The EcoSeed project

Impacts of Abiotic Stresses on Seed Quality in *Brassica oleracea* and Arabidopsis

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Climate Change and its Impact on Seed Production:

- The Inter Governmental Panel on Climate Change (IPCC) report (2007) revealed intense future changes to weather events on a global scale.
- Temperature rise due to the 'lowest' emission scenario of green house gases is predicted to be in the range of 1 to 2.9°C, while in the 'highest' emissions scenario the temperature could rise between 2.4 to 6.4°C.
- Increased global temperatures will result in higher evapotranspiration and increased crop water requirement.

To evaluate and combat the impact of these weather conditions on seed quality eleven institutions from five EU countries have joined hands forming the consortium 'EcoSeed' to study three important European crops (*Brassica oleracea*, Barley and Sunflower) and the model plant Arabidopsis.

Arabidopsis

At University of Warwick we have performed preliminary experiments on Arabidopsis (Col-0) to assess the impact of climate change on seed quality.

Plants were grown at three temperatures, Low (14/16°C); Optimal (16/22°C) and High (25/28°C) accompanied by water stress at -1.0 MPa (Mild stress) and -1.5MPa (Severe stress).

Preliminary results show that plants grown at 'high' temperature had compact growth and reduced seed yield even at optimum soil moisture levels (Figure 1).

EcoSeed partners will study physiological, molecular and biochemical pathways implicated in plant and seed resilience to perturbation.

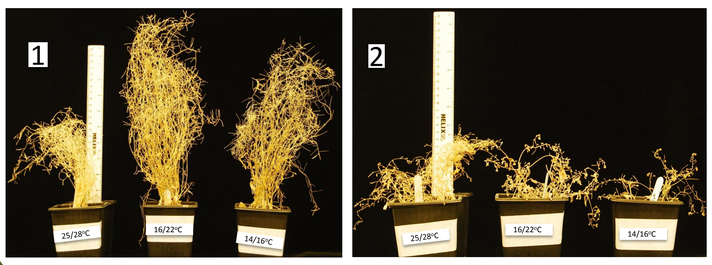


Figure 1. Impact of varying temperature on plant growth and seed production in Arabidopsis (Col-0). 1; Control (no water stress) plants grown at different temperatures: 2; Plants grown at a water stress (-1.0MPa)

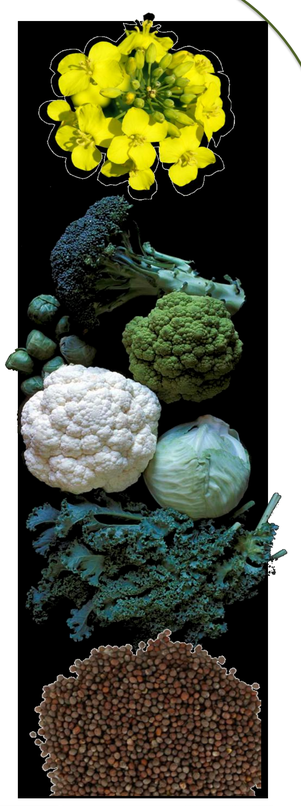
Brassica oleracea

A large glasshouse experiment was carried out on the impact of temperature (18/22°C and 22/28°C) and constant soil moisture deficit s (-1.0 and -1.5MPa) during 2013.

Two *B.oleracea* genotypes i.e. A12 (Chinese kale) and SL101 (A12 x broccoli) were evaluated under these conditions (Figure 2).

Seeds have been collected and their quality will be determined by evaluation of seed dormancy, vigour and seedling quality and samples will be supplied to other EcoSeed partners.

EcoSeed partners will conduct molecular and biochemical studies on *Brassica oleracea* seeds produced under environmental stress by University. of Warwick.



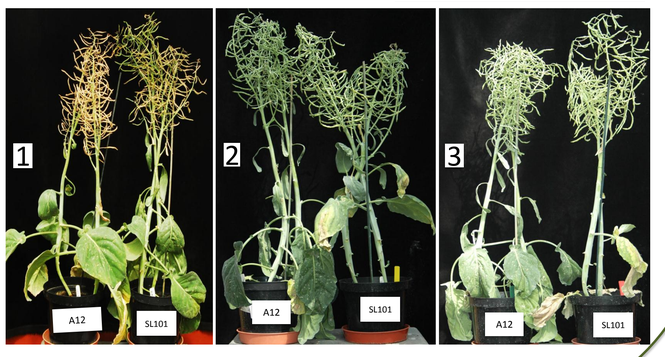


Figure 2: *Brassica oleracea* seed production under different constant soil water conditions at 22/28°C. 1; Control (no water stress), 2; Mild stress, (-1.0 Mpa) 3; Severe stress (-1.5MPa).

EcoSeed is a € 3 million FP7-project coordinated by the University of Innsbruck, Austria.
http://www.uibk.ac.at/botany/ecoseed/