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FONDAZIONE EDMUND MACH

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POSTER - Establishment and maintenance of soilless germplasm collections as a strategy for berry phenotyping and breeding processes

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Abstract: Worldwide, the berry industry chain demand is focused not only on the improvement of fruit quality characteristics, but also on the most rapid optimization for very different environments of new potential cultivars to the best management practices. Screening through phenotyping of new improved cultivars to meet growers, industry and consumers requirements is a highly dynamic procedure. Additionally, breeding programs are becoming more and more precise and specialized due to the adoption of novel but costly and time-consuming genomics techniques. Under these conditions the adoption of specialized and flexible soilless systems that enable more rapid and efficient plant screening and production of superior genotypes become an essential strategy for the success of new introductions.
The Fondazione Edmund Mach (FEM) at Vigalzano di Pergine (Italy) preserves genetic resources for various berry fruit species and cherry accessions. More than 350 accessions of *Rubus*, 100 of *Fragaria* and 130 of *Vaccinium* are maintained in this collection for the characterization of their agronomic traits to be potentially recommended to local growers and for a subsequent use for breeding purposes.
The soilless system at FEM is used for a binary process consisting of robust phenotyping, often on multiple cycles during the year, of the available continuously implemented germplasm, and the contemporary breeding programs on raspberry, strawberry and blueberry, that include population development, phenotyping and genotyping for marker development for particular traits of agronomic importance.
The most interesting parental accessions and all the breeding lines of *Fragaria*, *Rubus* idaeusand *Vaccinium* are propagated and maintained in containers with peator mixedsubstrates adequately fertirrigated. Part of the collection, with particular regard to the genotypes which are not very suitable to the local environment and those that are mainly considered of poor contribution to the breeding process are maintainedin vitro, in order to be constantly ready to be transferred in pots when necessary.
The aim of this report is to present the management strategy adopted at FEM based on soilless techniques as a flexible and optimized system. This allows for commercial introductions to readily screen new cultivars for their attitude to the environment and cultural system. Concerning breeding, it allows better synchronization and increased numbers of annual hybridization cycles, to improve seedling growth efficiency and to reduce through opportune plant manipulations the time to selection. For both purposes, it helps with evaluating the genotypes under different environmental conditions in the same period of time, optimizing growing factors like temperature, pH, water and nutrients and facilitating disease control.

Keywords: berries, germplasm, phenotyping, genotyping

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Topics: Germplasm collections and molecular characterisation