Lehr- und Forschungszentrum für Landwirtschaft
Raumberg-Gumpenstein

1. Tagung der Österreichischen Gesellschaft für Wurzelforschung 2011, 83 – 84
ISBN: 978-3-902559-63-0

A split-root system to study biochar effects on root growth, root distribution and assimilate translocation

Gerhard Soja[1*] und Bernhard Wimmer[1]

Abstract

Soil is the largest terrestrial carbon pool. In face of soaring atmospheric carbon dioxide concentrations a combination of many different mitigation methods will be necessary to slow the increase and stabilize the levels of greenhouse gases. Taking advantage of the carbon sink potential of soil is one of the promising strategies that could support the international efforts to combat climate change.

Pyrolysis of biomass results in gaseous, liquid and solid products. Whereas syn-gas and syn-oil are energy-rich by-products with potential uses as renewable fuels, the solid residues are called biochar and can be used for amending agricultural soils. Adding biochar to soil has several indirect positive effects apart from removing carbon from a fast geochemical turn-over cycle. On the one hand biochar is assumed to remain stable in the soil from several decades to several centuries, on the other hand its properties favor the enrichment of poor soils with organic carbon with positive effects on soil microbiology, delay the rapid migration of plant nutrients or pollutants to the groundwater and enhance the water holding capacity of the soil.

The methodological approach presented in this study is designed to investigate the suspected positive effects of biochar on plant growth within vertical soil columns. The key element of this method is the composition of the columns by differently amended soils in a vertical orientation. Thereby plants growing on top of the columns have the potential to grow their roots in the differently composed vertical segments of the columns without physical barriers in-between. When harvesting the plants, the vertical segments can be analyzed separately for root growth, density or assimilate translocation. Results from a pilot study with cover plants are presented.

[1] AIT Austrian Institute of Technology GmbH, A-2444 SEIBERSDORF

[*] Ansprechpartner: Dr. Gerhard Soja, gerhard.soja@ait.ac.at