Effects of a fungicide and a herbicide mixture on the food web structure of a benthic community and the fitness of the omnivore *Gammarus roeselii* in a microcosm experiment.

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Introduction

Fungicides and herbicides are commonly found in aquatic systems occuring in mixtures. Current pesticide risk assessment focuses mainly on single pesticide effects. Therefore, we assessed the effects of mixtures on a food web of a benthic community and the fitness of the omnivore *G. roeselii*.

Microcosms at the artificial pond and stream mesocosm facility (FSA, Umweltbundesamt)

Material and methods

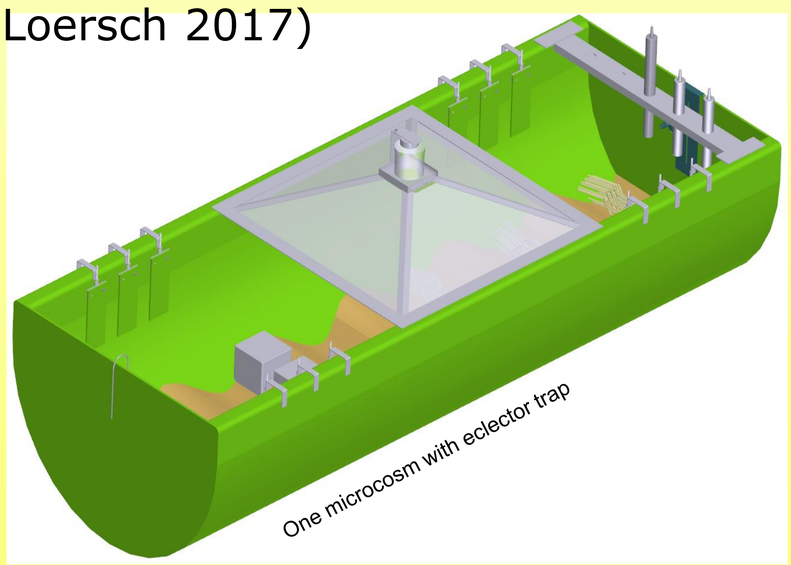
Model scenario

- 9 microcosms
- 3 fungicides
- 3 herbicides
- 6 concentrations
- 1 application of fungicides, herbicide application 30 d afterwards

control	0.1*NOEC	3*NOEC
control	0.03*NOEC	NOEC
control	RAC	0.3*NOEC

Measured parameters (selection)

- Fitness parameters of *G. roeselii*: RNA:DNA ratio, triglyceride concentrations (Wagner et al. 2001, Koop et al. 2008)
- Stable isotope analysis SIA of $\delta^{15}N$ & $\delta^{13}C$ for trophic level [TL] (see Brauns et al. 2012)
- Bayesian standard ellipse areas (SEA_B) (see Jackson et al. 2011)
- Benthic community and emergence (rf. Loersch 2017)



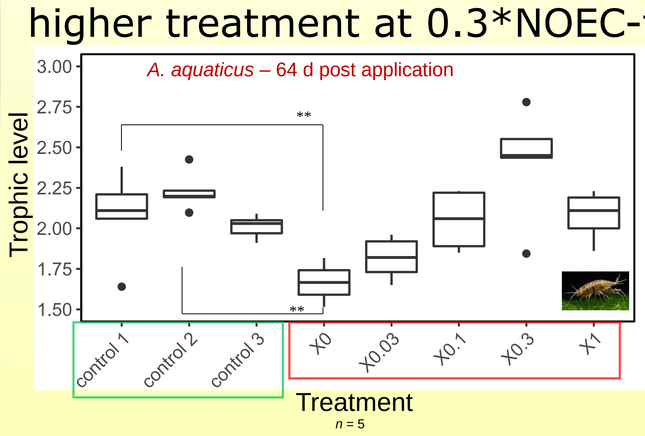
First Results

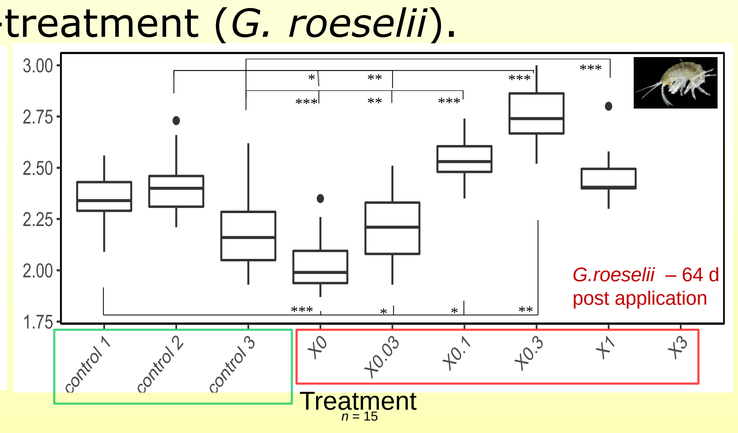
1. RNA:DNA and Triglycerides of *Gammarus roeselii*

No significant differences in any of both parameter at any time, neither for female, nor male *G. roeselii*.

2. Trophic Levels of *G. roeselii* and *A. aquaticus*

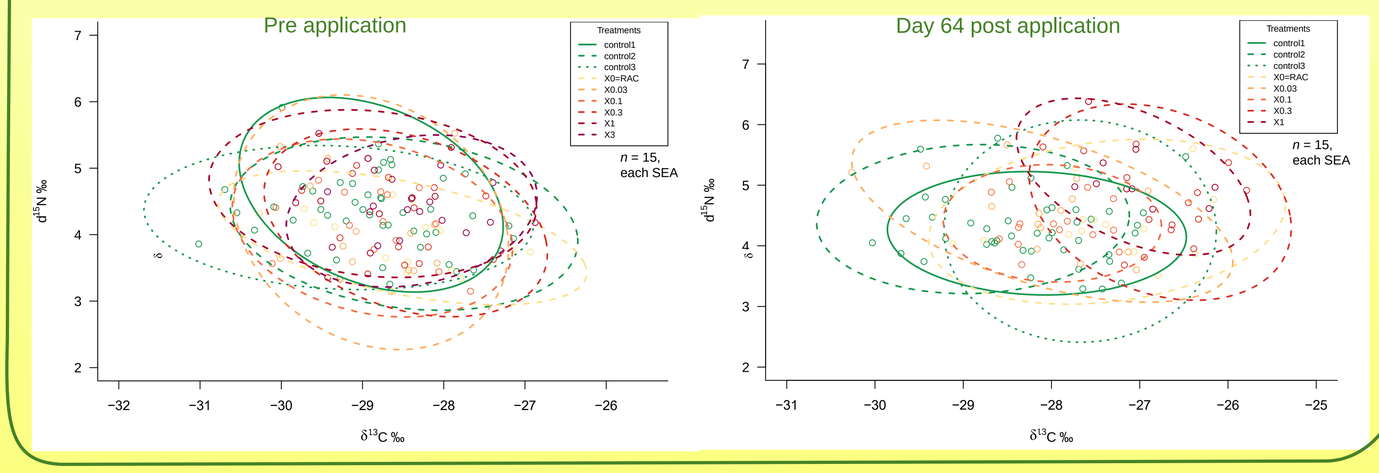
Significant lower trophic levels at RAC-treatment and significantly higher treatment at 0.3*NOEC-treatment (*G. roeselii*).





3. Isotopic niches of *G. roeselii*

Lower overlap between high treatments and controls after application.



Preliminary conclusion

Summary

x No significant decrease in fitness parameters after 64 days pesticides mixture exposure

✓ Changes in food web structure determined by stable isotope analyses → *indirect effects*

Questions remaining

? Long time exposure scale at low concentrations (RAC)?

? Consequences for ecosystem integrity, food webs, matter fluxes (terrestrial ↔ aquatic) .

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Photo Sources:
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