

Building Climate-Resilient Seagrass Meadows with Assisted Evolution

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Restoration of seagrass in times of climate change?









Marine heat waves will occur **5 x more often** in the Baltic Sea



- Providing resilient genotypes for sustainable restoration by utilizing the Toolbox of "Assisted Evolution" :
- "**Pre-conditioning**" of plants
- Incorporation of age-specific traits
- "Assisted Geneflow" from local microhabitats and Mediterranean habitats







Research Questions

- 1. Do younger plants exhibit greater heat resilience compared to adult plants?
- 2. Is there an effect of pre-conditioning in 1.5-year-old plants that experienced a heat wave earlier?



Experimental Setup





Mortality count

PAM

7 weeks of heat wave



Zostera marina plants



Reduced survival of adult plants and decreased photosynthetic efficency of pre-conditioned plants





Assisted Evolution: exploring chances for assisted gene flow **GEOMAR**



Setup winter experiment





Simulating a Western Baltic Sea Winter:

6 °C and reduced light

Controlled lab conditions:

14 °C and 100% light

Zostera marina plants origin:

Mediterranean Sea + Western Baltic Sea



Mortality count

PAM

Mediterranean plants do not differ from local plants under Western Baltic Sea winter conditions



Legend:

Temperature and Light

+ 14° C; good light condition * 6°C; reduced light

Origin



HELMHOLTZ

GEOMAR

8

Key findings and outlook



Young plants are more resilient than adult plants

There is no positive effect of pre-conditioning, the stress is even added up

Mediterranean plants are resilient in Western Baltic Sea Winter conditions



Are juveniles preferrable plants for restoration? Grown in a nursery breeding/ hybridization with Mediterranean plants would be a chance to improve resilience



What comes next?





Continue with testing the **Mediterranean plants** in a **summer heat wave**



Testing **seed priming** and **germination optimisation** with the collaboration team from Greifswald (Anne Brauer et. al) and Riccardo Pieraccini





Thank you!

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