Geophysical Research Abstracts
Vol. 18, EGU2016-5758, 2016
EGU General Assembly 2016

Can biochar in combination with compost improve degraded soils?

Wolfgang Friesl-Hanl (1,1), Franz Zehetner (2), Gerald Dunst (3), Mario Wagner (4), Markus Puschenreiter (2), Jasmin Karer (1), and Gerhard Soja (1)

(1) AIT Austrian Institute of Technology GmbH, Health and Environment Department, Tulln, Austria (wolfgang.friesl@ait.ac.at), (2) University of Natural Resources and Life Sciences, Institute of Soil Research, Vienna, Austria, (3) Sonnenerde Gerald Dunst Kulturerden GmbH, Riedlingsdorf, Austria, (4) Wagner Handelsgesellschaft, Vienna, Austria

As global demand for agricultural commodities is growing, the use and improvement of degraded land could at least partly meet this demand. Based on the Renewable Energy Directive 2009/28/EC (RED) which endorses the use of degraded land for biomass production on the one hand, and the emerging conflict of the 4 F′s (food, feed, fiber and fuel production) on the other hand, the application of biochar to ameliorate degraded land could be a strategy to improve the productivity of soils on marginal agricultural land.
The aim of our study was to investigate the effects of biochar/compost mixtures (w/w; 50/50) on two agricultural soils low in organic matter – one sandy, the other clayey. The suitability of the biochar/compost-amended (BC) soils for renewable biomass production using maize or Miscanthus was tested in the field.
We conducted two field experiments with different treatments based on the results of previous pot experiments with the same soils. The following treatments were applied:
• Co … Control (no BC but fertilized with (NH4)2SO4 corresponding to T3)
• T1 … 1 % BC
• T2 … 0.5 % BC + 175 kg N ha-1
• T3 … 1 % BC + 350 kg N ha-1
The treatments influenced water holding capacity (WHC), organic carbon content (Corg) in soil and biomass productivity (BM). WHC increased significantly upon 3 % BC addition in the previous pot experiment, but not significantly upon 1 % addition in the field (T1, T3). Due to heterogeneity in the field Corg did not show significant differences between treatments. The two test soils responded differently for BM productivity. Miscanthus (perennial) grown on sandy Eschenau soil was not influenced by the treatments in 2013 but showed a positive reaction trend in 2014. Miscanthus will need at least one further growing season to show its full yield potential. Maize (annual) grown on clayey Kaindorf soil increased BM significantly 2013 upon T3 but not in 2014 due to erosion events on sloping terrain.

Keywords: Soil quality, organic matter, crop yield, Miscanthus, maize