Population modelling: linking regulatory standard data to specific protection goals

Specific protection goals for environmental risk assessment are set on population level, except for vertebrates. Currently environmental risk assessment is a static approach based on worst-case assumptions for which results from standard toxicity tests at individual level are compared to the maximum concentration in a realistic worst case prediction. However exposure, effect manifestation and recovery are dynamic processes which depend also on the local situation.

Regulatory environmental risk assessment depends on information about expected exposure levels in the environment and relevant effect thresholds. While exposure levels in regulatory risk assessment are often predicted by using modelling approaches, this does not yet apply for the derivation of effect thresholds.

Population models are suggested to improve the understanding of the mechanisms driving effects and recovery patterns and to extrapolate to different exposure scenarios, seasons, geographic zone and species, as well as to link endpoints from standard regulatory studies to specific protection goals.

First examples of use suggest that a modular approach where various building blocks or “modules” can be assembled in a flexible manner to form the regulatory model best allows to ensure reliable model predictions for the risk assessment at hand (in contrast to a “one model fits all” approach).

I will give examples of population models to link standard laboratory endpoints to protection goals and discuss the advantage of a modular approach to tackle the complex tasks of environmental risk assessment in a transparent and scientific sound approach.