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Oral Communication Abstract – 4.02

IMPROVING WATER-USE EFFICIENCY THROUGH THE TEMPORAL AND SPATIAL UNCOUPLING BETWEEN WATER LOSS AND CARBON GAIN: INSIGHTS FROM A COMBINATION OF HIGH-THROUGHPUT PHENOTYPING, QUANTITATIVE GENETICS AND PHYSIOLOGY

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Breeding crops with more biomass produced per drop of water transpired is a key challenge in the context of climate change. However, the tight coupling between transpiration and carbon assimilation during the day makes it challenging to decrease water loss without altering photosynthesis and reducing crop yield. In order to overcome this trade-off and breed crops with high water-use efficiency without penalties on yield, strategies exploiting the physiological and genetic bases of the temporal and/or spatial variability between carbon gain and water loss offer promising avenues. I will present key results in this view, with a special focus on perennial species such as grapevine and apple tree. By combining high-throughput phenotyping in platform and in the field on hundreds of genotypes, quantitative genetics and physiological approaches, we have shed lights onto genetic leeway including (i) the key impact of night-time transpiration on water-use efficiency, (ii) the genetic independence of tree vegetative architecture and water use. For this Next Generation SIGA session, I will also share some aspects of my career path and decisive choices that have allowed me to explore these fascinating topics across different institutions and countries.