2025 BIOTA

TRAINING WORKSHOP ECOTOXICOLOGY

The workshop will focus on aquatic ecotoxicology & environmental risk assessment in groundwater ecosystems

Location: Cluj Napoca

Date: 15 May 2025

Time: 9.00 – 16.00

Agenda Items

|		
Morning session **9.00 – 10.00**	Introduction to groundwater ecosystems and their biota	**Dr. Tiziana di Lorenzo**
10.00 – 10.30	Principles of ecotoxicology Acute toxicity tests Sub-chronic and chronic tests	**Dr. Tiziana di Lorenzo**
11.00 – 12.00	Overview of dose-response analysis Environmental risk assessment	**Dr. Tiziana di Lorenzo**
12.00 – 12.30	Methods for sampling groundwater invertebrates	**Dr. Sanda Iepure**
Afternoon session **14.00 – 16.00**	Practice: dose-response modeling using R	**Dr. Tiziana di Lorenzo**
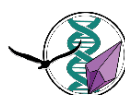
Additional information's

Students will be required to bring their own laptops with R and the drc package already installed.

Lecturers

Dr. Tiziana di Lorenzo is a Senior Researcher at the Research Institute of Terrestrial Ecosystems of the National Research Council of Italy, (IRET-CNR) and Vice-president of the World Association of Copepodologists. She has experience in groundwater ecology, functional biodiversity, ecotoxicology, and ecological risk assessment.


Dr. Sanda Iepure is Associate Professor at the University Babes Bolyai and Senior Researcher at the Institute of Speleology Emil Racovita with broad research interest in subterranean biology, cave ecology, biodiversity, biogeography, caves ecosystem functions and groundwater ecotoxicology.

More info: https://biogeo.ubbcluj.ro/pages/taxonomie/?page_id=137243
Contact: sanda.iepure@ubbcluj.ro
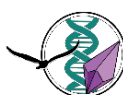
Why you need to understand Ecotoxicology

Ecotoxicology is a multidisciplinary science studying the adverse effects of chemicals on living organisms at the population, community and ecosystem levels. Ecological Risk Assessment (ERA) is the process of evaluating the potential adverse effects that chemicals may have on ecosystems and living organisms. It helps scientists and policymakers understand how pollutants impact biodiversity and ecosystem functions.

Aim of the course

This one-day course aim to provide an overview on the pollution of groundwater ecosystems and the application of various tools to assess the effects on aquatic invertebrates. The course offers basic ecotoxicological training for students and young scientists from universities and research institutes involved in ecotoxicological research.

Content of the course

This course provides a broad overview of different aspects of ecotoxicology, including toxicology, ecology and risk assessment related topics. The course consists of lectures, working classes and practical's. The course is divided into two parts of one day:

The first part (morning) deals with theory and is focused on the fate of chemicals in the groundwater environments and uptake in organisms (invertebrates).

Specific subjects are:

- ➢ 1. Introduction to Groundwater Ecosystems and Their Biota
    - o 1.1 Groundwater habitats: characteristics (oxygen levels, nutrient limitation, etc.)
    - o 1.2 Key biota: stygobites, stygophiles, and stygoxenes (examples from copepods and other fauna)
    - o 1.3 Ecological roles: nutrient cycling, decomposition, and ecosystem services
    - o 1.4 Threats to groundwater ecosystems: pollution, habitat fragmentation

- ➢ 2. Principles of Ecotoxicology, Acute, Sub-chronic, and Chronic Tests
    - o 2.1 Core principles of ecotoxicology (bioavailability, toxicity pathways)
    - o 2.2 Types of toxicity tests:
    - o 2.2.1 Acute toxicity tests (e.g., LC50 determination)
    - o 2.2.2 Sub-chronic tests and their relevance for assessing pharmaceuticals
    - o 2.2.3 Chronic tests and long-term population-level effects

UNIVERSITATEA BABEȘ-BOLYAI
BABES-BOLYAI TUDOMÁNYEGYETEM
BABES-BOLYAI UNIVERSITÄT
BABES-BOLYAI UNIVERSITY
TRADITIO ET EXCELLENTIA

Facultatea de
Biologie și Geologie
UNIVERSITATEA BABEȘ-BOLYAI

3B
Centrul de
Biologie Sistemică
Biodiversitate și
Bioresurse

- ➢ 3. Overview of Dose-Response Analysis and Environmental Risk Assessment
  - ○ 3.1 Dose-response curve basics (EC50, NOEC, LOEC)
  - ○ 3.2 Mathematical models (e.g., probit, logistic regression)
  - ○ 3.3. Defining PNEC and its role in environmental risk assessment
  - ○ 3.4 Risk assessment framework (MEC/PNEC ratio, decision-making thresholds)

The second part (afternoon) deals with practice and is focused o:

- ➢ 4. Practice: Dose-Response Modeling Using R
  - ○ Step 1: Setting up the R environment and loading data
  - ○ Step 2: Fitting dose-response curves using packages like drc
  - ○ Step 3: Estimating EC50 and deriving PNEC values
  - ○ Step 4: Visualizing results (dose-response plots)
  - ○ Step 5: Interpreting findings within a risk assessment context.

Outcomes

On successful completion of the course, participants should:

- ➢ Understanding the spreading of pollutants in groundwater ecosystems and how they affect biological systems;
- ➢ Know the main factors determining the uptake of chemicals in aquatic invertebrates
- ➢ Have insight in the methods used in ecotoxicology to assess the potential effects of chemicals in organisms and food chains; basic knowledge on ecological risk assessment.

Where?

Faculty of Biology and Geology, 5-7 Clinicilor Street, 400006, Cluj-Napoca, Romania