



PhD opportunity in modelling impacts of cultivation strategies on soil carbon and soil GHG emissions

Project Description

While there is a vast literature comparing the impact of crop establishment systems /soil cultivation on GHG emissions and soil carbon, there is much less information that is specific to mild climates. Furthermore, there is a scarcity of information relating to tillage intensity at a resolution that would allow systems which differ in depth or the number of cultivation passes in crop establishment to be compared. This is essential for the development of sustainable carbon-smart crop establishment and weed control systems suitable for Irish soil and climatic conditions. The aim of the project is to determine the impact of different levels and combinations of cultivation actions as used in weed control and soil preparation, on soil carbon change and net soil GHG balance of cropping systems.



This research is a part of recently funded DAFM project EVOLVE. The research work will involve in-situ measurement of soil carbon change, loss of CO₂ via soil respiration, and related variables from selected cultivation treatments in the long-term experiment established in Teagasc, Oak Park. The collected data complemented with data collected in previous field campaigns will be used to

calibrate and evaluate existing process-based models capable of simulating impacts of soil cultivation intensity on soil carbon and soil GHG emissions (DayCent, STICS, DSSAT). Through the measurements and employing an ensemble of the models, this project will quantify short-term and long-term impacts by 2050 and associated uncertainties.

The doctoral candidate will be supervised jointly by Dr. Magdalena Necpalova (University College Dublin), Dr. Gary Lanigan (Teagasc, Environment Research Centre, Johnstown Castle, Wexford) and Dermot Forristal (Teagasc, Crops Research Centre, Oak Park, Carlow). The successful candidate will be principally located at UCD, with short-term stays at Teagasc research centres while conducting their fieldwork and laboratory work during their PhD, and will be registered for a structured doctoral degree programme at UCD.

Award

The scholarship funding is €24,000 per annum, for 4 years, which includes a tax-free stipend paid monthly and University fees of up to a maximum of €6,000 per annum.

Requirements

Applicants should have a primary degree with a minimum 2.1 and/or Master's degree in Environmental Science, Agricultural Science, Ecology, Biology, (or related disciplines). Research experience in process-based modelling or in soil science would be a distinct advantage. The successful candidate should be self-motivated, independent, and interested in conducting field work, laboratory work and process-based modelling. Knowledge of basic software and R is desirable. Candidates whose first degree was not taught through English must meet UCD's Minimum English Language Requirements (<http://www.ucd.ie/registry/admissions/elr.html>). An EU driving licence is desirable.

The expected start date of the position is 1st August 2022.

Further Information and Application Procedure

For more information about this position contact Dr. Magdalena Necpalova (magdalena.necpalova@ucd.ie). Applications should be sent by email to magdalena.necpalova@ucd.ie with "EVOLVE PhD application" in the subject line. Applications should include a letter of motivation and CV, and the names and contact details of two academic referees.

The closing date for applications is Thursday, 30th June 2022.