

Ecotoxicology

Synopsis

Ecotoxicology is the study of the effect of environmental contaminants on living organisms - a merger of the study of the environment (ecology) with the study of interactions of chemicals with individual living organisms (toxicology). In this course, we will learn about how toxicants interact with and impact biological organisms, how ecotoxicology is measured in practice, and how to critically analyze ecotoxicological papers through case studies.

Aims

The aim of this course is to give the students an introduction to environmental science and ecotoxicology, and to contribute to the student's knowledge about how pollutant chemicals released in nature may cause adverse effects on organisms, populations and ecosystems.

Objectives

By the end of this course, students will:

- 1) Know the different classes of pollutants, major sources of pollution, the environmental behavior and fate of pollutants in ecosystems
- 2) Understand how toxicants interact with and impact biological organisms. We will learn about mechanisms of toxicity, how organisms accumulate and excrete toxic compounds, and the effects of toxicants on individuals, populations, and whole ecosystems.
- 3) Know how ecotoxicology is measured in practice. We will learn about standardized toxicity tests, alternative testing strategies, and the use of quantitative modeling for Ecological Risk Assessment.
- 4) Be able to critically analyze primary scientific literature. Students will read ecotoxicology papers and identify important points and summary measurements for comparison within the literature on the same toxicant and between contaminants of interest. More importantly, students will be able to read these papers critically, understanding the limitations of certain measurements or assumptions and identifying potential weaknesses of the methodology or analysis.

Key Skills Acquired

1. The ability to define and interpret effective concentrations (e.g. LC50, EC50)
2. Skills to undertake risk and hazard assessments of chemicals, based on physico-chemical parameters and ecotoxicological index
3. Skills to estimate the effects of chemical substances on populations of organisms
4. Competency to use characteristics and measured properties to interpret and assess the risks posed by chemicals for organisms, in various work contexts

Syllabus

Topics covered include:

- Types of pollution, pollutants
- Sources of pollutants
- Reactivity and fate of pollutants in ecosystems

Learning & Teaching

- Lectures: 18 hr
- Cases studies: 12 hr
- Seminars: 6 hr

Teaching Staff

M Monperrus, S Le Faucheur, L Lanceleur, V Bolliet

Semester: 1

Timetable slot: To be advised

ECTS: 5

Bibliography

- Walker, C. H., Sibly, R. M., Hopkin, S. P., Peakall, D. B. (2012). Principles of Ecotoxicology. CRC Press, Boca Raton, USA.
- Hoffman, D. J., Rattner, B. A., Burton, G. A., Cairns, J. (1995). Handbook of Ecotoxicology. Lewis, Boca Raton, USA

Assessment

- Written theory examination (60%)
- Case study and oral presentation (40%)

Course Evaluation

By completion of University Unit Evaluation Questionnaire by students, annual assessment by Unit Coordinator.