

Transnational Access Report

1. General Information

Project Acronym (ID):	RICEOZONE
Project Title	Genome-wide association mapping of rice seedlings response to acute ozone stress
Installation used	ExpoSCREEN
Name of Group Leader	Hannes Kollist
Name of organization	University of Tartu

2. Duration of access

Begin of the project	End of the project
9.9.2015	31.10.2015

3. Project summary (max. 250 words)

Tropospheric ozone levels have doubled within the past 100 years. It is a harmful air pollutant, causing various negative effects on plants affecting yield and quality of agricultural crops. Rice (*Oryza sativa*) is the staple food of more than half of the world's population and elevated ozone levels causes increased yield loss, especially in rice as its growth season overlaps with peak ozone concentrations. Considering the global food demand it is of great importance to understand ozone tolerance mechanisms in rice which could be used for breeding ozone tolerant varieties. Secondly, ozone has effectively been used as a tool to generate reactive oxygen species (ROS) in plants and to identify components in ROS signaling. In frames of the current project a collection of 84 rice accessions was chosen from the "rice diversity panel", in order to study ozone sensitivity, ROS-induced cell death and stomatal regulation. This population was obtained from genebank of U.S. Department of Agriculture (USDA). Selected accessions were treated with elevated ozone concentrations in order to reveal individuals with higher/lower ozone sensitivity. This would potentially allow us to identify molecular markers involved in ROS signaling. Additionally we analyzed stomatal conductance in accessions of interest as this trait has been shown to be an important factor determining ozone sensitivity in Arabidopsis. The obtained results have been used for selecting a subset of accessions with major variation in ozone sensitivity and stomatal conductance for further more detailed studies.

4. Main achievements (max. 250 words)

We identified accessions with higher and lower ozone tolerance and also variability in stomatal conductance. 24 accessions with greatest variability in ozone sensitivity and stomatal conductance have been chosen for more detailed gas-exchange analyses. The following traits will be analyzed in the selected accessions, stomatal responses to elevated ozone, elevated CO₂, decrease in humidity concentration and ABA treatment. It should be highlighted that accession Shai-Kuh (Indica rice variety) originating from China displayed clearly greater ozone sensitivity when compared to the other accessions. The following accessions showed higher ozone tolerance: Moroberekan from Guinea, R 101 from Zaire, Dodel from Spain, OS 6 (WC 10296) from Zaire, Kibi from Japan, C1-6-5-3 from Mexico, Paung Malaung from Myanmar and Edith from United

States. Abovementioned accessions would be of greatest interest for ozone research. Based on gas-exchange studies, the six most interesting accessions will be used for gene expression, hormonal and anti-oxidant studies.

5. Publications related to the access granted, acknowledging the support by EC.

Currently we have presented our preliminary results in two international meetings, Centre of Excellence ENVIRON conference in Tartu, Estonia and ClimBar consortia annual symposia in Halle, Germany (ClimBar is a project focusing on climate change effects on barley in the frames of The Joint Programming Initiative on Agriculture, Food Security and Climate, FACCEJPI). As we are planning to continue this research we expect that in time there will be several international publications in recognized scientific journals. But this will take time!