



Conference Abstract

Investigation on the effect of regenerative organic farming strategies on the productivity of *Solanum tuberosum* and *Phaseolus vulgaris* and soil substrate parameters

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Abstract

The depletion of soil resources associated with the application of intensive agricultural practices requires new approaches aimed at building and improving soil fertility. Integration of organic farming into modern agriculture plays a key role in maintaining the ecological balance, thereby ensuring the sustainable existence of the human population. Regenerative agriculture includes practices that stimulate plant growth and protection, improve soil physicochemical parameters and biodiversity, and at the same time provide nutrient-rich agricultural production.

The present project aims to investigate the mechanisms that affect plant productivity, the rhizosphere microbiome and the soil substrate after the application of mulch of natural origin in the model plants potato (*Solanum tuberosum*) and bean (*Phaseolus vulgaris*). The effect of mulching is being monitored within the framework of a multi-year program for regenerative agriculture on selected experimental fields, adding techniques such as the use of cover crops, green manure, minimal tillage, precise monitoring of soil and physiological parameters.

Our initial results show differences in soil parameters - control versus fields planted with potato and bean, as well as a trend towards improved redox soil potential and plant yield under mulched conditions. Phytopathological analyses of the plants did not show symptoms of fungal diseases on the collected leaf samples. Isolations made on solid nutrient media yielded fungal colonies with different phenotypes and growth patterns (Fig. 1).

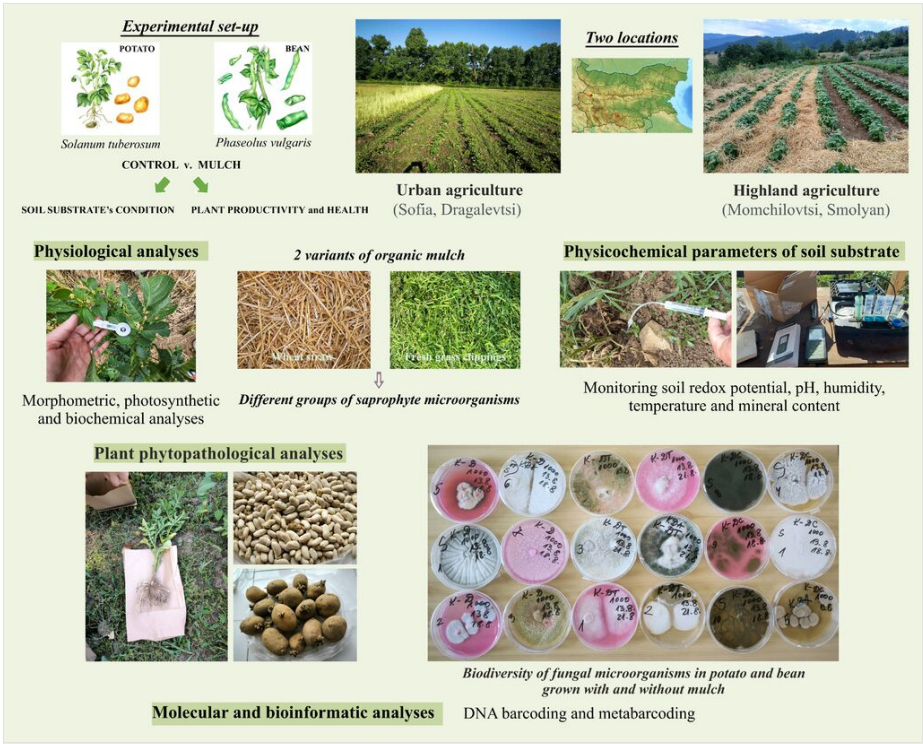


Figure 1. [doi](#)
Schematic representation of the project objectives, methodological approaches and analyses to be performed, as well as some initial results.

The knowledge acquired will contribute to clarifying the effects of mulching on model crops and their interactions with soil substrates and microbiome in the context of local climatic and geographical conditions. Molecular techniques, such as DNA barcoding and metabarcoding, will provide information on taxonomic diversity in the different experimental setups, which will further improve our understanding of the mechanisms of action of cover crops and mulching. The project aims to raise awareness among scientists and the general public of the concepts of organic farming, the importance of microorganisms for soil processes, as well as to foster the application of advanced DNA sequencing technologies. Successful implementation of the project will stimulate the development of novel strategies to reduce the adverse impact on the environment and promote sustainable organic agriculture in Bulgaria.

Keywords

organic farming, mulching, biodiversity, DNA barcoding and metabarcoding

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Conflicts of interest

The authors have declared that no competing interests exist.