Exploiting the multifunctional potential of belowground biodiversity in horticultural farming - EXCALIBUR

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Aim of the project

The main purpose of the project is to improve the knowledge on soil biodiversity dynamics in relation to the different agro-ecological factors, for enhancing the efficacy and application of biocontrol and biofertilization practices in horticultural farming.

Working programme

The overall aim will be achieved by targeting the following specific objectives:

1) Generate new knowledge on interactions between plant, soil, micro-, meso- and macro-organisms and on the links and dynamics between native soil biodiversity and agricultural practices;

2) Optimize the formulation and the application methods of bio-inocula, using already available soil-derived microbial strains and organic products (biostimulants, soil amendments) for plant nutrition and protection purposes, to improve the overall soil fertility and biodiversity;

3) Provide novel multifunctional microbial-based products and protocols to promote the adoption of a biodiversity-driven soil management;

4) Develop a statistical model to better quantify the impacts of bio-effectors and bio-inocula on crop production and soil biodiversity under different management (including conventional and organic) and biotic/abiotic stress conditions. The model will be the base for the development of a Decision Support Systems (DSS) helping to adopt a biodiversity-driven soil management;

5) Evaluate the efficacy of the new strategy under open-field conditions in improving plant health and reduction of external inputs as well as its economic feasibility;

6) Develop adequate tools to monitor the persistence and the fate of the microbial inocula in the field;

7) Evaluate the effects of the new strategy on soil quality and ecosystem functions, dynamics of soil and plant-associated microbial biodiversity at multi-scales, as well as ecological sustainability by a life-cycle assessment (LCA) throughout the value chains;

8) Disseminate the results to relevant stakeholders and encourage the adoption of best practices derived from the new strategy for both conventional and organic cropping systems.