Proceedings of the Joint Meeting AGI-SIBV-SIGA
Assisi, Italy – 19/22 September, 2011
ISBN **978-88-904570-2-9**

Poster Communication Abstract – 2A.51

HD-ZIP II TRANSCRIPTION FACTOR GENES CONTROL ADAXIAL-ABAXIAL PATTERNING IN *ARABIDOPSIS* LEAF MORPHOGENESIS

TURCHI L.*, CARABELLI M.*, SASSI M.*, POSSENTI M.**, RUZZA V.*, MELATTI C.*, MORELLI G.**, RUBERTI I.*

*) Institute of Molecular Biology and Pathology, National Research Council (Italy)
**) National Research Institute for Food and Nutrition (Italy)

Leaf development, Arabidopsis thaliana, HD-Zip

The Arabidopsis genome encodes for 10 Homeodomain-Leucine Zipper II (HD-Zip II) proteins. It has been previously shown that *ATHB2*, *HAT1*, *HAT2* (HD-Zip II γ subfamily), *HAT3* and *ATHB4* (δ subfamily) are induced by changes in the Red/Far Red ratio of the light environment. However, these genes are also tightly regulated during plant development with both distinct and overlapping patterns (Ciarbelli et al., Plant Mol. Biol. 2008, 68: 465-78). In order to understand the role of the light-regulated HD-Zip II genes in plant development, we have analyzed single and multiple mutants within γ and *δ* subfamilies. Here we present the phenotype of mutants in the *HAT3* and *ATHB4* genes. Young seedlings show a gradual loss of cotyledon and leaf expansion, up to completely radialized organs. The pattern of vascular development is also profoundly altered, in a manner that is tightly linked to lamina expansion. Fully radialized leaves lack procambial cells whereas trumpet shaped leaves show hyperproliferation of phloem with respect to xylem, a feature that is found in the vasculature of abaxialized leaves. *In situ* and GUS/GFP reporter analyses of the δ subfamily genes show that they are expressed in the adaxial side of cotyledons and leaves. Taken together, these data demonstrate that *HAT3* and *ATHB4* are required to specify adaxial identity in leaf morphogenesis. We are currently analyzing the molecular and genetic relationships between the d HD-Zip II genes and members of the HD-Zip III family genes, such as *PHB*, *PHV* and *REV*, key determinants of adaxial leaf identity.