

Are the Tier-1 effect assessment approaches in the EFSA Aquatic Guidance Document protective for pesticide exposure in aquatic ecosystems?



Theo Brock¹, René van Wijngaarden¹, Gertie Arts¹, Lorraine Maltby², Ivo Roessink¹

¹ Wageningen Environmental Research (Alterra), P.O. Box 47, Wageningen, The Netherlands

² Department of Animal and Plant Sciences, University of Sheffield, Sheffield, UK



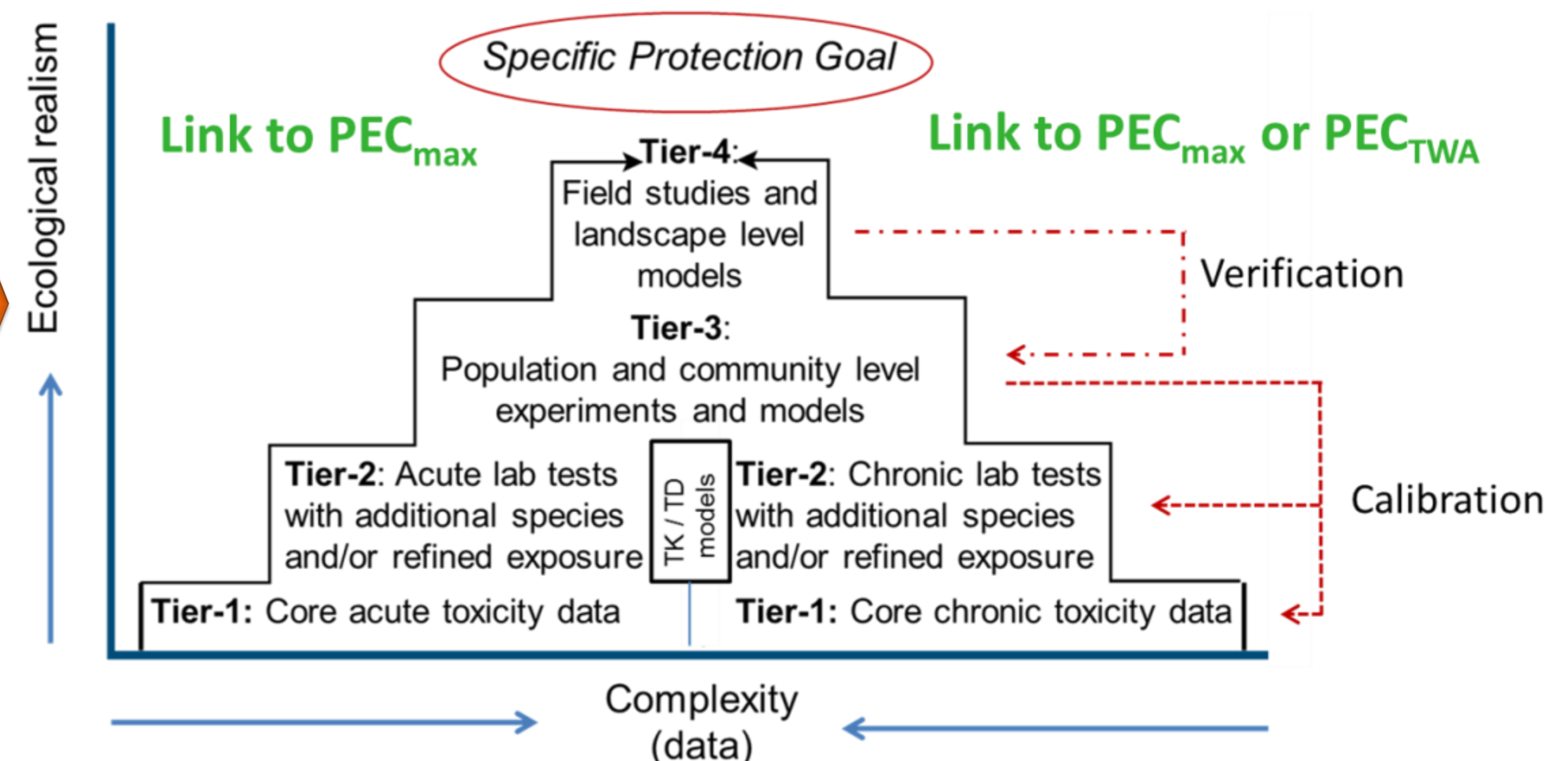
Objective and approach

Evaluation of the appropriateness of the Tier-1 effect assessment approach described in the Aquatic Guidance Document (AGD) to derive Regulatory Acceptable Concentrations (RACs) for pesticides

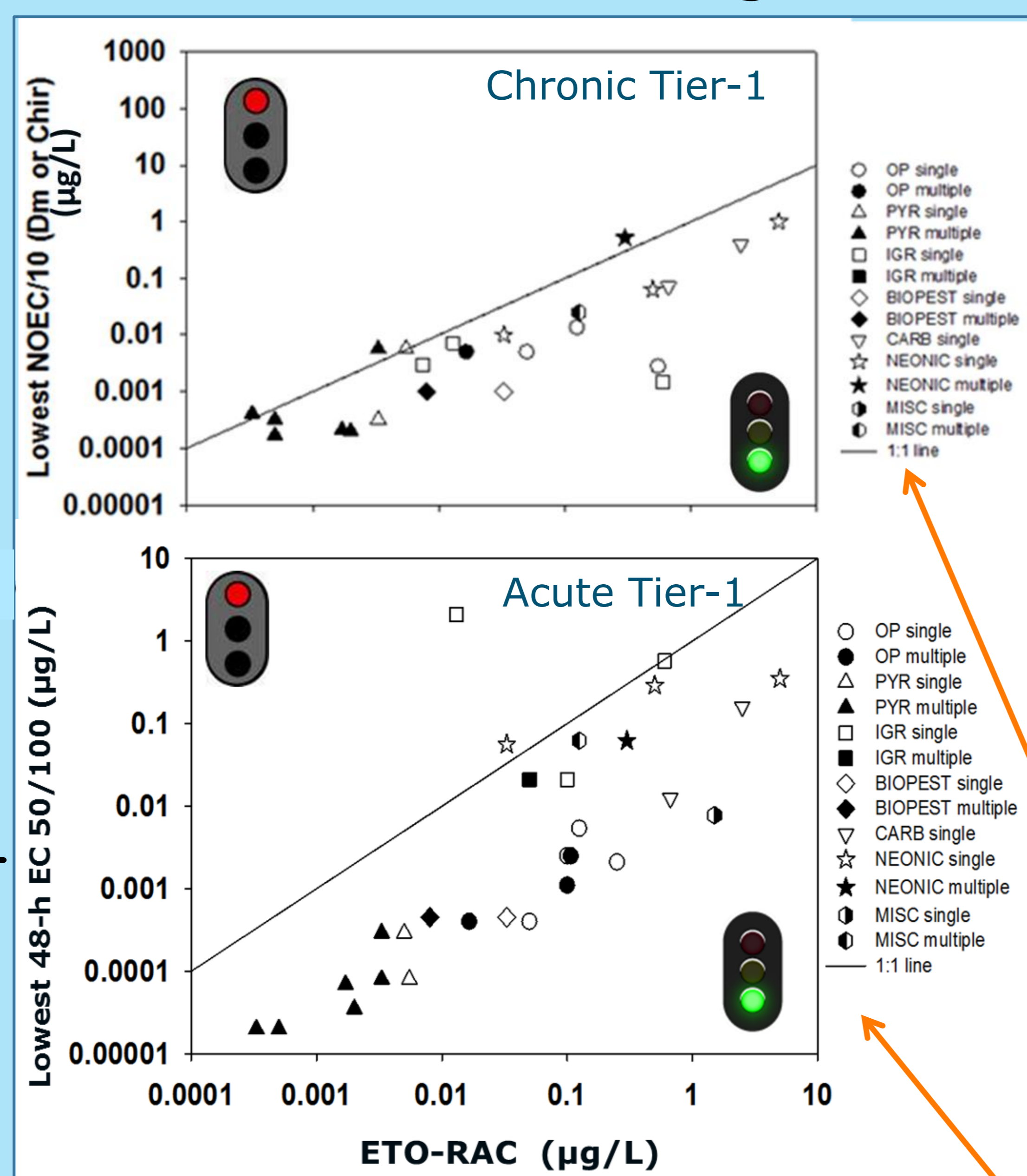
Use of Tier-3 ETO-RACs (Regulatory Acceptable Concentrations indicative for Ecological Threshold Option) derived from microcosm and mesocosm experiments as surrogate reference tier to calibrate Tier-1 RACs

Acute Effect Assessment

Chronic Effect Assessment

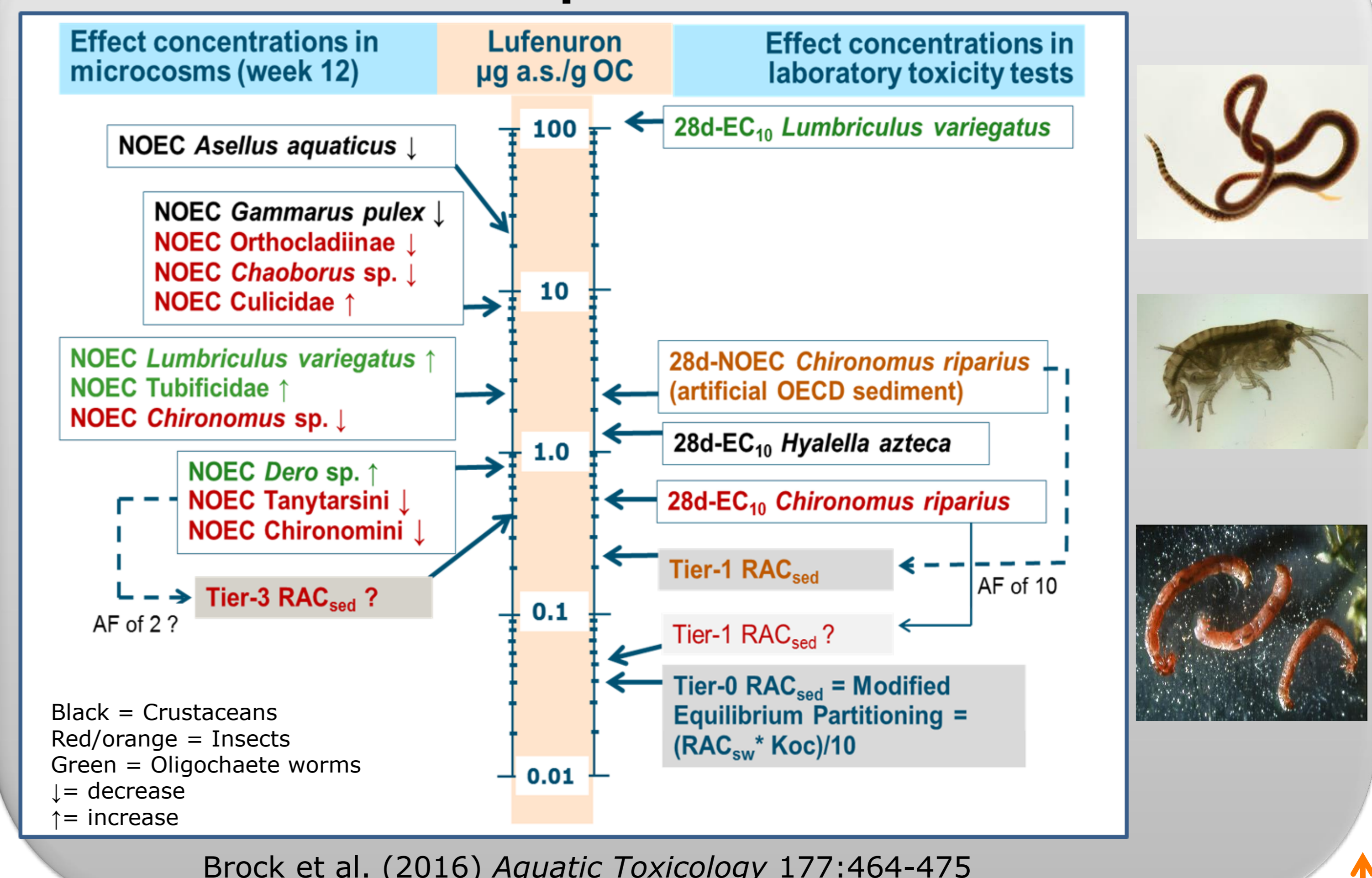


Protectiveness of Tier-1 effect assessment for individual insecticides and water organisms



Brock et al. (2016) *Integr Environ Assess Manag* 12:747-758
Van Wijngaarden et al. (2015) *Pest Management Science* 71:1059-1067

Protectiveness Tier-1 sediment effect assessment for the sediment-spiked insecticide lufenuron

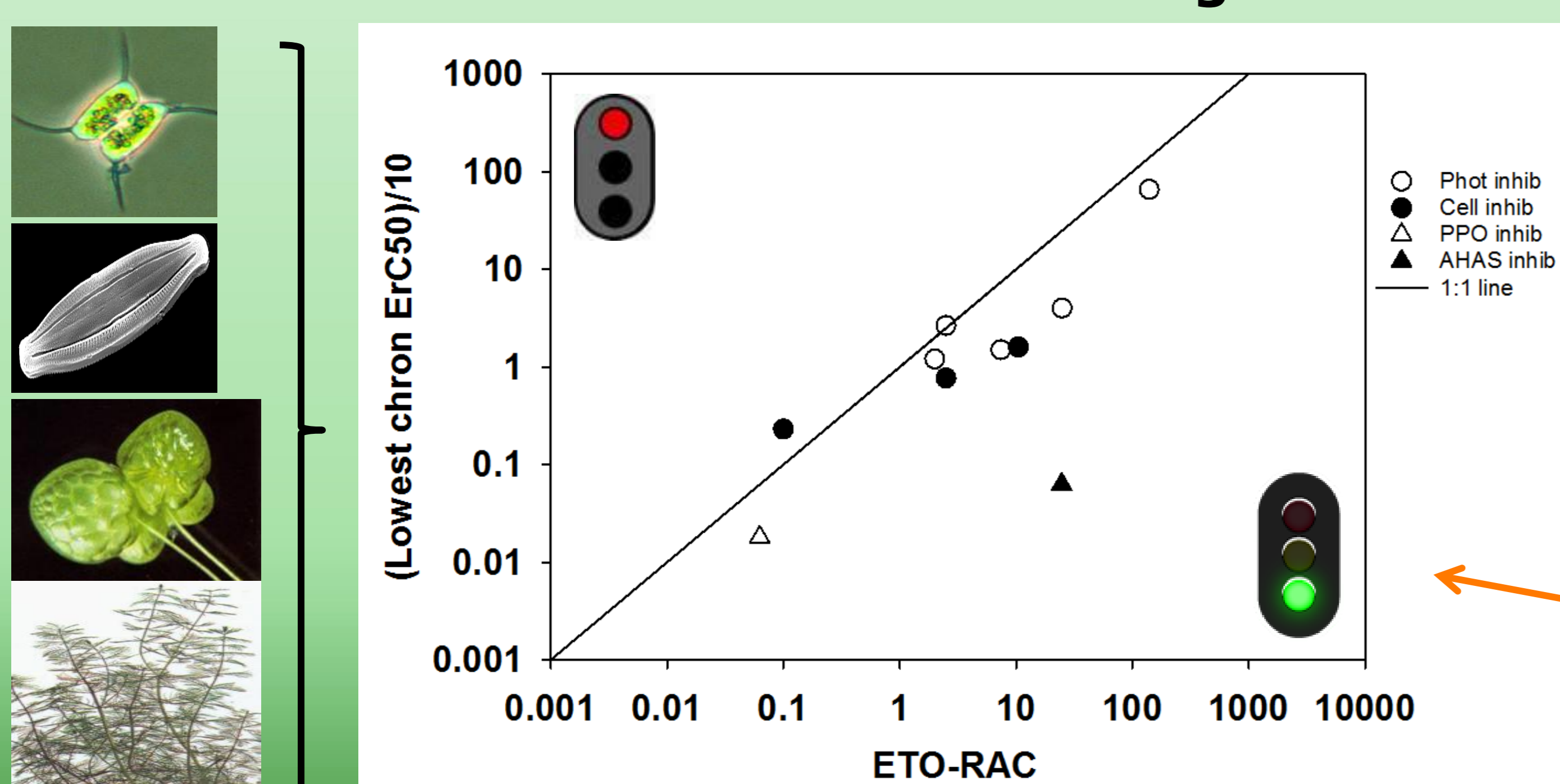


Brock et al. (2016) *Aquatic Toxicology* 177:464-475

Conclusions

- The **chronic Tier-1 RAC for insecticides and aquatic organisms** is in 83% of the cases protective when based on the lowest NOEC/EC10 value for the combination *Daphnia magna* and *Chironomus riparius*, but the margin of safety (conservativeness Tier-1 RAC relative to Tier-3 RAC) is rather small for a large proportion of substances.
- The **acute Tier-1 RAC for insecticides and aquatic organisms** is in 93% of the cases protective when based on the EC50's of either *D. magna* and *C. riparius* or *D. magna* and *Americamysis bahia*. For organophosphates, pyrethroids, carbamates and biopesticides the margin of safety is relatively large, in contrast to that of neonicotinoids and insect growth regulators (IGRs).
- The validity of the **Tier-1 effect assessment for sediment organisms** is poorly investigated for PPPs. For the insecticide lufenuron the proposal of EFSA (*EFSA Journal* 2015;13(7):4176) seems to be protective.
- The **Tier-1 RAC for herbicides** (10 cases only!) based on ErC50 values resulted in 80% of the cases in a sufficient protection level when compared with the Tier-3 ETO-RAC, but overall the margin of safety is relatively small.
- Future research ?**: Verifying the tiered approach for fungicides and sediment organisms and expanding the data sets for herbicides and chronic Tier-2 for insecticides

Protectiveness chronic Tier-1 effect assessment for individual herbicides and water organisms



Arts & Van Wijngaarden (2015) *Poster SETAC Europe Annual Meeting, Nantes*
Arts & Van Wijngaarden (submitted)

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