Session 3: Abiotic Stress

Keynote lecture

Moving towards grapevine genotypes better adapted to abiotic constraints

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Abstract

Vitis species, both in their cultivated and wild forms, grow in a large diversity of environments since thousands of years. Consequently, they have developed many adaptive mechanisms controlled by a range of regulatory processes. The cultivated species *Vitis vinifera* is fairly well-adapted to semi-arid conditions and its cultivation can be used to produce crops on marginal lands. However, this is under threat due to climate change, which is associated with a rise in temperature and CO_2 atmospheric content, modifications of water availability and a higher probability of extreme events, such as heat waves and early spring frosts. Indirect effects of climate change in solar radiation and soil mineral contents are also expected. Altogether, it is likely that cultivated grapevines will have to face more abiotic constraints occurring concomitantly or successively over one or several growing cycles. In addition to climate change, viticulture worldwide has to reduce pesticide use. Adapting to climate change and reducing pesticide use are challenging and increase the need to select new grapevine varieties more resistant to disease and better adapted to abiotic constraints. In this sense, the adaptive mechanisms from wild and cultivated Vitis species have to be leveraged. While major advances have already been made for disease resistance, the polygenic nature of adaptation to abiotic factors has slowed down research progress. To tackle this limitation, ambitious integrative strategies should be designed, from collection and characterization of genetic resources, genetic architecture studies and identification of underlying genes (including those involved in epigenetic regulation), to new breeding technologies and the development of genomic selection. An up-date on the state-of-the-art regarding these aspects will be presented.

Keywords: phenotyping, polygenicity, climate change, Vitis, diversity