**Suppl. Table 1**. Cyanobacterial richness and diversity indices obtained by Illumina sequencing of the 16S rRNA gene after normalization to 1983 sequences per sample.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|   | Observed OTUs | Good's coverage estimator (%) | Chao 1 | Shannon's index | Simpson's index | Equitability |
| Site T - 1 | 53 | 99 | 79.3 | 2.65 | 0.71 | 0.46 |
| Site T - 2 | 84 | 99 | 97.6 | 4.72 | 0.93 | 0.74 |
| **Site T (mean)** | **69** | **99** | **88.4** | **3.68** | **0.82** | **0.60** |
| Site P - 1 | 92 | 99 | 117.7 | 4.73 | 0.92 | 0.73 |
| Site P - 2 | 91 | 98 | 124.5 | 4.36 | 0.88 | 0.67 |
| Site P - 3 | 92 | 99 | 111.1 | 4.72 | 0.92 | 0.72 |
| **Site P (mean)** | **92** | **99** | **117.7** | **4.60** | **0.91** | **0.71** |
| **Site G** | **67** | **99** | **79.4** | **3.85** | **0.87** | **0.64** |

**Suppl. Table 2.** Characteristics of thawing seasons (when the soil temperature was > 0 °C) at the studied localities in Petunia Bay: a – in each year and b – 3-year mean for the individual months of the thawing period. The parameters were measured at 5 cm depth during the individual thawing seasons. SD corresponds to standard deviation.

*a.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Site** | **Season** | **Period** | **Duration (day)** | **Soil temperature, °C (SD)** | **Soil water content, m3 m-3 (SD)** |
| **T** | 2011 | 14/06 – 28/09  | 107  | 5.2 (2.2) | 0.36 (0.01) |
|  | 2012 | 16/06 – 22/09 | 99 | 4.8 (2.0) | 0.36 (0.01) |
|  | 2013 | 11/06 – 23/09 | 104 | 5.5 (2.7) | 0.37 (0.01)  |
|  | **2011-2013** |  | **103** | **5.2 (2.3)** | **0.36 (0.01)** |
| **P** | 2011 | 15/06 – 17/09 | 94 | 5.3 (2.7) | 0.23 (0.01) |
|  | 2012 | 2/07 – 19/09 | 72 | 4.1 (2.5) | 0.24 (0.01) |
|  | 2013 | 11/06 – 22/09 | 97 | 5.0 (2.9) | 0.24 (0.01) |
|  | **2011-2013** |  | **88** | **4.8 (2.8)** | **0.24 (0.01)** |
| **G** | 2011 | 14/06 – 27/09 | 102 | 6.7 (3.2) | 0.08 (0.03) |
|  | 2012 | 19/06 – 22/09 | 93 | 6.0 (2.8) | 0.08 (0.04) |
|  | 2013 | 11/06 – 22/09 | 100 | 6.2 (3.1) | 0.12 (0.04) |
|  | **2011-2013** |  | **98** | **6.3 (3.1)** | **0.09 (0.04)** |

*b.*

|  |  |  |
| --- | --- | --- |
|  | **Soil temperature (oC)** | **Soil water content (m3 m-3)** |
|  | **Site T** | **Site P** | **Site G** | **Site T** | **Site P** | **Site G** |
| **June** |  |  |  |  |  |  |
| Mean | 2.3 | 0.7 | 3.3 | 0.38 | 0.24 | 0.13 |
| Max | 11.2 | 14.1 | 16.6 | 0.42 | 0.30 | 0.30 |
| Min | -1.6 | -6.1 | -2.1 | 0.37 | 0.22 | 0.03 |
| **July** |  |  |  |  |  |  |
| Mean | 7.0 | 6.3 | 8.5 | 0.36 | 0.24 | 0.08 |
| Max | 11.9 | 16.1 | 19.0 | 0.38 | 0.29 | 0.16 |
| Min | 2.8 | -0.1 | 3.8 | 0.35 | 0.22 | 0.05 |
| **August** |  |  |  |  |  |  |
| Mean | 5.8 | 4.4 | 6.1 | 0.36 | 0.23 | 0.08 |
| Max | 10.7 | 13.0 | 14.7 | 0.37 | 0.28 | 0.22 |
| Min | 1.1 | -0.1 | -0.2 | 0.35 | 0.22 | 0.05 |
| **September** |  |  |  |  |  |  |
| Mean | 2.2 | 1.1 | 2.0 | 0.36 | 0.23 | 0.10 |
| Max | 6.7 | 5.6 | 7.0 | 0.37 | 0.28 | 0.17 |
| Min | -0.7 | -2.3 | -4.8 | 0.35 | 0.22 | 0.06 |

**Suppl. Table 3.** Two-way ANOVA mixed models of algal biovolume in the studied soil samples. Numbers show F ratios and superscripts correspond to the level of significance (\*\*\*p<0.001, \*\*p<0.01, \*p<0.05, ns - non-significant).

|  |  |  |  |
| --- | --- | --- | --- |
| **Source of variance** | **Cyanobacteria** | **Eukaryotic microalgae** | **Diatoms** |
| **Site** | 16.13 \*\*\* | 8.42\*\* | 6.15\* |
| **Year** | ns | 6.48\* | ns |
| **Site x Year** | ns | ns | ns |