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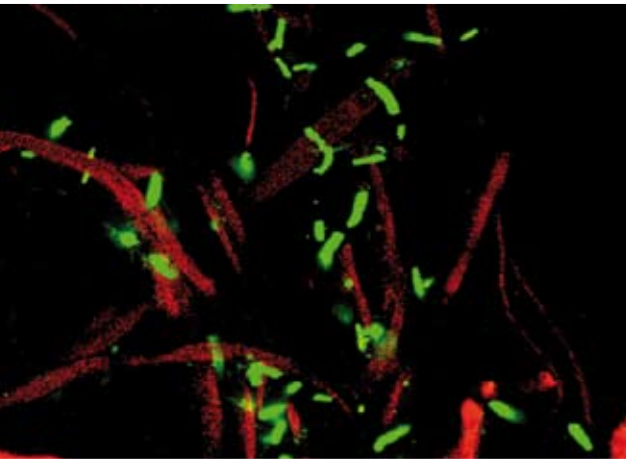

BAGECO 10

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Program & Abstract

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ECOSYSTEM SERVICES OF SOIL MICROBIAL COMMUNITIES - DEVELOPING SUSTAINABLE CULTIVATION METHODS FOR AGRICULTURE

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Agriculture is facing major environmental challenges due to climate change. Erosion and nutrient loading to waterways is increasing, if autumns get wetter and winters milder as predicted. Crop cover protects the soil surface reducing the risk of erosion and nutrient leaching. The remaining crop residues may, however, hamper agriculture and create optimal conditions for soil and residue born crop pathogens. Tillage, crop rotation and practices to increase organic matter in soils are shown to be beneficial for microbes suppressive on pathogenic fungi, but detailed mechanisms and the relationship between general disease suppression and agrotechnological practices are not fully understood.

The aim of the project is to develop innovative and feasible agro-environmental technology for improvement of environmental sustainability of cultivation methods. This will be achieved by increasing soil crop cover taking advantage of ecosystem services of soil microbes to suppress crop pathogens as an alternative system for chemical control, and to optimal degradation of crop residues.

Multidisciplinary research consortium consisting of researchers from MTT and the University of Helsinki in environmental technology in agriculture, environmental biotechnology, biology and microbiology will exploit long term field experiments of MTT on tillage intensity and crop rotations. Automatic techniques with continuous real-time measurement of soil and weather parameters all year round will be combined with cultivation method and microbiological studies outside growing season. Microbial communities in agricultural soils will be evaluated by massive parallel sequencing. A physical based model will be constructed and used to examine the effects of crop cover on conditions in soil-air –interface. A system's approach is needed to find out the best agrotechnological possibilities to enhance the occurrence and performance of soil microbes capable of suppressing soil and crop residue born plant pathogens. Results can be used to develop sustainable cultivation methods and commercial microbial products, which both enhance the adaptation of agriculture to the climate change. The poster will give an overview of the project.