

Session: 2.03.P - Aquatic Model Ecosystems and Aquatic Ecosystem Models: How Can They Be Used to Support Ecological Risk Assessment of Chemicals?

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Are mesocosms really not suitable for the risk assessment of plant protection products?

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A recently published article on the representativity of macroinvertebrate communities in micro- or mesocosm studies used as a higher tier tool in the environmental risk assessment of plant protection products (PPPs) in the EU concluded that micro- /mesocosm studies do not represent natural macroinvertebrate communities (Reiber *et al.* 2022, <https://doi.org/10.1186/s12302-022-00643-x>). We believe that this conclusion is unfounded for multiple reasons.

Fundamentally, the article based its conclusion on the analysis of studies in lentic micro- and mesocosms submitted to the UBA in a comparison to data from streams used as reference sites in a recent monitoring project in Germany. However, lentic test systems are not suitable for testing effects on typical stream taxa. Additionally, streams are not the only type of water bodies in agricultural landscapes and stream taxa are not, per se, more sensitive or vulnerable to pesticides than species living in ponds or ditches. Having initially identified 47 studies, the data used in the final analyses by Reiber *et al.* was constrained to eventually comprise of only 7 micro- or mesocosm studies, where mean numbers of taxa were considered by the Reiber *et al.* as sufficiently abundant for statistical evaluation. These were then compared against mean number of taxa present in at least five, of twenty-two, streams. This appears to be a biased comparison.

Here we intend to revisit the data provided by the 7 selected studies from this publication, with the objective of determining how many, and which, taxa were considered as potentially sensitive or vulnerable and allowed a meaningful statistical analysis of effects with no other constraints. In our view, carefully designed and well conducted micro- and mesocosm studies do provide reliable and useful data for the prospective environmental risk assessment of PPPs, and other chemicals, since they are the only aquatic experimental option to cover long-term as well as indirect effects under semi-natural conditions. Whilst artificial streams offer an alternative to lentic systems if there is a special concern on typical stream taxa, it should be considered that lentic test systems provide additional safety for extrapolation to streams since the exposure events to tested in lentic systems are usually prolonged compared to the ones expected for pesticides in streams and the sensitivity of typical stream taxa can be checked in laboratory tests if needed.