Aquatic Ecotoxicology
Higher tier studies

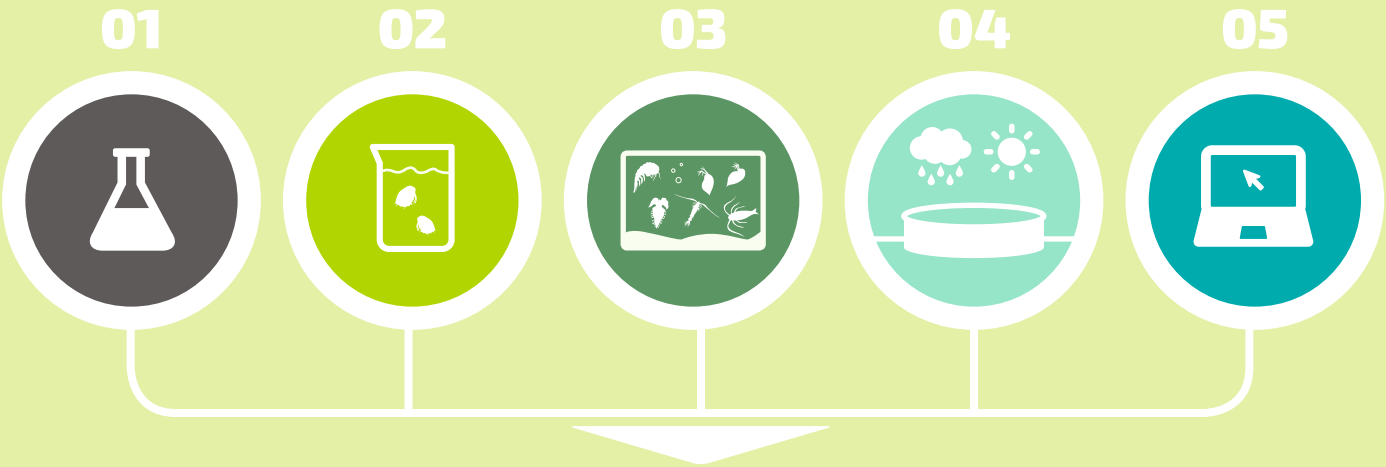
Our main focus is on the analysis and modelling of the effects of chemicals on different organisms and communities. Our strengths lie in our abilities to adapt our tools to the needs of the customer, by, e.g. considering different levels of complexity from individuals over populations to biocoenoses. The implementation of higher-tier studies in ecological risk assessment of plant protection products is one of gaiac's key areas. We offer a wide range of higher-tier approaches to refine the risk assessment for aquatic compartments, performed under **GLP**.

1 Ecotoxicological studies with non-standard species

2 Microcosm/ mesocosm studies

3 Mechanistic effect modelling

Higher-tier studies



01 Single species **lab studies**

02 Population **lab studies**

03 Community **lab studies**

04 Community **outdoor studies**

05 Modelling **studies**

Single Species Tests

- Standard tests with non-standard exposure scenarios
- Acute tests with non-standard species
- Chronic tests with non-standard species
- Population tests with selected species
- Studies under realistic exposure conditions

Community Studies

- Indoor microcosm studies with plankton communities
- Outdoor mesocosm studies with
  - Plankton communities
  - Macroinvertebrates
  - Macrophytes

Models for Ecological Risk Assessment

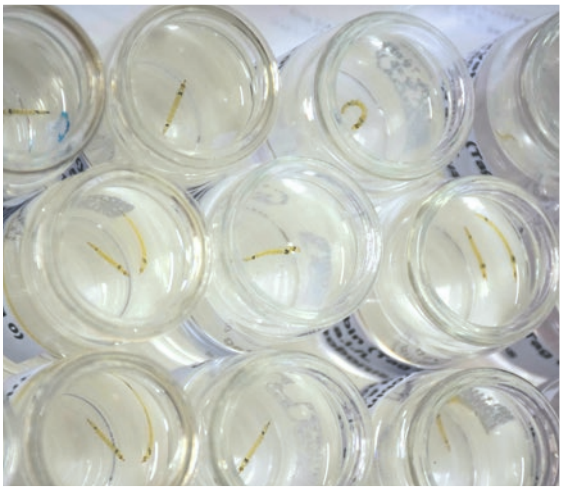
- TKTD and DEB based effect models
- IBM population models, e.g. for
  - Water flea *Daphnia magna*
  - Phantom midge *Chaoborus crystallinus*
  - Mayfly *Cloeon dipterum*
- Lake ecosystem models with zooplankton and phytoplankton
- Stream macroinvertebrate community model

Species identification

- Phytoplankton, periphyton and macrophytes
- Zooplankton
- Aquatic macroinvertebrates (running/standing waters)
- Emerging insects (larvae and adults)

Laboratory test species

- *Daphnia* species and other crustaceans
- *Chaoborus crystallinus*
- Amphipods (e.g. *Gammarus*, *Crangonyx*)
- Isopods (e.g. *Asellus*)
- Mayflies
- Caddisflies
- Stoneflies
- Different algal species



Field monitoring

- Biological monitoring of potentially affected communities
- Bioassays with environmental samples
- Linking ecotoxicological impacts with in-field effects

Our services

We have on offer our many years of experience in carrying out studies with single species, with aquatic micro- and mesocosms and with effect modelling. An additional focus of our research is the development of new, or the modification of existing ecotoxicological test methods. The test organisms and the test design are selected in accordance with the particular requirements of the client (e.g. in the context of species sensitivity distributions, SSD).

In addition, gaiac offers the identification of organisms in biological samples and the statistical analysis and reporting of externally performed ecotoxicological studies. Also for the re-evaluation of older studies in the light of the new EFSA Guidance Document (2013), we can perform the required statistical calculations and evaluations.

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