**Supporting Information for**

**Peatland degradation increased biodiversity and polyphenols accumulation**

Zeng Jia1, Chen Huai2,3, Bai Yinping1, Dong Faqin4, Yang Zhenan5, Yang Suizhuang1, Yang Gang1\*

1 School of Life Science and Engineering, Southwest University of Science and Technology, Mianyang 621010, China, 2 Key Laboratory of Mountain Ecological Restoration and Bioresource Utilization ＆Ecological Restoration Biodiversity Conservation, Key Laboratory of Sichuan Province, Chengdu Institute of Biology, Chinese Academy of Sciences, Chengdu, 610041, China, 3 Zoige Peatland and Global Change Research Station, Chengdu Institute of Biology, Chinese Academy of Sciences, Hongyuan 624400, China, 4 Key Laboratory of Solid Waste Treatment and Resource Recycle, Ministry of Education, Southwest University of Science and Technology, Mianyang 621010, China, 5 Key Laboratory of Southwest China Wildlife Resources Conservation (China West Normal University), Ministry of Education；No.1 Shi Da Road, Nanchong, Sichuan, China, 637000

**\* Corresponding authors**: Associate Prof. Gang Yang, PhD

1. mail: [yanggang903@swust.edu.cn](mailto:yanggang903@swust.edu.cn) or [yanggang903@163.com](mailto:yanggang903@163.com)

**Contents of this file**

Tables S1 to S5

**Introduction**

The support information provides the same charts and tables as in this article, as well as the data to generate the charts.

**Table 1 Soil properties (at depths of 0–30cm) of different degradation peatlands. Values are the annual means±standard error. Different letters between forests types indicate significant differences (LSD test, lowercase P<0.05).**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **swamp meadow** | **swamp meadows** | **alpine meadow** |
| **Degradation Stage** | intact fen with high water table | lightly degraded fen with a fluctuating water table | heavily degraded fen with a lower water table |
| **Dissolved Organic Carbon (mg/kg)** | 195.08c±22.18 | 348.63ab±22.80 | 445.04a±81.30 |
| **Total Carbon (%)** | 9.14b±1.28 | 26.84a±0.70 | 25.17a±2.78 |
| **CH4 emission**  **(mg·C·m−2·h−1)** | 12.64±6.29 | 4.39±1.96 | 0.11±0.14 |

**Table 2 Vegetation survey results for sampling of different types of peatlands representative of different stages of degradation (****Different letters indicate significant differences between different types of peatlands, P<0.05)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Peatland type** | **Total vegetation coverage** | **Dominant species** | **Coverage of dominant species** | **Accompanying species** | **Coverage of accompanying species** |
| **alpine meadow** | 97.50±4.18a | *Carex muliensis、**Scirpus triqueter* | 83.83±11.41a | *Deschampsia caespitosa、**Caltha scaposa、**potentilla anserine、**Sanguisorba officinalis、Tibetan golden lotus flower、**Cremanthodium brunneo-pilosum 、Saussurea stella Maxim、leontopodium leontopodioides、**Gentiana leucomelaena、Epilobium tibetanum Hausskn、Commelina diffusa、Limosella aquatica、Sibbaldia procumbens* | 27.00±7.29a |
|
|
| **swamp meadow** | 73.33±11.69b | *Carex meyeriana、**Commelina diffusa* | 62.83±13.86b | *Limosella aquatica、**Sibbaldia procumbens、Deschampsia caespitosa、Scirpus triqueter、Heleocharis kamtschatica、Sanguisorba officinalis、Caltha scaposa、**Gentiana leucomelaena、Cremanthodium brunneo-pilosum、**potentilla anserine、Delphinium grandiflorum* | 16.00±8.83b |
| **peat swamp** | 51.67±7.5c | *Commelina diffusa、Halerpestes tricuspis* | 47.33±8.52c | *Carex meyeriana、Polygonum aviculare、**Heleocharis kamtschatica、Deschampsia caespitosa、Epilobium tibetanum Hausskn、Draba nemorosa* | 6.33±3.27c |

**Table 3 Changes in evenness, diversity and richness of different stages of peatland degradation (different letters indicate significant differences, P<0.05)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Pielou evenness index** | **Shannon-Wiener's diversity index** | **Species richness index** |
| **alpine meadow** | 0.297±0.032a | 1.465±0.138a | 7.5±1.760a |
| **swamp meadow** | 0.29±0.041a | 1.264±0.219a | 5.833±1.329ab |
| **peat** **swamp** | 0.232±0.043b | 0.991±0.200b | 4.167±1.169b |

**Table 4 Water-soluble phenol concentrations at different soil depths and peatland degradation stages (different letters indicate significant differences, P < 0.05)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Soil depth** | | **Peatland degradation stages** | |
| **alpine meadow** | **swamp** **meadow** |
| **Water-soluble phenols (μg/g****)** | 0–10cm | 76.623 ±24.360c | 19.750±4.106a |
| 10–20cm | 161.795±17.020a | 22.989±2.956a |
| 20–30cm | 116.606±33.256b | 23.483±8.333a |
| **The total phenols**  **(μg/g)** | 0–10cm | 629.867±46.361b | 748.867±17.786a |
| 10–20cm | 651.533±52.786ab | 753.866±37.978a |
| 20–30cm | 741.539±35.303a | 696.533±16.921b |

**Table 5 Correlation analysis between water-soluble phenol concentrations and total vegetation coverage, etc**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Water-soluble phenols** | **Pielou evenness index** | **Shannon diversity index** | **Richness index** | **Total vegetation coverage** |
| **Water-soluble phenols** | 1 |  |  |  |  |
| **Pielou evenness index** | 0.428 | 1 |  |  |  |
| **Shannon diversity index** | 0.696\* | 0.881\*\* | 1 |  |  |
| **Richness index** | 0.778\*\* | 0.702\* | 0.749\*\* | 1 |  |
| **Total vegetation coverage** | 0.837\*\* | 0.552 | 0.825\*\* | 0.702\* | 1 |

**\*\*p<0.01；\*p<0.05**