

The role of light inhibition of foliar mitochondrial respiration for estimates of ecosystem respiration: A case study using Alfalfa (*Medicago sativa* L.)"

The Leibniz-Centre of Agricultural Landscape Research (ZALF e.V.) announces a BSc/MSc thesis topic within the Working Group *"Isotope Biogeochemistry and Gas fluxes"* of the Research Area 1 "Landscape Functioning".



Background:

Estimates of the net ecosystem carbon balance (NECB) by chamber or eddy covariance measurements include direct measurements of the net ecosystem exchange (NEE; daytime and transparent chamber) and ecosystem respiration (R_{eco} ; nighttime or opaque chamber). To accurately describe and understand the carbon dynamics of an ecosystem, measured NEE is often partitioned into R_{eco} and gross primary productivity (GPP) using the measured R_{eco} . However, GPP and daytime R_{eco} may be significantly biased if the potential impact of light inhibition of foliar mitochondrial respiration is not accounted for. When R_{eco} is gap-filled solely based on nighttime measurements (Eddy or transparent automatic chambers) the effect of light inhibition of foliar mitochondrial respiration might yield in an overestimation of daytime R_{eco} .

By performing a pot experiment it is aimed to identify and quantify the potential effect of light inhibition of foliar mitochondrial respiration on annual R_{eco} estimates of Alfalfa (*Medicago sativa* L.).

Tasks and requirements:

- Performing of/Assistance during the pot experiment
- > Data processing and analysis (using MS Excel and R)
- > Basic knowledge of empirical modeling is requested, but not essential.

Opportunities and duration:

The thesis is part of a bigger project dealing with the impact of soil erosion on the C and N cycling of agricultural landscapes. The aspirant will thus get insights in a broader variety of measurement techniques and methods to detect the gaseous C exchange of an ecosystem. Applications are accepted in English and German. Due to its setup, the duration of the experiment will be 3-4 month, starting in March 2018 (latest April 2018).

Contact:

Prof. Dr. Jürgen Augustin:	+49-33432-82-376	jaug@zalf.de
M.Sc. Mathias Hoffmann:	+49-33432-82-473	Mathias.Hoffmann@zalf.de