

Introduction to Ecotoxicology

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Literature:

M.C. Newman and W.H. Clements:

Ecotoxicology, a comprehensive treatment, CRC Press 2007

Lecture Series of 15 hours, Mo-Fr 09:00 to 12:30 h.

(Lectures 09:00 – 10:00; 10:15-11:15; short presentations 11:30-12:30)

Pre-registration required: Hartmut.Frank@uni-bayreuth.de

1. Day: Introduction to the basic concepts of Ecotoxicology, in its holistic and reductionist aspects. Ethical foundations of considerations on the state and protection of ecosystems. Definitions and priorities in studying human impacts on the stability and variability of ecosystems. Historical Developments and the Development of the Awareness towards chemical risks. Risk Assessment as a practical driving force for ecotoxicology.

2. Day: Emission, distribution and exposure towards chemicals. Compartments of the biosphere. Bioavailability and ways of uptake of chemicals from the abiotic environment. Life cycle-dependance of uptake and sensitivity to chemical insults. Natural versus man-made. Dose(concentration)-versus-response studies. Anatomical conditions and variability determining uptake. Exposure analysis/modelling (QSAR).

3. Day: Physiological, microanatomical, cytochemical and biochemical variability, determining uptake, metabolism, toxicity, and excretion of chemicals. Determination of toxicological effects; ecotoxicological test systems. Lethal/sublethal effects. Multiple exposure; bioaccumulation and persistence. Synergistic/antagonistic aspects. Effect analysis.

4. Day: Ancillary aspects modulating eco-toxicology. Population ecotoxicology. Epidemiological approaches; population dynamics. Food Chain and Key Species, Ecosystem. Adaptation and resistance. Energy and mass flow in ecosystems. Terrestrial vs aquatic ecosystems. Microcosms, mesocosms, field experiments. Translation between levels of complexity.

5. Day: Case Studies: POP's; selected heavy metals, Surfactants. Acidification, eutrophication as examples. Toxicology vs. Ecotoxicology. Practical Chemical Risk Assessment (REACH).