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Climate change is also causing profound changes in the ocean, which will have a major impact on ecosystem functions and human use of ocean resources. My research focuses on how coastal ecosystems in Europe might change. Using a combination of methods from ecology, physiology and evolutionary biology, I am trying to understand how quickly key species can adapt to climate change and how new species communities are forming along European coasts. My research aims to help protect coastal ecosystems more effectively. To this end, we work along the coast in the field and simulate climate change in laboratory and mesocosm experiments.

Selected mussel-related publications

1. Melzner, F., Stange, P., Trübenbach, K., Thomsen, J., Casties, I., Panknin, U., ... & Gutowska, M. A. (2011). Food supply and seawater p CO2 impact calcification and internal shell dissolution in the blue mussel Mytilus edulis. PloS one, 6(9), e24223.

2. Thomsen, J., & Melzner, F. (2010). Moderate seawater acidification does not elicit long-term metabolic depression in the blue mussel Mytilus edulis. Marine Biology, 157(12), 2667-2676.

3. Sanders, T., Schmittmann, L., Nascimento-Schulze, J. C., & Melzner, F. (2018). High calcification costs limit mussel growth at low salinity. Frontiers in Marine Science, 5, 352.

4. Nascimento‐Schulze, J. C., Vajedsamiei, J., Bean, T. P., Frankholz, L., Brennan, R. S., Melzner, F., & Ellis, R. P. (2025). Thermal selection shifts genetic diversity and performance in blue mussel juveniles. Evolutionary Applications, 18(6), e70118.

5. Nascimento‐Schulze, J. C., Vajedsamiei, J., Bean, T. P., Frankholz, L., Brennan, R. S., Melzner, F., & Ellis, R. P. (2025). Thermal selection shifts genetic diversity and performance in blue mussel juveniles. Evolutionary Applications, 18(6), e70118.

6. Knöbel, L., Nascimento-Schulze, J. C., Sanders, T., Zeus, D., Hiebenthal, C., Barboza, F. R., ... & Melzner, F. (2021). Salinity driven selection and local adaptation in Baltic Sea mytilid mussels. Frontiers in Marine Science, 8, 692078.

7. Ramesh, K., Hu, M. Y., Thomsen, J., Bleich, M., & Melzner, F. (2017). Mussel larvae modify calcifying fluid carbonate chemistry to promote calcification. Nature Communications, 8(1), 1709.

8. Yarra, T., Ramesh, K., Blaxter, M., Hüning, A., Melzner, F., & Clark, M. S. (2021). Transcriptomic analysis of shell repair and biomineralization in the blue mussel, Mytilus edulis. BMC genomics, 22(1), 437.