**CO₂ and CH₄ fluxes from abandoned peat extraction areas: the role of berry cultivation**

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Abandoned and unmanaged peat extraction areas loose carbon through carbon transport in water and due to emission of greenhouse gases - carbon dioxide (CO₂) and methane (CH₄). At the same time, those sites are excluded from production and have a low ecological value. One of the after-use strategies for abandoned peat extraction sites is berry production which, contrary to the traditional peatland restoration, can be profitable for land owners. Also, it may have a positive effect on reducing carbon losses from peat compared to abandoned and unmanaged peat extraction sites. The aim of this study is to compare results of the first-year CO₂ and CH₄ flux measurements in unmanaged former peat extraction sites and sites used for cranberry and blueberry cultivation in Latvia on an ongoing two-year project.

We measured soil CO₂ emission and CH₄ fluxes using closed chamber method and CO₂ net ecosystem exchange (NEE) using EGM-5 CO₂ analyzer once a month from December 2016 to November 2017 from following sites: four abandoned peat extraction sites with bare peat (BP), three abandoned peat extraction sites with ground vegetation cover (VP, covered with mosses, cottongrass, dwarf shrubs etc.), three cranberry and three blueberry cultivation sites.

CO₂ and CH₄ fluxes from different management types varied but were not significantly different between different practices. The smallest NEE was measured from cranberry sites (0.5 Mg CO₂-C ha⁻¹ year⁻¹), whereas NEE from BP, VP, and blueberry sites were 1.3, 1.8 and 1.4 Mg CO₂-C ha⁻¹ year⁻¹, respectively. In case of NEE from blueberry sites, C uptake by roots and woody biomass was not included, covering only NEE of ground vegetation. The lowest CH₄ fluxes were measured in cranberry and BP sites (0.005 and 0.002 Mg CH₄-C ha⁻¹ year⁻¹, respectively), while in VP and blueberry sites the corresponding values were 0.057 and 0.033 Mg CH₄-C ha⁻¹ year⁻¹. First year results showed that cranberry and blueberry sites produce less or similar amount of CO₂ and CH₄ as unmanaged sites. If the carbon uptake in woody and root biomass by blueberry plants would be included in calculations, both cranberry and blueberry sites would be admittedly smaller sources of CO₂ than abandoned and unmanaged peat extraction sites. Thus, cultivation of cranberries and/or blueberries on abandoned peat extraction areas could be beneficial from the point of view of both economy and environment.

Material is issued with the financial support of the EU LIFE program within the project LIFE14 CCM/LV/001103 “Sustainable and responsible management and re-use of degraded peatlands in Latvia” (LIFE REstore).