

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

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## Future climate change is simulated at the Kiel Benthocosm



↑ T: 5° C ↑ pCO<sub>2</sub>: 600 μatm

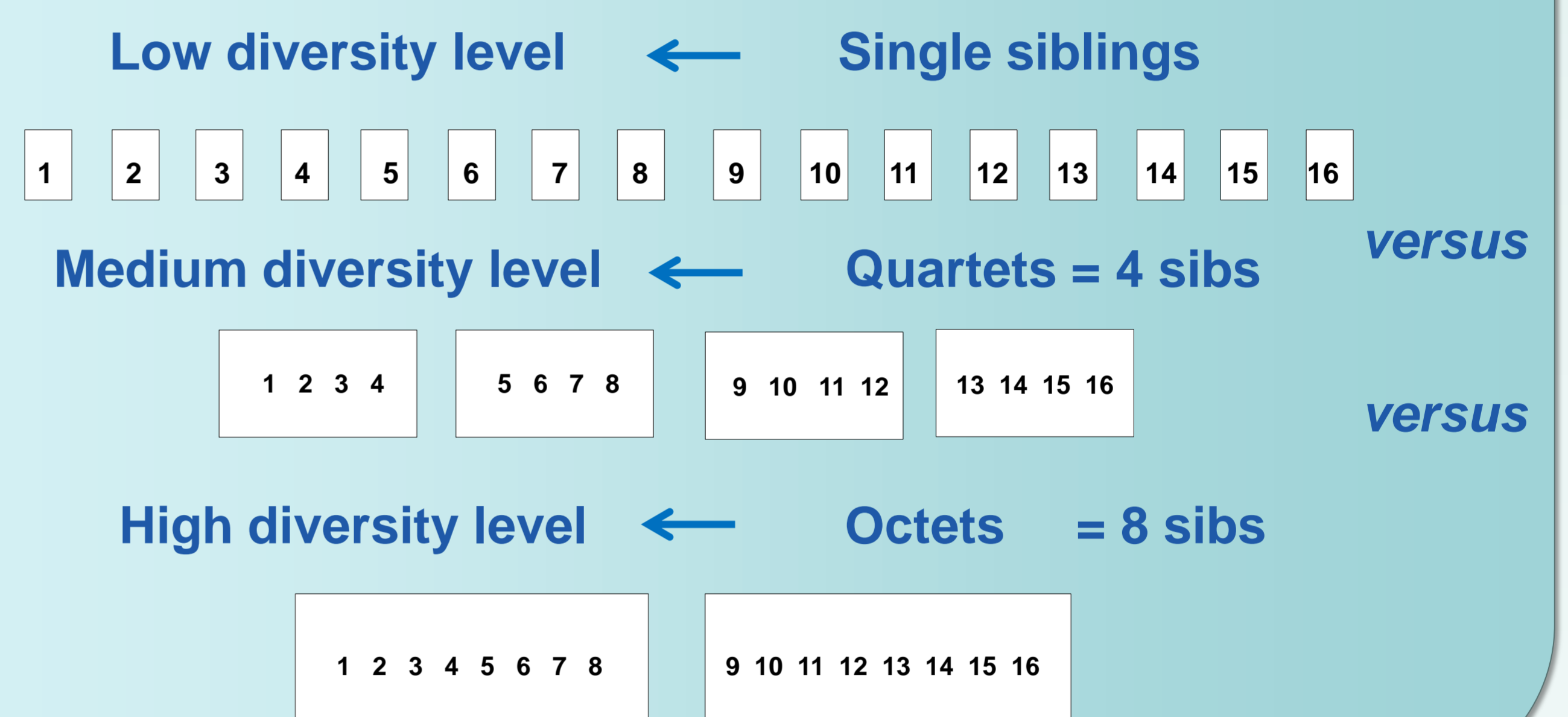
Climate change factors are overlain as a delta-treatment onto **naturally fluctuating regimes**. A *Fucus vesiculosus* community is exposed to different conditions. Temperature and pCO<sub>2</sub> increase simulate the **climate change predicted for 2100**.

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

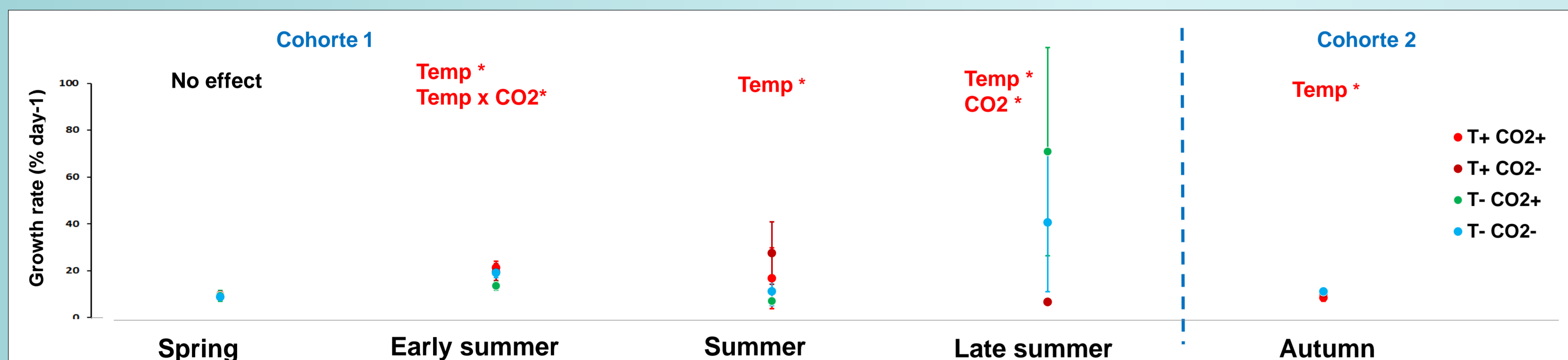
Genetic diversity confers potential for adaptation and is crucial for the conservation in a changing ocean. To explore the **significance of genetic diversity** during early life, when highest selection occurs, we exposed *Fucus vesiculosus* germlings to increased temperature, pCO<sub>2</sub> and nutrients. We **hypothesize** that **diverse genotypes react differently** on climate change factors. Performance of the germlings (photosynthetic efficiency & growth) and survival are measured continuously.



## Three diversity levels settled on limestones

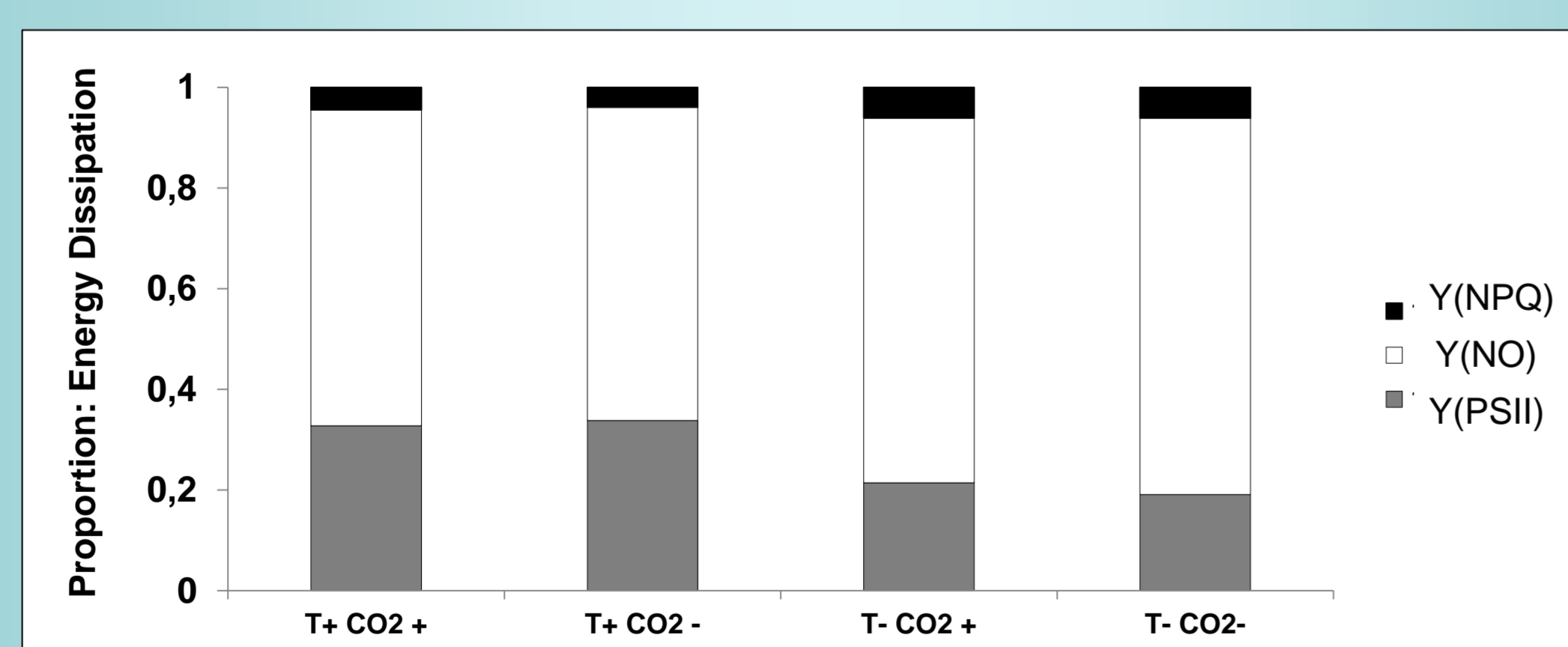


## Climate change effects on seaweed germlings' growth depends on season



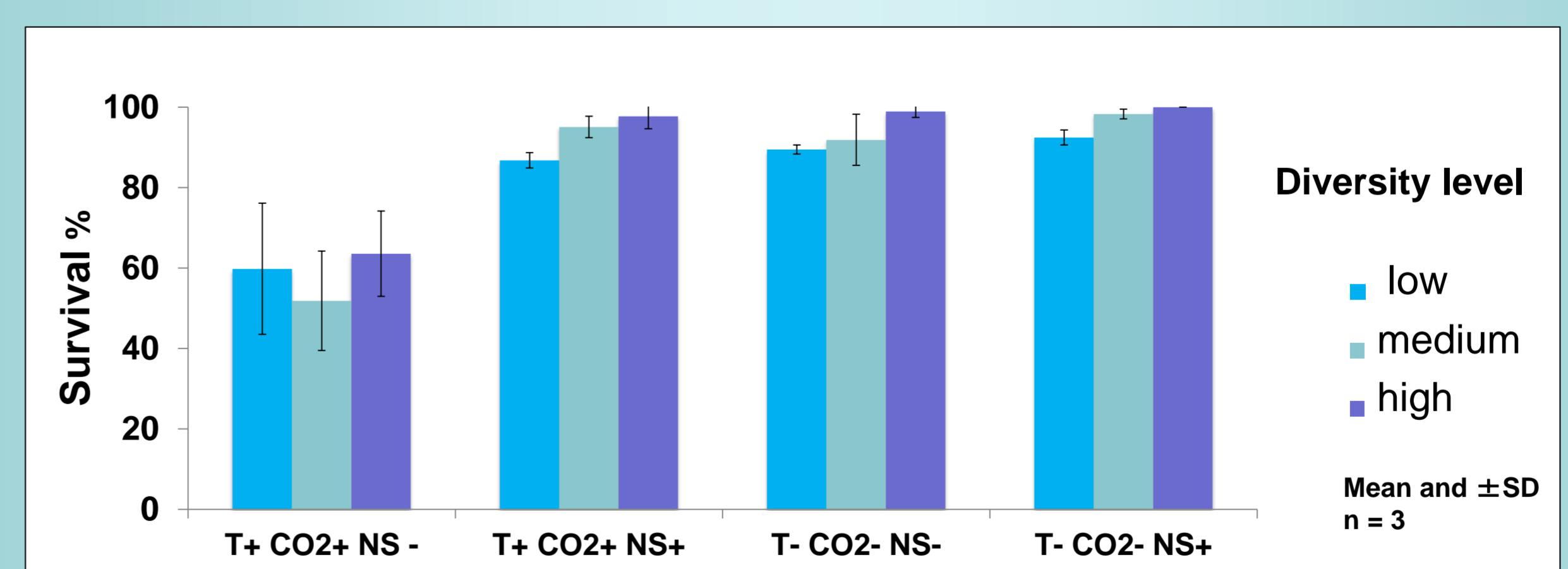
Higher **temperature** regimes enhance **growth rate** in spring and autumn, but lead to a high **mortality** during **summer**. The **fertilisation effect** caused by high pCO<sub>2</sub> is observed only during **summer**.

## Germlings' photosynthetic parameters are influenced at higher temperatures



The **high effective quantum yield** ( $F_v'/F_m'$ ) 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.