New tools to support pesticide registration at the national and EU levels

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Introduction

The recent EFSA opinion has recommended for national assessments to be undertaken to better evaluate the risks of crop protection products that may impact on the quality of water: “the FOCUS scenarios are limited to demonstrating safe use in a significant area in the EU; the FOCUS scenarios therefore may not address all the needs of groundwater assessments at the national level. For national assessments, all crops and the entire potential use area must be considered.” At the same time, EU Regulation 1107/2009 requires zonal risk assessments to be undertaken for crop protection products being considered for registration. Therefore, there is an urgent need for a tool which is able to perform leaching and surface water risk assessments for the all agriculturally relevant areas of the EU to support both national product authorisation procedures and the principle of mutual recognition.

The Footways regulatory modelling platform

A multi-lingual web-based risk assessment platform - Proziris - has been developed to support pesticide registration at the national, zonal and European scales. The system connects web interfaces with a supercomputer (650 cores) dedicated to pesticide fate modelling. The web input interface allows users to specify details of the applications to be evaluated including:

- crop to be simulated,
- pesticide application date(s) and rate(s),
- treated fraction of cropped area
- physicochemical characteristics of the active substance and related metabolites, including non-linear sorption, pH-dependent sorption, kinetic sorption, degradation in soil, surface water and sediment,
- mitigation measures, e.g. mitigating landscape elements (grassed buffer strips, riparian vegetation) or drift-reducing technology

Spatially-distributed pesticide fate modelling is undertaken using European-level datasets for soils (Soil Geographical Database of Europe 1:1000000; Le Bas et al., 1998)) and land cover/land use (CAPRI; Leip et al., 2008; Hiederer, 2012). For the weather data two options are provided: a) one weather station for each of the 16 FOOTPRINT climate zones or b) use one station for each of the 269 NUTS2 regions. More precise spatial data can be integrated as part of national projects. The modelling is undertaken automatically for 10 years using the PRZM 4.51 (surface runoff, erosion) and MACRO 5.2 (leaching, drainage, lateral subsurface flow) models based on the parameterisation methodology developed in FOOTPRINT (Dubus et al., 2009).

Pesticide leaching to groundwater is evaluated at the bottom of the soil profile (2 m), which is considered more relevant for groundwater than leaching at 1 m depth. Groundwater risk indicators include overall mean PECgw, annual PECgw and PITSAgw (calculated from annual PECgw) and the frequency of exceedance of threshold concentrations.
Spray drift input into surface water is calculated with the drift function proposed by FOCUS (2001) and Rautmann et al. (2001). The parameters of the drift function for the different percentiles have been obtained by fitting the equation to the different empirical percentiles of the Ganzelmeier-Rautmann raw data (Rautmann et al., 2001).

All pesticide and water fluxes to surface water bodies are fed into a recoded version of the latest STEPS-1-2-3-4 model (Klein, 2007), which calculates PECsw, PECsed and PECporewater time series. The obtained PECsw/sed/pw and leaching time series are post-processed automatically to yield all exposure endpoints that have regulatory relevance (e.g. PECmax and Time Weighted Average Concentrations TWAC) and the PITSA risk indicators which are used for post-registration risk management.

The results of an assessment are provided to the user via the web output interface both in non-aggregated (e.g. individual time series and indicators) and aggregated (e.g. tables, spatial CDFs, maps) formats.

References


http://eusoils.jrc.ec.europa.eu/ESDB_Archive/eusoils_docs/other/Eur25546EN.pdf


