**Building a giant army of tiny soldiers for farming in the Mediterranean**

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One of the major challenges of this century is to meet requirements for food and feed of a growing population (food security) while decreasing the environmental impacts of production (environmental sustainability). Within the European Union, the Mediterranean Basin is the principal area for the production of fruit and vegetables, and also a biodiversity hotspot threatened by nitrogen (N) pollution, resultant also from the intensification of agriculture.

The productivity of most systems, including agricultural systems, is limited by the availability of phosphorus (P) and N. As such, maximizing the role of plant–microbe interactions in governing the availability of these nutrients will enhance the economic and environmental sustainability of agriculture. A major cause of agricultural pollution is crops’ low efficiency in using fertilizers, with the ‘lost’ nutrients polluting the environment and affecting the receptor ecosystems. Within the European Union alone, the impacts of the N losses have been estimated at €70–320 billion per year.

The N losses occur primarily due to nitrification so that inhibiting nitrification is a priority. Improvement can also be made by manipulating rhizospheric microbial communities which help reduce costs and increase environmental sustainability. Long-term management of soil fertility due to agricultural practices influences the mycorrhizal symbiosis and may change mycorrhizal benefits to plants, namely N and P gains and increased resistance to water stress and pathogens. Soil microorganisms may have other important indirect roles because they interact and regulate plant and microbial functionality and performance. Therefore we focus on understating what drives:

* More competitive root systems;
* Effective microbial auxiliary communities adapted to crops and soils; and
* Efficient inhibition of nitrification and thus reduction of greenhouse gases emissions.

We gather a team of: i) microbiologists specialized in soil ecology and inoculants; ii) biologists with extensive experience on the impacts of agriculture on ecosystems; iii) a strong connection with industry and the productive fabric through the participation of companies; and iv) a strong connection with agricultural enterprises and associations of producers. By covering plant and soil interactions and their end-users we hope to deliver means that enable the farmers to produce more polluting less.