Proceedings of the LXVI SIGA Annual Congress
Bari, 5/8 September, 2023
ISBN: **978-88-944843-4-2**

Poster Communication Abstract – 2.29

PHENOPLANT: AN INNOVATIVE PLANT PHENOTYPING PLATFORM FOR DROUGHT STRESS ANALYSIS IN ROOTSTOCK/SCION GRAPEVINE COMBINATIONS

PALADINI F.*, DE PALO F.*, PATONO D. L.*, FERRANDINO A.*, MILANI A. M.*, COMINO C.*, LANTERI S.*, LOVISOLO C.*, ACQUADRO A.*

*) Department of Agricultural, Forest and Food Science (DISAFA), University of Torino, 10095 Grugliasco, Italy

plant phenotyping, Infra-Red Gas Analyser, grapevine drought stress, grapevine rootstocks

Phenotyping is a crucial component of research in biological and agronomical fields, as it allows for the characterisation of phenotypic traits in living organisms. In recent years, innovative platforms have been developed to simplify and enhance the precision of the phenotyping process, offering the opportunity to integrate genetic analysis and physiological measurements for a more comprehensive study of plants in a controlled environment.

Here we present ‘PhenoPlant’, the new plant phenotyping platform of the University of Torino, located at DISAFA (Dept. of Agricultural, Forestry and Environmental Sciences). PhenoPlant is a non-invasive, high-throughput data analysis tool that combines advanced technologies for acquiring and analysing phenotypic traits of plant species (http://tiny.cc/DISAFA-infrastructures). Within the platform, morpho-physiological analyses can be conducted using advanced technologies such as the PlantEye sensor (Phenospex), which combines 3D vision and multispectral imaging to capture precise and objective plant performance indexes in real-time, as well as the CIRAS-4 (PP system), a portable IRGA (Infra-Red Gas Analyser) for gas exchange and plant fluorescence.

Drought conditions can lead to dehydration in plants, caused by an imbalance between water uptake from the substrate and water loss through transpiration. This is of particular importance in studying adaptability to stress conditions of grafted plants such as grapevines (*Vitis vinifera* L.), for which the rootstock's impact on scion performance is significant.

Rootstocks offer tolerance to various limiting factors, both biotic (such as soil-borne pathogens) and abiotic (such as salinity, water or active limestone) while influencing the scion eco-physiology and quality of the berry. Although the critical role played by rootstock/scion interaction is well recognized, the molecular and physiological mechanisms at the base of rootstock-mediated control of scion phenotype remain mostly unknown.

Within the VINO Flagship Project (RM2, NODES, Spoke6, https://www.ecs-nodes.eu/), eleven combinations of scions (clones of Nebbiolo and Pinot noir) grafted on rootstocks with different drought-tolerance (1103P, 110R, M2, 140Ru) and drought-sensitivity (SO4, Kober 5BB, Gravesac, 420A) have been cultivated in the greenhouse and subjected to varying water regimes. A complete watering/drought/recovery experiment has been designed, and it will be analysed with the Phenoplant high throughput plant phenotyping facility. Data analysis will provide an opportunity to assess the relative contributions of different genotypes and their adaptability to stress conditions.

This work is part of the project NODES which has received funding from the MUR – M4C2 1.5 of PNRR with grant agreement no. ECS00000036”