**Poster Communication Abstract – 5.28**

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# METABOLIC GWAS OF EGGPLANT PEEL COMPOSITION IN A WORLDWIDE COLLECTION

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*Solanum melongena L., metabolic profiling, GWAS*

With a global production of 57 Mt in 2020 (FAOSTAT), eggplant (*Solanum melongena* L.) represents one of the most important vegetable crops. Eggplant fruits accumulate vitamins, phenolics and antioxidants, providing significant nutritional benefits, whose health protective effects and nutraceutical uses are recently becoming recognized. In the frame of the G2P-SOL project, we developed a collection of 322 homogeneous, non-segregant S. melongena accessions, as well as representatives of wild species belonging to the primary, secondary and tertiary genepools, representing the genetic diversity of over >3,600 accessions from worldwide genebanks. The collection was subjected to resequencing at 20X, resulting in >51M high quality SNPs. Commercially mature fruits were harvested from two independent field trials (Montanaso Lombardo, Italy and Valencia, Spain), sampled separately for peel and flesh, and semi-polar metabolites were analyzed by High Resolution LC-MS. Around 80 metabolites were annotated for the peel on the basis of accurate masses, MS2 patterns, comparison with authentic standards and/or literature data. Peel extracts of the entire collection were analyzed, and quantitative data were generated. Association analysis between > 1.2M SNPs and the BLUP value of each accession for each metabolite was performed using the GAPIT R package, using MLMM, FarmCPU and BLINK models to compare their strength and power of association detection. The multi-environment analysis resulted in 260

mQTLs. Fifty-eight metabolites, including compounds with described health benefits (polyphenolic acids, anthocyanins, flavonols) or promoting biotic/abiotic plant stress responses (polyamine conjugates, glycoalkaloids, citric acid), showed a heritability>0.6. The genetic basis of the mQTLs determining fruit quality are being investigated.