Does genetic diversity of *F. vesiculosus* germlings confer resistance towards climate change stress?


**Future climate change is simulated at the Kiel Benthocosm**

Climate change factors are overlain as a delta-treatment onto naturally fluctuating regimes. A *Fucus vesiculosus* community is exposed to different conditions. Temperature and pCO2 increase simulate the climate change predicted for 2100.

**Are Fucus germlings with high genetic diversity doing better under climate change scenarios?**

Genetic diversity confers potential for adaptation and is crucial for the conservation in a changing ocean. To explore the significance of genetic diversity during early life, when highest selection occurs, we exposed *Fucus vesiculosus* germlings to increased temperature, pCO2 and nutrients. We hypothesize that diverse genotypes react differently on climate change factors. Performance of the germlings (photosynthetic efficiency & growth) and survival are measured continuously.

**Climate change effects on seaweed germlings’ growth depends on season**

Higher temperature regimes enhance growth rate in spring and autumn, but lead to a higher mortality during summer. The fertilisation effect caused by high pCO2 is observed only during summer.

**Germlings’ photosynthetic parameters are influenced at higher temperatures**

The high effective quantum yield (Fv/Fm’) at elevated temperature regimes indicates a better health condition for *Fucus* germlings in spring (p-value < 0.05).

**Eutrophication increases survival of Fucus germlings**

While a heat wave lead to low survival of germlings, mortality was alleviated in presence of higher nutrient concentrations (p-value < 0.05). Groups with higher genetic diversity presented higher survival than those of lower levels.

**Conclusions**

- The temperature effect is favourable in spring and autumn but harmful during summer.
- High nutrient level alleviates mortality during the summer heat wave.
- Ocean acidification increases growth during summer due to a fertilisation effect.
- Survival is increased for groups with a high genetic diversity.
- For detecting genotypes selected in diverse populations, microsatellite markers are applied.

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