Plant trait characteristics vary with size and eutrophication in European lowland streams (Baattrup-Pedersen et al. 2015) **[1]**

Previous studies investigating community-level relationships between plant functional trait characteristics and stream environmental characteristics remain scarce. Here, we used community-weighted means to identify how plant traits link to lowland stream typology and how agricultural intensity in the catchment affects trait composition.

We analysed plant trait characteristics in 772 European lowland streams to test the following two hypotheses: (i) trait characteristics differ between plant communities in small and medium-sized streams, reflecting adaptations to different habitat characteristics, and (ii) trait characteristics vary with the intensity of agricultural land use in the stream catchment, mediated either directly by an increase in productive species or indirectly by an increase in species that efficiently intercept and utilize light.

We found that the communities in small streams were characterized by a higher abundance of light-demanding species growing from single apical meristems, reproducing by seeds and rooted to the bottom with floating and/or heterophyllous leaves, whereas the community in medium-sized streams was characterized by a higher abundance of productive species growing from multi-apical and basal growth meristems forming large canopies.

We also found indications that community trait characteristics were affected by eutrophication. We did not find enhanced abundance of productive species with an increasing proportion of agriculture in the catchments. Instead, we found an increase in the abundance of species growing from apical and multi-apical growth meristems as well as in the abundance of species tolerant of low light availability. The increase in the abundance of species possessing these traits likely reflects different strategies to obtain greater efficiency in light interception and utilization in nutrient-enriched environments.

Synthesis and applications. Our findings challenge the general assumption of the EU Water Framework Directive compliant assessment systems that plant community patterns in streams reflect the nutrient preference of the community. Instead, light availability and the ability to improve interception and utilization appeared to be of key importance for community composition in agricultural lowland streams. We therefore suggest moving from existing approaches building on species-specific preference values for nutrients to determine the level of nutrient impairment to trait-based approaches that provide insight into the biological mechanisms underlying the changes. We recommend that existing systems are critically appraised in the context of the findings of this study.

Publication Date:

Friday, 21 August 2015

Full reference:

Baattrup-Pedersen, A., Göthe, E., Larsen, S. E., O'Hare, M., Birk, S., Riis, T. & Friberg, N. (2015) Plant trait characteristics vary with size and eutrophication in European lowland streams. Journal of Applied Ecology.

Link to DOI:

REFORM has received funding from the European Union's Seventh Programme for Research, Technological Development and Demonstration under Grant Agreement no. 282656.

http://dx.doi.org/10.1111/1365-2664.12509 [2]

Links
[1] https://reformrivers.eu/plant-trait-characteristics-vary-size-and-eutrophication-european-lowland-streams-baattrup-pedersen
[2] http://dx.doi.org/10.1111/1365-2664.12509

REFORM has received funding from the European Union's Seventh Programme for Research, Technological