

EXPLAINING SPECIES SENSITIVITY TO TOXIC CHEMICALS

Level: Master
Start: After 15 March 2014 (please contact supervisor; see below)
Project duration: 6-12 months
Project form: Literature review / Data analysis / Modeling
Supervision: Ad Ragas (env. science)

Different species show different sensitivities to chemical substances. A substance that may be very toxic to one species, may be less toxic to another. Analysis of large datasets with toxicity data has shown that closely related species tend to be more similar in chemical sensitivity than species which are only distantly related. This insight is nowadays often used to predict the toxicity of a chemical for an untested species based on the results of a toxicity test with a closely related species.

The concepts of “taxonomic distance” and “related sensitivity” can in theory be used to identify parameters that drive the sensitivity of an organism. If it can be shown, for example, that some sensitive species all share a particular gene while insensitive species do not have this gene, it can be reasoned that this gene may be involved in the toxicity of this substance. This means that simultaneous analysis of species sensitivity and species traits could provide indications for the toxic working mechanism of a particular substance.

The aim of the current research project is to develop a methodology for analysing patterns in species sensitivity and species traits. If possible, UK data on the relationship between species sensitivities will be used. Otherwise, such a relationship will have to be established based on raw toxicity data which are available in various international toxicity databases. Next, an inventory of species traits has to be made, e.g. based on the genome of different test species. An important step in the study is to determine which traits to include and how to include them. If successful, this study could entail an important step forwards in our efforts to understand and predict the toxicity of chemicals to different (untested) species.

Interested? Please contact Ad Ragas (A.Ragas@science.ru.nl).