

Comparative response of six grapevine rootstocks to inoculation with arbuscular mycorrhizal fungi based on root traits

Antreas Pogiatis (1), Pat Bowen (2), Miranda Hart (1), Taylor Holland (1), and John Klironomos (1)

(1) University of British Columbia, Okanagan, Kelowna, BC, Canada, (2) Pacific Agri-food Research Center, Summerland, BC, Canada

Arbuscular mycorrhizal (AM) symbiosis has been proven to be essential in grapevines, sustaining plant growth especially under abiotic and biotic stressors. The mycorrhizal growth response of young grapevines varies among rootstock cultivars and the underlying mechanisms involved in this variation are unknown. We predicted that this variation in mycorrhizal response may be explained by differences in root traits among rootstocks. We analyzed the entire root system of six greenhouse-grown rootstocks (Salt Creek, 3309 Couderc, Riparia Gloire, 101-14 Millardet et de Grasset, Swarzmman, Teleki 5C), with and without AM fungal inoculation (*Rhizophagus irregularis*) and characterized their morphological and architectural responses. Twenty weeks after the inoculation, aboveground growth was enhanced by AM colonization. The rootstock varieties were distinctly different in their response to AM fungi, with Salt Creek receiving the highest growth benefit, while Swarzmman and 5C Teleki receiving the lowest. Plant responsiveness to AM fungi was negatively correlated with branching intensity (fine roots per root length). Furthermore, there was evidence that mycorrhizas can influence the expression of root traits, inducing a higher branching intensity and a lower root to shoot ratio. The results of this study will help to elucidate how interactions between grapevine rootstocks and AM fungi may benefit the establishment of new vineyards.