



Tropentag, September 17-19, 2014, Prague, Czech Republic

“Bridging the gap between increasing knowledge and decreasing resources”

Polyamine Action in Sweetpotato Plants in Response to Environmental Stresses

MERVAT AHMED EL-FAR^{1,2}, HANS-WERNER KOYRO², THOMAS BERBERICH³

¹*Agricultural Genetic Engineering Research Institute (AGERI), Agricultural Research Centre (ARC), Egypt*

²*Justus-Liebig University Giessen, Institute for Plant Ecology, Germany*

³*Biodiversity and Climate Research Center, Laboratory Centre (BIK-F), Germany*

Abstract

Adjustment to certain environmental stresses is one of the most required abilities of crop plants in times of global climatic changes especially in arid and semi-arid regions. *Ipomoea batatas* (sweetpotato) shows a high viability as it is a species with a high adaptability and a wide range of genotypes. It is therefore cultivated in more than 100 countries with tropical, subtropical and moderate climate. It is expected that the importance of sweetpotato, world wide ranked number seven among the most important food crops, will increase in times of drought, flooding and rising temperatures. It already serves as a candidate for reducing the increasing food insecurity and poverty alleviation in developing countries, buffering malnutrition and has the potential to play an important role in the industrial sector. However studies are rare about the mechanisms behind the stress resistance of sweetpotato.

Certain metabolites play important roles in the resistance of plants to a broad range of stresses. Polyamines, small organic polycations found in all eukaryotic cells, have been identified as such metabolites. The major plant polyamines, putrescine (Put), spermidine (Spd), and spermine (Spm) frequently accumulate in response to abiotic and biotic stresses. Our aim is to identify the correlation between abiotic stresses and polyamine production in sweetpotato. Anees, sweetpotato Egyptian orange-flesh genotype was used in this study. Four weeks old plants were exposed to heat, cold, drought and salinity stresses separately. Polyamines, putrescine (Put), spermidine (Spd), and spermine (Spm) were analysed using the high-performance liquid chromatography (HPLC).

The results obtained showed a correlation among the identified polyamines putrescine, spermidine, spermine and the different abiotic stresses in our study. Moreover, unique polyamine products were found as a specific response to each stress type. These polyamine products undergo identification process by mass spectroscopy. Our results indicate that the expression of polyamines can serve as specific stress indicators.

Keywords: Environmental stresses, polyamines, sweetpotato