

Transnational Access Report

1. General Information

Project Acronym (ID):	HeatWheat
Project Title	Heat tolerance in genotypes of wheat
Installation used	ABER IPC
Name of Group Leader	Eva Rosenqvist
Name of organization	University of Copenhagen

2. Project summary (max. 250 words)

The experiment will reveal physiological and morphological traits that underlie heat stress responses and whether the previous selection of wheat cultivars based on chlorophyll fluorescence is valid for general plant performance and yield in heat stressed wheat.

Part of the Danish RIL population for heat tolerance (numbers adapted to the set up in Aberystwyth) was used to study effects of the identified genes under repeated heat stress on physiology, dry matter production, grain yield and quality. The RIL population will allow us to validate these results without interference from other adaptive traits of the original cultivars.

By dividing the plants in half between the two greenhouse compartments before the first heat stress all four treatments were made possible by manually swapping half of the plants between the departments a few days before the second heat treatment. The plants was moved out of the IPC and allowed to mature normally for harvest and later analysed for grain yield and quality by staff from IBERS. We aim at analysing the differences between the “low tech” (manual measurements of) chlorophyll fluorescence based method used to select the sensitive/insensitive type and the large volume of information gained in high throughput phenotyping. The latter focus on a large number of plants measured over a longer timespan in stressed/unstressed conditions. Based on parent cultivars we have found better stay green properties, higher photosynthesis and higher stomatal conductance combined with less growth suppression in the high F_v/F_m group during heat stress, compared to the low group.

3. Main achievements (max. 250 words)

To our knowledge repeated heat stress treatments has not been made in a phenotyping context so this may yield valuable information on the overall responses of repeated stresses and whether acclimatization takes place after heat stress at an early vegetative developmental stage. It was possible to visually identify the sensitive and tolerant parents among all RIL lines by the degree of senescence after the second heat incidence. The RIL lines created a continuous gradient of senescence between the two extremes so there is good hope that the aims of the experiment will be achieved. This will reveal positive or negative effects of the identified genes under semi-controlled growing conditions without interference from other adaptive traits of the original cultivars, however at a large scale and more extensively monitored than in earlier experiments done on the original cultivars.