Proceedings of the XLIX Italian Society of Agricultural Genetics Annual Congress
Potenza, Italy – 12/15 September, 2005
ISBN **88-900622-6-6**

Poster Abstract – F.13

MONODEHYDROASCORBATE REDUCTASE ORTHOLOGS WITHIN SOLANACEAE FAMILY: FACTORS CONTROLLING THE ASCORBATE POOL?

A. DI MATTEO, M. R. ERCOLANO, L. FRUSCIANTE

Departement of Soil, Plant and Environmental Sciences - University of Naples "Federico II", Via Università 100, 80055 Portici, Italy – adimatte@unina.it

L-ascorbic acid, AsA, Monodehydroascorbate Reductase, Lycopersicon esculentum, Lycopersicon pennellii

Solanaceae family includes economically important food crops such as potato and tomato. Both, potato tubers and tomato fruits contain significant concentrations of vitamins, minerals and essential amino acids. In particular, they contribute to the daily intake of vitamin C (AsA – L-ascorbic acid). For this reason, there is great interest in increasing the L-ascorbic acid content in food crops. Despite the recent characterisation of many AsA biosynthetic pathway enzymes, the mechanisms controlling AsA distribution at the whole plant level and its accumulation in storage organs remain still elusive. To investigate the potential role of the Monodehydroascorbate Reductase (MDHAR) gene expression as controlling factor of the AsA pool size and oxidative state, we cloned and sequenced MDHAR genes expressed in tomato, potato and tobacco. The full-lenght cDNAs have been obtained from tomato fruit RNA by RACE approach. In particular, a 1161 bp intron-free MDHAR cDNA showed 100% homology to a MDHAR cDNA already submitted to the database. Also, a 350 bp conserved region have been amplified by RT-PCR from both potato and tobacco. Both fragment share a very high identity to the cDNA from tomato fruit. A set of functional primers to clone *mdhar Lycopersicon pennellii* orthologus genes were developed. Additionally, a single clearly defined 867 bp PCR product was purified and subsequently sequenced and analyzed for SNPs and INDRLs. This finding could allow to map the corresponding gene by SNPs approach on an *L. pennellii* introgression line population already analyzed for AsA content. Moreover, sense and antisense of a 400 bp *mdhar* fragment were cloned respectively upstream and downstream a 240 bp intron under the control of the alcohol dehydrogenase promoter and terminator. Further effort will be done to generate both tomato and potato stable transformant plants for the RNA interfering. Finally, a comparative study will be undertaken on tomato and potato germplasm to look for *mdhar* alleles and different levels of expression witch may affect AsA metabolism.