Organic matter turnover in whole soil and light fraction from a silvo-pastoral system in semi-arid NE Brazil. (S03-wick030407-Oral)

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Abstract:

We studied soil organic matter turnover following the removal of native deciduous thorn forest (caatinga) and conversion to a silvo-pastoral system in semiarid NE Brazil. Total C and natural 13C abundance (delta 13CV-PDB) of plant material, whole soil and water-floatable organic matter (light fraction) were compared: under the canopy of the single trees left standing during the forest felling, outside the canopy in the planted pasture, and under remaining native forest. All remaining trees maintained C3-derived C at the original thorn forest level. Lower levels under pasture were due to the mineralization of C3-C outside the canopy when the caatinga surrounding the trees was cleared and replaced by grass. The loss of C3-C from the cleared areas surrounding the trees after 13 years was about 60% in the whole soil and 75 % in the light fraction. This points to a very rapid organic matter turnover in this environment. Since the C4-C was similar under and outside the tree canopy, the introduction of grasses did not significantly increase the C4-C, i.e. little sequestration of new C had occurred in the soil. The trees thus maintained an island of higher tree-derived soil C content.

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Presentation Information:

Presentation Date: Thursday, November 14, 2002
Presentation Time: 10:30 am

Keywords:
organic matter turnover, silvo-pastoral system, NE Brazil, whole soil and light fraction