Soil carbon assessment as part of a total carbon balance of a bio-energy culture with fast-growing poplar

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POPFULL - Soil Survey March 2010

• GOAL: Quantifying initial soil carbon stock of experimental site
• Soil survey repeated in 2013/2014
  → changes in carbon stock after 4 years SRC culture

site characteristics
• located in Lochristi, Belgium
• agro-pedological region: sandy region
• formal landuse (since ±1800): agriculture (Fig. 1)
  8.83 ha cropland, mainly cornfield
  5.41 ha pasture

Material and methods

• 110 sample locations, spatially distributed over land uses and planting area of 4 poplar clones of interest (Grimminge, Koster, Skado, Wolterson)
• bulk density and loose soil samples at 15 cm-interval depths until -90 cm by core sampling (Eijkelkamp Agrisearch equipment, Netherlands)
• determination of carbon (C) and nitrogen (N) concentrations by dry combustion (NC element analyser, Carlo Erba Instruments, Italy)

Results

• decrease in C-concentration with depth (Fig. 2)
  • upper soil layer:
    • lower C-conc. in cropland (Fig. 1 & 2) due to removal of crop residues
    • higher density in cropland (Fig. 3) due to soil compaction and surface sealing

• average carbon contents (Fig. 4) at 0-90 cm of 115 Mg C ha⁻¹ in pasture and 124 Mg C ha⁻¹ in cropland

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