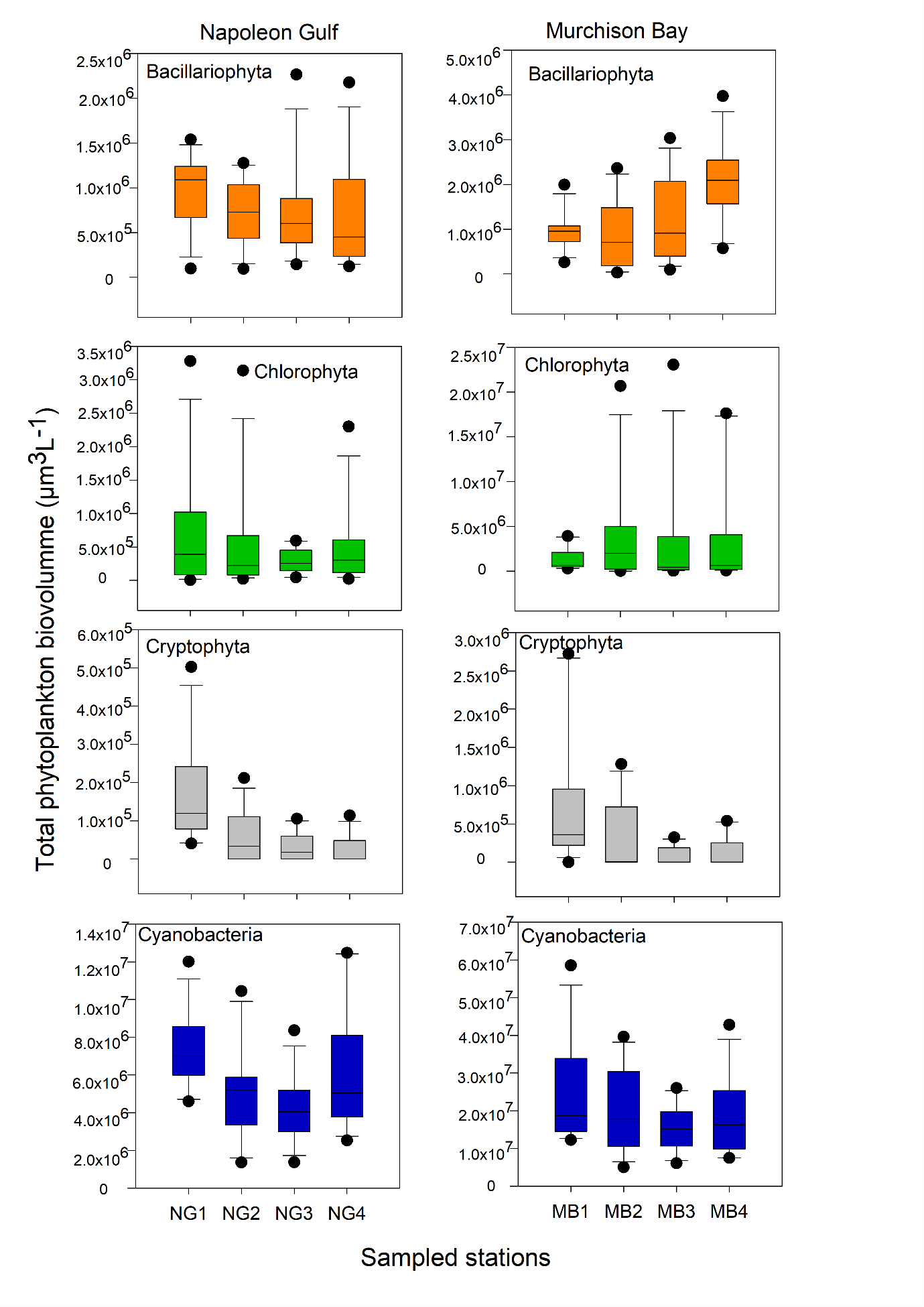
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**Supp Figure 3:** The total phytoplankton biovolume rank diagram in Napoleon Gulf and Murchison Bay northern Lake Victoria.

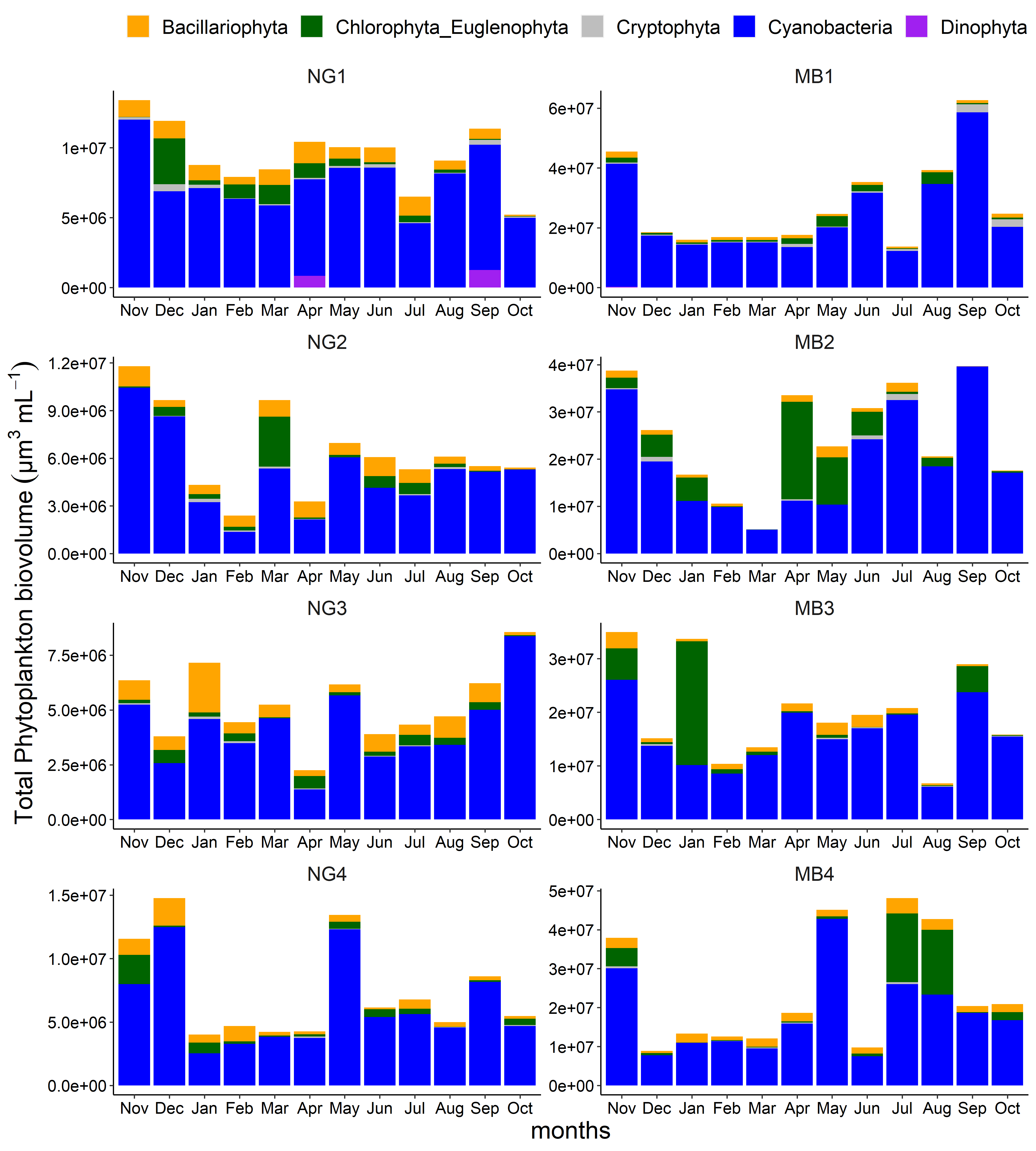
Chart

Description automatically generated

**Supp Figure 4:** Average taxa contribution to dissimilarity between phytoplankton communities from the two bays. The values are averaged across all pairs of the phytoplankton communities.



**Supp Figure 5*:*** Spatial variation of the biovolume of the phytoplankton groups along the distance gradient in Napoleon Gulf (Left panel) and Murchison Bay (Right panel) between November 2017 and October 2018.



**Supp Figure 6:** Temporal variation of total phytoplankton biovolume along the distance gradient in Napoleon Gulf (NG1-4) and Murchison Bay (MB1-4) between November 2017 and October 2018.

Chart, scatter chart

Description automatically generated

**Supp Figure 7:** The observed versus predicted biovolumes of the dominant taxa by the PLS model in NG and MB

**Supp Table S 1:** Summary statistics for the environmental and nutrient variables evaluated at the eight sites along the environmental gradients established in Napoleon Gulf (NG) and Murchison Bay (MB). Note: The negative values of fDOM means cells with little or no fluorescence

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **MB1** | | | **MB2** | | | **MB3** | | | **MB4** | | |
| Parameters | Mean±SD | Min | Max | Mean±SD | Min | Max | Mean±SD | Min | Max | Mean±SD | Min | Max |
| Depth (m) | 1.8±0.3 | 1.4 | 2.5 | 5.4±0.5 | 4.8 | 6.6 | 14.0±2.3 | 9.4 | 18.4 | 12.7±0.5 | 12 | 14 |
| Secchi (m) | 0.5 ±0.1 | 0.3 | 0.7 | 0.6±0.1 | 0.4 | 0.8 | 0.9 ±0.2 | 0.7 | 1.3 | 1.2±0.2 | 0.8 | 1.6 |
| Temp (°C) | 25.5±0.7 | 24.2 | 26.4 | 25.3±0.5 | 24.3 | 26 | 25.3±0.6 | 24 | 25.9 | 25.2±0.6 | 23.9 | 26.2 |
| EC (µS/cm) | 183.4±45.4 | 124.4 | 251.5 | 126.4±9.0 | 112.8 | 146.1 | 121.6±8.2 | 105.6 | 132.3 | 106.1±3.9 | 102 | 116 |
| fDOM (QSU) | 25.2±10.6 | 15.7 | 45.8 | 20.9±2.9 | 15.8 | 25.4 | 19.5±3.8 | 12.6 | 27 | 11.8±19.4 | 4.1 | 73.1 |
| Turbidity (NTU) | 78.9±63.9 | 8.9 | 197.2 | 30.6±18.7 | 9.7 | 73.7 | 14.0±8.8 | 4.4 | 32.9 | 10.9±8.6 | 2.1 | 30.9 |
| DO (mg/L) | 5.8±2.4 | 2.7 | 9.6 | 7.2±1.6 | 4.7 | 10.2 | 5.9±1.2 | 4 | 7.7 | 7.2±0.6 | 6.3 | 8.2 |
| pH | 8.2±0.4 | 7.6 | 8.9 | 8.6±0.5 | 8 | 9.4 | 8.3±0.3 | 7.8 | 8.8 | 8.6±0.3 | 8.1 | 9.1 |
| TP (µg/L) | 151.7±150.8 | 18 | 521.9 | 80.3±69.9 | 18.2 | 264.4 | 50.4±37.1 | 14.4 | 139.3 | 59.2±74.3 | 10.4 | 275.6 |
| SRP (µg/L) | 73.6±107.8 | 7.1 | 380.3 | 7.3±3.8 | 0.9 | 15.8 | 6.4±2.9 | 3.4 | 13.3 | 7.1±9.6 | 0.9 | 36.7 |
| TN (µg/L) | 3,008.6±170.5 | 153.1 | 21,633.60 | 1,036.2±877.9 | 170.5 | 3,294.60 | 1,020.0±1104.0 | 162.6 | 3,955.60 | 950.4±930.1 | 149.1 | 3,108.10 |
| NO3 (µg/L) | 88.4 ±100.9 | 19 | 380.4 | 146.8±258.4 | 8.5 | 940.1 | 84.1±67.4 | 7.3 | 231.4 | 64.7±55.1 | 9.7 | 170.1 |
| NH4 (µg/L) | 337.1±370.5 | 0.7 | 1,206.90 | 26.9±37.7 | 0.5 | 133.4 | 32.5±46.6 | 0.4 | 163.9 | 18.4±27.6 | 0 | 81.4 |
| SRSi (µg/L) | 1,089.8±922.7 | 282 | 3,081.90 | 483.0±243.0 | 139.5 | 932.1 | 385.3±185.7 | 112.4 | 685.6 | 235.9±196.1 | 9 | 596.9 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **NG1** | | | **NG2** | | | **NG3** | | | **NG4** | | | |
| Parameters | Mean±SD | Min | Max | Mean±SD | Min | Max | Mean±SD | Min | Max | Mean±SD | Min | Max |
| Depth (m) | 6.4±0.5 | 5.7 | 7.2 | 9.2±0.6 | 8 | 9.8 | 13.1±1.2 | 11.4 | 15.8 | 18.1±1.3 | 16.7 | 21.5 |
| Secchi (m) | 1.3±0.3 | 0.9 | 1.8 | 1.3±0.2 | 1 | 1.7 | 1.4±0.2 | 1.1 | 1.7 | 1.6 ±0.2 | 1.3 | 2 |
| Temp (°C) | 26.3±0.6 | 25.4 | 27.3 | 26.0±0.6 | 25.2 | 27 | 25.8±0.5 | 24.9 | 26.7 | 25.7±0.5 | 24.8 | 26.6 |
| EC (µS/cm) | 105.3±4.7 | 99.8 | 115.7 | 102.8±4.2 | 97.9 | 112.2 | 101.0±2.8 | 97 | 106 | 100.5±3.1 | 96 | 105.5 |
| fDOM (QSU) | -0.2±0.6 | -1.3 | 1 | - 0.5 ±0.5 | -1.6 | 0.4 | - 0.6±0.5 | -1.6 | -0.2 | - 0.8 ±0.4 | -1.5 | 0 |
| Turbidity (NTU) | 15.0±15.9 | 0.7 | 58.1 | 12.7±17.3 | 0.5 | 61.2 | 12.2±13.9 | 0.2 | 40 | 6.9±6.9 | 0 | 17.3 |
| DO (mg/L) | 7.3±1.0 | 5.5 | 8.8 | 7.4±0.8 | 6.4 | 8.8 | 7.1±0.7 | 5.8 | 8.1 | 7.0 ±0.8 | 4.9 | 7.9 |
| pH | 8.8±0.3 | 8.4 | 9.4 | 8.8±0.2 | 8.4 | 9.3 | 8.8±0.3 | 8.2 | 9.3 | 8.7±0.3 | 8 | 9.2 |
| TP (µg/L) | 37.9±36.6 | 8.9 | 145.1 | 44.0±24.9 | 8.2 | 168.4 | 40.6±31.4 | 10.1 | 128.1 | 36.9±22.8 | 8.6 | 94 |
| SRP (µg/L) | 4.5±1.9 | 0.6 | 8 | 5.2±2.3 | 0.7 | 9.5 | 6.4±3.1 | 0.7 | 11 | 8.8 ±5.3 | 0.7 | 18.2 |
| TN (µg/L) | 712.1±474.7 | 129.7 | 1,664.70 | 380.8±150.6 | 134.1 | 633.6 | 530.8±321 | 148.5 | 1,210.20 | 570.3 ±352.4 | 154.1 | 1,122.60 |
| NO3 (µg/L) | 28.6±22.0 | 2.1 | 68.5 | 41.6±43.5 | 1.9 | 153.9 | 50.4±46.0 | 1.1 | 170.2 | 121.0±262.2 | 2.1 | 947.4 |
| NH4 (µg/L) | 6.9±8.8 | 1.2 | 32.7 | 8.1±10.4 | 0.6 | 31 | 7.8±16.7 | 0.4 | 59.1 | 11.6 ±21.1 | 0.5 | 76.4 |
| SRSi (µg/L) | 302.9±194.2 | 99.9 | 635.4 | 308.2±210.1 | 81.9 | 717.8 | 327.1±194.5 | 80.2 | 629.9 | 368.8±262.6 | 73.4 | 903.9 |

**Supp Table 2**: Summary statistics for climatic parameters for Jinja and Kampala stations around Napoleon Gulf (NG) and Murchison Bay (MB) on the day of sampling and 5 days before sampling (D5). Data acquired from Uganda National Meteorological Authority (UNMA)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Napoleon Gulf** | | | **Murchison Bay** | | |
| **Parameters** | **Mean ±SD** | **Min** | **Max** | **Mean ±SD** | **Min** | **Max** |
| Rainfall | 3.52±8.19 | 0 | 28 | 4.61±6.07 | 0 | 17 |
| Min Temp | 16.45±1.28 | 13.5 | 18 | 19.01±1.02 | 17 | 20.5 |
| Max Temp | 28.04±2.47 | 22.1 | 32.2 | 28.16±1.85 | 24.6 | 31.8 |
| Mean Temp | 22.25±1.34 | 19.05 | 24.2 | 23.58±1.23 | 21.5 | 26.1 |
| Max Wind | 8.67±1.40 | 7.3 | 11.9 | 15.45±2.40 | 11.58 | 19.83 |
| Mean Wind | 3.68±0.42 | 3.1 | 4.4 | 5.12±1.04 | 3.227813 | 7.495938 |
| Max Solar | 884.13±249.22 | 199.2 | 1083.3 | 866.64±204.99 | 290 | 1059.5 |
| Mean Solar | 199.03±89.95 | 24 | 310.5 | 353.32±129.77 | 116.3447 | 532.3213 |
| Rainfall\_D5 | 12.47±16.51 | 0 | 61.1 | 9.93±10.84 | 0 | 34.3 |
| Min Temp\_D5 | 15.98±0.76 | 14.6 | 17 | 18.95±0.52 | 18.04 | 19.84 |
| Max Temp\_D5 | 28.18±1.92 | 24.72 | 31.86 | 28.09±1.53 | 25.9 | 31.14 |
| Mean Temp\_D5 | 22.08±0.97 | 20.3 | 23.54 | 23.52±0.88 | 22.11 | 25.17 |
| Max Wind\_D5 | 9.10±0.93 | 7.9 | 10.7 | 15.09±2.40 | 11.942 | 20.458 |
| Mean Wind\_D5 | 3.73±0.42 | 3.14 | 4.68 | 5.25±1.05 | 3.707667 | 8.107396 |
| Max Solar\_D5 | 954.61±69.06 | 792.7 | 1022.74 | 879.06±55.16 | 780.98 | 985.66 |
| Mean Solar\_D5 | 220.94±29.25 | 169.86 | 279.88 | 362.00±59.67 | 244.1796 | 451.7604 |

**Supp Table 3:** The presence-absence checklist of the phytoplankton taxa recovered and identified in NG and MB between November 2017 and October 2018.

| **Phytoplankton**  **taxa** | **Short name** | **Napoleon Gulf** | | | | **Murchison Bay** | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **NG1** | **NG2** | **NG3** | **NG4** | **MB1** | **MB2** | **MB3** | **MB4** |
| **Chlorophyceae** |  |  |  |  |  |  |  |  |  |
| *Actinastrum\_gracillimum* G.M. Smith | *Act\_gra* | - | - | - | + | + | - | - | - |
| *Actinastrum\_hantzschii* Lagerh | *Act\_han* | - | + | + | + | + | + | - | + |
| *Actinastrum\_*sp*.* | *Act\_sp.* | + | - | - | - | + | - | + | - |
| *Ankistrodesmus\_falcatus* (Corda) Ralfs | *Ank\_fal* | + | + | + | + | + | + | + | + |
| *Ankistrodesmus\_falcatus* var*. Tumidus* G.S. West | *Ank\_tum* | + | + | - | - | + | - | - | - |
| *Ankistrodesmus\_fusiformis* Corda | *Ank\_fus* | - | + | - | + | - | - | - | - |
| *Ankistrodesmus\_*sp. | *Ank\_sp.* | - | - | - | - | + | - | - | - |
| *Chlorella\_*sp. | *Chl\_sp.* | - | - | - | - | - | + | + | - |
| *Chlorella\_vulgaris* Beijerinck | *Chl\_vul* | + | + | + | + | + | + | + | + |
| *Closterium\_acerosum* (Shrank) Ehr. Ex Ralfs | *Clo\_ace* | - | + | + | - | - | - | + | + |
| *Closterium\_aciculare* T. West | *Clo\_aci* | - | - | - | + | - | - | - | - |
| *Closterium\_acutum* Brébisson – Ralfs | *Clo\_acu* | - | - | + | - | - | - | - | - |
| *Closterium\_gracile* Brébisson Ex Ralfs | *Clo\_gra* | - | - | - | - | + | - | - | + |
| *Closterium\_*sp*.* | *Clo\_sp.* | - | + | + | - | - | + | + | + |
| *Closterium\_*sps*.* | *Clo\_sps* | - | - | + | - | - | - | - | - |
| *Coelastrum\_microporum* var. *Microporum* Näg | *Coe\_mic* | - | - | - | + | - | - | - | - |
| *Coelastrum\_reticulatum* var. *reticulatum* Dang. Senn. | *Coe\_ret* | - | - | - | - | + | - | - | - |
| *Cosmarium\_“*habitat” sp1. | *Cos\_hab* | - | + | - | + | - | + | + | + |
| *Cosmarium\_*sp2*.* | *Cos\_sp.* | - | + | + | - | + | + | - | - |
| *Crucigenia\_fenestrata* (Schmidle) Schmidle | *Cru\_fen* | + | + | + | + | + | - | + | - |
| *Crucigenia\_*sp. | *Cru\_sp.* | - | - | - | - | + | + | - | - |
| *Crucigenia\_tetrapedia* (Kirchn.) W & G.S.West | *Cru\_tet* | - | - | - | - | - | - | + | - |
| *Dictyosphaerium\_*sp. | *Dic\_sp.* | - | - | - | - | + | - | - | - |
| *Didymocystis\_tuberculata* Korš. | *Did\_tub* | - | + | + | - | + | - | - | - |
| *Euglena\_acus* Ehren. | *Eug\_acu* | - | - | - | - | + | - | - | - |
| *Kirchneriella\_contorta* Schmidle | *Kir\_con* | - | - | + | - | - | - | - | - |
| *Kirchneriella\_obesa* (W.West) Schmidle | *Kir\_obe* | + | + | + | + | + | + | + | + |
| *Kirchneriella\_*sp*.* | *Kir\_sp.* | + | - | - | - | - | - | + | + |
| *Lagerheimia\_citriformis* (Snow) Coll. | *Lag\_cit* | + | - | + | - | - | - | - | - |
| *Monoraphidium\_arcuatum* (Korš.) Hind. | *Mon\_arc* | - | - | - | - | - | - | + | + |
| *Monoraphidium\_contortum* (Thur.) Kom. – Legn. | *Mon\_con* | + | + | + | + | + | + | + | + |
| *Monoraphidium\_griffithii* (Berk.) Kom. – Legn. | *Mon\_gri* | - | + | + | + | + | - | - | + |
| *Monoraphidium\_*sp1*.* | *Mon\_sp1* | - | - | - | - | - | + | - | - |
| *Oocystis\_borgei* Snow | *Ooc\_bor* | - | - | + | + | - | - | - | + |
| *Oocystis\_gigas* W.Archer | *Ooc\_gig* | + | + | + | - | + | + | - | - |
| *Oocystis\_*sp. | *Ooc\_sp.* | - | - | - | - | + | - | - | - |
| *Pediastrum\_duplex* Meyen | *Ped\_dup* | - | - | + | + | - | - | - | - |
| *Pediastrum\_simplex* Meyen | *Ped\_sim* | + | + | + | + | + | + | - | + |
| *Pediastrum\_tetras* (Ehrenb.) Ralfs. | *Ped\_tet* | - | - | + | - | - | - | - | - |
| *Phacus\_acuminatus* A. Stokes | *Pha\_acu* | - | + | - | - | - | - | - | - |
| *Phacus* sp. | *Pha\_sp.* | - | - | - | - | + | - | - | - |
| *Scenedesmus\_acuminatus* (Lagerh.) Chod. | *Sce\_acum* | + | + | + | + | + | + | + | + |
| *Scenedesmus\_acutus* Meyen | *Sce\_acut* | - | + | - | - | - | - | - | - |
| *Scenedesmus\_apiculatus* (W. &G.S. West) Chod. | *Sce\_apic* | + | + | + | + | + | - | + | - |
| *Scenedesmus\_ecornis* (Ehren.) Chod. | *Sce\_eco* | - | - | - | - | - | - | - | + |
| *Scenedesmus\_arcuatus* (Lemm.) Lemm. | *Sce\_arc* | - | + | - | - | - | - | - | - |
| *Scenedesmus\_armatus* Chod. | *Sce\_arm* | - | - | - | - | + | - | - | + |
| *Scenedesmus\_falcatus* Chod. | *Sce\_fal* | - | - | + | - | - | - | - | + |
| *Scenedesmus\_obliquus* (Turp.) Kütz. | *Sce\_obl* | + | - | - | - | - | - | - | - |
| *Scenedesmus\_perforatus* Lemm. | *Sce\_per* | + | + | + | + | + | + | + | + |
| *Scenedesmus\_quadricauda* Hortob. | *Sce\_qua* | - | + | + | + | + | - | + | + |
| *Scenedesmus\_*sp | *Sce\_sp* | - | - | - | + | - | + | - | - |
| *Scenedesmus\_*sp1*.* | *Sce\_sp1* | + | - | - | - | - | - | - | - |
| *Selenastrum\_bibraianum* Reinsch | *Sce\_bib* | - | - | - | - | + | - | + | - |
| *Selenastrum\_minutum* (Näg.) Coll. | *Sel\_min* | - | - | - | - | - | + | - | - |
| *Selenastrum\_*sp. | *Sel\_sp.* | - | - | - | - | - | - | + | + |
| *Staurastrum\_anatinum* Cooke Et Wills | *Sel\_ana* | - | + | - | - | - | - | - | - |
| *Staurastrum\_furcigerum* (Bréb.) W.Archer | *Sta\_fur* | - | - | - | - | + | - | - | - |
| *Staurastrum\_gracile* Ralfs | *Sta\_gra* | + | + | - | + | + | - | - | + |
| *Staurastrum\_paradoxum* Meyen Ex Ralfs | *Sta\_par* | - | + | - | - | - | - | - | - |
| *Tetraedon\_*sp | *Tet\_sp* | - | + | - | + | - | - | - | - |
| *Xanthidium\_*sp. | *Xan\_sp.* | - | - | - | + | - | - | - | - |
| **Cyanobacteria** |  |  |  |  |  |  |  |  |  |
| *Anabaenopsis\_tanganyikae\** (G.S West) Wol. Et Mill | *Ana\_tan* | + | + | - | + | + | - | + | - |
| *Aphanocapsa\_delicatissima* West & G.S West | *Aph\_del* | + | + | + | + | + | + | + | + |
| *Aphanocapsa\_elachista* West & G.S West | *Aph\_ela* | + | + | + | + | + | + | + | + |
| *Aphanocapsa\_holsatica* (Lemm.) G.Crond. & Kom. | *Aph\_hol* | + | + | - | + | + | + | + | + |
| *Aphanocapsa\_incerta* (Lemm.) G.Crond. & Kom. | *Aph\_inc* | + | + | + | + | + | + | + | + |
| *Aphanocapsa\_nubilium* Kom. & H.J.Kling | *Aph\_nub* | + | + | + | + | + | + | + | + |
| *Aphanocapsa\_*sp. | *Aph\_sp.* | - | - | - | - | + | + | + | + |
| *Aphanocapsa\_*sp1*.* | *Aph\_sp1* | + | + | + | + | - | - | - | - |
| *Chroococcus\_dispersus* (Keis.) Lemm. | *Chr\_dis* | + | + | + | + | + | + | + | + |
| *Chroococcus\_limnetica* Lemm. | *Chr\_lim* | + | + | + | + | + | + | + | + |
| *Chroococcus\_minutus* (Kütz.) Näg. | *Chr\_min* | + | + | + | + | + | + | + | + |
| *Chroococcus\_*sp*.* | *Chr\_sp.* | + | + | - | - | - | + | + | + |
| *Chroococcus\_turgidus* (Kütz.) Näg. | *Chr\_tur* | + | + | + | + | + | + | + | + |
| *Coelomoron\_pusillum* (Van Goor) Kom. | *Chr\_pus* | + | + | + | + | + | + | + | + |
| *Coelomoron\_*sp*.* | *Coel\_sp.* | + | - | - | - | - | - | + | - |
| *Coelomoron\_tropicale* P.A.C Senna, A.C. Peres & Kom. | *Coel\_tro* | + | + | + | + | + | + | + | + |
| *Coelosphaerium\_kuetzingnium* Näg. | *Coe\_kue* | + | + | + | + | + | + | + | + |
| *Cylindrospermopsis\_africana\** Kom. & Kling | *Cyl\_afr* | + | + | + | - | - | - | - | - |
| *Cylindrospermopsis\_raciborskii\** (Wol.) Seen. Et Sub.Raj | *Cyl\_rac* | - | - | - | + | - | - | - | - |
| *Dolichospermum\_circinale\** Rab. Ex Bor. Et Flah | *Dol\_cir* | + | + | + | + | + | + | + | + |
| *Dolichospermum\_compactum\** Nygaard | *Dol\_com* | - | + | - | - | - | - | - | - |
| *Dolichospermum\_*sp1\*. | *Dol\_sp1* | - | - | - | - | - | + | - | - |
| *Dolichospermum\_*sp2\*. | *Dol\_sp2* | - | - | - | - | - | - | - | + |
| *Gomposphaeria\_aponina* Kütz. | *Gom\_apo* | - | + | - | - | + | + | + | + |
| *Gomposphaeria\_lacustris* Chod. | *Gom\_lac* | - | - | - | - | + | + | - | + |
| *Leptolyngbya\_africana* (Lemm.) Anagn. & Kom. | *Lep\_afr* | - | - | + | - | - | - | - | - |
| *Merismopedia\_elegans* A.Braun Ex Kütz. | *Mer\_ele* | + | - | + | + | - | - | - | + |
| *Merismopedia\_glauca* (Ehr.) Näg. | *Mer\_gla* | - | + | - | - | - | + | - | - |
| *Merismopedia\_punctata* Meyen | *Mer\_pun* | + | - | - | - | - | - | - | - |
| *Merismopedia\_tenuissima* Lemm. | *Mer\_ten* | + | + | + | + | + | + | + | + |
| *Microcystis\_aeruginosa\** (Kütz.) Kütz. | *Mic\_aer* | + | + | - | + | + | + | + | + |
| *Microcystis\_botrys\** Teiling | *Mic\_bot* | - | - | - | - | - | - | - | + |
| *Microcystis\_flos-aquae\** (Wittr.) Kirch. | *Mic\_flo* | + | + | + | + | + | + | + | + |
| *Microcystis\_novacekii\** (Kom.) Compére | *Mic\_nov* | + | - | - | - | + | - | - | - |
| *Microcystis\_viridis\** (A. Braun) Lemm. | *Mic\_vir* | - | - | - | - | + | + | + | + |
| *Microcystis\_wensenbergii\** Kom. | *Mic\_wen* | - | - | - | - | + | + | + | + |
| *Planktolyngbya\_circumcreta* (G.S.West) Anagn. & Kom. | *Pla\_cir* | + | + | + | + | + | + | + | + |
| *Planktolyngbya\_contorta* (Lemm.) Anagn. & Kom. | *Pla\_con* | + | - | - | - | + | + | - | - |
| *Planktolyngbya\_limnetica* (Lemm.) Komá-Legn. & Cronb. | *Pla\_lim* | + | + | + | + | + | + | + | + |
| *Planktolyngbya\_tallingii* Kom. & Kling | *Pla\_tal* | + | + | + | + | + | + | + | + |
| *Planktolyngbya\_undulata* Kom. & Kling | *Pla\_und* | - | + | - | + | - | - | - | - |
| *Pseudanabaena\_limnetica* (Lemm.) Kom. | *Pse\_lim* | + | + | + | + | - | + | + | - |
| *Pseudanabaena\_mucicola* (Naum. & Huber-Pesta.) Schwabe | *Pse\_muc* | + | - | - | - | + | - | - | - |
| *Pseudanabaena\_*sp*.* | *Pse\_sp.* | + | - | + | + | - | - | - | - |
| **Bacillariophyceae** |  |  |  |  |  |  |  |  |  |
| *Aulacoseira\_ambigua* (Grun.) Sim. | *Aul\_amb* | + | - | - | - | - | + | + | - |
| *Aulacoseira\_granulata* (Ehr.) Sim. | *Aul\_gra* | - | + | + | - | + | + | + | + |
| *Centric\_diatom* | *Cen\_dia* | - | - | - | - | - | - | - | + |
| *Cocconeis\_*sp*.* | *Coc\_sp.* | - | + | - | + | - | - | - | - |
| *Cyclotella\_kutzingiana* (Kütz.) Brun. | *Cyc\_kut* | + | - | + | - | + | - | + | + |
| *Cyclotella\_meneghiniana* Kütz. | *Cyc\_men* | - | + | - | + | - | - | + | - |
| *Cyclotella\_*sp*.* | *Cyc\_sp.* | + | + | - | + | + | - | - | - |
| *Cyclotella\_*spp*.* | *Cyc\_spp* | - | - | - | + | - | - | - | - |
| *Epithemia\_argus* (Ehren.) Kütz. | *Epi\_arg* | - | - | - | - | - | - | - | + |
| *Navicula\_gastrum* (Ehren.) Kütz. | *Nav\_gas* | + | + | + | + | + | - | - | + |
| *Navicula\_radiosa* Kütz. | *Nav\_rad* | + | + | + | + | - | - | + | + |
| *Navicula\_*sp. | *Nav\_sp.* | - | - | - | - | - | + | - | - |
| *Navicula\_*sp1 | *Nav\_sp1* | - | - | - | - | + | - | - | - |
| *Nitzschia\_acicularis* (Kütz.) W. Smith | *Nit\_aci* | + | + | + | + | + | + | + | + |
| *Nitzschia\_acicularis* var*. constricta* (W. Greg.) Grunow | *Nit\_con* | - | + | + | - | + | + | - | + |
| *Nitzschia\_fonticola* (Grunow) Grunow | *Nit\_fon* | + | + | - | + | + | + | + | + |
| *Nitzschia\_*sps. | *Nit\_sps* | - | - | - | - | + | - | - | - |
| *Stephanodiscus\_astraea* Kütz. | *Ste\_ast* | + | + | + | + | + | + | + | + |
| *Stephanodiscus\_*sp. | *Ste\_sp.* | - | - | - | - | + | - | - | - |
| *Surirella\_constricta* W. Smith | *Sur\_con* | - | - | - | - | - | - | + | - |
| *Surirella\_robusta* Ehren. | *Sur\_rob* | - | - | - | - | + | - | - | - |
| *Synedra\_acus* Kütz. | *Syn\_acu* | + | - | - | - | - | - | - | + |
| *Synedra\_cunningtonii* G.S. West | *Syn\_cun* | + | + | + | + | + | + | + | + |
| *Ulnaria\_sp.* | *Uln\_sp.* | - | - | - | - | - | + | - | - |
| **Dinophyceae** |  |  |  |  |  |  |  |  |  |
| *Goniochloris*\_sp. | *Gon\_sp.* | - | - | - | - | + | - | - | - |
| *Peridinium \_*sp*.* | *Per\_sp.* | + | - | - | - | - | - | - | - |
| **Cryptophyceae** |  |  |  |  |  |  |  |  |  |
| *Cryptomonas\_erosa* Ehren. | *Cry\_ero* | + | + | + | + | + | + | + | + |
| *Cryptomonas\_marssonii* Skuja | *Cry\_mar* | + | + | + | - | + | + | - | + |
| **Chrysophyceae** |  |  |  |  |  |  |  |  |  |
| *Ochromonas\_*sp*.* | *Och\_sp.* | - | + | + | - | - | - | + | + |
| **Species richness (S)** |  | **61** | **69** | **59** | **60** | **74** | **57** | **58** | **65** |
| **Shannon – Weaver diversity index (H’)** |  | **2.69** | **2.72** | **2.61** | **2.58** | **2.59** | **2.76** | **2.92** | **2.69** |

**Supp Table 4:** The average dissimilarity amongst stations and taxa contribution to dissimilarity within the Napoleon Gulf (NG1-4) and Murchison Bay (MB1-4): Note (only > 3.5% contribution shown)

| **Phytoplankton taxa** | **Average biovolume** | | **Mean ± SD dissimilarity** | **Contribution (%)** | **Cumulative contribution (%)** |
| --- | --- | --- | --- | --- | --- |
| **Napoleon Gulf stations NG1-4** | | | | | |
|  | **NG1** | **NG2 (Mean = 53.89)** | |  |  |
| *Dolichospermum\_circinale* | 1550.72 | 1283.08 | 3.61±1.23 | 6.7 | 6.7 |
| *Pseudanabaena\_sp.* | 563.93 | 0 | 3.11±2.3 | 5.77 | 12.46 |
| *Planktolyngbya\_circumcreta* | 1731.71 | 1368.85 | 3.07±1.45 | 5.7 | 18.16 |
| *Microcystis\_flos-aquae* | 539.23 | 318.95 | 2.87±1.09 | 5.32 | 23.49 |
| *Pseudanabaena\_limnetica* | 555.03 | 43.13 | 2.85±1.33 | 5.29 | 28.78 |
| *Merismopedia\_tenuissima* | 99.91 | 482.46 | 2.2±1.59 | 4.08 | 32.86 |
| *Pediastrum\_simplex* | 294.66 | 147.23 | 2.04±0.61 | 3.78 | 36.64 |
|  | **NG1** | **NG3 (Mean =53.64)** | |  |  |
| *D.\_circinale* | 1550.72 | 1180.29 | 3.84±1.31 | 7.16 | 7.16 |
| *P.\_circumcreta* | 1731.71 | 1197.16 | 3.39±1.57 | 6.32 | 13.48 |
| *M.\_flos-aquae* | 539.23 | 90.92 | 3.16±0.99 | 5.9 | 19.38 |
| *Pseudanabaena\_sp..* | 563.93 | 60.59 | 3.06±2.03 | 5.7 | 25.08 |
| *Pseudanabaena\_limnetica* | 555.03 | 291.54 | 2.77±1.36 | 5.16 | 30.24 |
|  | **NG2** | **NG3 (Mean =51.90)** | |  |  |
| *D.\_circinale* | 1283.08 | 1180.29 | 4.75±1.34 | 9.16 | 9.16 |
| *M.\_tenuissima* | 482.46 | 88.57 | 2.62±1.58 | 5.05 | 14.21 |
| *P.\_circumcreta* | 1368.85 | 1197.16 | 2.5±1.21 | 4.82 | 19.03 |
| *M.\_flos-aquae* | 318.95 | 90.92 | 2.2±0.89 | 4.23 | 23.26 |
|  | **NG1** | **NG4 (Mean =64.77)** | |  |  |
| *Aphanocapsa\_nubilium* | 75.43 | 1174.23 | 4.53±2.01 | 7 | 7 |
| *D.\_circinale* | 1550.72 | 1955.68 | 4.25±1.33 | 6.56 | 13.55 |
| *M.\_tenuissima* | 99.91 | 1044.55 | 3.69±1.52 | 5.7 | 19.25 |
| *Aphanocapsa\_sp1* | 38.31 | 910.25 | 3.51±1.35 | 5.43 | 24.68 |
| *M.\_flos-aquae* | 539.23 | 1128.16 | 3.4±1.48 | 5.25 | 29.93 |
| *Aphanocapsa\_delicatissima* | 24.64 | 684.13 | 2.76±0.94 | 4.26 | 34.19 |
| *Nitzschia\_acicularis* | 671.48 | 0 | 2.71±2.71 | 4.19 | 38.37 |
| *Aphanocapsa\_holsatica* | 14.93 | 579.44 | 2.3±0.81 | 3.55 | 41.92 |
|  | **NG2** | **NG4 (Mean =63.03)** | |  |  |
| *D.\_ circinale* | 1283.08 | 1955.68 | 5.28±1.31 | 8.37 | 8.37 |
| *A.\_nubilium* | 204.16 | 1174.23 | 4.42±1.86 | 7.01 | 15.38 |
| *M.\_flos-aquae* | 318.95 | 1128.16 | 4.14±1.59 | 6.57 | 21.95 |
| *Aphanocapsa\_sp1* | 152.39 | 910.25 | 3.63±1.48 | 5.76 | 27.71 |
| *M.\_tenuissima* | 482.46 | 1044.55 | 3.1±1.32 | 4.91 | 32.62 |
| *A.\_delicatissima* | 160.33 | 684.13 | 2.96±1.08 | 4.7 | 37.33 |
| *N.\_acicularis* | 606.85 | 0 | 2.66±2.67 | 4.23 | 41.55 |
| *A.\_holsatica* | 86.91 | 579.44 | 2.53±0.87 | 4.02 | 45.57 |
|  | **NG3** | **NG4 (Mean =65.94)** | |  |  |
| *D.\_circinale* | 1180.29 | 1955.68 | 5.63±1.38 | 8.53 | 8.53 |
| *M.\_flos-aquae* | 90.92 | 1128.16 | 5.1±1.74 | 7.73 | 16.26 |
| *Aphanocapsa\_nubilium* | 275.43 | 1174.23 | 4.37±1.78 | 6.63 | 22.89 |
| *M.\_tenuissima* | 88.57 | 1044.55 | 4.18±1.55 | 6.34 | 29.23 |
| *Aphanocapsa\_sp1* | 132.79 | 910.25 | 3.81±1.43 | 5.78 | 35.01 |
| *A.\_delicatissima* | 91.81 | 684.13 | 3.09±1 | 4.69 | 39.7 |
| *N.\_acicularis* | 605.91 | 0 | 2.74±3.34 | 4.16 | 43.86 |
| *Aphanocapsa\_elachista* | 176.08 | 586.47 | 2.65±0.99 | 4.02 | 47.88 |
| **Murchison Bay stations MB1-4** | | | | | |
|  | **MB1** | **MB2 (Mean =59.62)** | |  |  |
| *Microcystis\_aeruginosa* | 1913.4 | 1490.08 | 5.62±1.47 | 9.43 | 9.43 |
| *M.\_flos-aquae* | 2199.86 | 2097.74 | 4.57±1.32 | 7.67 | 17.1 |
| *D.\_circinale* | 1422.77 | 1525.27 | 4.35±1.4 | 7.3 | 24.39 |
| *P.\_simplex* | 253.6 | 921.38 | 3.17±0.73 | 5.32 | 29.72 |
| *Chroococcus\_turgidus* | 803.54 | 898.27 | 2.85±1.36 | 4.78 | 34.49 |
| *P\_ circumcreta* | 1086.81 | 907.63 | 2.54±1.25 | 4.25 | 38.75 |
| *Gomposphaeria\_aponina* | 535.83 | 526.95 | 2.52±0.78 | 4.23 | 42.98 |
|  | **MB1** | **MB3 (Mean = 58.35)** | |  |  |
| *M.\_aeruginosa* | 1913.4 | 1046.71 | 5.68±1.4 | 9.73 | 9.73 |
| *M.\_flos-aquae* | 2199.86 | 1428.68 | 4.48±1.31 | 7.67 | 17.4 |
| *D.\_circinale* | 1422.77 | 1736.69 | 3.6±1.39 | 6.16 | 23.56 |
| *C.\_turgidus* | 803.54 | 799.99 | 2.66±1.35 | 4.55 | 28.12 |
| *P.\_circumcreta* | 1086.81 | 1595.34 | 2.65±1.41 | 4.54 | 32.66 |
| *G.\_aponina* | 535.83 | 460.72 | 2.45±0.78 | 4.2 | 36.86 |
|  | **MB2** | **MB3 (Mean =57.91)** | |  |  |
| *M.\_flos-aquae* | 2097.74 | 1428.68 | 4.98±1.35 | 8.6 | 8.6 |
| *D.\_circinale* | 1525.27 | 1736.69 | 4.77±1.43 | 8.24 | 16.84 |
| *M.\_aeruginosa* | 1490.08 | 1046.71 | 4.26±1.28 | 7.35 | 24.19 |
| *P.\_circumcreta* | 907.63 | 1595.34 | 3.76±1.23 | 6.49 | 30.68 |
| *P.\_simplex* | 921.38 | 0 | 3.15±0.61 | 5.44 | 36.12 |
| *C.\_turgidus* | 898.27 | 799.99 | 3.09±1.4 | 5.34 | 41.46 |
| *G.\_aponina* | 526.95 | 460.72 | 2.76±0.77 | 4.77 | 46.24 |
|  | **MB1** | **MB4 (Mean = 66.65)** | |  |  |
| *M.\_flos-aquae* | 2199.86 | 50 | 7.16±1.79 | 10.74 | 10.74 |
| *M.\_aeruginosa* | 1913.4 | 1181.93 | 5.86±1.3 | 8.79 | 19.54 |
| *D.\_circinale* | 1422.77 | 2346.67 | 5.04±1.41 | 7.57 | 27.11 |
| *P.\_circumcreta* | 1086.81 | 1999.39 | 3.87±1.72 | 5.8 | 32.91 |
| *P.\_simplex* | 253.6 | 674.43 | 2.45±0.62 | 3.68 | 36.59 |
| *C.\_turgidus* | 803.54 | 300.96 | 2.38±1.23 | 3.57 | 40.15 |
| *G.\_aponina* | 535.83 | 434.21 | 2.27±0.71 | 3.41 | 43.57 |
|  | **MB2** | **MB4 (Mean =65.70)** | |  |  |
| *M.\_flos-aquae* | 2097.74 | 50 | 7.41±1.62 | 11.28 | 11.28 |
| *D.\_circinale* | 1525.27 | 2346.67 | 6.04±1.33 | 9.19 | 20.47 |
| *P.\_circumcreta* | 907.63 | 1999.39 | 5.06±1.38 | 7.7 | 28.17 |
| *M.\_aeruginosa* | 1490.08 | 1181.93 | 4.81±1.31 | 7.33 | 35.5 |
| *P.\_simplex* | 921.38 | 674.43 | 4.36±0.76 | 6.63 | 42.13 |
| *C.\_turgidus* | 898.27 | 300.96 | 2.86±1.26 | 4.36 | 46.49 |
| *G.\_aponina* | 526.95 | 434.21 | 2.61±0.71 | 3.97 | 50.46 |
|  | **MB3** | **MB4 (Mean = 59.40)** | |  |  |
| *M.\_flos-aquae* | 1428.68 | 50 | 5.11±1.49 | 8.6 | 8.6 |
| *D.\_circinale* | 1736.69 | 2346.67 | 4.87±1.51 | 8.2 | 16.8 |
| *M.\_aeruginosa* | 1046.71 | 1181.93 | 4.49±1.28 | 7.56 | 24.37 |
| *P.\_circumcreta* | 1595.34 | 1999.39 | 3.85±1.31 | 6.48 | 30.85 |
| *G.\_aponina* | 460.72 | 434.21 | 2.52±0.71 | 4.25 | 35.1 |
| *C.\_turgidus* | 799.99 | 300.96 | 2.47±1.17 | 4.16 | 39.26 |
| *P.\_simplex* | 0 | 674.43 | 2.02±0.44 | 3.4 | 42.66 |