



Black Carbon – Soil Organic Matter abiotic and biotic interactions

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Wildfires, prescribed burns and the use of char as a soil amendment all add large quantities of black carbon to soils, with profound, yet poorly understood, effects on soil biology and chemical-physical structure. We will present results emerging from our black carbon program, which addresses questions concerning: 1) black carbon-soil organic matter interactions, 2) char decomposition and 3) impacts on microbial community structure and activities. Our understanding derives from a complementary set of post-fire black carbon field surveys and laboratory and field experiments with grass and wood char amendments, in which we used molecular (i.e., BPCA, PLFA) and isotopic (i.e., ^{13}C and ^{15}N labelled char) tracers. Overall, emerging results demonstrate that char additions to soil are prone to fast erosion, but a fraction remains that increases water retention and creates a better environment for the microbial community, particularly favoring gram negative bacteria. However, microbial decomposition of black carbon only slowly consumes a small fraction of it, thus char still significantly contributes to soil carbon sequestration. This is especially true in soils with little organic matter, where black carbon additions may even induce negative priming.