

Modelling of fate and behavior of pesticides in artificial wetland

Abstract

The transfer of pesticides in the environment is an issue of the WFD. While actions to reduce their use are slow to be generalized, their interception and retention by artificial wetland or ponds has shown their interest in managing this risk. The project of this PhD included into the ANR project PESTIPOND proposes to pursue the current research work by the development of a modelling approach of the fate of pesticides in artificial wetland. The first step will be to statistically analyze the available datasets (6 years of measurement on the sites of Rouffach and Rampillon) with the objective of selecting the main processes related to the properties of the molecules and with the abiotic factors of artificial wetland. The development of the "pesticides' behavior" module will be based on the Tank In Series approach that has proven to be efficient for the Nitrate case. This module will contribute to define ecological engineering rules for artificial wetland design for every studied pesticides. Finally, the last step consist on integrating this new module to SWAT modelling tool to assess land use scenarios and cumulative impacts of artificial wetland at the catchment scale (up to 1100km²). The question of uncertainties will be addressed by incorporating variations of the sensitive parameters.

Planning

The PhD will be split into 5 stages:

Stage 1: Statistical analysis of experimental field efficiency

Stage 2: Identification of main processes involved into pesticides removal in order to integrate them in modelling approach

Stage 3: Development of the module « Fate and Behavior of Pesticides in pond ». Test of robustness on experimental sites of PESTIPOND project

Stage 4: implementation of the module into SWAT model, and upscaling test at watershed scale

Stage 5: Writing of the manuscript

Organisation

Supervisor: J. Tournebize (HYCAR/Irstea, HDR) & S. Sauvage (ECOLAB, CNRS, HDR)

The PhD will be affected At Irstea Antony (suburb of Paris) in the team ARTEMHYS (Research Unit HYCAR) in strong relationship with Ecolab research unit at Toulouse.

Profile of PhD student

Background in hydrologiy and biogéochimistry ; skills in statistic, in GIS ; motivated by modelling ; French and English languages requested.

Contact

Dr J. Tournebize

Irstea, 1 rue Pierre Gilles de Gennes, 92160 ANTONY

Email : julien.tournebize@irstea.fr

Phone : +33140966038

