Effects of Terbuthylazine on Freshwater Communities Under Climate Change Scenarios

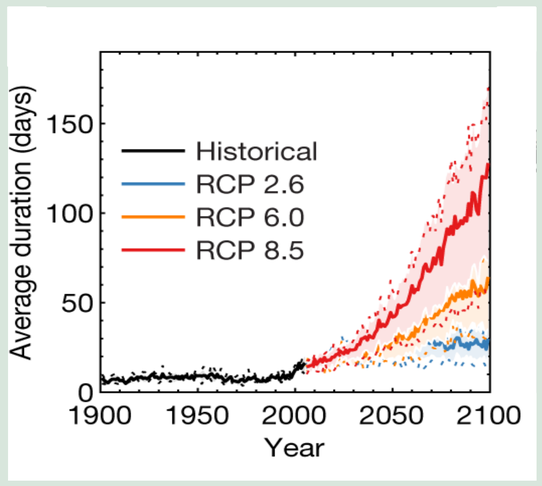
Pierina I. Rivas-Comerlati [1], Ivo Roessink [2], Paul van den Brink [1]

[1] Department of Aquatic Ecology and Water Quality Management, Wageningen University & Research, Wageningen, Netherlands

[2] Environmental Risk Assessment, Wageningen Environmental Research, Wageningen, Netherlands

Background

- Standard ecotoxicological tests hardly consider interactions with environmental stressors → **Global Climate Change (GCC)**
- Most studies with **fixed mean higher temperatures.**
- Lake heatwaves expected to become **hotter and longer** by the end of the 21st century.
- Lack of studies evaluating **herbicides'** toxicity under GCC scenarios.
- **Terbuthylazine (TBA)** is a **photosynthesis inhibiting herbicide** globally used as alternative to atrazine.
- Effects need to be addressed on whole **communities / ecosystems.**



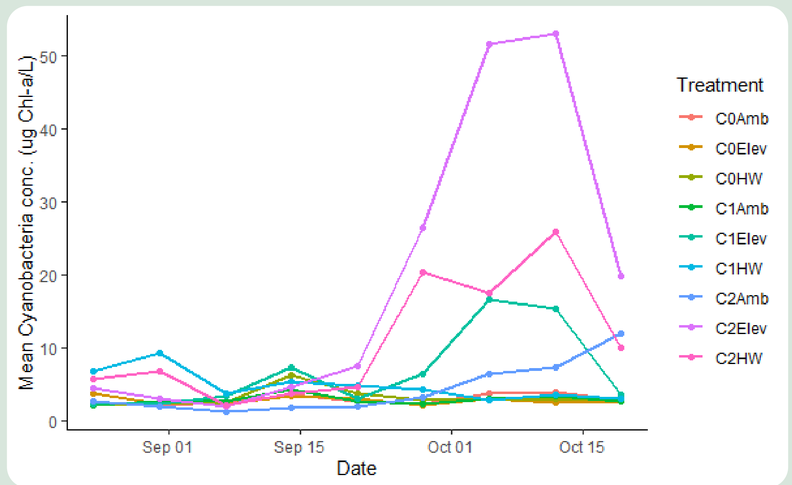
Source: Woolway *et al.* (2021)

To assess the single and combined effects of TBA and GCC warming scenarios on freshwater communities under a realistic set up

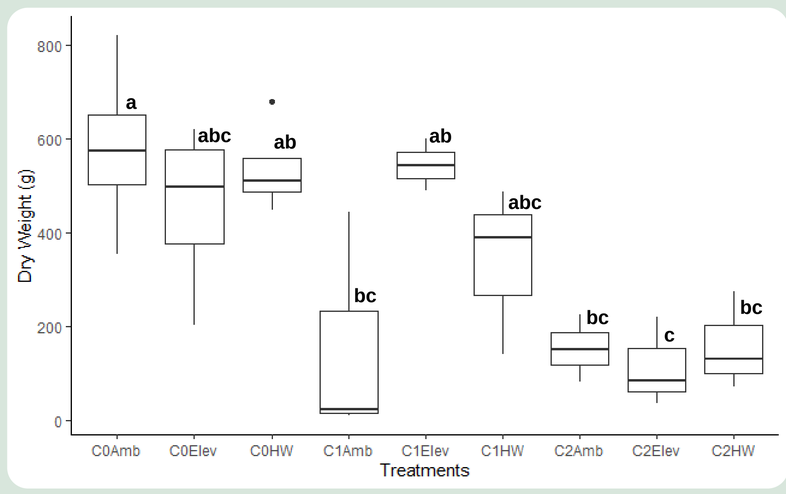
Results

- Possible combined effects that benefitted Cyanobacteria growth.
- Antagonistic effects on macrophytes between warming (Elev, HW) and low concentration of TBA (C1).
- High concentration of TBA (C2) completely inhibited macrophyte growth → causing a severe decrease of DO levels.
- Further analyses on other key communities (Zooplankton and Macroinvertebrates) will be carry out.

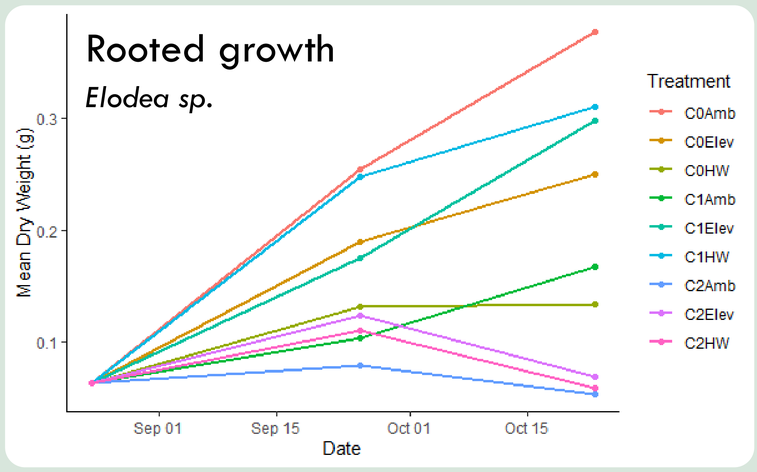
Phytoplankton Community

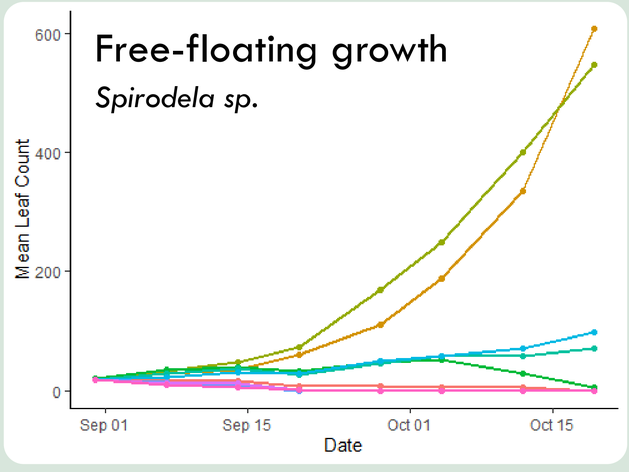


Macrophytes Community

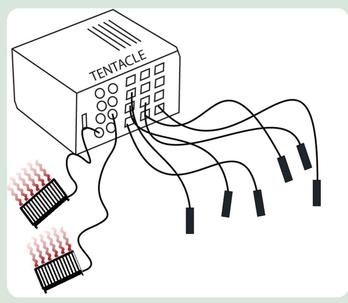


Macrophytes Bio-essay

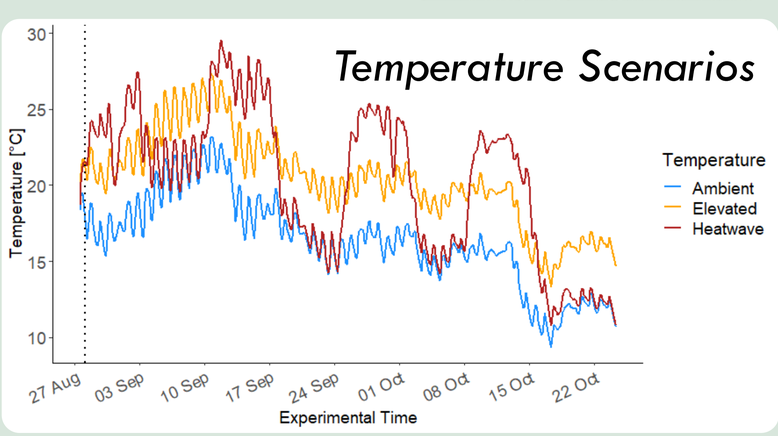




Set-up



Hermann *et al.* (2022)



Conclusions

- Antagonistic effects possibly present only with low TBA concentration (environmentally relevant).
- Further analysis will be done in hope of a better understanding of the mechanistic pathways of these stressors' interactions.

Literature cited

- Dinh, K. V. *et al.* (2022). Interactive effects of warming and pollutants on marine and freshwater invertebrates. *Current Pollution Reports,* 1-19.
- Hermann, M. *et al.* (2022). A transportable temperature and heatwave control device (TENTACLE) for laboratory and field simulations of different climate change scenarios in aquatic micro-and mesocosms. *HardwareX, 11*, e00307.
- Woolway, R. I. *et al.* (2021). Lake heatwaves under climate change. *Nature, 589(7842)*, 402-407.

Acknowledgments

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Funded by the European Union

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