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Long-term soil microbial biomass in conventional tillage, no tillage and crop-livestock systems

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Introduction

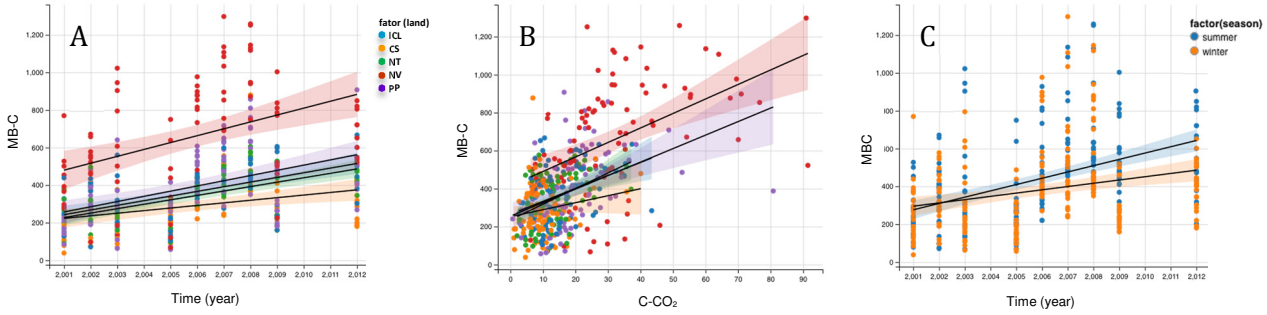
Incorporation harvest residues and mineral soil also offers promise for improving long-term C storage. Soil microbial biomass can improves soil quality but it also has implications for global carbon cycle since soils are the largest terrestrial reservoir of carbon (Stockmann et al., 2013). Compared to native soil, agricultural land use inevitably leads to a decrease in organic carbon and increased emissions of carbon dioxide into the atmosphere (Lal, 1997).

Material and Methods

We measured the soil microbial biomass carbon (MB-C) during 10-yrs in different cropping systems in summer and winter seasons production in the Cerrado (savannah) biome, using a method fumigation extraction technique. Soil samples were collected from an experimental field design of Embrapa Western Agriculture. Soils from a adjacent native vegetation were collected and using with reference compare with the other cropping systems. Analysis of variance was performed using the general linear model.

Results and Conclusions

Fig. 1. Soil microbial biomass carbon (MB-C) (A), MB-C vs basal respiration (B) and MB-C under summer and winter seasons (C) under conventional systems (CS), no-till (NT), integrated crop-livestock (ICL), permanent pasture (PP) and native vegetation (NV).



Here we show that microbial biomass carbon (MB-C) always showed highest ($p<0.05$) values in native vegetation and increase in no-tillage, integrated crop-livestock and permanent pasture after year 2006 compared CS (Fig. 1A). Additionally, MB-C *vs* basal respiration showed high activity in NV, and lower activity in CS (Fig. 1B). The MB-C result in increase ($p<0.05$) under summer season than winter season after soil sampling in year 2005 (Fig. 1C). Take together our results showed that the incorporation of plant residues in long-term would preferentially stimulate soil microbial biomass in native vegetation, no-tillage, crop-livestock and permanent pasture preferentially in summer season. This may have occurred because smaller among of carbon being lost by soil respiration over 10-yrs of monitoring microbial biomass carbon.

References cited

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