Impact of mycorrhizal inoculation of 'Monastrell' grapevines grafted onto different conventional vs. newly breed rootstocks

Maider Velaz,[1,2*], Ignacio Buesa[3], Josefa María Navarro[4], L. Gonzaga Santesteban[1,2], José Escalona[5], Pascual Romero[4], Maite Loidi[1], Ana Villa-Llop[1], Pablo Botia[4], Nazareth Torres[1,2]

[1] Dept. of Agronomy, Biotechnology and Food Science, Public University of Navarre, Campus Arrosadia, 31006 Pamplona, Navarra, Spain
[2] Institute for Multidisciplinary Research in Applied Biology (IMAB-UPNA), Public University of Navarre, Campus Arrosadia 31006 Pamplona, Spain
[3] Desertification Research Center (CIDE-CSIC-UV-GV), CV-315, Km. 10, 7, 46113 Moncada, Valencia, Spain.
[4] Group of Irrigation and Stress Physiology, Instituto Murciano de Investigación y Desarrollo Agrario y Medioambiental (IMIDA), Murcia 30150, Spain
[5] Agro-Environmental and Water Economics Institute (INAGEA), University of Balearic Islands (UIB)

[*]Corresponding author: maider.velaz@unavarra.es

Abstract (250 words)

Grafting *Vitis vinifera* L. (wine traditional cultivars) onto North American grapevine species or hybrids is a common practice in viticulture given their tolerance against phylloxera (*Daktulosphaira vitifoliae*). However, rootstock genetic background affects the response of grapevines to environmental stresses and their ability for establishing a symbiotic relationship with the microbial communities, and more specifically with arbuscular mycorrhizal fungi (AMF).

The aim of this study was to evaluate Monastrell variety (clone ENTAV 369) grafted onto three rootstocks (140Ru, 110R and RG8) characterized by a different genetic background, in combination with AMF inoculation (*Rhizophagus irregularis*) *vs.* a non-inoculated control with regards to vegetative growth, leaf gas exchange parameters, and mycorrhization. Potted vines were grown in open-top greenhouses and irrigated by counteracting evapotranspiration. The vines were monitored over the season. Plants were homogenized by measuring the trunk section, and at the end of the season, vegetative growth evidenced differences between rootstocks on the scion annual growth. Neither water potential nor gas exchange parameters were significantly affected by the treatments; however, a trend towards increased carbon assimilation rate was observed in inoculated vines. Assayed rootstocks showed different pattern for mycorrhization, with 140Ru being the rootstock that achieved higher values, but no effect was observed on glomalin secretion. To sum up, results showed that the effect of mycorrhizal inoculation on vine growth and gas exchange parameters was modulated by the rootstock genotype.

Keywords: Arbuscular mycorrhizal fungi (AMF), gas exchange parameters, glomalin, vegetative growth, *Vitis* genotypes.