Expert group leader:

Dr. Markus G. Weinbauer

IAD Expert Group: **Coastal Ecology**

With my background in coastal ecology and microbial ecology, **I propose to see the coastal Black Sea system as an ecotone between the Danube Delta and the marine system**, involving all marine organisms, including free-living microorganisms and microorganisms associated with animals and plants. This ecotone is characterized by dynamic biogeochemical processes, shaped by both autotrophic and heterotrophic microbial metabolism, which respond to seasonal dynamics and episodic events (as highlighted in studies on oligotrophic coastal marine ecosystems).

In this context, I aim to examine microbial carbon fluxes, particularly bacterial carbon demand in relation to primary production, as recent studies suggest the need for a re-evaluation of carbon cycling in seagrass systems such as Posidonia oceanica. **The interactions between microbial communities and organic/inorganic particles further influence nutrient cycling and energy flow**, underscoring the role of viruses in regulating microbial populations. Viral ecology, particularly the influence of prokaryotic viruses on microbial communities, remains an essential factor in **understanding carbon turnover**, bacterial mortality rates, and **ecosystem resilience**. Additionally, changes in **bacterial community composition** due to top-down controls, such as enhanced flagellate grazing, may modulate the balance between bacterial production and viral-induced mortality, affecting overall trophic interactions in this ecotone.

By integrating these perspectives, I seek **to advance our understanding of microbial-driven processes in the coastal Black Sea and their implications for ecosystem stability and biogeochemical cycles.**

***Relevant publications**, the background of my interest to lead this EG in IAD, are the following*:

Velimirov, B and **Weinbauer, M.G.** 2025. Bacterial Carbon Demand and Primary Production in a Posidonia oceanica System: A Re-Evaluation of Carbon Fluxes. J.Mar. Sci. Eng. 13: 314 (https://doi.org/10.3390/jmse13020314)

Bonilla-Findji, O., Gattuso, J.-P., Pizay, M.-D. and **M.G. Weinbauer.** 2010. Autotrophic and heterotrophic metabolism of microbial planktonic communities in an oligotrophic coastal marine ecosystem: seasonal dynamics and episodic events. Biogeosciences. 7: 3491–3503

Weinbauer, M.G., Bettarel, Y., Cattaneo, C., Luef, B., Maier, C. Motegi, C., Peduzzzi, P. and X. Mari. 2009. Viral ecology of organic and inorganic particles in aquatic systems: avenues for further research. Aquat Microb. Ecol. 57: 321-341

Weinbauer, M.G. 2004. Ecology of prokaryotic viruses. FEMS microbiology reviews. 28: 127-181

Šimek, K., Pernthaler, J., **Weinbauer, M.G.**, Hornák, K., Dolan, J.R., Nedoma, J., Masin, M. and R. Amann. 2001. Changes in bacterial community composition, dynamics and viral mortality rates associated with enhanced flagellate grazing in a meso-eutrophic reservoir. Appl. Environ. Microbiol. 67: 2723-2733