# Soil carbon balance and dynamics in a bio-energy plantation (POPFULL)

#### PhD project: Gonzalo Berhongaray

Promotor: R. CEULEMANS In collaboration with: L. BROECKX, J. COOLS, T. DE GROOTE, O. EL KASMIOUI, R. FICHOT, S. NJAKOU DJOMO, M. VERLINDEN, D. ZONA, S. DILLEN, I. JANSSENS.

Gonzalo.berhongaray@student.ua.ac.be Research Group of Plant and Vegetation Ecology (PLECO) University of Antwerp, Department of Biology 2610 Wilrijk, Belgium.

Full LCA global warming contribution of SRC	
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Full LCA C-balance of SRC system	
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### OBJECTIVES

Bio-energy crops can contribute to  $CO_2$  mitigation by replacing fossil energy sources and by sequestering carbon in the soil. The carbon sequestration and the soil carbon balance depend on the poplar clones used and on the previous land use.



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Overall framework of the objectives and approaches of the POPFULL project toward a full system analysis and global warming potential.

# **MEASUREMENTS** and METHODS

Isotopic discrimination for SOC turnover (SOC = Soil

#### **Objective of POPFULL**

System analysis of a short-rotation coppice culture of poplar
Full greenhouse gas balance and energy accounting

#### **Objective of my PhD**

• Quantify all carbon pools and fluxes in the soil in two phenotypically contrasting poplar clones and on two previous land uses



- Organic Carbon)
- SOC stock and other soil variables
- Root biomass and turnover
- Litterfall biomass and carbon concentration
- DOC concentration (DOC = Dissolved Organic Carbon)
- Soil CO<sub>2</sub> efflux



Above: Below-ground carbon stocks and fluxes are being studied for two poplar clones and two previous land uses.

Left: Soil cores of different bag mesh size and filled with C4 soil allow the quantification of all relevant soil carbon input fluxes.

## **EXPECTATIONS FROM MY PhD**

- Reliable estimates of all below-ground carbon stocks and fluxes, together with a better understanding of the effects of previous land use and of the poplar clones planted
- An improved knowledge of the relative contribution of different carbon fluxes to the soil carbon balance
- A proper quantification of the root dynamics in contrasting clones and under different previous land uses



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